

**FIFTH RENEWABLES ORDER
FOR ENGLAND AND WALES**

SEPTEMBER 1998

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FIFTH RENEWABLES ORDER FOR ENGLAND AND WALES

EXECUTIVE SUMMARY

Introduction

- 1 The Government has announced its intention to make a fifth Non-Fossil Fuel Obligation Order (NFFO5) in England and Wales. This will require the 12 public electricity suppliers (PESs) in England and Wales to secure the availability of generating capacity from renewable energy sources. This document explains the steps that have been taken to assess whether the projects proposed will indeed secure such capacity, and sets out advice to the Secretary of State on the means of meeting the Order.
- 2 The PESs through their agent, the Non-Fossil Purchasing Agency (NFPA) contract collectively in order to meet their obligations under the Non-Fossil Fuel Orders. The additional costs they incur are recovered through the Fossil Fuel Levy.

Previous Orders

- 3 Four previous Orders have been made. The first, in 1990, involved 75 projects with a total capacity of 152 MW. The second, in 1991, involved 122 projects with a total capacity of 472 MW. The third Order, in 1994, involved 141 projects with a total capacity of 627 MW. The most recent Order, made in 1997, involved 195 projects with a total capacity of 843 MW.
- 4 Not all projects that were awarded contracts under previous Orders have gone ahead. Reasons have included failure to obtain planning and other consents, difficulty in obtaining equipment or fuel and problems in the application of new technology.
- 5 Under NFFO1 and NFFO2, 73 per cent of projects (50 per cent of capacity) proceeded to generate. Contracts for these projects run to 31 December 1998. So far, 40 per cent of projects (26 per cent of capacity) under NFFO3 and 4 per cent of projects (2 per cent of capacity) under NFFO4 have proceeded to generate. Present assumptions about completion rates suggest an overall completion rate of 65 to 70 per cent for NFFO3 and NFFO4.

The Proposed Fifth Renewables Order

- 6 In November 1997 the Minister said he expected contracts under NFFO5 to run for 15 years between 1998 and 2018. The technology bands likely to be included were landfill gas from existing sites, municipal and industrial waste, municipal and industrial waste with combined heat and power, small scale hydro and on-shore wind power.

- 7 The Minister said in setting the size of the Order he would take into account the cost and quality of the proposals received and may decide to omit a band if the cost or quality of the proposals received does not justify its inclusion. He expected NFFO5 to stimulate further reductions in the electricity prices contracted under NFFO.

The Application Procedure

- 8 Applicants were required to complete a series of questionnaires and OFFER applied a series of technical, economic, and other reviews, known collectively as the “will secure” test to each project.

Applications and Bids

- 9 433 projects were submitted under NFFO5. Four projects failed the NFPA and PES pre-scrutiny for failure to comply with the tender conditions. 20 projects withdrew and one project failed the will secure test. 408 projects passed the will secure test.

Description of NFFO5 Projects

- 10 The 408 projects that passed the will secure test represented an aggregate capacity of 2579 MW. Landfill gas and wind have the highest number of projects with 156 projects for 341 MW and 123 projects for 706 MW respectively. Hydro and municipal and industrial waste with CHP have the lowest number of projects with 28 projects for 12 MW and 7 projects for 70 MW respectively. The average project size is 6 MW. There is however a wide range of sizes, from under 1 MW to over 25 MW.

Bid Prices

- 11 The bid prices range from 2.34p/kWh to 6.88p/kWh. The average bid price is 2.86p/kWh - a reduction of 22 per cent compared to the average NFFO4 contract price (in 1998 prices). The lowest average bid price for any technology band is 2.63p/kWh for the CHP band. The highest average bid price is 4.43p/kWh for the hydro band.

Additional Costs To Customers

- 12 The difference between the prices paid to NFFO generators and the Pool Selling Price is charged to customers via the Fossil Fuel Levy. In order to assess the extent of the costs that customers will bear assumptions need to be made about future Pool Selling Prices. Based on predictions about the effect of the end of the five year coal contracts and increasing competition in the generation market, this paper assumes a reduction in Pool Selling Price from 2.5p/kWh to 2.25p/kWh over five years from 1998/99, thereafter remaining constant.

Possible Level and Composition of the Order

- 13 408 projects with a total capacity of 2579 MW are competing to be included in the Order. Whilst no indication has been given of the likely size of the Order, the Government has indicated that it is carrying out a review of what would be necessary and practicable to achieve 10 per cent of the United Kingdom's electricity needs from renewable sources by the year 2010. Taking this into account recommendations for NFFO5 have focused on an Order of approximately the same size as NFFO4.
- 14 Two options are presented. The first calculates the least-cost combination of projects providing a capacity approximately the same as the NFFO4 capacity. Ranking projects in order of bid price, the first 72 projects would yield a capacity of 858 MW. They comprise 46 municipal and industrial waste projects (684 MW), 20 landfill gas projects (87 MW), 4 combined heat and power (46 MW) and 2 wind projects (41 MW). No hydro projects are included in this collection of projects. Allowing for assumed completion rates of 50 per cent for wind and combined heat and power projects, 60 per cent for municipal and industrial waste projects and 95 per cent for landfill gas projects, the expected effective capacity would be 536 MW implying an overall completion rate of 63 per cent. Over the next 15 years the expected cost to the Levy of this set of projects might be about £160 million.
- 15 This selection would minimise the cost of meeting the Order, but include a relatively large proportion of municipal and industrial waste projects. Many of these projects enter into commercial contracts with local authorities for the supply of waste and receive payments based on the amount of waste disposed of. Many of these projects are therefore profitable at the market price for electricity without a NFFO subsidy. Taking this into account, an alternative option for meeting an Order has been calculated which includes only those municipal and industrial waste projects at the lower end of the price range. More landfill gas projects and wind projects have been included, so as to include all such projects with bid prices at or below the mid-way point between present Pool price and average NFFO4 contract prices. Hydro bid prices are only slightly lower than NFFO4 prices and no such projects are included.
- 16 This selection of 166 projects would yield a capacity of 907 MW. They comprise 114 landfill gas projects (264 MW), 39 wind projects (446 MW), 11 municipal and industrial waste projects (186 MW) and 2 combined heat and power (10 MW). Allowing for assumed completion rates the expected effective capacity would be about 591 MW implying an overall completion rate of 65 per cent. Over the next 15 years the expected cost to the Levy of this set of projects might be about £275 million.
- 17 Different sizes or compositions of Order might be considered. More CHP projects could be included in the light of the Government's commitment to CHP and more landfill gas projects could be included to make use of what is otherwise an

environmentally harmful resource. The number of wind projects could be tailored to public acceptability.

