Barriers to Commissioning Renewable Energy Projects

Final Report

Prepared for Future Energy Solutions,
on behalf of the Renewables Advisory Board and DTI,
by
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In association with IT Power

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EXECUTIVE SUMMARY

1. In June 2005 Land Use Consultants, in association with IT Power, were commissioned by Future Energy Solutions on behalf of the Renewables Advisory Board (RAB) to undertake research into factors delaying the commissioning of renewable energy projects in the post-planning approval phase.

2. The research will inform future policy and practice necessary to meet the Government's target of 10% of our electricity needs from renewable sources by 2010.

3. The research focuses on barriers to commissioning onshore wind projects, given the potential for this resource to contribute to meeting the 2010 target. It also addresses offshore wind, biomass and hydro projects.

4. The key objectives of the study were:

   - To provide a quantitative analysis of delays in the post-planning approval period;
   - To see if the situation is improving or getting worse, and to assess future prospects;
   - To identify the nature and causes of delays;
   - To make recommendations for work to reduce delays for future projects.

5. As per the brief set for the research, the methodology centred on statistical analysis to understand the extent of delays, and consultation with industry representatives to understand the causes of these delays. Twenty-four renewable energy developers and related organisations and eight financial institutions contributed to the research either by returning questionnaires or taking part in telephone interviews or focus groups, during the period June to September 2005. Questionnaire returns represent 58% of total approved megawatts (MW) of renewable energy capacity.

KEY FINDINGS

- Total renewable energy capacity approved in the last five years (in the onshore, offshore, hydro and biomass sectors) totals 3722MW.
- 16% of this capacity has been installed, 20% is under construction and 64% has yet to start construction.
- Of the capacity awaiting the start of construction, 5% (six schemes) has been waiting for more than three years, 22% (14 schemes) for 2-3 years, and the majority, 73% (15 schemes), has been approved for less than two years.
- For onshore wind schemes (approved in the last five years) the average time to commissioning is 20 months, compared to 22 for offshore schemes, 17 for biomass schemes and 16 for hydro schemes.
- These times exceed developers views on best practice project timescales e.g. for onshore wind schemes developers suggested timescales of 6-12 months from approval to commissioning, or a maximum of 18 months for large schemes (>100MW).
- The time taken to commission renewable energy schemes, following planning approval, is lengthening. For example, the average for onshore wind schemes commissioned in 1995 was 7 months compared to 31 months in 2004.

- Windfarms in Scotland typically take a little longer to reach the commissioning stage (21 months) than in Wales, England and Northern Ireland (all in the range of 17-19 months), reflecting in part the fact that the average size of schemes in Scotland is greater.

- Onshore wind schemes approved by the DTI/Scottish Executive via S36 applications (over 50MW) take almost twice as long from consent to commissioning, reflecting a combination of size of scheme, time taken by different types of determining authority to finalise post-approval planning matters and a lack of resource within the Energy Consents Units within DTI and the Scottish Executive.

- A range of factors are contributing to this, including negotiating with landowners and securing connection Wayleave Rights, obtaining grid connections, sourcing technology, agreeing engineering, procurement and construction (EPC) contracts, finalising legal agreements and agreeing conditions with determining authorities, and delays due to marginal project economics for offshore and biomass technologies leading to longer negotiations with banks, PPA providers, etc.

- Several causes of delay are becoming increasingly problematic e.g. competition for grid capacity (outlined further below under Trends in Delays).

- Larger developers have sought to minimise delays by taking action at an early stage, in many cases paralleling key activities in the knowledge that this may result in lost investment if planning permission is not obtained. For example, they seek to secure grid connections, despite uncertainty in planning outcomes. Those larger developers with more control over PPAs, finance, and suppliers typically have more scope to minimise delays than smaller developers.

- The general conclusion from the investor survey is that there is no lack of liquidity (for debt or equity) in the market, i.e. a well structured, thought-through project will raise finance. Therefore any delays appear to lie upstream of and not within the financial community.

- According to financial investors, the developers best able to secure project finance have adequate project management and risk assessment processes in place.

- The investor survey also raised the significant issue of a perceived threat of a ROC price crash to financing renewables which is a barrier to securing long-term debt on projects. It also makes equity financing more expensive because of the revenue uncertainty in the second half of the life of a renewable energy project (i.e. beyond 2015).

KEY CAUSES OF DELAY

Onshore wind

- The most often cited cause of delay for onshore wind schemes is negotiating connection Wayleave Rights and landowner negotiations (ranked as being the first or second most significant cause of delay by 64% and 56% of respondents, respectively, which represent companies with 50% and 36% of approved capacity, respectively), followed by issues surrounding grid connection (by 55%, representing companies accounting for 42% of approved capacity).

- There is a general consensus amongst onshore windfarm developers that where grid capacity is constrained developers should seek grid allocation prior to planning approval. Nearly 60% of developers indicated they would either have a full legal agreement or

'heads of terms' in place for grid connection at the point at which they intend to submit a planning application.

- Delays due to negotiating contracts with suppliers were cited as a primary cause of delay by 27% of respondents and as having caused a delay of some degree by 58%. Procurement times for turbines in the order of 9-12 months are not uncommon (particularly where developers want a non-standard product).

- 80% of developers have experienced delays due to negotiating planning agreements, and 70% due to agreeing and discharging conditions.

- Issues surrounding PPAs were considered less critical, and were cited as a cause of delay by 17% of respondents.

- Onshore windfarm developer responses indicated that 66MW of approved capacity is effectively 'stuck' due to difficulties in discharging conditions.

- There exists across all technology sectors developer frustration at the uncertainty of planning process timeframes post-approval, in terms of finalising planning agreements and conditions. This leads to uncertainties about when to approach suppliers and when to schedule construction timeframes with contractors. A lack of resources in determining authorities and statutory consultee organisations is also leading to delays in terms of discharging conditions.

- Planning conditions were reported to be increasing in both number and complexity. This is resulting in increased time being spent by the developer agreeing and discharging conditions.

Offshore Wind

- Agreeing contracts with suppliers was cited by 75% of questionnaire respondents (representing companies accounting for 46% of approved capacity) as being either the first or second most significant cause of delay for their projects. Discussions with developers revealed that marginal project economics for offshore schemes result in lengthy negotiations with banks, suppliers and PPA providers to make schemes profitable.

- Project economics are worsening as suppliers react to technical difficulties faced with early schemes, by increasing fees to cover their risks.

- Lack of turbine availability and construction capacity is also leading to delays.

- Some developers have experienced problems and delays due to FEPA licensing conditions e.g. technical requirements which are difficult for contractors to work to. Lack of resources within key organisations involved in the consent and post-consent processes are also leading to delays.

- Grid issues have not been a significant problem for Round 1 schemes, which are relatively small and easy for the grid to accept. However, high costs and delays in receiving grid offers were cited by some developers.

- Changing ownership of schemes, lack of construction capacity and difficulties negotiating onshore grid connection routes have also caused delays.

Hydro

- Hydro projects are constrained by the number of technology providers in the market place and finding construction contractors who fully understand the full scope of work and the remoteness of the working site can lead to delays.
- Delays are occurring during construction due to lack of contractor experience in remote working conditions.
- Conditions for hydro projects can take a considerable time and effort to resolve and can become a critical factor in delaying project timescales.

Biomass

- Of the range of factors contributing to delays, no one factor was unanimously identified as the most significant, which reflects the differences between developers and schemes.
- Typically financial investors and lenders will only discuss projects in detail when planning permission is secured, which elongates project timescales.
- Fuel supply risks affect economic viability and fuel mix can affect ease of planning process, i.e. a balance between fuel supply risk with a single fuel and planning risks (such as transportation issues) arising from a diverse mix of fuel must be assumed by the developer.
- PPA price, length and conditions have delayed smaller developers' projects.
- Uncertainty of long-term ROC prices (beyond 2015) is concerning developers as it typically limits the length of viable PPA that can be obtained and can also affect the conditions surrounding finance being raised.
- Lack of qualified engineering, procurement and construction (EPC) contractors with experience in the construction and commissioning of biomass projects is leading to elongated negotiations.

TRENDS IN DELAYS

- Developers of onshore wind schemes identified a number of worsening causes of delay: increasing competition for grid connection (particularly in Northern Ireland and Scotland) (by 55% of respondents); increasing difficulties in securing connection Wayleave Rights and completing legal agreements with landowners (by 55% and 45%, respectively) and increasingly complicated planning conditions/agreements (by 55% of respondents).
- Negotiating Power Purchase Agreements (PPAs) is becoming less problematic for onshore developers due to experience (according to 42% of questionnaire respondents, whilst no respondents indicated the situation was worsening).
- In the past developers experienced difficulties making changes to schemes approved via Section 36 applications. Therefore developers now recognise the need to spend more time in the pre-planning submission period to finalise scheme details. Therefore schemes now being approved or recently approved may face less delays from this cause and, other things being equal, might be built more quickly.
- Offshore wind schemes are facing worsening project economics; as economic viability worsens finalising supplier contracts is becoming more difficult. This trend looks set to continue.

- Grid connection could be a greater issue for offshore Round 2 schemes, particularly in terms of the early point at which developers must commit to grid connections, which leads to a financial risk. Grid connection is also becoming a more significant problem for hydro developments in Scotland.

- Offshore developers fear that delays could worsen due to an increase in pre-construction monitoring requirements.

- The key factor which developers across all technologies felt could emerge in the future and contribute to further delays was any change to the Renewables Obligation.

RECOMMENDATIONS TO GOVERNMENT, TRADE ASSOCIATIONS AND OTHER KEY ORGANISATIONS

Landowner negotiations and connection Wayleave Rights

1. RAB to encourage the Law Society to include landowner services within its publications and online resources (e.g. online Directory of Solicitors and Barristers, which can be searched by area of law), in order to help those approached by developers to access expert advice. RAB to also explore the scope for advice on how to approach negotiations, with a landowner representative organisation such as the CLA.

Grid connection

2. RAB to urgently take a lead on reviewing grid connection issues, the magnitude of anticipated delays and explore possible solutions in association with DTI/ Ofgem/NGET.

Technology supply

3. RAB/DTI/Trade Associations to develop a programme of work to address the ability of the supply chain to build projects for 2010. This should include technology, supply, market confidence and contracting issues.

Engineering, procurement and construction (EPC) contracts

4. BWEA, with support of DTI/Scottish Executive, to (continue to) facilitate discussions between offshore wind developers and suppliers on cooperation and alliances (as in the oil and gas industry) to resolve issues surrounding contract prices and apportionment of risk.

Post-approval decision making by determining authorities

5. Government to work with planning bodies (RTPI and/or TCPA) to develop guidance for determining authorities and developers on the process of agreeing a timetable for post-approval actions (finalising legal agreements and agreeing conditions) to provide more certainty for developers to allow them to start putting construction plans in place.

6. Government in association with industry and planning bodies to draft guidance on the suggested contents of legal agreements for onshore wind schemes. Guidance could also be used to encourage 'frontloading' of legal planning agreements, whereby the outline of an agreement is commenced prior to the resolution to grant planning permission.

7. RAB/BWEA to establish a working group with planning officers and ODPM/DTI/Scottish Executive representatives to produce guidance on planning conditions for renewable energy schemes.

8. RAB to consider and advance a range of possible measures to reduce delays to offshore windfarms due to FEPA licensing conditions, including producing guidance on appropriate conditions for offshore schemes, coordination of industry standards based on technical capabilities, coordination of a centralised database of monitoring studies to reduce cases of repeat monitoring.

9. Government to work to improve skills and capacity of organisations involved in the post-approval decision making process, including determining authorities (DTI, Scottish Executive and Defra) and statutory consultees. Measures to consider include the use of recently increased planning fees to improve resources for processing renewable energy applications; increased funding of key organisations through Government budgetary decisions to support adequate staffing levels; working with trade associations to develop training packages on renewable energy technologies; provision of regular technology bulletins and/or provision of a centralised advice centre; and reviewing the strategy in place for the recruitment and retention of key staff.

Project economics

10. Government/RAB to consider additional support options to assist biomass and offshore wind projects in the early (capital intensive) stages of project operation.

Project planning

11. Trade representatives to produce guidance for developers (particularly smaller or less experienced developers) on possible causes of delay in projects, drawing on the conclusions of this research, and means of overcoming these, based best practice.

Biomass specific measures

12. Government to consider a number of measures specifically designed to support the biomass sector including providing Government underwriting of PPA price for the necessary payback term for those projects considered "pathfinders"; introducing a Renewable Heat Obligation to promote better use of fuel and to improve project economics for those opting for combined heat and power; and reviewing and providing further clarification on the classification of biomass fuels[1].

[1] N.b. the Biomass Task Force Final Report to Government (October 2005) sets out the findings from a more detailed analysis of the barriers facing development of biomass technology, which has been published since the research for this report was undertaken. In particular the Task Force report rules out a Renewable Heat Obligation. The recommendations put forward in this report are based on a small sample size of biomass developers (due to the limited number with experience in the post-approval phase) but nevertheless reflect the views of developers who responded during the research.

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1. INTRODUCTION

BACKGROUND TO THE RESEARCH

1.1. In June 2005 Land Use Consultants, in association with IT Power, were commissioned by Future Energy Solutions on behalf of the Renewables Advisory Board (RAB) to undertake a research study into factors delaying the commissioning of renewable energy projects in the post-planning approval phase. This research will inform future policy and practice necessary to meet the 2010 target of 10% of our electricity needs from renewables.

1.2. At current rates of deployment, the UK may fall short of the 2010 target. However, the target could still be met if barriers to the development of projects can be lifted. For example, the Renewables Innovation Review (February 2004) reported that the 2010 target can still be met if barriers to wind deployment in particular can be eliminated. DTI sources[2] indicate that to meet the 10% target by 2010, renewable energy sources will need to generate approximately 10,000 megawatts. This is equivalent to between 3,000 and 5,000 wind turbines, or two hundred 50-megawatt biomass power stations.

1.3. As of August 2005 there were 2364 MW of renewable energy projects with planning consent which have yet to be constructed (64% of approved capacity since 2000). It is essential that policy makers, developers, financiers and all those involved in delivering renewable energy schemes therefore understand why delays are occurring in the post-planning approval phase and develop measures to overcome them.

SCOPE OF THE RESEARCH

1.4. The research addresses barriers to commissioning onshore wind, offshore wind, biomass and hydro projects. It focuses on onshore wind primarily, given the potential for this resource to contribute to meeting the 2010 target and the delays which projects are facing. As the most economic renewable technology the DTI recognises that wind energy - both onshore and offshore – will make the largest contribution towards the Government's 10% target, but expects other low carbon technologies like wave, tidal and solar PV to come to the fore after 2010.

1.5. The research covers England, Wales, Scotland, and Northern Ireland, and seeks to identify where there may be any differences in barriers facing renewable energy projects between countries.

TIMEFRAME

1.6. The research has focussed on the current issues facing renewable projects, given the aim of the research is to inform progress to the 2010 target. Where applicable it touches on possible future issues which may emerge, but this is not a key aim for the research. The research looks back to August 2000 (the earliest date from which there are valid planning permissions for renewable energy schemes – schemes

[2] http://www.dti.gov.uk/renewables/renew_5.1.4.htm

granted planning permission prior to this date would either now be under construction/commissioned or have not been taken forward and the planning permission lapsed).

Report structure

1.7. The remainder of this report is structured as follows:

- Section 2 summarises the objectives of the research and the methodology used;
- Section 3 provides a quantitative analysis of the scale of delays facing renewable energy projects in the post-planning approval phase;
- Sections 4-7 provide an analysis of the factors leading to delays for each technology type;
- Section 8 provides an overview of investor perspectives in relation to financing renewable energy schemes;
- Section 9 outlines possible future trends and prospects for commissioning renewable energy schemes;
- Section 10 sets out a series of recommendations for taking forward renewable energy schemes in the post-planning phase.

2. OBJECTIVES AND METHODOLOGY

MAIN OBJECTIVES OF THE STUDY

2.1. The key objectives of the study are as follows:

- To provide a quantitative analysis of delays in the post-planning approval period by gathering data on how long it takes for consented projects to become operational, including an analysis of what proportion of consents do not progress to construction, and why;
- To see if the situation is improving or getting worse, and to assess future prospects;
- To identify any specific lessons that can be learned including:
  - The nature and cause of delays;
  - Examples of good practice to avoid and resolve delays which could be incorporated into developer guidelines;
  - The likelihood that problems will be resolved without further intervention;
  - Remedial actions which can be taken to minimise delays.

METHODOLOGY

Data analysis

2.2. Data from a range of sources (the DTI Renewable Energy database for approved schemes, DTI RESTATS database for commissioned schemes, and data supplied by Future Energy Solutions, BWEA, and DTI/Scottish Executive on specific schemes) have been used to analyse the extent of delays facing renewable energy schemes (biomass, hydro, offshore and onshore wind schemes) in the post-planning phase. The analysis also considers whether delays vary by country, funding mechanism, and size of scheme.

2.3. By focusing on the five year period during which planning permissions are valid (i.e. those granted planning approval post-August 2000), the nature and extent of delays facing 'current schemes' are analysed. Given the availability of data from the BWEA, trends in delays facing all onshore wind schemes approved since November 1991 are also explored.

Literature review

2.4. An extensive review of a range of literature sources has been undertaken including DTI, RAB, academic and other literature on barriers to commissioning renewable energy schemes.

Questionnaires

Developer questionnaire

2.5. In order to ascertain the views of renewable energy developers (representing a significant proportion of approved capacity) a questionnaire was sent out to 45 contacts within 32 companies (some companies received several questionnaires covering different technology types). In summary:

- **Onshore wind:** 27 questionnaires sent; 12 returned (44% response rate);
- **Offshore wind:** 8 questionnaires sent; 4 returned (50% response rate);
- **Hydro:** 4 questionnaires sent; 1 returned (25% response rate);
- **Biomass:** 6 questionnaires sent; 3 returned (50% response rate);

2.6. An overall response rate of 42% has been achieved (following telephone and/or postal reminders to contacts). The questionnaire is included in **Appendix 1**. The table below summarises the capacity (approved since 2000) which questionnaire responses account for (calculated on the basis of known capacity represented by each company).

Table 2.1: Approved renewable energy capacity covered by questionnaire responses

Technology type	Capacity represented by questionnaire responses		
	Approved capacity (since 2000) represented by questionnaire responses	**Capacity of operational schemes (approved since 2000)**	**Capacity expected from schemes that are approved (since 2000) and currently awaiting commissioning**
Onshore wind	54% (1179MW)	59% (443MW)	57% (736MW)
Offshore wind	62% (822MW)	97% (120MW)	64% (702MW)
Hydro	50% small Hydro[#] (11MW); 100% large Hydro (100MW)	94.7% (3.5MW); n/a (large hydro)	41.0% (7.5MW); 100% (100MW)
Biomass	50.7% (47.91MW)	100% (2.71MW)	49.3% (45.2MW)

[#]*Small Hydro = projects <10MW (DNC)*

Investor questionnaire

2.7. 71 questionnaires were sent out to financial institutions who are known to invest in renewable energy projects, of which 8 were returned.

Case study Interviews

2.8. Eight case study interviews were undertaken with developers, in relation to specific renewable energy schemes (four onshore, one offshore, one hydro and two biomass schemes). These were used to explore the factors leading to delays in commissioning schemes following planning approval in more detail.

Focus groups & telephone interviews

2.9. In addition, two focus groups and five telephone interviews were undertaken with key renewable energy developers and industry representatives, in order to explore the factors leading to delays and possible solutions in more detail. The two focus groups sought the views of onshore wind developers (the first included around 40 BWEA members, and the second a further six industry representatives). In addition interviews were undertaken with three offshore developers/industry representatives.

3. DELAYS IN THE POST-PLANNING PERIOD: THE SCALE OF THE PROBLEM

3.1. The following section presents an analysis of the extent of delays facing renewable energy schemes (biomass, hydro, offshore and onshore wind schemes) in the post-planning phase[3].

3.2. By focusing on the five year period during which planning premissions are valid (i.e. those granted planning approval post August 2000), the nature and extent of delays facing 'current schemes' have been analysed. Given the availability of data from the BWEA[4], trends in delays facing all onshore wind schemes approved since November 1991 are also identified, including an analysis of projects which have never been commissioned despite obtaining planning approval[5].

PROGRESS OF APPROVED SCHEMES

Progress of all schemes approved since August 2000

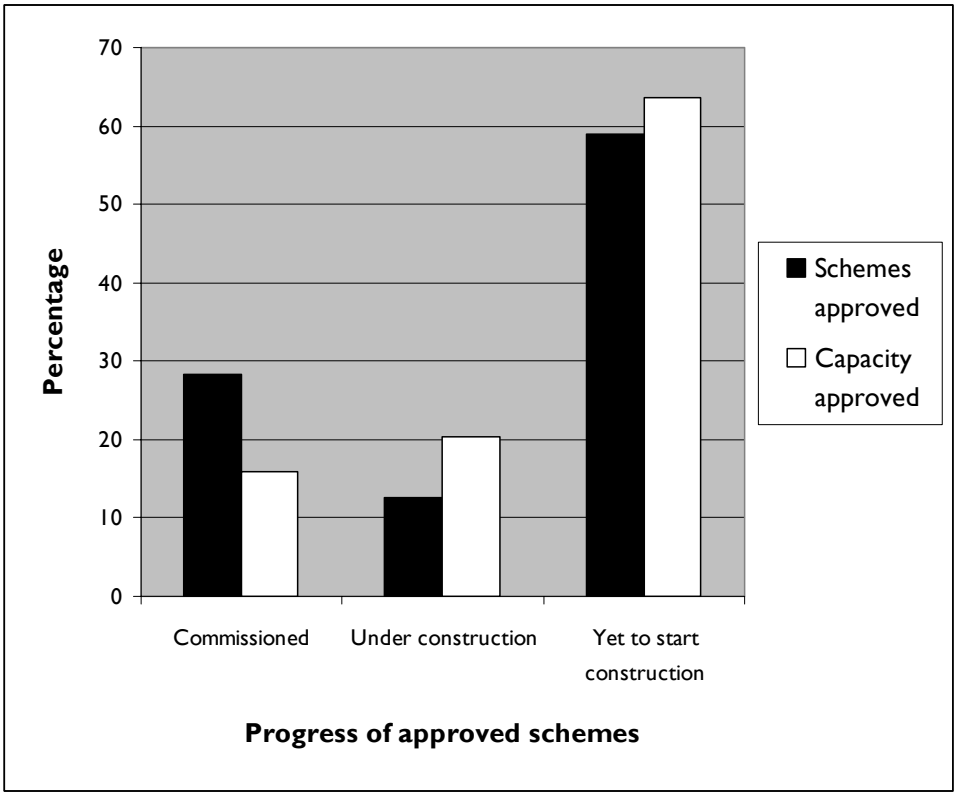
3.3. In the UK 134 renewable energy projects representing 3722 MW of installed capacity[6] have been granted planning approval since August 2000 in the renewable energy technology bands of biomass, hydro, offshore wind and onshore wind. The size of applications range considerably in terms of potential installed capacity, for example, from 0.2 MW per year for the Afon Ty-Cerig Hydro Scheme in Wales to 216 MW per year for Robin Rigg offshore windfarm off the coast of Scotland.

3.4. Over three quarters of planning applications have been for onshore windfarms (representing 58% of capacity). The remaining applications have been spread fairly evenly between biomass, hydro and offshore wind schemes, although the latter accounts for 36% of approved capacity, as offshore schemes are, on average, larger than other schemes (at 111 MW).

3.5. The progress to date towards commissioning the 134 renewable energy projects that have been approved since August 2000 is shown in **Figure 3.1**.

[3] The data sources used for the analysis and assumptions made in compiling and using the information are summarised in Appendix 3.
[4] The BWEA compiles the UK Wind Energy Database.
[5] Data pre-2000 is not included for other renewable energy technologies as it is not easily available.
[6] Installed capacity is the measure of a power station's electric generating capacity at full production, usually measured in megawatts (MW). Installed capacity is the term used throughout this analysis to reflect a scheme's capacity, be it commissioned or awaiting construction.

Figure 3.1 Progress towards commissioning of schemes approved since August 2000



Commissioned projects

3.6. Over a quarter (28%) of projects approved in the last five years have been commissioned and are fully operational. These schemes account for 597 MW, or 16%, of installed capacity approved in that time. Those commissioned include 1 biomass, 2 hydro, 2 offshore wind and 33 onshore wind schemes. By country, this includes 12 in England, 3 in Northern Ireland, 16 in Scotland and 7 in Wales.

Projects under construction

3.7. 17 of the renewable energy projects approved since August 2000 (13%) are currently under construction. These projects collectively account for 761 MW, or 20% of potential installed capacity approved in that time. Schemes currently under construction include 2 hydro, 2 offshore and 13 onshore windfarms. By country, this includes 4 in England, 1 in Northern Ireland, 10 in Scotland and 2 in Wales.

Projects yet to start construction

3.8. Construction of the majority of approved projects has yet to commence (59%). Schemes within this category account for 2364 MW, or 64%, of the total potential installed capacity approved since August 2000, suggesting that some larger projects are yet to start construction. These projects include 6 biomass, 8 hydro, 8 offshore wind and 57 onshore windfarms. By country,

this includes 35 schemes in England, 1 in Northern Ireland, 32 in Scotland and 11 in Wales.

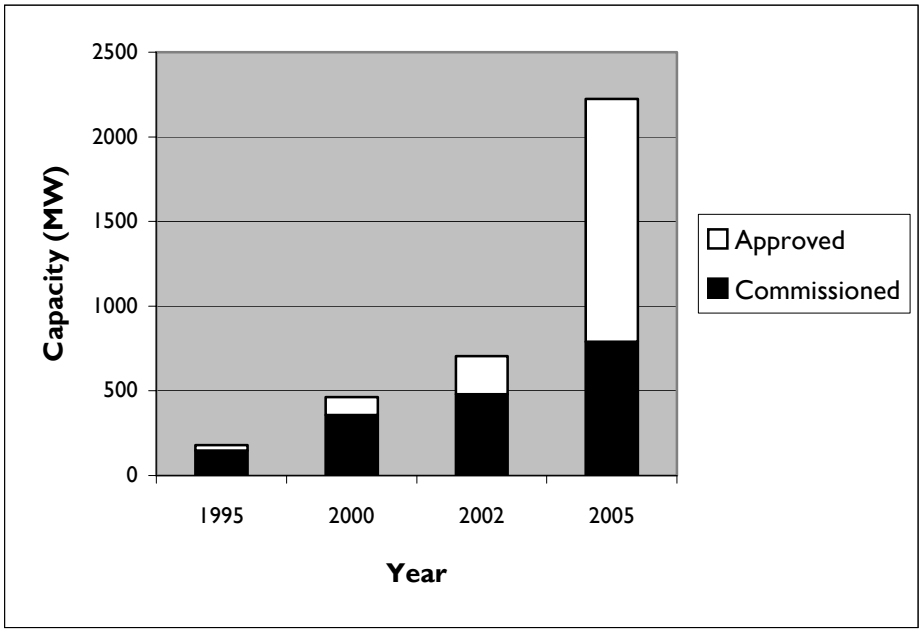
All onshore wind schemes since 1991

3.9. Of the 179 onshore wind schemes that have received planning approval in the UK since 1991 accounting for 2708 MW, 104 have been commissioned (which account for 36% (963 MW) of total approved installed capacity). The majority (47%) of this capacity is in Scotland, with 24% in Wales, 20% in England and 9% in Northern Ireland. **Figure 3.2** shows how commissioned schemes as a proportion of approved schemes has changed over time. It can be seen that the gap between capacity approved and commissioned has widened between 1995 and 2005, with a significant upturn from 2002 onwards. In summary:

- In 1995 32.5 MW of approved capacity was awaiting commissioning (18% of a total 180 MW of approved capacity).
- By 2000, this was 107 MW (23%, out of a total of 464 MW).
- By 2002, this was 224 MW (32% of a total of 704 MW of approved capacity).
- By 2005, this was 1434 MW (64% out of a total of 2224 MW of approved capacity).

3.10. The upsurge in approved capacity post 2002 is likely to be due to the introduction of the Renewables Obligation in England and Wales and Renewables Obligation (Scotland) in April 2002.

Figure 3.2 The cumulative capacity of approved and commissioned onshore schemes over time



AVERAGE TIME TAKEN FROM APPROVAL TO COMMISSIONING

All schemes approved since August 2000

3.11. The average time taken from approval to commissioning is approximately 20 months for renewable energy schemes approved within the biomass, hydro, offshore wind and onshore wind technology bands since 2000. This is fairly comparable to the average time taken from approval to commissioning for all onshore wind schemes currently operational in the UK, as discussed above.

3.12. A breakdown of average time from approval to commissioning by technology band is shown in **Table 3.1**. The technology band which takes the shortest average time to commissioning is hydro (16 months), compared to offshore wind which, taking an average of 22 months to commissioning.

Table 3.1 Average time taken from approval to commissioning for schemes approved post August 2000

Technology Band	Schemes commissioned (that were approved post August 2000)				Average installed capacity (MW)	Average time taken from approval to commissioning (months)
	Number	%	MW	%		
Biomass	1	3	3	1	3	17
Hydro	2	5	4	1	2	16
Offshore wind	2	5	120	20	60	22
Onshore wind	33	87	470	78	14	20
Total	38	100	597	100	16	19

Average time to commissioning by country

3.13. The average time taken from approval to commissioning for schemes approved since 2000 broken down by country is presented in **Table 3.2**. It is difficult to identify trends in the average time taken from approval to commissioning for biomass, hydro and offshore wind schemes due to a lack of operational projects in each country.

3.14. **Figure 3.3** shows how the average time from approval to commissioning for onshore windfarms approved post 2000 varies by country. It can be seen that:

- At 17 months, onshore windfarms in Northern Ireland take the least time to move from approval to commissioning. In contrast to the other three countries, all onshore wind schemes in Northern Ireland are submitted through the Department of Environment (and conditions are agreed prior to approval), which may be a contributing factor to this relatively low average time.

- Windfarms in England (averaging 4MW in size) and Wales (averaging 18MW in size) take a similar length of time (19 months on average).

- At almost 21 months, onshore windfarms in Scotland take the longest time to become operational after receiving planning approval. It is possible that this trend is affected by other factors, such as scheme size (the average size of windfarms in Scotland is 20 MW).

Figure 3.3 Average time from approval to commissioning for onshore windfarms approved post August 2000 by country

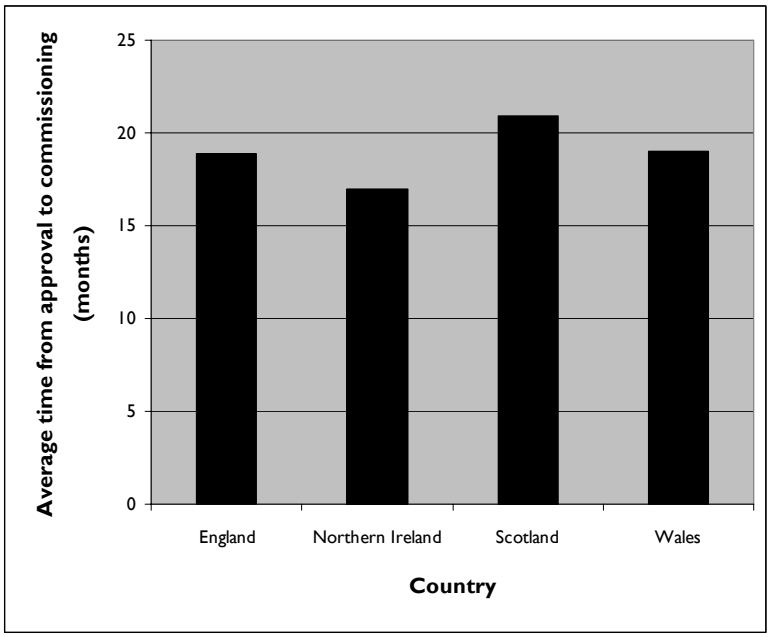


Table 3.2 Average time taken from approval to commissioning for schemes approved post August 2000 by country (months)

Technology Band	Country											
	England			Northern Ireland			Scotland			Wales		
	No of schemes	Total MW capacity	Average time (months)	No of schemes	Total MW capacity	Average time (months)	No of schemes	Total MW capacity	Ave time (months)	No of schemes	Total MW capacity	Average time (months)
Biomass	-	-	-	1	3	17	-	-	-	-	-	-
Hydro	-	-	-	-	-	-	1	4	20	1	0.2	11
Offshore wind	1	60	27	-	-	-	-	-	-	1	60	16
Onshore wind	11	40	19	2	46	17	15	297	21	5	89	19
Total	12	100	20	3	48	17	16	300	21	7	149	17

Average time to commissioning by funding

3.15. The average time from approval to commissioning takes marginally longer for renewable energy projects funded through NFFO (and its equivalent in Scotland and Northern Ireland) than for projects funded through the Renewables Obligation (RO) scheme. For example, the average time from approval to commissioning for schemes approved post August 2000 is 20 months for NFFO funded projects compared to 19 months for RO funded projects. A breakdown by technology band is presented in **Table 3.3**.

3.16. This trend is reinforced when the onshore wind technology band is analysed, which has a number of projects under both funding schemes. Within this technology band, the gap between the two funding methods widens with NFFO projects taking on average 21 months to commissioning once approval has been granted compared to RO schemes which take on average 19 months to make the same progress.