Possible Means of Meeting 10 per cent of the United Kingdom's Electricity Needs From Renewables

- 18 The Minister is carrying out a review of what would be necessary and practicable to achieve 10 per cent of the United Kingdom's electricity needs from renewables by the year 2010. Assuming that demand continues to increase at the same rate as over recent years, 10 per cent of electricity needs might amount to about 8,300 MW. The total capacity available from existing renewable sources and NFFO projects expected to commission is about 3,300 MW. A further 5,000 MW of capacity would therefore be required to meet the 10 per cent renewable target.
- 19 This target might be met by including 1,000 MW of additional waste projects at no cost to the Levy since such projects are profitable without NFFO support; 1,000 MW of additional on-shore wind projects at 2.9p/kWh or less; and 3,000 MW of off-shore wind and energy crops projects at 5-6p/kWh. The total cost of meeting the target in this way might amount to between around £790 million and just over £1 billion per year.

Future Arrangements

- 20 A number of significant changes affecting the electricity market are likely to require changes to the arrangements for future and existing renewables projects. These changes involve opening up the market to supply electricity to competition, the proposal to separate PES distribution and supply activities and the proposed replacement of the existing Pooling and Settlement arrangements with market based trading arrangements, one effect of which would be to require NFFO contracts to use an alternative reference price.
- 21 In the light of these changes, consideration needs to be given to revisions to the arrangements for supporting renewable projects, including the nature of the powers to make renewables Orders and to reimburse additional costs, and the form of the contracts.

1 INTRODUCTION

- 1.1 On 25 November 1997 the Minister for Science, Energy and Industry announced his intention to introduce a fifth Order under section 32(1) of the Electricity Act 1989 requiring the 12 public electricity supply companies (PESs) in England and Wales to secure the availability of generating capacity from renewable sources.
- 1.2 Before the Order is made the Director General of Electricity Supply is responsible for advising the Secretary of State on the means of meeting this Order and considering whether the projects proposed by the PESs will secure such capacity.
- 1.3 PESs are required to make arrangements which “will secure” the availability to them of the required amounts of non-fossil fuelled electricity generating capacity. The will secure test carried out by OFFER is designed to establish a reasonable degree of confidence that the arrangements made by the PESs will secure the results specified in the Order.
- 1.4 Subject to the conditions of their licences, the PESs can meet a Non-Fossil Fuel Obligation by:
 - owning and operating non-fossil plant; or
 - contracting individually with non-fossil generators; or
 - contracting collectively for their non-fossil requirements.
- 1.5 PESs purchase the electricity to contribute to the Non-Fossil Fuel Obligation through their agent, the Non-Fossil Purchasing Agency (NFPA). The additional costs incurred by the PESs under the collective contracts are met from the Fossil Fuel Levy which is paid by all licensed suppliers based on the aggregate amount charged by them for the leviabale electricity supplied.
- 1.6 An Order setting a Non- Fossil Fuel Obligation is framed in terms of Declared Net Capacity (DNC). Regulations under the Electricity Act 1989 specify how the DNC is to be determined for the purposes of the Order when renewable sources of electricity such as wind can be intermittent. Very broadly, the DNC for such intermittent renewables is defined as the equivalent capacity of the baseload plant that would produce the same average annual energy output.
- 1.7 This paper sets out details of the previous Orders made, describes the NFFO application procedure and considers the projects that have been submitted for NFFO5.

2 THE FOUR PREVIOUS ORDERS

- 2.1 The four Orders made previously required the PESs to enter into contracts with 533 projects with a total capacity of 2094 MW. Table 1 gives details of the contracts for the first four Orders.
- 2.2 Not all projects that are awarded contracts proceed to generate. In NFFO1 and NFFO2 out of a total of 197 projects with a contracted capacity of 624 MW, 143 projects with a capacity of 314 MW proceeded to commission. In NFFO3 out of a total of 141 projects with a contracted capacity of 627 MW, 56 projects with a contracted capacity of 163 MW have commissioned to date. In NFFO4 out of a total of 195 projects with a contracted capacity of 843 MW, 8 projects with a capacity of 14 MW have commissioned to date. More projects in NFFO3 and NFFO4 are expected to commission. The expected effective capacity for NFFO3 and NFFO4 is around 350 MW and 500 MW respectively.
- 2.3 The main reasons for projects not proceeding to commission are failure to obtain planning permission, difficulty in obtaining equipment and problems in the application of new technology. Some projects, particularly in the municipal and industrial waste technology band fail to secure an adequate supply of fuel, often because a number of applicants are taking part in a competitive tendering process with local authorities.
- 2.4 The uncertainty about whether an individual project will proceed as planned is taken into account when an Order is made and assumptions are made about likely completion rates. Based on experience to date, this advice assumes completion rates of 50 per cent for wind projects and CHP projects, 60 per cent for hydro and municipal and industrial waste projects, and 95 per cent for landfill gas projects.
- 2.5 Since the first Order was made in 1990, the average prices paid to projects awarded contracts have reduced from 6.5 p/kWh to 3.46 p/kWh in money of the day. Table 2 gives details of the prices paid in each of the first four Orders. It is worth noting that the prices paid in NFFO1 and NFFO2 are not directly comparable with the prices paid in NFFO3 and NFFO4. The contracts in the first and second Orders cover the period to December 1998. Contracts in the third and fourth Orders are for up to 15 years thus allowing a longer pay back period than in the first two NFFO rounds.
- 2.6 Two Scottish Renewables Orders made in 1994 and 1996 involved 56 projects in aggregate with a total capacity of 190 MW. 10 projects with a capacity of 27 MW have commissioned to date.

TABLE 1

STATUS OF NFFOS 1-4 AT JUNE 1998

	PROJECTS CONTRACTED		PROJECTS GENERATING		PROJECTS TERMINATED		PROJECTS YET TO COMMISSION		COMPLETION RATES	
	NUMBER	MW	NUMBER	MW	NUMBER	MW	NUMBER	MW	NUMBER	MW
NFFO1	75	152.12	61	141.48	14	7.58	0	0	81%	93%
NFFO2	122	472.23	82	172.60	40	298.49	0	0	67%	37%
NFFO3	141	626.91	56	162.55	2	1.90	83	460.99	40%	26%
NFFO4	195	842.72	8	13.76	0	0	187	828.96	4%	2%
TOTAL NFFO	533	2093.98	207	490.39	56	307.97	270	1289.95	39%	23%