Table 3.3 Average time taken from approval to commissioning for schemes approved post August 2000 by funding (months)

Technology Band	Funding					
	NFFO/SRO/NI-NFFO			RO		
	No of schemes	Total MW capacity	Average time (months)	No of schemes	Total MW capacity	Average time (months)
Biomass	-	-	-	1	3	17
Hydro	1	0.2	11	1	4	20
Offshore wind	-	-	-	2	120	22
Onshore wind	17	172	21	16	299	19
Average time from approval to commissioning	18	172	20	20	425	19

Average time to commissioning by size of scheme

3.17. The extent to which the average time from approval to commissioning varies by size of scheme can be explored by analysing operational schemes that were approved through Section 36 applications. Applications to build renewable energy generating schemes over a certain capacity threshold are made to the DTI in England and Wales and the Scottish Executive in Scotland through Section 36 applications. Where the capacity of a scheme lies below the threshold, the application for consent is made to the relevant local planning authority. Therefore, by analysing differences in the average time taken from approval to commissioning between these two application routes, inferences can be made as to how the size of scheme affects the commissioning of projects (n.b. the determining authority could also affect time to commissioning if there are any differences in their application process, e.g. in terms of

time taken to agree/discharge conditions, etc. However, the research suggests that there are issues with both the DTI/Scottish Executive and local planning authorities in terms of finalising conditions). The capacity thresholds determining the application route of renewable energy schemes are summarised in **Box 3.1**.

Box 3.1 Section 36 applications

Capacity thresholds for Section 36 applications:

- In excess of 50 MW for schemes not wholly or mainly driven by water, i.e. onshore wind and biomass;
- In excess of 1 MW for offshore wind schemes and schemes wholly or mainly driven by water (i.e. hydro).

Applications to build these schemes in Northern Ireland are submitted to the Department of the Environment, regardless of capacity. Most offshore schemes go through the S36 application process.

3.18. Of the 38 commissioned renewable energy schemes that have been approved since August 2000:

- The DTI and Scottish Executive have approved 6 schemes through Section 36 applications. These include 1 hydro scheme, 2 offshore wind schemes and 3 onshore wind schemes.
- Local planning authorities have approved over three quarters of schemes (77%). These include 1 hydro scheme approved in Wales and 28 onshore wind schemes, 13 of which were in Scotland, 11 in England and 4 in Wales.
- The Department of the Environment in Northern Ireland has approved 3 applications, including 2 onshore wind and 1 biomass project.

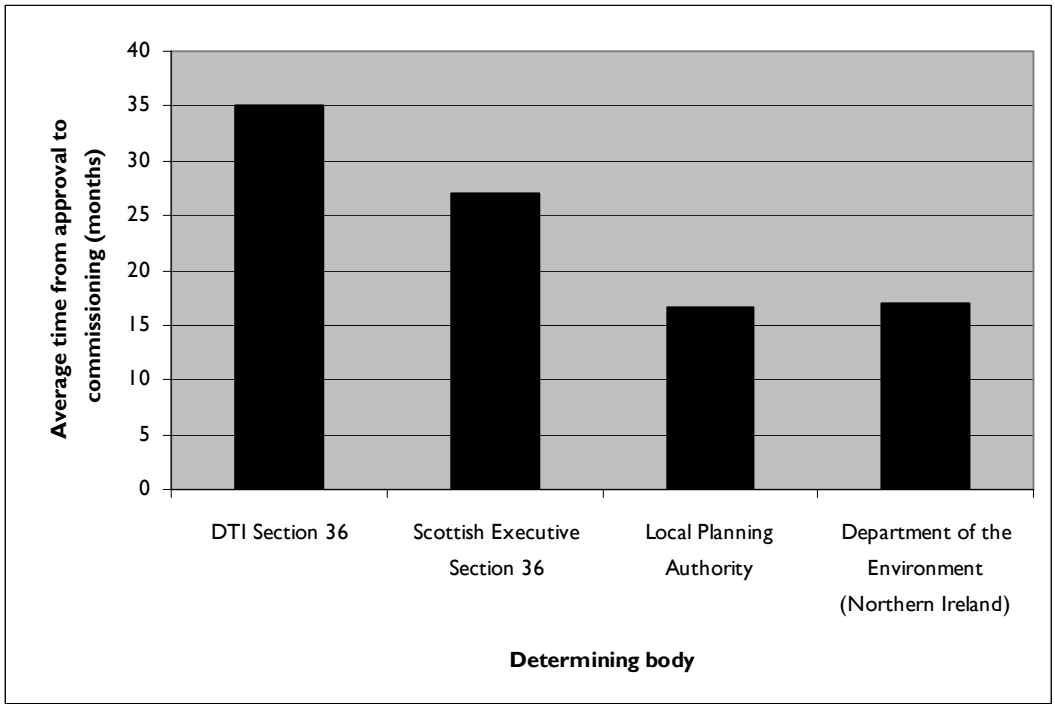
3.19. Although it is difficult to compare the average time taken from approval to commissioning between these planning application routes for biomass, hydro and offshore wind schemes due to a lack of operational projects approved through each route, a comparison of onshore windfarms can be made. **Figure 3.4** shows how the average time from approval to commissioning for onshore windfarms approved post August 2000 varies by planning application route.

3.20. It can be seen that the time taken from approval to operation for onshore wind schemes approved by local planning authorities or the Department of the Environment in Northern Ireland is similar, at approximately 17 months. All of these schemes are under 50 MW in installed capacity. In contrast, schemes over 50MW approved by the DTI or Scottish Executive take on average 30 months from approval to commissioning, almost twice as long as those approved by local planning authorities or the Department of the Environment in Northern Ireland.

3.21. This additional time for onshore wind schemes to reach commissioning status through Section 36 applications could be due either to the size of schemes, as they all comprise projects over 50 MW or, as suggested above, potentially due to any

differences in the time taken to finalise post-approval planning issues by different determining authorities.

Figure 3.4 Average time from approval to commissioning for onshore windfarms approved post August 2000 by planning application route



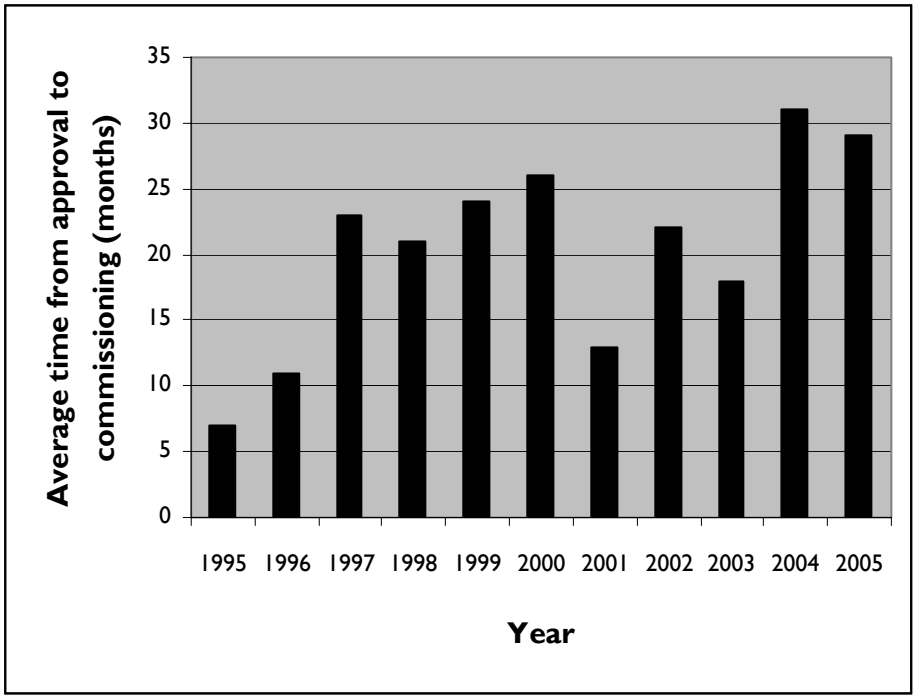
Average time taken from approval to commissioning for all onshore wind schemes

3.22. The average time taken from approval to commissioning for all onshore wind schemes that are currently operational in the UK is 19 months[7]. **Figure 3.5** shows how the average time between approval and commissioning varies for onshore wind schemes by the year in which schemes became operational. It can be seen that with the exception of a dip between 2001-2003, the average time taken from approval to commissioning has gradually increased since 1995. For example, for schemes commissioned in 1995, the lead in time from approval was approximately 7 months, compared to schemes which were commissioned in 2004 which, on average, had taken 31 months to move from approval to operation (although it should be noted that this annual average includes two schemes in England Holmside Hall and Hare Hill, accounting for 10MW of capacity, which were particularly slow schemes).

3.23. The shorter length of time from approval to commissioning for early schemes probably, in part, reflects the fact that the average size of schemes operational in 1995 was 7 MW whilst the average size of schemes operational in 2005 is 18 MW.

[7] Based on the UKWED dataset.

Figure 3.5 Average time from approval to commissioning for onshore wind schemes by the year in which windfarms became operational



LIKELIHOOD OF SCHEMES BEING COMMISSIONED: LEVEL OF RISK

Numbers of schemes never commissioned

3.24. Given that planning permission remains valid for five years, there have only been two onshore windfarms which have been approved but not constructed during their valid period of planning permission. These schemes have a combined capacity of 8 MW and were both approved in England.

Risk of not commissioning schemes approved since 2000

3.25. Of the 3722 MW of installed capacity that has been granted planning approval since August 2000 in the biomass, hydro, onshore wind and offshore wind technologies, 64% (2364 MW) is awaiting construction. The number and capacity of renewable energy schemes that have not yet started construction are summarised in **Table 3.4** in terms of the length of time they have been in the post-approval planning phase. Given that planning permission remains valid for five years and that the average time from approval to commissioning is approximately 20 months, those schemes that have been approved for three to five years and are still awaiting construction are considered to be at high risk of not being commissioned.

3.26. The installed capacity of renewable energy schemes that have been approved but are awaiting construction is presented in **Figure 3.6**, in terms of the length of time they have been in the post-approval planning phase. **Figure 3.6** shows that the majority of capacity (74%) is currently at low risk of not being constructed (i.e. has been in the post-approval planning phase for 0-2 years). Only around 4.5% (106 MW) of

consented capacity is at high risk of not being constructed, since these schemes have been in the post-approval planning phase for over 3 years. This capacity represents 6 onshore windfarm schemes.

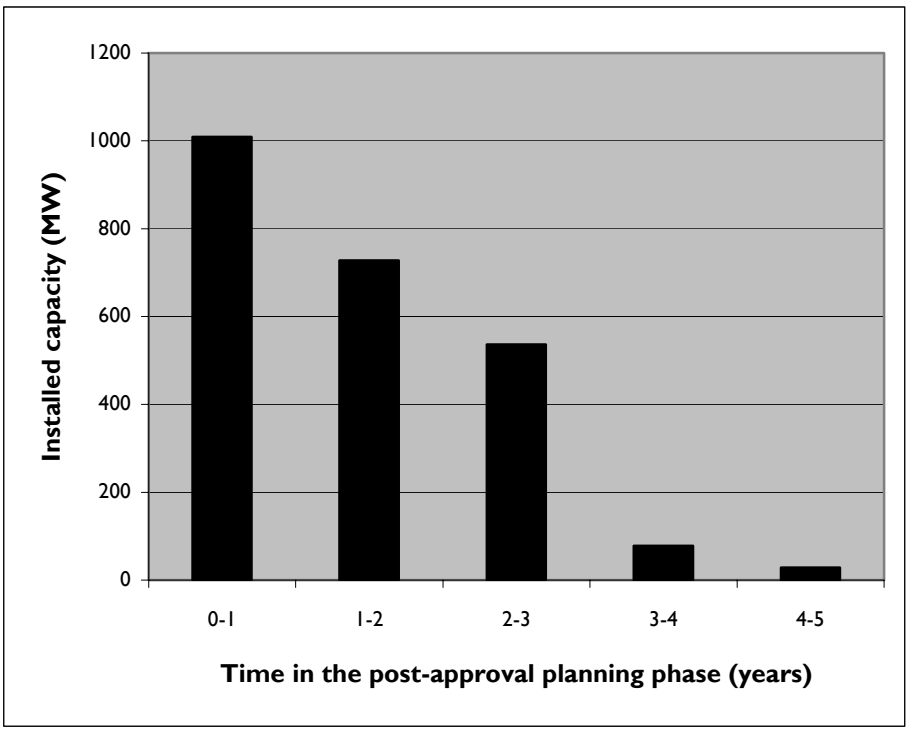
Table 3.4 Length of time in the post-approval planning phase for capacity awaiting construction

Technology band	Time (years) awaiting start of construction				
	0-1	1-2	2-3	3-4	4-5
	Low risk		Medium risk	High Risk	
Biomass*	37 MW (2)	56 MW (3)	5 MW (1 scheme: • Nuneaton Animal Waste)	-	-
Hydro	100 MW (2)	4 MW (4)	4 MW (2 schemes: • Garrogie • Eredine)		
Offshore wind	108 MW (1)	534 MW (5)	366 MW (2 schemes: • Rhyl Flats • Robin Rigg)	-	-
Onshore wind	722 MW (27)	178 MW (15)	144 MW (9 schemes: • Isle of Flotta • Burgar Hill • Cheverton Down • Edinbane • St Breock Repowering • An Suidhe • Ardinglass • Swansea Docks • Ffynnon Oer)	78 MW (5 schemes: • Arnish Moor • Stags Holt • High Sharpley • Teeside North • Wharrels Hill)	29 MW (1 scheme: • Black Hill)
Total	967 MW (32)	772 MW (27)	520 MW (14)	78 MW (5)	29 MW (1)

N.b. numbers of schemes are shown in brackets and where schemes are at high or medium risk, individual schemes are listed.

* N.b. the SembCorp biomass scheme in Redcar and Cleveland (32 MW) is awaiting construction work, but as this is operational development (conversion from an existing boiler to a wood firing biomass plant), planning permission is not required and there is no time since approval to measure. This development is therefore included as a low risk scheme. The developer has yet to submit a planning application for storage buildings that will be needed prior to operating the scheme and the LPA anticipates that this will be submitted later in 2005, with the scheme becoming operational in 2006.

Figure 3.6 Installed capacity of schemes that are awaiting construction in terms of the length of time they have been in the post-approval planning phase



3.27. It can be seen that:

- There are 6 schemes currently at high risk of not being commissioned before their planning approval expires. These are all onshore wind schemes that have been approved by local planning authorities and collectively account for 106 MW of installed capacity. Two-thirds of the schemes are located in England and the remainder in Scotland.

- The scheme at most risk of not being commissioned is Black Hill, an onshore wind scheme in Scotland with a potential installed capacity of 29 MW which received planning approval in July 2001.

- There are 14 schemes at medium risk of not being commissioned before their planning approval expires. 64% of these schemes are onshore windfarms and the remainder are accounted for by biomass, hydro and offshore wind projects. Together these schemes account for 520 MW of potential installed capacity.

4. FACTORS DELAYING COMMISSIONING OF ONSHORE WIND SCHEMES

INTRODUCTION

4.1. The Renewables Innovation Review (February 2004) reported that the 2010 renewable electricity target can still be met if barriers to wind deployment can be eliminated. It notes that wind power, both on- and offshore, is presently the only economic technology capable of being developed at scale and will deliver the majority of the required growth in renewable energy to meet the 2010 target and continue to be the dominant technology out to 2020.

4.2. It goes on to note that the Government's announcement in December 2003 that it intended to raise the level of the RO beyond the 10.4% already set for 2010/11 to increase year on year to 15% in 2015/16 has improved the investment case for wind, however removal of institutional barriers and timely incentives for grid upgrades are needed to increase the likelihood that targets will be met.

4.3. This section identifies the key factors which are leading to delays in starting construction of, and commissioning, onshore windfarms in the post planning approval phase.

The picture for onshore wind

Extent of delays

- In the UK, 179 onshore wind schemes have been granted planning approval since 1991, which collectively account for 2708 megawatts (MW) of capacity. Of these projects, 104 are operational and account for 963 MW. 13 windfarms are currently under construction (accounting for 554MW), whilst 57 windfarms are yet to start construction (accounting for 1150MW).
- Around 5% of approved capacity (6 onshore wind schemes) can be considered to be at high risk of not being commissioned (construction has not commenced 3+ years since approval).
- 9 onshore wind schemes have been approved for 2-3 years (accounting for 144 MW), which could be classed as being of 'medium risk' in terms of likelihood of commissioning.
- The average time taken from approval to commissioning for all onshore wind schemes in the UK approved since 1991 is 19 months.
- Based on an analysis of several points in time, which provide a snap-shot of trends since the early 1990s, time to commissioning has increased from approximately 7 months for onshore wind schemes which were commissioned in 1995, to 31 months for schemes commissioned in 2004.
- Of the 13 schemes approved and currently under construction, the average time from approval to start of construction is 18 months.
- Developers indicated that 'best practice' lengths of time to start of construction would be in the order of 9 months, although for large schemes (>100 MW) this time could be

up to 12-18 months.

Key causes of delay (in order of severity)

- Landowner negotiations and connection Wayleave Rights are a key cause of delay (which accords with an earlier survey undertaken by the BWEA in 2003);
- The next most significant cause of delay are issues surrounding grid connection, compounded by a lack of clarity for developers in terms of how allocation is managed.
- Negotiating contracts with suppliers are a further cause of delay.
- Issues surrounding PPAs and factors relating to planning conditions/agreements were ranked as being less critical, and by fewer respondents.
- Nevertheless 80% of developers have experienced delays due to negotiating planning agreements, and 70% due to agreeing and discharging conditions.