TABLE 2

CONTRACTS FOR THE FIRST FOUR ORDERS

	NFFO1	NFFO2	NFFO3	NFFO4
TECHNOLOGY BAND	BID PRICE RANGE (p/kWh)	BID PRICE RANGE AND AVERAGE (p/kWh)	BID PRICE RANGE AND AVERAGE (p/kWh)	BID PRICE RANGE AND AVERAGE (p/kWh)
WIND	5.75 - 10.00	6.39 - 11.00 9.97	3.98 - 5.99 4.43	3.11 - 4.95 3.56
HYDRO	3.85 - 7.50	3.40 - 6.00 5.06	4.25 - 4.85 4.46	3.80 - 4.40 4.25
LANDFILL GAS	3.60 - 6.40	3.96 - 5.70 4.75	3.29 - 4.00 3.76	2.80 - 3.20 3.01
WASTE COMBUSTION	5.06 - 6.00	5.50 - 6.55 6.20	3.48 - 4.00 3.89	2.66 - 2.80 2.75
OTHER COMBUSTION	4.43 - 6.00	4.00 - 5.90 5.42	-	-
SEWAGE GAS	4.40 - 6.00	4.80 - 5.90 5.16	-	-
ENERGY CROPS	-	-	4.90 - 8.75 5.62	5.49 - 5.79 5.51
MUN AND IND WASTE WITH CHP	-	-	-	2.79 - 3.40 3.23
TOTAL	3.60 - 10.00 6.50	3.40 - 11.00 6.61/7.20	3.29 - 8.75 4.35	2.66 - 5.79 3.46

Notes

1. In NFFO1, NFFO3 & NFFO4 projects were paid their bid price. In NFFO2, in each band all projects were paid the marginal price (the “band price”).
2. In NFFO1 6.50 p/kWh was the average price paid. In NFFO3 4.35 p/kWh was the average price paid. In NFFO4 3.46p/kWh was the average price paid.
3. Prices referred to are actual prices in money of the day
4. In NFFO2 6.61 p/kWh was the average bid price, 7.20 p/kWh was the average price paid.
5. In NFFO1 & NFFO2 prices are for output up to 1998; in NFFO3 and NFFO4 prices are for output for up to 15 years from commissioning.

3 THE PROPOSED FIFTH RENEWABLES ORDER FOR ENGLAND AND WALES

Government Policy

3.1 Renewable Energy Bulletin No 5, published in October 1993 by the Department of Trade and Industry, set out the policy for renewables and the Non-Fossil Fuel Obligation. It said that the Government's policy is to stimulate the development of renewable energy sources, wherever they have prospects of being economically attractive and environmentally acceptable, in order to contribute to:

- diverse, secure and sustainable energy supplies;
- reduction in the emission of pollutants;
- encouragement of internationally competitive renewable industries.

3.2 It explained that the Government is working towards a figure of 1500 MW of new renewable electricity generating capacity by the year 2000. Non-Fossil Fuel Obligation Orders for England and Wales and for Northern Ireland, and Scottish Renewable Obligation Orders, are the Government's main instruments for pursuing the development of this capacity. So far there have been four such Orders in England and Wales with a total capacity of 2094 MW, details of which are given in the previous chapter. There have also been two Orders in Scotland with a total capacity of 190 MW and two Orders in Northern Ireland with a total capacity of 32 MW. The overall total capacity from the eight Orders is 2316 MW.

3.3 Following the Kyoto meeting in December last year European member states agreed to reduce greenhouse gases and emissions by an overall eight per cent by the year 2010 compared with 1990 levels. To contribute to this reduction the Government is presently carrying out a review of what would be necessary and practicable to achieve 10 per cent of the United Kingdom's electricity needs from renewable sources by the year 2010. A statement issued by the Minister for Science, Energy and Industry in November 1997 indicated that NFFO5 will be the first step towards this increased drive for renewables.

Fifth Non-Fossil Fuel Obligation

3.4 On 25 November 1997 the Minister for Science, Energy and Industry announced proposals for a fifth NFFO Order for England and Wales. On 3 December the Minister for Industry at The Scottish Office announced his intention to make a third Order in Scotland.

3.5 Further guidance about the policy proposals for NFFO5 was issued in Renewable Energy Bulletin No. 7 (REB 7) published by the Department of Trade and Industry in November 1997. The main points were that the Order:

- would allow PESs to enter into contracts with generators covering periods of 15 years, between 1998 and 2018;
- was likely to include separate bands for new generating capacity from landfill gas from existing sites, municipal and industrial waste, municipal and industrial waste with combined heat and power, small scale hydro and on-shore wind power. The wind technology band may be split into two size bands with the split point at 1.0 MW DNC or less;
- might impose conditions so as to limit the number, maximum project size or aggregate capacity of projects contracted by a particular generator or group of generators;
- set out definitions for new capacity for each technology band.

In the case of hydro generating stations:

- no payment will have been made, or will be made, under a premium price arrangement in respect of output from that generating station;
- the generating station must not have been commissioned on or before 25 November 1997, disregarding structures or works for holding or channelling water which have not been used in the period commencing on 1 January 1989 and ending on 25 November 1997 for a purpose directly related to the generation of electricity;
- its commissioning and operation must not adversely affect the supply of water power to any other generating station wholly or mainly driven by water which was in operation on 25 November 1997 to an extent that would significantly reduce the amount of electricity which that other station is capable of generating (on the assumption that that other station remains in operation throughout the period of the NFFO5 contract entered into in relation to the first mentioned station).

With the exception of landfill gas and hydro generating stations, the Order was likely to define “new capacity” so as to exclude the use of previously used component parts of generating sets. The conditions that landfill gas generating stations were expected to be required to meet were that they should be at existing landfill sites and the generating set should have a useful life of at least 15 years. The commissioning and operation of a generating set, other than a hydro generating set, must not adversely affect the supply of landfill gas, waste or wind power to any generating set in operation on 25 November 1997 to an extent that would significantly reduce the amount of electricity which that other generating set is capable of generating (on the assumption that other generating set remains in operation throughout the period of the NFFO5 contract).

3.6 The Minister gave no indication of the possible size of the Order. REB 7 stated that in setting the size of the Order the Minister will take into account the cost and quality of the proposals received and may decide to omit a band if the cost or quality of the proposals received does not justify its inclusion. The Minister indicated that the NFFO5 round is expected to stimulate further reductions in the electricity prices contracted under NFFO.

4 THE APPLICATION PROCEDURE AND THE WILL SECURE TEST

4.1 The arrangements for assessing NFFO5 applications are similar to the arrangements used in previous rounds. They seek to ensure:

- fair and consistent treatment for all applicants;
- adherence to the published timetable;
- dialogue with generators to ensure an open and transparent process; and
- a competitive bidding process so as to ensure best value for customers and further reductions in the electricity prices contracted under NFFO.

4.2 Shortly after the publication of Renewable Energy Bulletin No. 7 the NFPA published its “Information Notes for Generators”. Generators were given until 16 January 1998 to request a tender pack comprising a series of questionnaires and detailed guidance notes. 719 requests were received. Generators then had until 1 May to complete and return their applications, with the technical, economic and contract details. This process involved liaison with staff from NFPA, the PESs and OFFER.

4.3 The timetable issued following the announcement by the Minister in November 1997 indicated that the NFFO5 Order would be made in November 1998. This allowed around a year between the announcement being made and the Order being made - several months less than in the case of NFFO4. This allowed less time for applications to be made and scrutinised. Slightly different arrangements therefore had to be put in place in order to meet the timetable requirements.

4.4 In previous NFFO rounds applicants submitted their applications in two stages. Technical and contract details were submitted by applicants to NFPA and the PESs. NFPA and the RECs carried out a pre-scrutiny to check that applications complied with the tender conditions and applications were subsequently passed to OFFER. Applicants then had to submit to OFFER commercial and economic questionnaires, including a non-binding bid price. The will secure test was carried out by OFFER on the complete submissions. The economic element of the will secure test explained in paragraph 4.6 was carried out using this non-binding price. Following completion of the will secure test applicants had several months in which to submit a final binding bid price, which could not be lower than the initial bid price submitted.

4.5 In NFFO5, instead of submitting applications in two stages, applicants were required to submit complete applications to OFFER at the same time that the technical questionnaires and contract details were submitted to NFPA and the PESs. The NFPA and PES scrutiny was carried out simultaneously with the will

secure test. Instead of applicants submitting non-binding bid prices during the process of the will secure test, with final binding bid prices being submitted after the will secure test had been completed, applicants had to submit final binding bid prices by 17 July, during the process of the will secure test.

4.6 On receipt of applications OFFER applied a series of reviews in order to form a view as to whether each project is capable of contributing towards the capacity of the Order. This review procedure is known as the will secure test. The five elements of the will secure test were as follows:

- a technical review to establish whether the project could reasonably be expected to achieve the technical performance claimed. The adequacy of the connection and metering arrangements were also evaluated;
- a planning review to establish that the applicant was aware of, and had allowed sufficient time for obtaining the planning and other consents needed;
- a legal review to establish that the seller was entitled to generate electricity and sell the output to NFPA, that the contract schedules properly described the project and met the requirements of REB 7 and the tender conditions, and that, if successful in being awarded contracts, the projects would be capable of meeting the requirements of Section 32 of the Electricity Act 1989;
- a commercial review to establish whether an applicant had identified suitable and adequate sources of fuel to generate the contracted capacity, and in the case of projects submitted under the municipal and industrial waste with combined heat and power technology band, that they had reasonable prospects of obtaining contracts to supply the amount of heat specified in REB 7;
- an economic review to establish whether, at the applicant's final bid price, the project's economic performance would give a positive net present value over either the contract or project life. Projects showing a negative net present value were given the opportunity to proceed providing the applicant submitted a declaration acknowledging this to be the case. These declarations would be taken into account in the event of any subsequent application for economic termination. Seven such declarations were submitted.

4.7 In Scotland, following the announcement about SRO3, 220 requests for tender packs were made. 147 applications were submitted by the tender deadline date of 21 August.

5 NFFO5 APPLICATIONS AND BIDS

- 5.1 Of the 433 projects submitted, four failed the NFPA and PES pre-scrutiny for failure to comply with the tender conditions. In brief, these tender conditions required applicants to identify a specific site and to provide information to show that the proposed project would meet the requirements of the relevant technology band, that sufficient fuel would be available, and that, where appropriate, written confirmation had been provided from the landowner that he was prepared to enter into negotiations in respect of the site. A full list of the tender conditions is attached at Annex 1.
- 5.2 20 projects subsequently withdrew. One project failed the will secure test because the resource data was inadequate. The applicant has indicated that he intends to appeal against this decision and further details are awaited. 408 projects passed the will secure test.
- 5.3 Table 3 shows the number of projects in each stage in the application process for each of the technology bands. For comparison Table 3 also shows the total figures for each stage of NFFO4. As explained in paragraph 4.4 NFFO4 included the additional stage - submission of final bids following completion of the will secure test. For the purposes of this table the column headed 'Passed will secure test' shows the number of NFFO4 projects that passed the will secure test and submitted final bids.
- 5.4 Table 4 shows how the picture differs by technology band. Whilst there were more NFFO5 applications in the landfill gas and municipal and industrial waste bands, there were fewer in the wind, hydro and CHP bands.
- 5.5 Table 4 also shows that, whilst there were fewer projects submitted under NFFO5 than under NFFO4, there were 77 per cent more applications than the number of NFFO4 applications that were not awarded contracts. This indicates that in addition to some projects that were not awarded contracts in NFFO4 being submitted in NFFO5, other new projects also came forward. This is the case for each technology band, ranging from just one project more in the CHP band, to over four times as many (125 projects) in the landfill gas band.

TABLE 3

NUMBER OF APPLICATIONS AND SUBMITTED BIDS FOR NFFO5

TECHNOLOGY BAND	REQUESTS FOR TENDER PACKS	NUMBER OF APPLICATIONS	PASSED TO OFFER	WITHDREW	FAILED WILL-SECURE TEST	PASSED WILL-SECURE TEST	% OF APPLICATIONS PASSED
WIND	199	127	127	4	0	123	97%
HYDRO	56	30	30	1	1	28	93%
LANDFILL GAS	264	158	157	1	0	156	99%
MUN AND IND WASTE	180	110	107	13	0	94	85%
MUN AND IND WASTE WITH CHP	20	8	8	1	0	7	88%
TOTAL NFFO5	719	433	429	20	1	408	94%
TOTAL NFFO4	890	529	494	23	14	457	86%

TABLE 4

COMPARISON OF THE NUMBER OF FINAL BIDS RECEIVED - NFFO4 AND NFFO5

	(i) NFFO4 - PASSED WILL-SECURE TEST AND FINAL BIDS RECEIVED	(ii) NFFO4 CONTRACTS AWARDED	(iii) NFFO4 CONTRACTS NOT AWARDED	(iv) NFFO5 - PASSED WILL- SECURE TEST AND FINAL BIDS RECEIVED	(v) NFFO5 BIDS RECEIVED COMPARED TO NFFO4 BIDS RECEIVED	(vi) NFFO5 BIDS RECEIVED COMPARED TO NFFO4 CONTRACTS NOT AWARDED
WIND	152	65	87	123	-19%	+41%
HYDRO	43	31	12	28	-35%	+133%
LANDFILL GAS	101	70	31	156	+54%	+403%
MUN AND IND WASTE	55	6	49	94	+71%	+92%
MUN AND IND WASTE WITH CHP	16	10	6	7	-44%	+17%
AGRICULTURAL WASTE	15	6	9	-	-	-
ENERGY CROPS	44	7	37	-	-	-
TOTAL	426	195	231	408	-4%	+77%

DESCRIPTION OF PROJECTS SUBMITTED TO NFFO5

The map at Figure 1 shows the location of projects submitted to NFFO5. They are located throughout England and Wales. There is also one wind project located in Scotland.