WHAT IS A BEST PRACTICE LENGTH OF TIME FROM PLANNING PERMISSION TO START OF CONSTRUCTION?

4.4. As noted in Section 4, the average time from planning approval to start of construction for onshore windfarms is approximately 18 months. However, developers indicated 'best practice' lengths of time in the order of 6 – 12 months, with approximately half of questionnaire respondents citing a time of 9 months. Focus group participants similarly indicated that this time should be less than a year, although indicated that for large schemes (>100MW) the time may be greater, in the order of 12 – 18 months. One developer noted that if the developer is willing to 'tandem' elements (with concomitant risk), the time from approval to construction can be 12 months or less, but if elements are put in place in sequence then this period can last up to 2 years.

4.5. Overall it appears that schemes therefore are facing delays over and above what developers would expect.

KEY FACTORS LEADING TO DELAYS

4.6. Developers have to move a range of complex contracts along in parallel and any one factor can lead to a delay. Therefore the source of delay tends to be unique for every project. Nevertheless, it is possible to identify a number of factors which appear to be key causes for concern.

4.7. When asked to identify which factors had led to delays, approximately 80% of developers noted that negotiation of planning agreements had delayed schemes and approximately 70% noted that agreeing and discharging planning conditions as having led to delays). 67% of respondents indicated that grid connection issues had led to delays in their projects, while 58% noted that finalising supplier/construction contracts had led to delays and securing Wayleave Rights and landowner negotiations were cited by 50% of respondents. Delays caused by developers themselves were identified by 33% of developers. Financial factors were not cited by very many developers as having caused delays: 25% noted that securing capital had led to delays, whist only 17% had experienced problems negotiating PPAs. A range of other factors were identified by single developers, many of which relate to activity by determining

authorities in the post-approval, phase linked to finalising planning agreement and conditions e.g. conditions to do with breeding birds, and slow responses by NGOs.

4.8. Questionnaire respondents were also asked to identify which causes of delay were most significant. The most often cited, as being of most importance (ranked first or second), were negotiating connection Wayleave Rights (by 64% of respondents, representing companies accounting for 50% of approved capacity), followed by landowner negotiations (by 55% of respondents, representing companies accounting for 36% of approved capacity), and grid connection issues (by 55% of respondents, representing companies accounting for 42% of approved capacity). Contracts with suppliers were the next most often cited and significant cause of delay (by 27% of respondents). Issues surrounding PPAs and factors relating to planning conditions/agreements ranked lower, and by fewer respondents (only 9% of respondents ranked these as being one of the most significant causes of delay). These issues are explored in more detail below.

Landowner negotiations and connection Wayleave Rights

4.9. Developers noted that landowner negotiations are becoming increasingly difficult for a number of reasons:

- Landowners are more knowledgeable about windfarms and their value, which can lead to 'ransom strips' in the case of connection routes, but this rarely prevents a scheme going ahead;
- Larger sites have multiple tenants who must all sign up to legal agreements;
- Longer connection routes due to grid constraints again result in a higher number of landowners who must sign up to legal agreements;
- Landowners tend to use local solicitors who may need to be 'brought up to speed' due to a lack of experience in relation to windfarm schemes, which takes time. However, this situation is improving over time;
- Some large land owners e.g. Forestry Commission are willing in terms of setting up agreements, but delay these due to their lawyers being unable to deal with the large number of proposals on their land.

Grid connection issues

4.10. The DTI/Carbon Trust Renewables Innovation Review (February 2004) identified grid upgrades to be a critical factor affecting the delivery of 2010 targets, which require timely incentivisation. The review indicated that upgrades must start in 2004.

4.11. Similarly, a brief paper by the Sustainable Development Task Force (2004) questions whether strategic network investment in the Transmission and Distribution Price Control processes are proceeding at the pace necessary. In response to this the DTI noted (April 2004) that various incentives (through Ofgem's regulatory framework) are in place to distribution companies to invest efficiently and quickly.

4.12. Nevertheless, a 2005 report by SERA[8] concludes that significant large scale upgrades will be required, but these have yet to enter the planning system, and that further upgrades will still be required if further new projects emerge as predicted. As a result it is possible that the grid reinforcements will prove to be too little too late to meet 2010 targets.

4.13. A paper to the RAB (May 2004) highlighted a further concern around the fact that some capacity has been 'booked' by projects which have not yet received consent. It concludes that consideration should be given to prioritising allocation of grid connections to projects which have both consent and agreed planning conditions. However, developers involved in this research generally appear to oppose this suggestion. The reasons for this include the long lead in times involved, which make it preferable to apply for a grid connection as early as possible, and the degree of uncertainty surrounding availability of grid capacity, which means it is again preferable to apply early to increase the chance of obtaining a connection.

4.14. Grid connection issues were raised by a number of consultees throughout the research. Issues relate to:

- Availability and allocation of capacity and issues with queuing systems;
- Lack of clarity in the system which means developers find it hard to plan for grid connections;
- Management and timing of upgrades – in some cases offers have been given but connection dates can be a long way off e.g. 2016;
- Lack of flexibility in terms of when allocations must be taken up and lack of coordination between grid and planning consents;
- The time taken by DNOs to turn around applications, particularly for smaller developers;
- Increased costs of connections.

Capacity issues

4.15. In general it is felt that there is less of a problem in terms of grid capacity and allocations in Wales and England (although there are problems in northern England), whereas in parts of Scotland and Northern Ireland grid connection can cause significant delays and uncertainty for projects. Several consultees noted that grid connection can cause major delays in Scotland as there is minimal capacity in the grid to the north of Denny. Obtaining planning permission for grid connections themselves can also be a major problem in its own right e.g. for the Beauly to Denny line. Two major Scottish developers noted that issues with grid connection are only just starting to kick in.

[8] Our Environmental Future: The role of wind power. The Socialist Environment and Resources Association, NPower and BWEA, 2005.

4.16. It was also suggested that a revised queuing system for grid connections could remove some of the apparent constraints (it was noted that the queuing systems mean that less urgent upgrades may be undertaken ahead of more urgent upgrades, thus leading to delays for some schemes).

Allocation of capacity

4.17. Historically where there is competition for capacity, companies have tended to commit to a connection prior to planning permission, and risk losing a proportion of their first payment (as they still have to cover NGET costs).

4.18. Developers noted that NGET is now managing a new system, but that there is a lot of uncertainty amongst developers as to how this will work. For example, one major developer questioned what will happen to capacity if a scheme does not get consented – will the developer get a refund and the capacity be allocated to someone else? Generally developers indicated that they would welcome greater clarity on how capacity is allocated and the system managed.

4.19. One developer made the point that it would be difficult to regulate when developers choose to register for grid connection, but that there is a need to ensure schemes with planning permission get priority when other schemes drop out of the queue. Another developer noted that it would not be realistic, given lead-in times and uncertainties, to expect developers to wait until they had received planning permission to apply for a grid connection.

Management and timing of upgrades

4.20. Concerns were raised regarding the Beauly to Denny transmission line in Scotland and the related England/Scotland interconnector. The levels of renewable generation that developers are contracting to connect to transmission and distribution networks are such that the existing transmission capacity from Beauly to Denny is inadequate. The development of the replacement transmission line (a 400,000 volt overhead transmission line will replace the existing 132,000 volt transmission line) will provide more reliable and less constrained electricity network capacity for around 2,300MW of renewable energy capacity in the north of Scotland, and will form a basis for growth in the long term.

4.21. The interconnector upgrade will be subject to the Beauly to Denny line being consented. Beauly to Denny is unlikely to go ahead until 2007 and key interconnector upgrades will then take another 3 years, leading to a bottle neck of constraints. These elements should be brought forward in tandem.

4.22. The need for better coordination of upgrades with actual wind energy capacity in the pipeline was also raised. Upgrades assume all windfarms for which applications have been submitted will be built. However, issues such as cumulative landscape issues mean that not all schemes will be permitted. Whilst NGET cannot assess the merits of individual projects, they could, when designing particular hub capacities discuss what proportion of submitted capacity is actually likely to be consented by consulting with LPAs, BWEA, DTI, Scottish Executive, SNH and English Nature. This would enable realistic engineering solutions to be designed.

4.23. Situations exist where an engineering solution is proposed, developers get a quote for grid connection costs, they pay a deposit, some then drop out of the queue as they think they won't get planning permission, NGET then seeks other developers to take their place, but if there aren't enough developers willing to underwrite the works, they can't take place, resulting in a downgrade in plans which could have been predicted in the first place.

Other grid issues

4.24. Another issue raised was the fact that grid connection and planning permission are not linked, for example developers are allocated capacity based on when they expect to get planning permission and they then have to pay to maintain that slot if permission takes longer than expected. This lack of flexibility in terms of time limits is problematic. Ideally grid connection and planning permission should be coordinated or integrated.

4.25. It was also noted that in some cases developers have to wait for a year or more following planning permission for a grid upgrade which delays schemes.

Engineering, procurement and construction (EPC) contracts

4.26. Several developers noted that suppliers can be reluctant to start negotiations prior to planning approval, which can lead to delays. One smaller developer noted that it can be difficult to get contracts agreed. For example, one contractor pulled out due to a larger order leading to a 2 month delay. There is often a 6-8 month lead-in time. Developers have reported that procurement times in the order of 9-12 months are not uncommon (particularly where they want a non-standard product), and this is becoming longer as time moves on due to the burgeoning US market which is taking up turbine supply.

4.27. It was also noted that manufacturers are requiring increasing amounts of information e.g. wind data prior to agreeing contracts.

4.28. Further turbine suppliers based in the UK are required. This may help to ease issues of turbine availability, and it was felt that this would increase the economic benefit of the industry to the UK which could add to public support.

Power Purchase Agreements (PPAs)

4.29. As noted above securing PPAs has not emerged as being a key cause of delay for projects. Typically developers have built up experience in negotiating PPAs and factor in time for negotiations which are necessary to get a satisfactory deal. Furthermore wind energy schemes are generally seen as a low risk technology, compared to other renewable energy technologies.

4.30. Nevertheless some developers did note that PPAs are generally not long enough and that it takes time to find a suitable solution which can lead to delays. Most comments in relation to PPAs focussed on the need to maintain certainty in the Renewables Obligation in order to avoid destabilising the market. One smaller developer noted that '*political change is a big worry…we wouldn't be able to finance projects if the RO changed*'.

Planning agreements

4.31. Approximately 80% of developers noted that negotiation of planning agreements (S106 in England and Wales and S75 in Scotland) have delayed schemes. Several developers indicated that local planning authorities did not readily enter into discussions due to a lack of resources and/or time taken to source external expertise, which leads to delays (one developer cited a delay of 6 months, whilst focus group participants in Scotland agreed that it can take up to two years to receive final consent due to a lack of legal resources in the Scottish Executive). In contrast some local authorities work very quickly, using model agreements. Professional experience suggests that a number of factors are contributing to delays:

- Local authorities are under-resourced and don't have time to deal with S106 agreements;
- Local authorities can be resistant to receiving draft S106 agreements from developers and want to draft their own agreements which takes time;
- If there are multiple landowners involved in a scheme each landowner will need to sign the S106 agreement;
- Some local authorities are unclear about what a S106 agreement should contain. This is less of a problem with some authorities in Scotland which are used to dealing with applications. Particular problems are occurring in mid Wales and many local authorities in England who have never dealt with applications of this nature before.

4.32. This backs up recent research by the BWEA (BWEA, August 2004) which found that the time taken to conclude Section 106 agreements, after determination of an application, can typically take another 6 months, sometimes longer, adding as much as a year onto final consent times for some proposals. This is a factor in England, Scotland and Wales. It is not a factor in Northern Ireland where proposals do not have to go through S106 agreements as part of the final planning consent (although the average wait for planning determination is almost 3 years, which is similar to the entire time take for planning determination and conclusion of S106 agreements in Wales).

Planning conditions

4.33. Professional experience suggests that conditions tend to present fewer problems and cause fewer delays than S106/S75 agreements. However, the majority (approximately 70%) of questionnaire respondents indicated that negotiating and discharging planning conditions have led to delays in the start of construction of schemes, despite the fact that the same proportion noted that they commenced discussions with the local authority at the pre-permission stage. The extent to which conditions took longer than expected to agree ranged from around 3 months to up to 9 months.

4.34. A recent report (SERA, 2005) on the challenges that must be overcome to fully exploit the potential for wind power to contribute to reductions in emissions and improved energy security concludes that there is considerable potential to reduce

the length of time taken to finalise planning conditions, since most planning conditions are fairly standard, and local planning authority (LPA) uncertainty arises where they have not dealt with many applications previously.

4.35. Some focus group participants in Scotland noted that despite an emphasis on pre-application discussions by the Scottish Executive, they had experienced difficulties commencing discussions with some bodies e.g. SNH and Environmental Health Officers.

4.36. In terms of agreeing conditions, delays can occur when multiple local authorities are involved in a large scheme; here it can be difficult to get agreement between the authorities on the wording of the conditions.

4.37. The focus group in Scotland identified a lack of time/resources to agree conditions within LPAs to be a key cause of delay. One participant felt that *'LPAs feel that once consented, a scheme is out the door"*. Furthermore it was felt that LPAs set conditions but then *'don't have in-house expertise to help discharge them'*.

4.38. The nature of conditions, when set, can result in conditions which are difficult to discharge. Around 80% of questionnaire respondents noted that they have experienced 'open' conditions being attached to permissions (i.e. conditions where the actions required to discharge the conditions are more open ended and less clearly defined). Such conditions can take considerable time to agree with consultees. A lack of staff within consultee organisations, and in particular key specialists can cause delays.

4.39. A tendency for consultees to 'revisit' projects when agreeing conditions can lead to delays, which can have knock-on effects, for example leading developers having to reschedule agreements with turbine suppliers.

4.40. Two developers indicated that they have approved capacity (amounting to 66 MW DNC) effectively 'stuck' due to difficulties resolving 'open' conditions.

4.41. Particular types of conditions can also cause problems, particularly noise conditions. Not all local authorities are signed up to the ETSU noise guidance and prefer to use their own approach. This can cause real problems as developers can open themselves up to financial risk if they accept overly onerous conditions.

4.42. Conditions relating to decommissioning can also cause problems. Several developers noted that they have had to negotiate extensively with LPAs to ensure a reasonable bond value is agreed. It was also noted that LPAs want bonds in place prior to consent being granted, which is costly for developers. A legal professional noted that other mechanisms, such as ESCROW accounts might be more suitable.

4.43. Planning conditions which developers have found difficult to satisfy are summarised in the box below.

Conditions developers have found difficult to satisfy

Setting up trusts to administer community funds. One developer noted difficulties due to the reluctance of the local parish council to be involved following opposition to scheme..

Habitat Management Plans require input from many sources with differing views.

General conditions (such as '….as shall be agreed in writing with……') mean that issues relating to ecology, archaeology, monitoring and Construction Method Statements remain up for agreement.

Conditions are an opportunity for consultees to 'park' problems. Consultees are often slow to respond to Construction Method Statements as required by planning conditions.

Decommissioning and end of life restoration can be problematic. Full restoration with removal of foundations is, in developers' opinions, commercially and environmentally impracticable, but is still sought by some local authorities.

The validity of ETSU for noise conditions is being questioned by some; conditions frequently don't follow ETSU guidance closely enough.

4.44. Some delays relating to conditions and agreements can also be caused by developers themselves. One legal professional noted that the large utilities can take a long time to sign off applications, conditions and S106 agreements. This is because they have to have agreement from various people at different levels i.e. development team, construction team, heads of development and construction teams, and in some cases even board level. The construction teams often want to try to avoid being tied down by conditions. Smaller developers tend to get thing moving and resolved much faster.

Other planning factors

4.45. Sometimes developers fail to plan ahead which can lead to subsequent delays. For example once an application has been submitted the developer may decide to increase the size of the turbines for technical reasons, which may have landscape, visual and noise impacts. Depending on the nature of the change this may require submission of further information to comply with EIA regulations or re-submission or the whole application.

4.46. It is also important to note that whilst there is a proportion of capacity in the planning system with a resolution to grant (e.g. approximately 1200MW in Scotland) not all of this will be approved, as some outstanding issues may not be resolvable e.g. aviation issues or peat issues. Focus group participants in Scotland noted that whilst they might have a resolution to grant, they may then be asked for further information, which requires re-advertisement of the application, which can lead to significant delays.

Other factors

4.47. Issues surrounding viability of NFFO contracts were also raised, particularly by focus group participants in Scotland. However, it was cited that this is only actually affecting a small proportion of capacity (around 20 MW in Scotland).

WHAT SCHEME ELEMENTS ARE TYPICALLY IN PLACE WHEN PLANNING PERMISSION IS GRANTED?