Table 5 shows the 408 projects classified by technology band and size. The highest numbers of projects are in the landfill gas technology band, with 156 projects for 341 MW of capacity. The lowest numbers of projects are in the hydro band, with 28 projects for 12 MW capacity, and in the municipal and industrial waste with combined heat and power band, with 7 projects for 70 MW capacity.

The average size of projects is 6 MW. The actual size ranges from 70 kW to over 40 MW. 34 per cent of projects are less than 1 MW, 29 per cent are between 1 and 5 MW, 14 per cent are between 5 and 10 MW, 18 per cent are between 10 and 25 MW and 4 per cent are over 25 MW.

Most of the hydro projects are under 1 MW and all are under 5 MW. The wind projects range from under 1 MW to over 25 MW with an average size of 6 MW. Most of the landfill gas projects are less than 5 MW with the average size being 2 MW. The CHP projects range from under 1 MW to between 10 and 25 MW with the average size being 10 MW. The municipal and industrial waste projects are generally the largest ranging from between 1 and 5 MW up to over 25 MW with an average size of 15 MW.

In NFFO4, 426 projects with a total capacity of 2556 MW were competing to be included in the Order. 195 projects with a total capacity of 843 MW were awarded contracts. In NFFO5, 408 projects with a total capacity of 2579 MW are competing to be included in the Order. This is over three times the NFFO4 Order capacity of 843 MW. Chapter 9 of this paper describes possible sizes for the NFFO5 Order and describes how choices might be made to select projects to provide an Order.

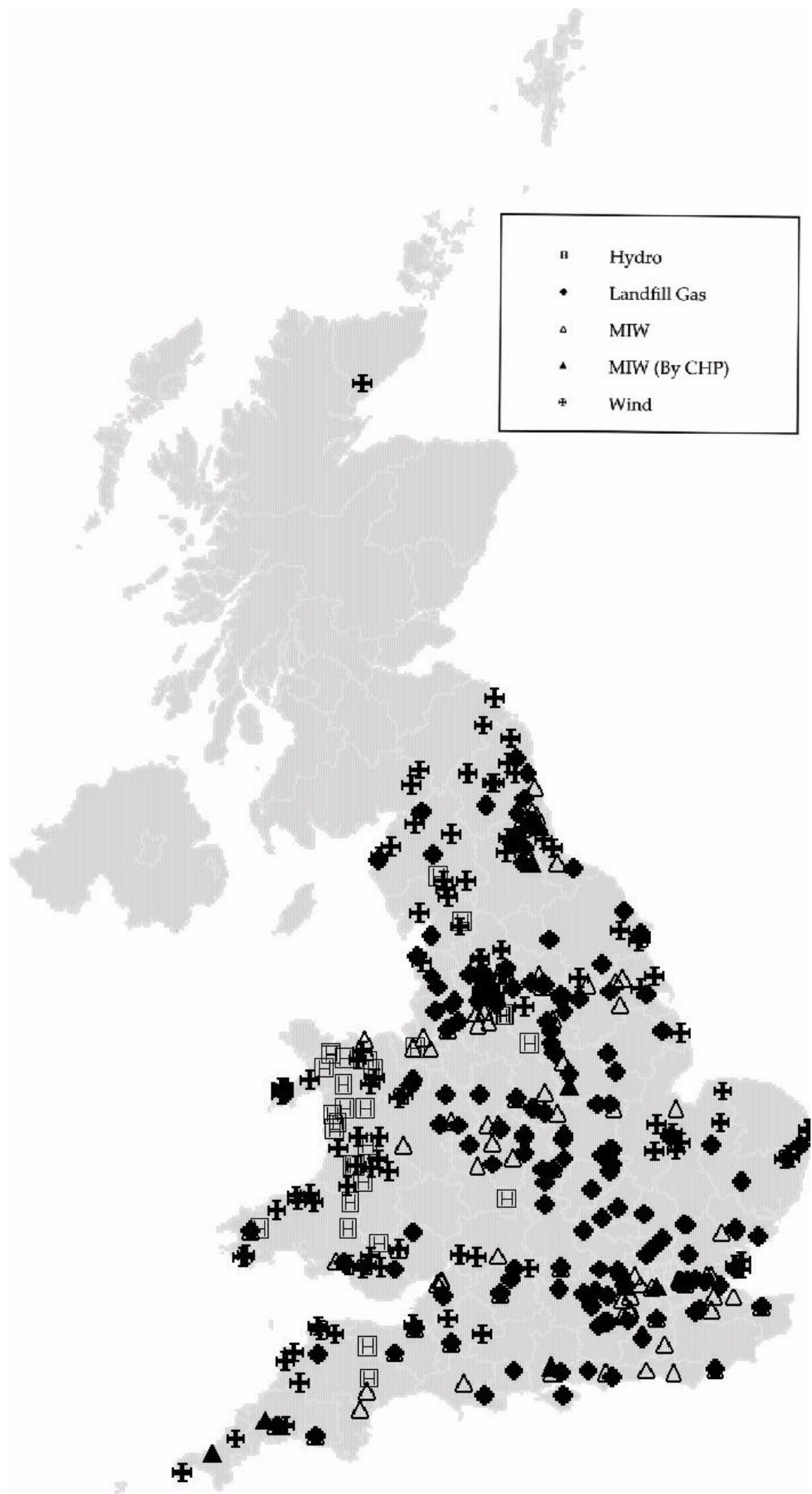


TABLE 5

NFFO5 SCHEMES CLASSIFIED BY TECHNOLOGY AND SIZE

SIZE	WIND	HYDRO	LANDFILL GAS	MUN AND IND WASTE	MUN AND IND WASTE WITH CHP	TOTAL
UP TO 1MW	46 36MW	25 8MW	67 56MW	-	1 1MW	139 100MW
1 - 4.99 MW	32 110MW	3 4MW	75 153MW	8 23MW	1 3MW	119 293MW
5 - 9.99 MW	26 181MW	-	8 58MW	22 181MW	3 22MW	59 441MW
10 - 24.99 MW	16 278MW	-	6 74MW	51 834MW	2 45MW	75 1231MW
25 MW AND OVER	3 101MW	-	-	13 413MW	-	16 514MW
TOTAL NFFO5	123 706MW	28 12MW	156 341MW	94 1451MW	7 70MW	408 2579MW

(Figures for capacity may not sum because of rounding)

7 BID PRICES

7.1 As part of the application process each project was required to submit a bid price per kWh at which it would be prepared to go ahead. Projects that are awarded contracts will be paid this price. In NFFO1, NFFO3 and NFFO4 this was also the case, whilst in NFFO2 projects were paid the marginal price for each technology band. In each NFFO round the prices are linked to inflation.