4.48. The extent of time taken to start of construction once schemes have received planning permission will depend on the degree of progress made in the pre-approval

phase in relation to a number of key elements required for renewable energy schemes. Elements required in order to enable construction to commence, include:

- Grid connection;
- Power Purchase Agreement (PPA);
- Agreement with landowner;
- Connection Wayleave Rights;
- Contracts with suppliers.

4.49. Several developers during interviews and focus group discussions noted that planning permission is often the key item within project planning which is 'waited on' before putting other elements in place. Responses from questionnaires indicated that:

- Agreements with landowners are typically put in place at an early stage, with the majority (92%) of developers having a full legal agreement in place at the point of receiving planning permission.
- Typically developers have not made any significant progress in terms of contracts with suppliers at this point (75% indicated that this was the case). The time at which a decision will be made by the determining authority is very unpredictable, advanced discussions on tendering are very difficult, and manufacturers are often unwilling to engage in discussions prior to planning approval. Furthermore contract details will depend in part on planning conditions. However, one major developer indicated that they would have a contract at an advanced stage ready to place soon after receiving planning permission. This reflects the fact that larger companies are likely to find it easier to enter into negotiations at an early stage.
- Other elements vary between developers: 50% of questionnaire respondents noted that they have nothing in place in terms of PPAs, with one developer noting that due to the complexity of negotiations they will only take forward discussions if a scheme is consented. One focus group participant noted that typically developers need planning consent, an idea of timescales for generation and electrical information prior to being able to negotiate a PPA. 17% of questionnaire respondents (i.e. two developers) indicated that they typically have full legal agreements in place. Large vertically integrated companies fall at both ends of the spectrum, since there is no difficulty confirming the PPA as it is an internal transaction i.e. they can choose to arrange it sooner or later.
- The level of agreement in place in terms of grid connection varies: 33% of developers would typically have a full legal agreement in place, 25% heads of terms, 33% an agreement in principle, and a small minority nothing in place (8% representing one questionnaire respondent). This varies by country, with developers in Scotland being more likely to have progressed grid connection further than developers in England, who prefer to pay for connection following planning approval, due to differing constraints. None of the questionnaire respondents indicated that they would have made no progress at all.

- In terms of connection Wayleave Rights 50% of respondents noted that they would have heads of terms in place, whilst 42% indicated they would have nothing in place. One developer indicated they would have a full legal agreement in place.

4.50. Questionnaire respondents were asked what proportion of their schemes are speculative in nature (i.e. submitted for planning permission prior to having agreed project finance, PPAs, grid connection, etc). Of those who answered this question, approximately half indicated that all their projects were 'speculative', whilst only one developer indicated that a small proportion (25%) of their projects were speculative.

WOULD THIS DIFFER IF CERTAIN CONSTRAINTS WERE REMOVED?

4.51. Several developers made the point that the time taken to receive a decision on planning applications is very unpredictable, which means that advanced discussions on tendering and procurement are very difficult. The uncertainty in terms of planning application outcomes was also cited as a factor which limits confidence to advance other elements of a scheme.

4.52. Another developer noted that if 'up front costs' were different this would affect the 'risk profile' of schemes. This refers to costs such as grid connection deposits, which are forfeited if planning permission is refused and a scheme is abandoned.

ACTIONS UNDERTAKEN BY DEVELOPERS TO MINIMISE DELAYS

4.53. Developers cited a number of actions which they have undertaken to minimise delays in the start of construction (only one developer noted that his company had not taken any action as such). Typically actions include:

- Ensuring that key constraints are understood at an early stage e.g. potential competition for grid capacity;
- Paralleling key activities in the knowledge that this may result in sunk costs (noted by several developers). For example, commencing procurement in parallel to seeking planning permission; negotiating with turbine suppliers before a PPA is in place; working on construction contracts, grid agreements and landowner agreements pre-approval in order to move quickly after consent;
- There is a general feeling amongst developers that where grid capacity is constrained developers should seek grid allocation prior to planning approval. One developer noted that '*it is unrealistic to go for planning permission and then grid connection due to the huge lead in times*';
- Putting elements in place at an earlier stage e.g. securing land and ensuring all off site works are defined early on, earlier applications for grid connections, etc;
- One developer funded external legal support to speed up local authority work (although he noted that when the company tried to appoint consultants to act on

behalf of the LPA this led to procedural issues/concerns over conflicts of interest);

- Another developer appointed a construction project manager 6-12 months before a planning decision was expected in order to move key elements of the project on at an early stage.

4.54. However, developers noted that there are limits to what they can do. For example, one developer noted *'we have suffered* [from delays] *less than others due to the effort put in at the pre-consent stage. We appreciate this is not always possible for smaller developers'*. This suggests that there are two tiers of developers: large developers with more control over PPAs, finance (for example using balance sheet financing which allows elements to run in tandem), suppliers etc. and smaller developers with less control over these elements. Another noted that some elements simply cannot be put in place prior to granting of planning permission e.g. securing project finance with banks.

COMPARISON WITH FINDINGS FROM EARLIER SURVEYS OF ONSHORE WIND SCHEMES

4.55. Generally the findings from this research accord with the findings of earlier surveys (BWEA, 2003 and RAB, 2004). For example, the BWEA survey found that landowner negotiations were the most often cited cause of delay, which is also the case from this research. Many of the other factors identified through earlier research have again been raised as issues through this research e.g. grid connection issues. However since this research asked developers to rank the significance of factors leading to delays it is possible to identify that some factors, such as agreeing PPAs, are not considered to be key causes of delay which require action. Other observations include:

- NFFO viability which was identified by several developers as leading to fairly lengthy delays did not emerge as a key issue through this research.

- Grid connection issues appear to be becoming more significant, compared to the results of earlier surveys.

- Issues with planning agreements and conditions, which were identified by a number of developers in earlier surveys, appear to continue to be a cause of delay.

5. FACTORS DELAYING COMMISSIONING OF OFFSHORE WIND SCHEMES

INTRODUCTION

5.1. Offshore wind energy is expected to be an important contributor towards the Government's 2010 target for renewable generation. There is currently over 1000 MW of capacity with planning consent waiting to commence construction, and a second round of offshore leases from the crown estate totalling 7200 MW.

The picture for offshore wind

Extent of delays

- 12 offshore wind schemes have been approved since 2000. Of these 2 are operational, 2 are under construction, and 8 schemes are yet to reach the start of construction (the latter representing 1008 MW).
- Of the schemes awaiting the start of construction, 2 schemes, accounting for 366 MW have been awaiting construction for 2-3 years (which could be classed as being of 'medium risk' of not being constructed).
- The average time from approval to start of construction is 15 months and the average time from approval to commissioning is 22 months.

Key causes of delays

- Agreeing contracts with technology suppliers has emerged as being one of the key issues which is delaying the development of offshore wind schemes. This relates to how the balance of construction risk is shared between the contractor and developer, and hence affects contract prices.
- Marginal project economics are leading to difficulties in securing project finance with banks.
- Developers are having to undertake lengthy negotiations with banks, suppliers and PPA providers to try to make schemes profitable.
- Some developers have experienced problems and delays due to FEPA licensing conditions e.g. technical requirements which are unrealistic for contractors to work to.
- Lack of resources within key organisations involved in the consent and post-consent processes are leading to some delays.
- Changing ownership of schemes, lack of construction capacity and difficulties negotiating onshore grid connection routes have also caused delays.

WHAT IS A BEST PRACTICE LENGTH OF TIME FROM PLANNING PERMISSION TO START OF CONSTRUCTION?

5.2. The average time taken from approval to commissioning of offshore windfarms is 22 months. The average time from approval to start of construction is 15 months (based on the four schemes which have reached this stage), but the length of time ranges considerably with the four schemes taking 9, 10, 13 and 26 months.

Developers have indicated that they would expect a best practice length of time from approval to start of construction to be anywhere between 6-9 months to 18 months.

5.3. In terms of construction itself, it was noted that the construction period is very variable for offshore schemes due to the sensitivity to inclement weather conditions. Construction periods therefore tend to drift. It was noted that this might improve with experience.

KEY FACTORS LEADING TO DELAYS

5.4. As only a small number of developers have experience post approval (2 offshore windfarms have been built and two are under construction), the sample on which the following analysis is based is relatively small. Nevertheless some clear messages and common experiences have emerged.

5.5. Finalising supplier/construction contracts were identified as having caused delays by all the questionnaire respondents. Finalising grid connection and landowner negotiations (for onshore connections) were identified as having caused delays by 50% of questionnaire respondents. A range of other factors causing delays were identified by single developers, including difficulties securing capital finance, agreeing PPAs, and securing Wayleave Rights.

5.6. When asked to identify the most significant factors delaying the start of construction the following issues were raised:

- Three questionnaire respondents (75%, representing 46% of approved offshore capacity) identified finalising contracts with suppliers to be one of the most problematic issues; this was backed up by discussions with the BWEA.
- Project financing and agreeing PPAs were ranked top by two further developers.
- Onshore grid connection, license conditions and landowner negotiations/connection Wayleave Rights were ranked as being of second most significance by three of the respondents.

Engineering, procurement and construction (EPC) contracts

5.7. Agreeing contracts with suppliers has emerged as being one of the key issues which is delaying the development of offshore wind schemes. Overall project economics seem to be worsening because of increased steel prices and as suppliers react to technical difficulties faced with early schemes, by increasing fees to cover their risks. The key issue stems from how the balance of construction risk is shared between the contractor and developer. One developer noted that 'risk allocation' is leading to delays in finalising supplier/construction contracts of more than 15 months.

5.8. Typically, EPC contracts push the risks down the contracting chain. Developers seek a fixed price contract, prime contractors then push risk on to sub-contractors, which leads to a high fixed price to factor in the high level of risk.

5.9. However, due to marginal economics for offshore wind schemes it is difficult for developers to accept high prices. One developer noted that EPC contracts have to be constantly reworked to make them profitable.

5.10. Another developer noted that as an independent developer they require third party finance from banks. Banks require EPC contracts to be in place which means the developer does not have the freedom to use multi-contractors, which would enable them to take on a greater degree of risk themselves and hence minimise costs. The developer noted that *'the fundamental thing that needs to be resolved is how to reduce the risk premium and the EPC costs'*.

Project finance

5.11. Offshore schemes have additional technological costs over onshore technologies and the costs of grid connection are higher. A lack of competition in the market and a small number of suppliers also push up costs. A series capital grants for offshore wind farms from DTI and one from the New Opportunities Fund was made available shortly after the start of Round 1, & consented projects received grants of up to £10m per project, roughly equivalent to 10% of capital costs. These formed an essential bridge between the RO and early offshore project costs.

5.12. However, project economics for offshore schemes are still marginal which is leading to delays. Marginal economics mean that schemes are facing difficulties in securing finance from banks. One developer felt that this was due to the immature market for Round 1 projects. Another developer noted that *'if the project is marginal (or worse) internal and/or third party funding will be difficult to obtain. More time is then spent on this aspect as well as trying to improve the PPA and EPC contracts in order to achieve financial close on the scheme'*.

Power Purchase Agreements (PPAs)

5.13. Concerns were also raised that poor PPA offers can put projects below the economics threshold.

Grid connection

5.14. Some Round 1 schemes have experienced difficulties with grid connection. Primarily this appears to relate to high costs and delays in receiving offers e.g. one developer noted that a delay on the part of the grid company in providing an offer delayed the project by 6 months.

5.15. Overall it appears that grid issues have not been a significant problem for Round 1 schemes, since they are relatively small and hence easy for the grid to accept. A BWEA representative also noted that generally there is less competition for grid capacity offshore and, due to the strategic identification of offshore locations, there is less of a 'free-for-all' as is the case onshore.

5.16. However, increasing grid connection issues for Round 2 schemes are likely, and are discussed further in relation to emerging trends (see section 9).

License conditions/approval procedures

5.17. Offshore windfarms require several consents, including consent via a S36 application for the windfarm itself and offshore cables, S37 approval for onshore cables and planning approval through Town and Country Planning procedures for the substation onshore. Schemes also require a Food & Environment Protection Act (FEPA) license (as do all developments affecting the seabed). It was noted by one interviewee that processes were 'quite confused' for Round 1 schemes, but this is being resolved as experience is built up. It was also noted that the Marine Bill, included in the programme of legislation for the new session of Parliament, might affect consenting procedures for offshore windfarms. The aims of the Bill include introducing a streamlined system for planning and managing activities and consenting developments in coastal and marine waters and improving capacity for planning and handling the growth in offshore developments across a range of sectors.

5.18. One developer in particular noted that FEPA licensing conditions[9] (which in England are set by Defra) can lead to delays (in their case it took 9 months longer than expected to agree conditions). The BWEA industry representative also indicated that there is a general perception that conditions can lead to delays, although this is not considered to be a major problem (particularly compared to the financial issues outlined above).

5.19. Conditions which developers have found problematic include:

- Onerous environmental monitoring requirements which do not take into account previous monitoring. It is hoped that Defra will be looking at monitoring results in order to adjust requirements in future. For example in relation to sand bank scour, monitoring of current schemes is proving this to be a lesser concern than at first thought.
- Requirements for remote bird monitoring due to availability of technology.
- Unrealistic expectations of technical delivery. Contractors are unwilling to commit authority requirements e.g. 3m burial depth on cable installation, and requirements for turbine lighting.
- Maritime and Coastguard Agency lighting requirements are considered to be excessive and poorly justified by developers. Some developers are being asked to put lit-up numbers on turbines to help vessels pinpoint their location, which arguably is not mitigation of an impact, but an expectation of an improvement on the back of offshore development. Lighting requirements can also conflict with concerns over visibility onshore.

5.20. The BWEA also raised concerns about lack or resources within key organisations involved in the consent process and also in agreeing conditions. For example, within

[9] All applications for licenses under the Food & Environment Protection Act in England are processed and licences issued by the Marine Consents & Environment Unit (MCEU) on behalf of Defra, the licensing authority. Although responsibility for statutory controls in respect of activities within Welsh territorial waters is devolved to the National Assembly for Wales, the administration of such applications on behalf of the Assembly is also undertaken by the MCEU. Licences for deposits made in Scottish waters are the responsibility of the Scottish Executive (administered on behalf of the Environment and Rural Affairs Department by the Marine Laboratory, Aberdeen); those around the coast of Northern Ireland being the responsibility of the Northern Ireland Assembly (DoE Environment and Hertitage Service).

Defra, the MCA and CEFAS (who undertake assessments for Defra) which could lead to project delays.

Other factors

5.21. A number of other factors also contribute to project delays:

- **Changing ownership of schemes**: One developer noted that the time it took to agree the sale meant that the construction 'window' was missed leading to the project being delayed by a year. Another scheme which changed hands experienced delays due to conditions agreed prior to the sale proving difficult to fulfil in engineering terms.

- **Supply of turbines/construction capacity:** There is a lack of capacity globally, and the burgeoning market in the USA and other countries is increasing lead times considerably and putting upward pressure on prices. Developers also noted vessel availability as affecting the start of construction. There is often considerable uncertainty as to when construction will commence.

- Time taken to **negotiate onshore grid connection routes**: the constrained choice of onshore grid connection locations can result in very narrow areas being suitable for running onshore cables. This puts landowners in a strong position, hence leading to longer periods of negotiation.

WHAT SCHEME ELEMENTS ARE TYPICALLY IN PLACE WHEN PLANNING PERMISSION IS GRANTED?

5.22. The extent of time taken to start construction once schemes have received planning permission will, in part, depend on the degree of progress made in the pre-approval phase. The extent to which different scheme elements are advanced at the point of planning approval are summarised below:

- Grid connection: of the four developers who responded to the questionnaire all would typically have made some progress with grid connection, typically either an agreement in principle (40%), agreeing heads of terms (40%), or even having a full legal agreement in place (20%).

- PPAs: the extent to which PPAs are progressed varies considerably from having nothing in place (20%), through to an agreement in principle/shake of hands (20%) to heads of terms or a full legal agreement (60%);

- Landowner negotiations: typically developers have heads of terms in place (80%), with one developer noting that sometimes they might have a full legal agreement;

- Connection Wayleave Rights: this element also showed considerable variation across developers, ranging from nothing in place (20%) to a full legal agreement (20%);

- Contracts with suppliers: typically developers have not commenced contracts with suppliers at the point of planning approval (60%), although one developer

noted they may have an agreement in principle/shake of hands in place and another noted they may have agreed heads of terms.

WOULD THIS DIFFER IF CERTAIN CONSTRAINTS WERE REMOVED?

5.23. Two developers noted that EPC negotiations are dependent on the final conditions attached to consent. However, one noted that if model conditions were established, this could provide more certainty in terms of likely requirements/expectations by authorities, which could enable negotiations with suppliers to start sooner.

ACTIONS UNDERTAKEN BY DEVELOPERS TO MINIMISE DELAYS

5.24. Developers noted several things they have done to minimise delays, including:

- Starting discussions even earlier than originally intended for example with landowners onshore, with Defra etc;
- Thorough due diligence processes, learning from past experience;
- Progressing a large amount of development expenditure prior to having agreement on planning conditions, grid connection, Easements, etc.