Comparison with NFFO4 Prices

- 7.2 Renewable Energy Bulletin No 7 set out the expectation that NFFO5 should stimulate further reductions in the prices contracted under NFFO.
- 7.3 Table 6 gives details of the bid prices for NFFO4 and NFFO5. For comparison purposes, the NFFO4 bid prices have been adjusted to 1998 prices. In NFFO4 the bid prices ranged from 2.83p/kWh to 9.25p/kWh. The average bid price was 4.2p/kWh. The contract prices ranged from 2.83p/kWh to 6.17p/kWh. The average contract price was 3.68p/kWh. In NFFO5 the bid prices range from 2.34p/kWh to 6.88p/kWh. The overall average bid price is 2.86p/kWh. The lowest average bid prices are for the waste projects, with average bid prices of 2.63p/kWh for CHP and 2.72p/kWh for other municipal and industrial waste projects. The next lowest is for landfill gas projects, with average bid prices of 2.75p/kWh. Wind projects have average bid prices of 3.2p/kWh. The most expensive technology band is hydro with average bid prices of 4.43p/kWh.
- 7.4 Taking the collection of bids as whole, the NFFO5 bid prices are 32 per cent lower in real terms than the NFFO4 bid prices. The largest reduction has been 36 per cent in the CHP band. Municipal and industrial waste and wind bid prices are 25 per cent lower and landfill gas bid prices are 17 per cent lower. The smallest reduction is in the hydro bid prices which are 6 per cent lower.
- 7.5 A comparison of NFFO5 bid prices with the prices paid to the 195 NFFO4 projects that were awarded contracts shows a reduction of 22 per cent. The largest reductions have been 24 per cent in the CHP band, followed by 16 per cent and 14 per cent in the wind and landfill gas bands respectively. There have been smaller reductions of 7 per cent in the municipal and industrial waste band and 2 per cent in the hydro band.
- 7.6 Within each technology band there was a range of bid prices. Figure 2 shows the supply curves for all the technology bands constructed by ranking the projects in each band in order of bid price.

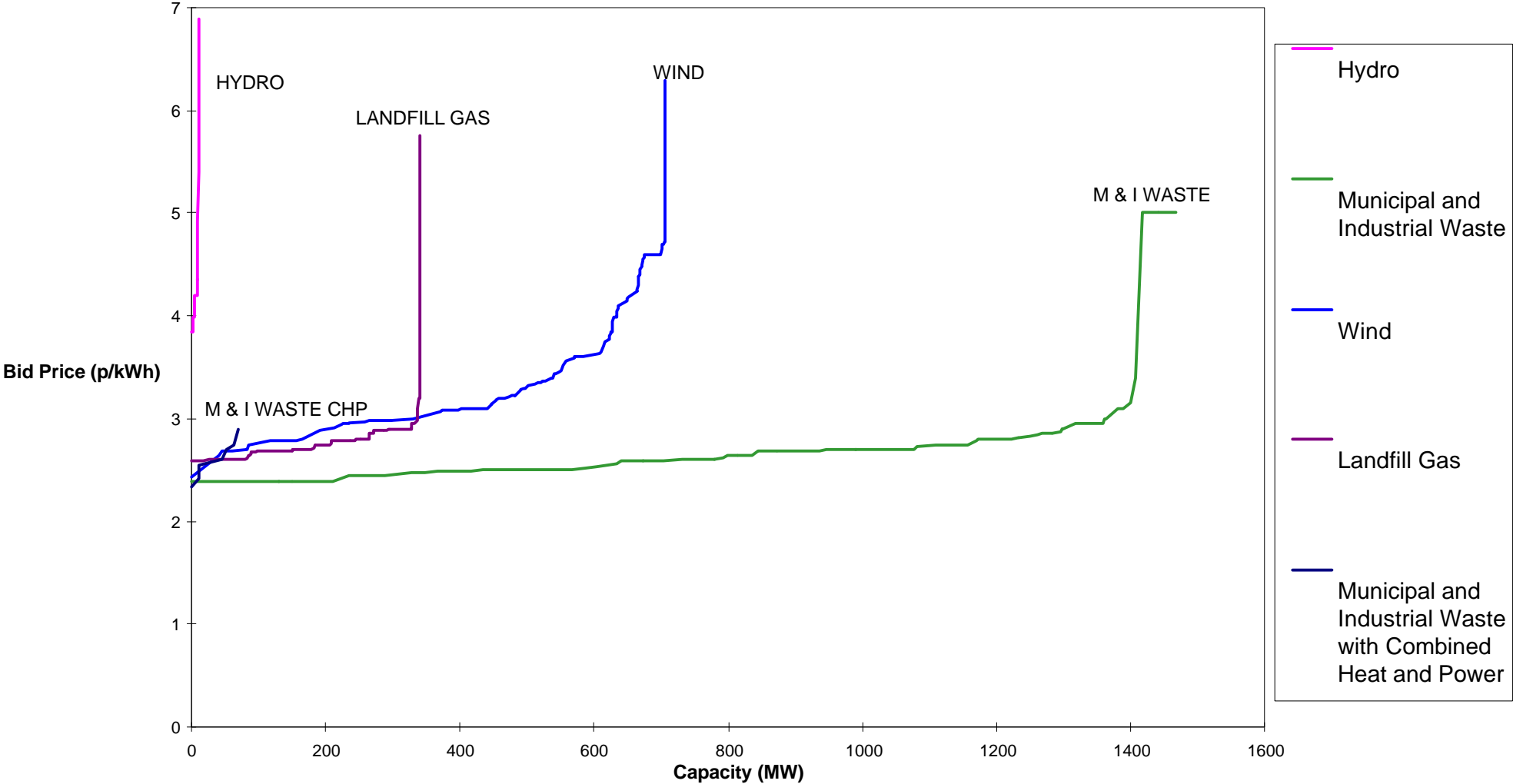
TABLE 6

REDUCTION OF BID PRICE FROM NFFO4 TO NFFO5

TECHNOLOGY BAND	NFFO4 BID PRICES		NFFO4 CONTRACT PRICES		NFFO5 BID PRICES		AVERAGE NFFO5 BID PRICES COMPARED TO AVERAGE NFFO4 BID AND CONTRACT PRICES PERCENTAGE CHANGES	
	RANGE	AVERAGE	RANGE	AVERAGE	RANGE	AVERAGE	BID PRICE (COMPARED TO NFFO4)	CONTRACT PRICE (COMPARED TO NFFO4)
WIND	3.31 - 7.42	4.25	3.31 - 5.27	3.79	2.43 - 6.30	3.20	-24.7%	-15.6%
HYDRO	4.05 - 6.39	4.72	4.05 - 4.69	4.53	3.85 - 6.88	4.43	-6.14%	-2.2%
LANDFILL GAS	2.98 - 4.15	3.30	2.98 - 3.41	3.21	2.59 - 5.75	2.75	-16.7%	-14.3%
MUN AND IND WASTE	2.83 - 5.32	3.63	2.83 - 2.98	2.93	2.39 - 5.0	2.72	-25.1%	-7.2%
MUN AND IND WASTE WITH CHP	2.97 - 4.15	4.13	2.97 - 3.62	3.44	2.34 - 2.90	2.63	-36.3%	-23.5%
AGRICULTURAL WASTE	5.43 - 5.91	5.58	5.43 - 5.54	5.51	-	-	-	-
ENERGY CROPS	5.85 - 9.25	6.75	5.85 - 6.17	5.87	-	-	-	-
TOTAL NFFO	2.83 - 9.25	4.2	2.83 - 6.17	3.68	2.34 - 6.88	2.86	-31.9%	- 22.3%

All prices are p/kWh, 1998 equivalent. Averages are capacity weighted.

SUPPLY CURVES FOR NFFO5 TECHNOLOGY



8 ADDITIONAL COSTS TO CUSTOMERS - THE LEVY

- 8.1 Those projects that are awarded contracts will be paid a guaranteed price per unit of output. The additional cost of this above Pool Selling Price is met by the Fossil Fuel Levy which is paid by customers.
- 8.2 Since 1 April 1998 the Levy has been set at 0.9 per cent of the final bills to all electricity customers. The total Levy proceeds for the year 1998/99 are expected to be about £120 million.
- 8.3 The following chapter includes calculations of the likely cost to the Levy of possible NFFO5 Orders of different size and composition. These calculations require assumptions to be made about the future path of Pool prices. In January 1996 advice about NFFO4 considered two scenarios, reflecting different views of the market. One scenario was a reduction in Pool Selling Price from 2.5p/kWh to 2.4p/kWh over three years, thereafter remaining constant. The other scenario was a reduction in Pool Selling Price from 2.5p/kWh to 2.2p/kWh over three years from 1996, thereafter remaining constant (all in 1996 prices).
- 8.4 In 1996 Time-Weighted Pool Selling Price was 2.7p/kWh. This fell to 2.61p/kWh in 1997. However the reduction in Pool Selling Price has, in part, been the result of the removal of transport uplift from the Pool Selling Price calculation. Transport uplift is now within the transmission services incentive scheme for NGC - a move designed to reduce uplift costs. Therefore a direct comparison of PSP in 1996/97 and 1997/8 is misleading. If transport uplift is included back in the PSP calculation, PSP in 1997/98 was above 1996/97 levels. A large proportion of the increase occurred in the Winter period (October-March) of 1997/98, when System Marginal Price rose 26 per cent above the same period in the previous year. OFFER investigated the rise in Pool prices over the Winter period of 1997/98 and concluded that the increase was a direct result of the price setting generators' ability to manipulate prices. The Director General concluded in his report on the Pool price increase that further steps need to be taken to increase competition in generation, such as the divestment of National Power and PowerGen's coal fired plant into the hands of competitors.
- 8.5 This advice assumes a reduction in Pool Selling Price from 2.5p/kWh to 2.25p/kWh over five years from 1998/99, thereafter remaining constant (all in present day prices). The end of the five year coal contracts has led to a significant reduction in fuel costs for power stations, which alone should reduce the costs of generation and therefore Pool prices. Increasing competition in the generation market including divestment and continued new entry will further compound the downward pressure on prices.
- 8.6 Chapter 11 discusses proposals for reform of electricity trading arrangements in England and Wales. If implemented, these would require an alternative benchmark price to be identified for the purposes of NFFO arrangements in place of Pool

Selling Price. This advice assumes that the new benchmark price would equate to the assumptions about Pool Selling Price in paragraph 8.5 above.

9 POSSIBLE LEVEL AND COMPOSITION OF THE ORDER

- 9.1 In order to estimate how much capacity is likely to result from a particular size of Order, assumptions need to be made about expected completion rates for the different technology bands. The cost of supporting projects is paid by electricity customers through the Levy. As in previous rounds, this advice considers how the requirements of an Order may be met in an economic way.
- 9.2 In his statement of 25 November 1997 the Minister said that in setting the size of the NFFO5 Order he would take into account the cost and quality of the proposals received. He indicated that in the light of the review of what would be necessary and practicable to achieve 10 per cent of the United Kingdom's electricity needs from renewable sources by the year 2010, NFFO5 would be the first step in the new and strong drive for renewables. He said that he expected NFFO5 to contribute substantially to reducing greenhouse gases and encouraging internationally competitive industries.
- 9.3 The Minister has indicated that he expects NFFO5 to stimulate further reductions in the electricity prices contracted under NFFO. He also said that in setting the size of the Order he would take into account the cost and quality of proposals received and may decide to omit a band if the cost or quality of the proposals does not justify its inclusion.

Assumptions on Completion Rates

- 9.4 408 projects with a total capacity of 2579 MW are competing to be included in the Order. Not all these projects can be commissioned simultaneously because several are competing to use the same source of fuel. Of the 94 municipal and industrial waste projects with a total capacity of 1451 MW, the fuel sources identified and the amount of fuel likely to be available mean that at most only 73 projects with a total capacity of 1199 MW could commission. Of the 156 landfill gas projects with a total capacity of 341 MW, fuel and site clashes mean that at most only 148 projects with a total capacity of 318 MW could commission. This means that the effective maximum number of projects which could be considered for inclusion in the Order is 379, with a total capacity of 2304 MW.
- 9.5 Reasons for failure to commission include failure to obtain planning and other consents. Based on previous experience, the assumed completion rates are 50 per cent for wind and CHP projects, 60 per cent for hydro and municipal and industrial waste projects and 95 per cent for landfill gas projects.