6. FACTORS DELAYING COMMISSIONING OF HYDRO SCHEMES

INTRODUCTION

6.1. It is widely accepted that further large hydro schemes are unlikely to be developed in the UK, with the exception of the 100 MW Glendoe scheme proposed by Scottish and Southern Energy for a site near Loch Ness in the Scottish Highlands, which was approved by the Scottish Executive in July 2005.

6.2. However, as noted by Harrison[10], while large scale potential may be limited, there is significant potential for smaller plant, particularly in Scotland. A Renewables Advisory Board study in 2003[11] identified 123 potential small hydro projects with a combined capacity of 205 MW. Of these, 43 MW were in progress or highly likely to go ahead by 2010, with a further 28 MW classed as likely, i.e. with a 50% chance of progressing. Overall, between 90 and 135 MW of additional small hydro was expected by 2010 although it was noted that a failure to deal with planning, financing and network issues could see that capacity fall.

6.3. The small number of schemes which have been approved since 2000 (see box below) and the small amount of this accounted for by small hydro schemes, suggests that these schemes are not progressing into or through the planning system at as fast a rate as anticipated or required. This research has focused on post-approval delays, but one developer noted that a key area of concern is securing planning approval in the first place, for example, due to environmental concerns.

6.4. From the single questionnaire response received from hydro developers, 2 of the developer's projects were under development having received planning consent and one was fully operational, all based in Scotland. In having only one respondent with projects in only one part of the UK, neither regional variations nor problems associated with developer size could be determined.

The picture for hydro schemes

Extent of delays

- Of the 12 schemes which have been approved since 2000 (representing 120.64MW of capacity), 2 hydro projects have been commissioned, 2 are under construction and 8 are yet to start construction (the latter representing 108.54 MW, of which 100MW is accounted for by one large hydro scheme).
- Of the schemes awaiting the start of construction, 2 schemes, accounting for 4.14MW, have been awaiting construction for 2-3 years (which could be classed as being of 'medium risk' of not being constructed).
- At present there are no schemes awaiting start of construction which could be classed as being of high risk (3+years in post approval phase with no progress with

[10] G.P. Harrison Prospects for Hydro in the UK: Between a ROC and a Hard Place? University of Edinburgh, United Kingdom

[11] Renewables Advisory Board (2003). The Carbon Trust and DTI Renewables Network Impact Study, London: DTI

construction).

- 104.4MW of capacity has been awaiting the start of construction for less than 2 years (with 100MW of capacity in the Glendoe scheme only having been approved in July 2005).
- For hydro schemes approved and commissioned within the last 5 years, the average time to commissioning is 15.5 months.

Key causes of delays

- It was reported that most issues with hydro schemes tend to arise pre-approval, and relate to what must be addressed to successfully secure planning permission e.g. satisfying environmental concerns.
- Grid connection is recognised as becoming a more significant problem in Scotland.
- Finding EPC Contractors who fully understand the full scope of work and the remoteness of the working site is difficult.
- For projects over 1MW (DNC), the Scottish Executive will be the determining authority. Conditions arising from this process are typically reasonable, but conditions are sometimes applied which take a considerable time and effort to resolve and can become a critical factor in delaying project timescales.

WHAT IS A BEST PRACTICE LENGTH OF TIME FROM PLANNING PERMISSION TO START OF CONSTRUCTION?

6.5. From the one developer who took part in the research, best practice times were considered to be as follows:

- From consent to construction start: 0 to 6 months
- From construction start to fully operational: 2 to 3 years (depending on project size).

KEY FACTORS LEADING TO DELAYS

6.6. Factors which can lead to delays for hydro schemes are explained below.

Engineering, procurement and construction (EPC) contracts

6.7. No delays were encountered in the negotiation and finalisation of EPC contracts, but significant delays were subsequently incurred during the construction phase. The remoteness of small and large hydro projects played a significant role in this delay, which was not accounted for by the main contractor.

Project finance

6.8. No delays through difficulties in financing were incurred, due to the projects being funded by the developer. Internal investment criteria still had to be met by each project, however, but this was determined well in advance of the planning decision.

Power Purchase Agreements (PPAs)

6.9. The projects under development by this large utility did not suffer any problems with PPAs, as the company was vertically-integrated with a supplier and so avoided any issues affecting smaller developers.

Grid connection

6.10. The developer noted that grid connection is a worsening problem for many renewable energy schemes and a significant barrier to the smooth progress of schemes. This however, had not affected the small hydro projects under development by the developer as there had been decent HV connection opportunities adjacent to the project.

Planning conditions/agreements

6.11. All projects under development were in excess of 1MW declared net capacity (DNC) and therefore the planning applications were determined by the Scottish Executive and not the Local Planning Authorities (LPA). Even though planning conditions discussions began at a pre-permission stage, there were still delays incurred through these negotiations being protracted and then difficulties in resolving the planning conditions once agreed upon.

WHAT SCHEME ELEMENTS ARE TYPICALLY IN PLACE WHEN PLANNING PERMISSION IS GRANTED?

6.12. The questionnaire respondent noted that most scheme elements would be at a fairly advanced stage at the point of planning approval, for example heads of terms would be agreed for grid connection, full legal agreements would be in place with landowners and heads of terms would be in place for connection Wayleave rights. The main element which would not have been commenced is contracts with suppliers. It was not felt that this situation would change even if certain constraints in the post-planning phase were removed.

ACTIONS UNDERTAKEN BY DEVELOPERS TO MINIMISE DELAYS

6.13. To accelerate the post-approval programme, the developer chose to progress key elements of the scheme, such as grid connection, landowner negotiations and connection wayleave rights at an early stage of the project. This was possible since the developer financed the projects internally and gained corporate approval at the pre-consent stage. This would not, however, be an option for many smaller developers looking to develop similar schemes.

7. FACTORS DELAYING COMMISSIONING OF BIOMASS SCHEMES

INTRODUCTION

7.1. The DTI and Carbon Trust Renewables Innovation Review notes that whilst wind power can deliver almost all the required growth in renewable energy to meet the 2010 target and is likely to continue to be the dominant renewable technology out to 2020, biomass could provide a material contribution to UK heat and electricity generation. However, it recognises that development of biomass schemes may be resource constrained. The main challenges in taking biomass forward are therefore not technology issues but related to the fuel chain. There is the potential for many biomass feedstocks to be grown within the UK. In some cases, crop yields will need to be improved before the process becomes economic. Likely areas for development are smaller-scale regional projects, and the promotion of energy crops such as short-rotation coppice.

7.2. Of the three questionnaire responses received through this research covering three projects, one project was based in England, one in Scotland and one in Northern Ireland. The schemes had proposed installed capacities of 2.6, 44 and 2.7MW respectively. Only one of the respondents' projects was designed to be a combined heat and power facility, with the other two designed for electricity generation only. Due to its limited life expectancy within, and cap on contribution to, the Renewables Obligation co-firing was not included within this study.

The picture for biomass schemes

Extent of delays

- Of the 7 schemes which have been approved since 2000 (representing 116.11MW of capacity), 1 biomass project has been commissioned (in Northern Ireland, with a capacity of 2.71MW), 6 are yet to start construction (representing 113.4 MW) and there are no schemes currently under construction.
- Of the schemes awaiting the start of construction, 2 schemes, accounting 22.2MW, have been awaiting construction for 2-3 years (which could be classed as being of 'medium risk' of not being constructed).
- 79MW of capacity has been awaiting the start of construction for less than 2 years.
- For the 1 biomass scheme approved and commissioned within the last 5 years, the time to commissioning was 17 months.

Key causes of delays

- Delays are most prevalent prior to applications being submitted (awaiting grant funding approval) and during the application period (LPA inexperience and lack of resources).
- Financial investors and lenders will generally be unwilling to discuss projects in detail until full planning consent has been secured. No legally-binding commitment will then be made by investors or lenders until all project risks have either been removed or mitigated.
- Fuel supply risks can have a significant role in whether a project is economically viable.
- Incorporation of "recycled" biomass into the fuel mix can help project economics but

lead to more stringent environmental permitting conditions and could give rise to planning application objections.

- Planning conditions have not been a cause of delay.
- Grid connection and wayleave rights have not been a cause of delay.
- Uncertainty on how BETTA regulations are going to work in Scotland are a cause for concern but not causing any delay to projects at present.
- PPA price, length and conditions have been indicated by smaller developers as causing delays to projects. This is not an issue for large utilities as they are often vertically-integrated with Suppliers.
- Uncertainty of long-term ROC prices (beyond 2015) is concerning developers as it typically limits the length of viable PPA that can be obtained and can also affect the conditions surrounding finance being raised.
- There is a lack of good quality, turnkey EPC contractors with experience in the construction and commissioning of biomass projects, leading to elongated negotiations.
- New technologies are not currently bankable as they do not have any track record of operation. Therefore projects proceeding are currently reverting to proven technology suppliers with bankable guarantees.

WHAT IS A BEST PRACTICE LENGTH OF TIME FROM PLANNING PERMISSION TO START OF CONSTRUCTION?

7.3. Developers reported a wide range of 'best practice' times from receipt of planning permission to start of construction, typically between 6 and 12 months. Depending on project size, a best practice length of time from consent to full operation is anticipated by developers to be 18 months (for small MW projects) to 3 years (for large MW projects).

KEY FACTORS LEADING TO DELAYS

7.4. Of the perceived risks, no single element was unanimously highlighted from the responses as the most significant cause for delay, which reflects in part the differences in size and background of each developer, and specific details of each project. Key causes of delay are discussed below.

Planning approval

7.5. The first major barrier to dedicated biomass projects lies with the application stage of planning and is considered by most developers the most time-consuming and first major hurdle to overcome. Whilst this falls outside the scope of this study, the magnitude of this barrier is such that it would be errant not to mention its significance in passing. Very little progress is often made by the developer on key elements such as grid connection, PPAs, landowner and wayleave negotiations, and supplier contracts prior to the planning approval being granted, due to the financial and time commitments necessary in overcoming this initial hurdle.

7.6. Those projects being progressed by large developers or developers with an existing site with an operational business are typically at an advantage as they may either be vertically integrated with a supplier, thus avoiding protracted PPA negotiations or

have a grid connection and, to some extent infrastructure, already present. This will inevitably lead to a more condensed project programme post-consent.

Project finance

7.7. Beyond planning approval, mitigating risks to enable finance and insurance to be secured is the next most significant barrier highlighted by all of the developers. The ability for a developer to raise finance is greatly affected by the perceived risks of the project and/or the developer himself. Financial investors or lenders will typically require all risks associated with fuel supply, planning conditions, grid connection and wayleave rights, power purchase agreements, technology and the EPC contract mitigated prior to their participation, which would normally not be before project financial close has been reached.

7.8. Additionally, securing grant funding or good quality combined heat and power (CHP) incentives can delay projects as the application process can be slow and with regard to CHP, the documentation is not designed for biomass but must be adapted from natural gas documentation.

7.9. Changing legislation and long-term ROC price uncertainty were highlighted by all three respondents as a major concern to biomass projects. These projects typically require a 15 to 20 year payback period at the outset, which is currently well beyond the 2015/16 Obligation plateau, and therefore it is key for many developers requiring significant external finance to obtain a guaranteed off-take price for a significant proportion of this time. This is not currently possible with the levelling off of the Obligation in 2015/16, as there is not sufficient confidence amongst Suppliers that there will a shortfall of ROCs beyond this point.

Fuel supply

7.10. Biomass is the only renewable energy source which has a cost associated with the feedstock (n.b. where "clean" biomass is utilised). Fuel supply uncertainty has been indicated as a significant uncertainty for the largest project of the three respondents, which is attributable to not only the cost of this fuel but the availability of sufficient material within a 25-30 mile radius of the generating facility. Economics for "clean" biomass projects are thus marginal at best, often leading to the application for the addition of other "recycled" biomass materials to the fuel mix. This will, however, lead to greater fuel handling and combustion complexity, and more stringent emissions limits being imposed by the Environment Agency as the project will be required to comply with the Waste Incineration Directive (2000/76/EC), in turn leading to greater project capital expenditure and potentially more onerous planning conditions.

Planning conditions

7.11. None of the respondents highlighted agreeing or discharging planning conditions as a cause for delay in their respective projects. All had differing mixes of open and closed conditions placed on them by the LPA, for which discussions were initiated with the LPA case officer in the pre-permission phase of the application.

Wayleave rights

7.12. Wayleave rights were not highlighted as a problem, which may be due to biomass projects needing to be located close to major road networks and/or on previous industrial sites, which could potentially alleviate the problem of "ransom strips".

Grid connection

7.13. Grid connection was not considered a cause for delay for any of the respondents' projects, but no clear conclusions can be drawn as each project is at a different stage of development, with differing site-specific requirements from the connection, and located in different areas of the UK.

7.14. For example, the respondent from Scotland is only at the point of selecting the combustion technology and main EPC contractor, and does not anticipate the project to be operational until late 2007, therefore grid connection negotiations have not taken priority at this point and are at a stage where Heads of Terms have been agreed. In contrast, the project in Northern Ireland is now operational but already had an existing grid connection to the site and therefore specific negotiations were required to change from a net importer of electricity to a net exporter.

7.15. One current area of uncertainty as raised by a respondent was with regard to BETTA. It was stated that it was still not clear how the new BETTA regulations were to work in Scotland for small generators. This is, however, understood by the study team to be under review by OFGEM/DTI.

Power Purchase Agreements (PPAs)

7.16. Negotiations of PPAs were indicated as a barrier which has given rise to delays for the two smaller projects. The causes of these delays were different in nature, which was primarily a reflection of each project's location. The first project, based in Northern Ireland, faced lengthy negotiations through the inexperience of Suppliers in the region in writing agreements for any renewable technology sector other than wind. The other project, located in England, is still suffering delays through not being able to secure an acceptable long-term agreement at a viable price. This is not, however, due to inexperience of the Suppliers and it is not clear what would be deemed as "acceptable", which may or may not be realistically achievable. These factors led to delays of 1 to 2 months for the former and +1year (and counting) for the latter.

7.17. The largest project, under development by a large utility, has stated that being vertically-integrated with a Supplier has avoided any issues with regard to PPAs.

Engineering, procurement and construction (EPC) contracts

7.18. Supplier (EPC and technology) contracts have been raised by two of the respondents as causes for delay, with the difficulty lying in the ability to find suitably experienced EPC contractors to undertake this type of project. This has elongated the project programme by a few weeks. To mitigate technology risks, these developers have opted for standard, proven technologies from suppliers with bankable performance guarantees.

WHAT SCHEME ELEMENTS ARE TYPICALLY IN PLACE WHEN PLANNING PERMISSION IS GRANTED?

7.19. Biomass schemes typically appear to have finalised fewer scheme elements at the point of planning permission (e.g. grid connection and landowner negotiations) than other renewable energy technologies. This appears to reflect the fact that planning approval itself is seen as the key hurdle to be overcome.

ACTIONS UNDERTAKEN BY DEVELOPERS TO MINIMISE DELAYS

7.20. Developers noted several things they have done to minimise delays, including:

- Concentration on developing existing sites;
- Constant and ongoing dialogue to try to secure long term PPAs.

8. INVESTOR FEEDBACK SUMMARY

INTRODUCTION

8.1. This part of the study primarily aimed to:

- Ascertain from the financial community the conditions under which finance would be available at the appropriate scale and lowest cost;
- Secondary to this, the research aimed to establish whether there were any key criteria not being fulfilled by developers delaying financial investment in renewable energy projects, thus contributing to delays in commissioning these projects.

8.2. Direct engagement of the investment community was effected through the distribution of an Investor Questionnaire, distributed to 70 organisations covering the full investment spectrum including large utilities, banking, private equity and fund managers. Responses were few, however, numbering only 8 in total, and therefore the following analysis does not establish a firm evidence-based consensus from the entire community. Nevertheless it does give a snap-shot of prevailing attitudes.

8.3. Feedback from the questionnaires has been collated and evaluated against the project objectives to develop perspectives on:

- Investor perceptions of the major opportunities and risks associated with investment in renewables in the UK, by technology sector and regionally;
- Comparison of incentives in the UK from the Renewables Obligation versus the Non-Fossil Fuels Obligation, and how the introduction of the RO has affected investor confidence;
- Identification of the scale of potential funding available from the private sector and actions required by others (e.g. Government, developers, etc.) to support such investment;
- Investor recommendations for increasing quantity and rate of investment or lending to renewable energy projects.

INVESTOR PERSPECTIVES

8.4. The majority of those who had completed the Investor Questionnaire were debt providers (5 of 8), and primary technology in which active investment or lending was taking place was in the wind sector, both onshore and offshore. Whilst 75% of respondents said they were actively seeking opportunities in the biomass sector also, very little debt/equity provision had taken place to date.

8.5. The perceived lack of transparency and predictability of Renewables Obligation payments at the outset meant that they initially constituted equity upside rather than a bankable element in a project's revenue stream, leading to difficulties in projects obtaining funding. Banks have held back from attempting to predict (and lend against) Renewables Obligation Certificate and Levy Exemption Certificate values at the

outset, let alone lending against the value of any recycled payments that might be shared with a generator under the Renewables Obligation's buy-out mechanism (the 'smear-back'), which has made it increasingly difficult to get projects through to financial closure.

8.6. When asked about how actual investment or lending had performed since the RO was introduced in 2002 versus business forecasts made at that time, all but one respondents said that generally there were slower than expected levels of development, leading to a shortfall in their forecasts. Of all the sectors considered, onshore wind and landfill gas had drawn higher levels of investment as both were fully accepted asset classes by the financial community, whilst dedicated biomass clearly had drawn lower levels of investment due to the quality of projects being insufficient to meet investment criteria in terms of mitigating technology and fuel supply chain risks.

8.7. There were split views as to whether investment or lending opportunities had increased since the introduction of the Renewables Obligation. The positive feedback from the questionnaires was that there was definitely more incentive to invest under the RO compared with the NFFO scheme, but that some projects coming forward are new technology with insufficient support to guarantee future projections of operation and there is stiffening competition from other parts of Europe for renewable energy capital.

8.8. The minimum investment criteria for renewable energy projects varied from respondent to respondent, but typically investors do not want to commit to projects until financial close or beyond, when all project risks have been satisfactorily mitigated in terms of planning, technology, performance and long-term revenue security (PPA). Some investors will look for a minimum project size, in terms of installed capacity or output per annum, whilst others will look for a minimum amount of debt to be provided at an internally acceptable rate of return.

8.9. This point has been further reflected in the responses received to the question of number of projects currently financially committed to and post-consent barriers encountered. Only the large utility respondents (2 in total) have disclosed having incurred delays, which is a reflection of its financial commitment to the project in the early stages of development. To date, 50% of projects under development by this company have suffered delays.

Comparison of RO and NFFO Schemes

8.10. The Renewables Obligation, based on an economically rational, market-orientated, demand driver, represented a significant break with the financial certainty of NFFO. The introduction of the RO policy framework created new Renewables Obligation Certificate (ROC) and Levy Exemption Certificate (LEC) revenue streams for renewable generators, with the view of helping elevate the sector from peripheral to main stream generator status.

8.11. The supply shortfall resulting from the demand obligation still points to premium Renewables Obligation Certificate values through to 2010, and possibly even through to 2015, based on certain recycled buy-out payment assumptions and the

government's recent amendment (2004) to its Renewables Obligation demand profile extending it through to 15.4% by 2015.

8.12. All respondents viewed the Renewable Obligation Certificate (ROC) market as sufficiently valuable to support ongoing involvement of the financial community in renewables, although all but one respondents indicated that long-term price security for the ROC being established to beyond 2015 (possibly to 2020) in the near future was paramount in retaining investor confidence. One respondent suggested that to retain confidence, perhaps a minimum ROC price certainty on a long-term basis was required by virtue of establishing a floor price or implementing guaranteed target increases.

Scale and Conditions of Funding Available

8.13. Projects financed under the Renewables Obligation generally have higher equity and lower debt requirements than their NFFO predecessors, reflecting the uncertainty associated with the market-driven Renewables Obligation. The 90/10 debt/equity structures common under NFFO have thus given way to something closer to 60/40, and it is these increased equity requirements that small project developers have had difficulty meeting.

8.14. Two respondents stated that they would typically look for a minimum internal rate of return from renewable energy projects of 10% (no other responses were given in relation to this point), with typical cost of debt ranging from LIBOR+0.9 to 1.0% for onshore wind, to LIBOR+1.4% for offshore wind and biomass.

8.15. Responses with regard to debt service coverage requirements varied from 1.35 times against base case wind forecasts on P50 energy yield assumption for low risk projects, to >1.5 times for high risk projects such as biomass projects.

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

8.16. A summary of respondents views on potential areas giving rise to delays in the period from consent to commissioning projects were as follows:

- Unacceptable risk mitigation measures in place;
- Unrealistic developer programmes;
- Unsophisticated developer project management and risk management processes;
- Grid connection/access easement;
- Open-ended post-consent environmental studies;
- EPC contract negotiations;
- Suitably long-term bankable PPA in place;
- Marginal (at best) economics for offshore wind and biomass.

8.17. All of these risks are considered 'generic' in nature, and therefore all need to be adequately addressed before financial close can occur. It is, however, recognised that regional variations do exist for certain elements (e.g. grid constraints in Scotland and Northern Ireland) but this will not affect the investor as investment will take place only after these issues have been resolved.

8.18. Key factors suggested by the respondents to encourage greater investor participation and to help unlock consented projects included:

- Provision of better support for Round 2 Offshore wind and biomass projects;
- Development of mechanisms to mitigate fuel supply risks and technology risks;
- Provision of power of compulsory purchase of land for grid connection cable run;
- Help to improve project developers' project management and risk management approaches by building necessary skills;
- Provision of greater consistency in planning consent conditions in terms of content and resolution time, through introduction of binding limits on consultation requirements and studies, and legal time limit for determination;
- Resolution of impending grid connection issues;
- Provision of greater ROC liquidity, potentially allowing non-Suppliers to submit ROCs directly to OFGEM (as proposed within the 2005/06 RO Review consultation document).

8.19. The general conclusion drawn from the responses is that there is no lack of liquidity (for debt or equity) in the market, i.e. a well structured, thought-through project will raise finance. Thus the problems must lay upstream of and not within the financial community.

8.20. One of the greatest issues to financing UK renewables, which primarily comprises wind farms, is the perceived threat of a ROC price crash. The possibility of the ROC price crashing to zero is perceived as a distinct possibility under the RO and is thus a barrier to securing long-term debt on projects. It also makes the equity financing more expensive because of the revenue uncertainty in the second half of the wind farm's life (i.e. beyond 2015). Other international markets, such as in Germany and the USA can secure 20-year debt due to the certainty in the long-term incentives for green electricity.

8.21. One possible solution put forward, called the Eufinium Solution and developed by John Dunlop (HSH Nordbank), extends the logic of non-Suppliers able to submit ROCs by proposing full exclusion of suppliers from presenting ROCs in exchange for exemptions on paying the buyout penalty. This would fundamentally change the Supplier's role to a simple administrator of the buyout penalty from the rate-payers to the buyout fund. With all suppliers obligated to pay the full buyout penalty for their individual obligations into a separate buyout fund, this would allow the fund to be distributed proportionately to all holders of ROCs, including Suppliers. In having this type of system, it would alleviate the concerns of worthless ROCs in the

scenario of oversupply to the market. For existing PPAs in place with Suppliers, these would be grandfathered until the expiry of the PPA term.

8.22. This concept seems to offer a robust solution to the fears of a potential ROC price crash, and returns the true value of the ROC to the generator, but may lead to other problems arising, such as the purchase of the power itself from renewables projects with no embedded benefits attached, and whether an obligation on Suppliers to purchase this green power would still be enforceable when they would already be paying the full penalty.

9. FUTURE TRENDS & PROSPECTS

9.1. Overall it appears that there are a number of factors leading to delays in the post-approval phase which are unlikely to improve without intervention of some sort, for example, in relation to grid connection capacity issues for on and offshore wind schemes and financial viability of offshore Round 2 schemes and biomass schemes. Other issues appear to be lessening in terms of severity of delays, for example, negotiating PPAs for onshore wind schemes, due to the body of experience which has been built up on the part of both developers and PPA providers.

9.2. Factors leading to delays in commissioning renewable energy schemes which appear to be becoming more significant over time are explored below for onshore and offshore wind schemes. Due to the small number of hydro and biomass schemes and hence questionnaire responses, it has not been possible to draw out key trends for these sectors.

ONSHORE WIND SCHEMES

9.3. The key factors leading to delays which questionnaire respondents felt are worsening in severity include the following:

- ***Grid connection*** (55% of questionnaire respondents indicated that this is worsening); it was noted by several respondents that grid capacity is becoming a scarcer resource with increasing competition, which is making the process of securing a connection a more onerous process. This was particularly highlighted for Northern Ireland and Scotland;
- ***Connection Wayleave Rights*** (55% of questionnaire respondents indicated that this is worsening); reasons cited for this include landowners becoming more aware of the structure of projects and the potential value leading to ransom strips for access and grid connections;
- ***Planning conditions/agreements*** (55% of questionnaire respondents indicated that this is worsening); it was noted that planning conditions are becoming increasingly complicated;
- ***Landowner negotiations*** (45% of questionnaire respondents indicated that this is worsening);
- ***Contracts with suppliers*** (27% of questionnaire respondents indicated that this is worsening); one developer noted that demand for and supply of turbines are pushing up prices and reducing availability. This was also mentioned in focus group discussions.

9.4. In addition it was noted by one interviewee that in Scotland a lack of resources and expertise in the Scottish Executive is leading to a slow down in the processing of S36 applications.

9.5. Conversely approximately 8% felt grid connection issues were becoming less problematic, and 36% felt PPAs are becoming less problematic due to experience. Landowner negotiations, connection Wayleave Rights and contracts with suppliers were also considered to be lessening in terms of delays by a small minority of respondents.

9.6. One developer highlighted a further factor that he feels is now reducing post-approval delays. He noted that in the past developers suffered from a lack of flexibility in terms of making any changes to S36 schemes post planning approval, leading to delays of up to 12 months (and sometimes requiring re-submission of schemes). He went on to note that developers now know that they must spend longer in the pre-planning submission period (around 6 months longer) to pin down scheme details prior to submitting the application in order to avoid time consuming delays later.

9.7. The key factor which developers felt could emerge in the future and contribute to further delays was any change to the RO, which could jeopardise PPAs and project finance.

OFFSHORE WIND SCHEMES

9.8. Developers expressed mixed views in terms of which factors leading to delays are worsening in severity and which are lessening. This perhaps reflects specific experiences based on individual schemes. For example, grid connection issues, agreeing PPAs, and landowner negotiations were reported by some to be worsening and others to be lessening. Some possible worsening circumstances are explored below.

Financial viability of Round 2 schemes

9.9. Developers appear to agree that project economics are worsening. It was noted that whilst capital grants helped Round 1 schemes, the viability of Round 2 schemes is difficult or even impossible to achieve under the RO alone.

9.10. One developer noted that as well as there being no capital grants, Round 2 schemes are typically bigger and further offshore which will mean costs will be even higher (due to longer cable runs, deeper water, etc.).

9.11. As economic viability worsens, finalising supplier contracts is also becoming harder. One developer indicated that more offshore projects with less credible suppliers, and a realisation by suppliers that the environment is more difficult to work in, is leading to more difficulties in securing profitable contracts with suppliers.

Condition 'creep'

9.12. One developer feared that delays would worsen due to an increase in pre-construction monitoring requirements (which he termed as condition 'creep').

Grid connection issues

9.13. Discussions with developers and industry representatives indicate that grid connection could be a greater issue for Round 2 schemes. The main issue appears to relate to the time at which developers must commit to grid connections. For example, schemes in the north Irish Sea will need significant grid reinforcement on shore, which will take 5 years to put in place. This results in developers taking on a proportion of financial liability before they even have consent for a scheme.

9.14. This point was backed up by a developer who noted that for Round 2 projects long grid connection timescales mean there is a need to accept a grid offer before receiving consent, which involves very high liabilities. This may lead some developers to delay acceptance of the grid offer until a project is more certain which will lead to delays in commissioning schemes.

10. RECOMMENDATIONS

10.1. Based on the preceding analysis which has found that renewable energy schemes are facing a range of delays in the post planning approval phase, the following recommendations are put forward to:

- Assist current approved schemes towards construction and commissioning;
- Speed up the process for future approved schemes.

10.2. Recommendations are grouped according to the cause of delay they are seeking to address. The categories of recommendations are as follows:

- Landowner negotiations and connection Wayleave Rights
- Grid connection
- Technology supply
- Engineering, procurement and construction (EPC) contracts
- Post approval decision making by determining authorities
- Project economics
- Project planning
- Biomass specific measures.

Landowner negotiations and connection Wayleave Rights

Recommendation 1:

RAB to:

- *Encourage the Law Society to include landowner services within its publications and online resources (e.g. online Directory of Solicitors and Barristers, which can be searched by area of law), in order to help those approached by a developer to access expert advice;*
- *Explore the scope for advice on how to approach negotiations, with a landowner representative organisation such as the CLA.*

Justification:

Delays due to difficult landowner negotiations were cited as a key cause of delay, particularly for on- and offshore windfarms. For example, negotiating connection Wayleave Rights were ranked as being the most significant cause of delay by 64% of onshore questionnaire respondents, representing companies accounting for 50% of approved capacity, followed by landowner negotiations (by 55% of respondents, representing companies accounting for 36% of approved capacity). 50% of offshore developers cited landowner negotiations (for onshore connections) as having led to delays.

Grid connection

Recommendation 2:

RAB to urgently take a lead on reviewing grid connection issues, the magnitude of anticipated delays and explore possible solutions in association with DTI/Ofgem/NGET.

Actions to consider, within the context of current consultations and decision making processes in relation to the transmission system, include:

- *Providing clear information on how grid capacity is allocated, where and when capacity will be available, and how charges are determined, for Renewables Trade Associations to disseminate to members;*
- *Investigating scope for more flexibility in terms of when allocations must be taken up and reduced/refundable deposits;*
- *Implementation of a system whereby schemes with planning permission get priority for grid allocation when other schemes drop out of the queue for grid connection (n.b. developers indicated that it would not be acceptable to enforce a system whereby developers seek grid connections on receipt of planning approval. This suggestion was made to help improve the system for schemes with planning permission awaiting grid connection);*
- *Working with DNOs to speed up the process of negotiating grid connection. E.g. by devising best practice guidelines and setting targets to reduce the time required to finalise grid connection;*
- *Ensuring DNOs resource new connections adequately;*
- *Resolving issues surrounding Beauly to Denny line and interconnector upgrade in Scotland and encouraging consent of necessary interconnector in tandem with Beauly to Denny line. (Developers expressed concern that the Beauly to Denny line will take several years to consent and construct and that key interconnector upgrade work will then take another 3 years, leading to a bottle neck of constraints);*
- *Considering whether adjusting transmission charges for renewable generators in the north of Scotland for up to 10 years (as per the current consultation) is a long enough guarantee to support financing of wind schemes;*
- *Government (DTI, ODPM, Scottish Executive), statutory consultees (SNH, EN, etc.) and industry representatives (BWEA, Scottish Renewables Forum) to work together with NGET and determining authorities to ensure asset investment by NGET in terms of grid capacity is planned to take into account likely capacity requirements based on probable planning outcomes (based on cumulative environmental and landscape assessments). This is necessary to avoid situations whereby engineering solutions are designed to meet greater grid capacity demands than are actually likely, which ultimately leads to re-planning of upgrade works leading to delays;*
- *Providing greater advice to developers to undertake projects in areas where grid connection is not an issue;*
- *Resolving issues surrounding grid connection for Round 2 schemes through the current consultation on Regulation of Offshore Electricity Transmission (issued by DTI/Ofgem on 27 July 2005).*

Justification:

Future grid connection constraints are a significant concern to all technology developers, particularly in Scotland and Northern Ireland, and particularly in relation to on- and offshore wind schemes. 67% of onshore developer questionnaire respondents indicated that grid connection issues had led to delays in their projects, and these were ranked as being one of the most significant causes of delay by 55% of respondents, representing companies accounting for 42% of approved capacity. 50% of offshore developers noted that

grid connection negotiations had led to delays.

Developers expressed a number of concerns regarding how grid capacity is allocated and a lack of information on this process. RAB should consider these concerns within the context of recent changes in the electricity transmission system in Great Britain (including the introduction of the new British Electricity Trading and Transmission Arrangements (BETTA) on 1 April 2005, at which time National Grid took on the role of Great Britain System Operator) and within the ongoing consultation on a number of matters, including:

- *DTI consultation on adjusting transmission charges for renewable generators in the north of Scotland, in order to decide whether to exercise powers to adjust transmission charges on the basis that renewable development in that area would be likely to be deterred or hindered in a material respect by the level of charges that would otherwise apply.*
- *Consultation on Transmission Network Use of System Charges.*
- *Electricity Distribution Price Control Review: Statutory consultation on the licence modifications.*

Technology supply

Recommendation 3:

RAB/DTI/Trade Associations to develop a programme of work to address the ability of the supply chain to build projects for 2010. This should include technology, supply, market confidence and contracting issues.

Justification:

There is concern across all sectors with regard to the lack of UK technology providers. 58% of onshore developers noted that finalising supplier/construction contracts had led to delays, whilst all offshore developers cited this factor. Both on- and offshore wind developers in particular noted the benefits of having a UK based supply of technology. For example, onshore developers felt that if economic benefits of the industry to the UK economy could be improved this would encourage more support for renewable energy development.

Engineering, procurement and construction (EPC) contracts

Recommendation 4:

BWEA, with support of DTI/Scottish Executive, to (continue to) facilitate discussions between offshore wind developers and suppliers on cooperation and alliances (as in the oil and gas industry) to resolve issues surrounding contract prices and apportionment of risk.

Justification:

Offshore wind developers indicated that negotiating EPC contracts was a key cause of delay due to the apportionment of risk and marginal economics requiring lengthy negotiations. All offshore questionnaire respondents noted that this factor had contributed to delays.

Post approval decision making by determining authorities

Negotiating planning agreements and agreeing and discharging conditions

Recommendation 5:

Government (DTI, ODPM, Scottish Executive) to work with the Royal Town Planning Institute/Town & Country Planning Association to develop guidance for determining authorities and developers on the process of agreeing a timetable for post-approval actions (finalising legal agreements and agreeing conditions), in order to provide more certainty for developers to allow them to start putting construction plans in place.

Justification:

Several developers noted that uncertainty as to when conditions and legal agreements will be finalised due to lack of resources/commitment on the part of determining authorities has knock-on effects on wider project timescales. Measures to provide more certainty for developers would enable earlier progress on grid connection, finance and technology supply, etc. The White Paper in Scotland on Modernising the Planning System (which is currently out for consultation) provides support for such a measure in Scotland (see para 5.1.1 in relation to major development).

Recommendation 6:

Government (DTI, ODPM, Scottish Executive) in association with industry and planning bodies to draft guidance on the suggested contents of legal agreements (S106 agreements in England & Wales, and S75 agreements in Scotland) for onshore wind schemes. This could take the form of a circular for determining authorities providing direct technical advice from the SoS.

Guidance could also be used to encourage 'frontloading' of legal planning agreements, whereby the outline of an agreement is commenced prior to the resolution to grant planning permission. An outline of the S106/S75 agreement could be set out in the Planning Committee Report.

Justification:

Time taken to finalise legal agreements was cited as a key cause of delay by onshore windfarm developers (by 80% of questionnaire respondents). Any actions to encourage earlier consideration of the content of legal agreements could help to reduce such delays.

Recommendation 7:

RAB/BWEA to establish a working group with planning officers and ODPM/DTI/Scottish Executive representatives to produce guidance on planning conditions (rather than model conditions) to be made available to LPAs and statutory consultees for onshore windfarms.

The production of guidance should draw on the findings from DTI workshops with planners and councillors and advanced planning seminars.

Topics where it is felt guidance would be useful include:

- *The need to clearly set out how conditions might be satisfied, by when and with whom this must be agreed;*
- *Particular concerns have been raised over use of ETSU guidance on noise conditions. A group recently looked at this guidance to determine whether it needed reviewing and concluded that it did not. Therefore it is recommended that guidance should reconfirm the use of ETSU in line with PPS22/PAN45;*

- *Early agreement of 'Statement of Operations' setting out construction processes and time frames to enable a condition which sets out a requirement to 'work to the statement of operations' which would save time during post-approval discussions;*
- *Monitoring requirements during and post construction e.g. for birds, archaeology etc;*
- *Requirements for peat stability studies;*
- *Community funds – how to agree management thereof; industry standards;*
- *Guidelines for producing Habitat Management Plans (appropriate level of detail required), and guidelines as to whom should agree these;*
- *Decommissioning and restoration, including agreement of bonds/ESCROW accounts;*
- *The benefits of clearly defined conditions with clear actions for developers to fulfil (rather than more open conditions which require agreement from a wide range of parties).*

Justification:

Developers cited time taken to agree and discharge planning conditions as a cause of delay. For example, this factor was cited by 70% of onshore questionnaire respondents.

Recommendation 8:

Consider the following measures to reduce delays to offshore windfarms due to FEPA licensing conditions:

- *BWEA/Government to consider producing guidance on appropriate conditions for offshore schemes. This could cover issues such as environmental monitoring, noise, lighting, etc;*
- *BWEA/Government to consider the need for, and to coordinate, industry standards based on technical capabilities e.g. for cable burial depth. Such standards could be circulated to authorities involved in setting license conditions to ensure conditions are realistic;*
- *DTI/Scottish Executive/Defra/ Northern Ireland Assembly/BWEA to coordinate a centralised database of monitoring studies to reduce cases of repeat monitoring work being undertaken.*

Justification:

Offshore developers noted that FEPA licensing conditions must be realistic and not become increasingly onerous.

Planning resources

Recommendation 9:

Government to work to improve skills and capacity of organisations involved in the post-approval decision making process, including determining authorities (DTI/Scottish Executive in relation to S36 applications and Defra in relation to licensing for offshore schemes) and statutory consultees. The following measures to achieve this should be considered:

- *The use of recently increased planning fees to improve resources for processing renewable energy applications;*
- *Increased funding of key organisations through Government budgetary decisions to support adequate staffing levels;*

- *Government working with trade associations to develop training packages for LPA and statutory consultee staff on renewable energy technologies;*
- *Provision of regular technology bulletins and/or provision of a centralised advice centre where LPA staff can access detailed technical advice e.g. on dedicated biomass technologies;*
- *Reviewing the strategy in place for the recruitment and retention of key planning staff in LPAs and Scottish Executive/DTI. Revise where necessary to ensure greater influx and retention of core skills.*

Justification:

Developers indicated that lack of capacity and lack of experienced staffing resource in determining authorities and other key agencies is leading to delays in post-approval decision making.

Project economics

Recommendation 10:

The Government/RAB to consider additional support options to assist biomass and offshore wind projects in the early (capital intensive) stages of project operation. Assistance for offshore wind is required imminently to keep the early Round 2 projects on schedule.

The grant application process could have a fixed determination length (and possibly enable developers to receive support earlier on in project timeframes) to allow developers to plan ahead.

Justification:

Marginal project economics were cited by developers in the offshore and biomass sectors as leading to delays. For example, project financing were ranked as being key causes of delay by 50% of offshore questionnaire respondents.

Both offshore wind (particularly Round 2 schemes) and biomass projects require improved and ongoing support in the form of DTI grants or other financial mechanisms to help establish these sectors in the marketplace. Both have significant financial outlay at the outset of the project which is the time when both are most likely to suffer commissioning "teething problems" but interest on debt is at its greatest.

The grant application and determination process is open-ended (similar to the planning determination problems), which creates delays in submitting planning applications to the LPA.

Project planning

Recommendation 11:

Trade representatives (BWEA, Scottish Renewables Forum, RPA) to produce guidance for developers (particularly smaller or less experienced developers) on possible causes of delay in projects, drawing on the conclusions of this research report, and means of overcoming these, based on best practice. For example, taking early action to identify possible delays, taking project elements forward at an early stage e.g. starting discussions with landowners well before planning approval is granted, implementing suitable project management systems and risk management processes.

Justification:

Several developers provided an indication of how they have taken action to minimise delays in the post-approval phase. This typically builds on earlier experiences, which smaller and/or new developers could learn from. The investor perspective provided by the investment questionnaire also indicated a number of ways in which developers could improve their management of projects to enhance timescales and ability to secure finance.

Biomass-specific measures

Recommendation 12:

Government to consider a number of measures specifically designed to support the biomass sector:

- *Provide Government underwriting of PPA price for the necessary payback term for those projects considered "pathfinders";*
- *Introduce a Renewable Heat Obligation to promote better use of fuel and improve project economics for those opting for combined heat and power;*
- *Review and provide further clarification on the classification of biomass fuels (i.e. what is a waste and what is a fuel).*

Justification:

The biomass sector faces a number of specific constraints which need to be addressed to unlock the potential of the sector. The measures identified above could all aid developers in the post planning approval phase. The third measure (review and provide further clarification on the classification of biomass fuels) could indirectly help as this may give approved plants more fuel options allowing them to trim the fuel cost and improve project economics.

N.b. the Biomass Task Force Final Report to Government (October 2005) sets out the findings from a more detailed analysis of the barriers facing development of biomass technology, which has been published since the research for this report was undertaken. In particular the Task Force report rules out a Renewable Heat Obligation. The recommendations put forward in this report are based on a small sample size of biomass developers (due to the limited number with experience in the post-approval phase) but nevertheless reflect the views of developers who responded during the research.

APPENDIX I

Developer questionnaire

ONSHORE WIND

Please could you return the completed questionnaire by 22 July 2005.

BARRIERS TO COMMISSIONING RENEWABLE ENERGY PROJECTS: QUESTIONNAIRE TO DEVELOPERS

Your name: …… **Job title:** ……

Company: …… **Telephone:** ……...

Email: ……

SECTION 1: Applications for onshore wind schemes

1. Please indicate the countries within which your company has operated since 2000 (please tick):

England	Scotland	Wales	Northern Ireland	Other (please specify)

2. Please provide details of onshore wind projects approved since 2000 that your company has been involved in:

Scheme name and country	Capacity MW (DNC)	Date planning permission granted	Date construction commenced or expected date of commencement	Please indicate whether scheme is being taken forward under a NFFO/ SRO/NI NFFO contract or RO

3. When planning permission for schemes is granted, at what stage are the following elements typically at?

	No agreement/ nothing in place	Agreement in principle/shake of hands	Heads of terms	Full legal agreement
Grid connection	☐	☐	☐	☐
Power Purchase Agreements (PPAs)	☐	☐	☐	☐
Landowner negotiations	☐	☐	☐	☐
Connection Wayleave Rights	☐	☐	☐	☐
Contracts with suppliers	☐	☐	☐	☐

4. Would this situation differ if any particular constraints/barriers were removed? Please explain.

5. What proportion of your applications are speculative in nature, i.e. submitted for planning permission prior to having agreed project finance, power purchase agreements, or grid connection, etc?

……%

SECTION 2: Factors delaying/preventing the start of construction of schemes with planning permission

6. In your opinion, what would be a 'best practice' length of time for a scheme to move from receiving planning permission to starting construction provided there are no unexpected delays?

……months

7. Please identify the key factors that drive the length of time between receiving planning permission and starting the construction of renewable energy schemes?

Financial factors

8. Please indicate if you have experienced any delays in starting the construction of schemes in the post-planning permission phase as a result of any of the following financial factors:

Cause of delay	Tick if yes	Why has the factor led to a delay?	On average, how long did each factor delay the commencement of construction over and above what you would expect (in weeks)? Has it ever led to a scheme being abandoned?	Suggested actions to overcome delay
Difficulties securing capital finance from banks				
Landowner negotiations, such as the financial settlement				
PPAs				
NFFO/SRO/NI NFFO contract issues				
Others (please specify)				

Other factors

9. Please indicate if you have experienced any delays in starting the construction of schemes in the post-planning permission phase as a result of the following factors:

Cause of delay	Tick if yes	Why has the factor led to a delay?	On average, how long did each factor delay the commencement of construction over and above what you would expect (in weeks)? Has it ever led to a scheme being abandoned?	Suggested actions to overcome delay
Finalising grid connection				
Securing Wayleave Rights				
Commons and Crofters Rights				
Landowner negotiations				
Securing Highway Agreements for site access and changes to road layout				
Finalising supplier/ construction contracts				
Developer caused delays				
Others (please specify)				

Post planning permission issues

10. At what point in the planning process did you begin to discuss planning conditions with the local authority case officer?

    Pre-permission stage ☐

    Post-permission stage ☐

11. What types of conditions have been attached to schemes for which you have received planning permission?

    Closed conditions (i.e. conditions where the actions required to fulfil the conditions are clearly defined and require no further negotiation) ☐

    Open conditions (i.e. conditions where the actions required to fulfil the conditions are more open ended and less clearly defined) ☐

12. Has the negotiation of planning conditions held up any of your schemes?

    Yes ☐ No ☐

13. If yes, how much longer did it take to agree conditions than you expected?

    ……months

14. Please describe any conditions which you have found difficult to satisfy and explain why.

15. Previous research has found that 'open conditions' can be difficult to fulfil. Of your approved schemes, are any effectively 'stuck' in the pre-construction phase because you are unable to resolve 'open conditions'? If yes, what capacity is this affecting?

    ……MW DNC

16. If guidance on model conditions were to be produced to assist local planning authorities and developers, what topics do you think it should cover?

17. Has the negotiation of the Section 106/Section 75 Agreements held up your scheme (if applicable)?

    Yes ☐ No ☐

18. If yes, please outline any difficulties which arose during negotiations and the time taken from commencing negotiations to the signing of the Agreement.

19. Various elements must be finalised to enable a scheme to go ahead. Please rank the following in terms of their significance as barriers to starting the construction of renewable energy schemes, by inserting a number 1 in the corresponding box for the most significant barrier, etc:

1.	Grid connection	☐
2.	PPAs	☐
3.	Landowner negotiations	☐
4.	Connection Wayleave Rights	☐
5.	Contracts with suppliers	☐
6.	Other ……	☐
7.	Other ……	☐

SECTION 3: Trends in factors leading to delays

20. Do you feel that the nature and extent of delays for new schemes coming through the planning system have changed over the last five years?

	Worsening issue	Becoming less problematic
Grid connection	☐	☐
PPAs	☐	☐
Landowner negotiations	☐	☐
Connection Wayleave Rights	☐	☐
Contracts with suppliers	☐	☐
Other ……	☐	☐
Other ……...	☐	☐

Please provide any explanation of how/why factors are changing.

21. Can you foresee any other factors emerging in the near future which could contribute to delays (e.g. policy related, due to changes in the planning system, etc) which could affect whether or not the UK meets its 2010 target of 10% of electricity from renewables?

SECTION 5: Action to overcome delays

22. Have you/your company taken any action to help minimise delays in starting the construction of renewable energy schemes?

Yes ☐ No ☐

23. If yes, please specify below:

24. Do you think any additional actions (over and above those identified above) are required? Please outline these below.

SECTION 6: Questionnaire follow-up

Case study project interviews

We are planning to use up to ten renewable energy projects that are currently in the post planning phase to obtain a more in-depth understanding of the factors delaying the commencement of construction of projects. These interviews will further help to identify remedial actions which could be taken to speed up the commissioning of schemes with planning permission. For each scheme we will conduct a pre-prepared, structured telephone interview with the project developer.

25. If you would be willing to take part, please provide a few details on a suitable project below:

    (a) Name: ……

    (b) Technology band: ……

    (c) Location: ……

    (d) Planning & commissioning status (e.g. approved, commissioned, not yet commissioned, etc) ……..

    (e) Types of delays experienced post grant of planning permission ……

Developer focus groups

We are also organising a series of focus groups to explore the factors contributing to delays and measures required to overcome them.

26. Would you be interested in attending a focus group event to discuss these issues in more detail?

    Yes ☐ No ☐

Thank you for completing the questionnaire. Your individual responses will be treated in confidence.

Please return the completed questionnaire either in the post to Charlotte Goodwin at

Land Use Consultants
43 Chalton Street
London
NW1 1JD

Or fax through for the attention of Charlotte to 0207 383 4798.

If you have any queries about the questionnaire or the project in general, please do not hesitate to contact Charlotte by email at Goodwin_c@london.landuse.co.uk or by telephone on 0207 383 5784.

APPENDIX 2

Data sources and assumptions

APPENDIX 2: DATA SOURCES AND ASSUMPTIONS

10.3. The DTI Renewable Energy Planning Monitoring and Review Service Database, which is managed by Land Use Consultants, was used as the basis for carrying out the statistical analysis. To ensure that this database is appropriate for the purposes of the study, it has been updated using a wide range of additional sources of data covering renewable energy schemes within the biomass, hydro, offshore wind and onshore wind technology bands. These sources, and the assumptions made in updating the database, are summarised in **Table A1**.

Table A1 Data sources and assumptions involved in updating the DTI Renewable Energy Planning Monitoring and Review Service Database

Technology Type	Sources of data used to update the DTI Renewable Energy database	Assumptions/problems
Biomass	A list of biomass schemes with planning permission and those nearing this status provided by Future Energy Solutions. DTI Renewable Energy database for approved schemes, DTI RESTATS database for commissioned schemes, and data supplied by FES, BWEA, and DTI/Scottish Executive on specific schemes	
	Information provided in questionnaire responses and during case study project interviews was used to update the database.	• It was assumed that information provided by the developer was more up-to-date/accurate than information in the DTI database.
	Schemes in the DTI Renewable Energy database that were identified as effectively 'dead' by the project team were removed.	
Hydro	Information provided in questionnaire responses and during case study project interviews was used to update the database.	• It was assumed that information provided by the developer was more up-to-date/accurate than information in the DTI database.
	Schemes in the DTI Renewable Energy database that were identified as effectively 'dead' by the project team were removed.	
Offshore wind	The BWEA website which lists all Round 1 offshore wind projects and provides information on their location, capacity, status and developer.	
	Commissioning dates for all offshore wind schemes were updated using the RESTATS database.	

Technology Type	Sources of data used to update the DTI Renewable Energy database	Assumptions/problems
	A list of Section 36 applications provided by the DTI and Scottish Executive.	
Onshore wind	A database maintained by the BWEA was used to replace onshore wind entries in the DTI Renewable Energy Database, because the BWEA database holds a wider range of information.	
	Commissioning dates for all onshore wind ROC and NFFO schemes were checked using the RESTATS database.	• Some schemes in RESTATS were not listed in the updated database. This could have been due to a scheme changing name between application and commissioning. Where there was insufficient information to accurately log missing schemes, they were not added to the Renewable Energy Database.
	A list of Section 36 applications provided by the DTI and Scottish Executive was used to check entries in the database.	