Options For The NFFO5 Order

- 9.6 The Minister's statement of 25 November 1997 gave no indication of the preferred size of the NFFO5 Order. A number of options are therefore explored. The first option is based on the least cost combination of projects totaling the approximate

same capacity as the NFFO4 Order (843MW). Ranking projects in order of bid price, the first 72 projects would provide a total capacity of 858 MW. Table 7 shows the mix of projects that this would include. The majority of the projects are in the municipal and industrial waste band - 46 projects with a total capacity of 684 MW. There are 20 projects in the landfill gas band with a capacity of 87 MW, 4 projects in the CHP band with a capacity of 46 MW and 2 projects in the wind band with a capacity of 41 MW. No hydro projects are included in this collection of projects. Allowing for assumed completion rates, the expected effective capacity of the 72 projects would be 536 MW. Calculations in the next chapter suggest that an annual Order to yield about 500 MW would be needed to meet the target of 10 per cent of United Kingdom generating capacity from renewables by 2010.

- 9.7 These 72 projects have prices from 2.34p/kWh up to 2.65p/kWh, with an average price of 2.51p/kWh. This would represent a 32 per cent reduction in real terms compared to the average price in the NFFO4 Order.
- 9.8 Over the next 15 years or so the estimated total undiscounted cost to customers, in terms of Levy payments, of including this set of projects in the Order might be £160 million in 1998 prices. This assumes a Pool price (or equivalent) of 2.5p/kWh for 1998/99 reducing to 2.25p/kWh over the next five years and remaining constant thereafter. The actual cost would depend on actual completion rates and the future level of Pool prices. The total cost is lower than the comparable cost of £525 million for NFFO4.

Alternative Option for the Order

- 9.9 The composition of the least-cost option described above might not be preferred by the Government for two main reasons. First, in previous Orders governments have wished to encourage greater diversity of projects than the least-cost criterion would imply. Second, the least-cost option includes a relatively large proportion of municipal and industrial waste projects. Many of the municipal and industrial waste projects and CHP projects enter into commercial contracts with local authorities for the supply of waste. These contracts are subject to a competitive tendering process as the contracting project receives a “gate fee” calculated according to the amount of waste to be disposed of. The gate fees that such projects indicate they expect to receive would mean that most projects would be profitable at the market price for electricity, without a subsidy from NFFO.
- 9.10 In view of these factors, an alternative option for meeting an Order totaling the approximate same capacity of the NFFO4 Order has been calculated. This includes only those municipal and industrial waste projects at the lower end of the price range, with bid prices at or below 2.42p/kWh. (There is a “natural break” in the municipal and industrial waste bid prices between 2.39p/kWh and 2.45p/kWh and in CHP bid prices between 2.42p/kWh and 2.55p/kWh.) The capacity displaced by reducing these projects has been replaced by including those landfill gas projects and wind projects with bid prices at or below the mid-way point between present

TABLE 7

SELECTION OF PROJECTS FOR 850MW NFFO5 ORDER TO MINIMISE COST PER UNIT

TECHNOLOGY BAND	NUMBER OF PROJECTS	QUALIFYING CAPACITY (MW)	ASSUMED COMPLETION RATES	EXPECTED CAPACITY (MW)	BID PRICE RANGE (p/kWh)	CAPACITY WEIGHTED AVERAGE BID PRICE (p/kWh)
WIND	2	40.46	50%	20.23	2.43 - 2.64	2.57
HYDRO	-	-	-	-	-	-
MUN AND IND WASTE	46	684.22	60%	410.53	2.39 - 2.65	2.49
MUN AND IND WASTE WITH CHP	4	45.92	50%	22.96	2.34 - 2.6	2.55
LANDFILL GAS	20	87.04	95%	82.69	2.59 - 2.65	2.60
TOTAL	72	857.64	63%	536.41	2.34 - 2.65	2.51

Qualifying capacity takes account of the fuel and site clashes which limit the projects that could commission.

Pool price and the NFFO4 average contract prices for those technologies. This encourages the more economic technologies and those that have made the most progress since the last Order. Hydro bid prices are higher than for other technologies and have reduced by only 2 per cent compared to average NFFO4 contract prices. This reduction is much lower than for the other bands and does not justify the inclusion of any hydro projects.

- 9.11 This selection of 166 projects would provide a total capacity of 907 MW. Table 8 shows the mix of projects that this would include. There are still 11 municipal and industrial waste projects with a total capacity of 186 MW. There are two projects in the CHP band with a total capacity of 10 MW. The number of landfill gas projects increases to 114 with a total capacity of 264 MW and the number of wind projects increases to 39 with a total capacity of 446 MW. Allowing for the assumed completion rates, the expected effective capacity of the 166 projects would be 591 MW, about 15 per cent greater than the expected capacity from the NFFO4 Order.
- 9.12 These 166 projects have prices from 2.34p/kWh up to 3.14p/kWh, with an average price of 2.73/kWh. Over the next 15 years or so the estimated total undiscounted cost to customers, in terms of Levy payments, of including this set of projects in the Order might be about £275 million (based on assumed Pool price of 2.25p/kWh for 1998/99 reducing to 2.25p/kWh over the next five years and remaining constant thereafter) compared to a cost of about £160 million for the least-cost option for about the same amount of capacity. Again the actual cost would depend on completion rates and the future level of Pool prices.

Composition and Alternative Levels of Order

- 9.13 Different sizes or compositions of Order could be considered. For example, more CHP projects could be included in the light of the Government's commitment to CHP, and more landfill gas projects could be included to make use of what would otherwise be an environmentally harmful and wasted resource. Figures 3 to 7 give details of the capacity available in each band at any given cost to the Levy. Using these cost curves it is possible to calculate the cost to the Levy of any selection of projects. For example, for the Order described in Table 8, costs to the Levy can be read from the curves for each technology band as follows:

CAPACITY	CULMULATIVE COST	
	(MW)	(£m)
Wind	446	146.2
MIW	186	17.8
MIW with CHP	10	0.6
Landfill Gas	264	110.7
Total	906	275.3

TABLE 8

ALTERNATIVE OPTION FOR 850MW NFFO5 ORDER

TECHNOLOGY BAND	NUMBER OF PROJECTS	QUALIFYING CAPACITY (MW)	ASSUMED COMPLETION RATES	EXPECTED CAPACITY (MW)	BID PRICE RANGE (p/kWh)	CAPACITY WEIGHTED AVERAGE BID PRICE(p/kWh)
WIND	39	446.46	50%	223.23	2.43 - 3.14	2.9
HYDRO	-					
MUN AND IND WASTE	11	186.12	60%	111.67	2.39	2.39
MUN AND IND WASTE WITH CHP	2	10.4	50%	5.2	2.34 - 2.42	2.36
LANDFILL GAS	114	264.42	95%	251.2	2.59 - 2.85	2.7
TOTAL	166	907.4	65%	591.3	2.34 - 3.14	2.73

Fig.3

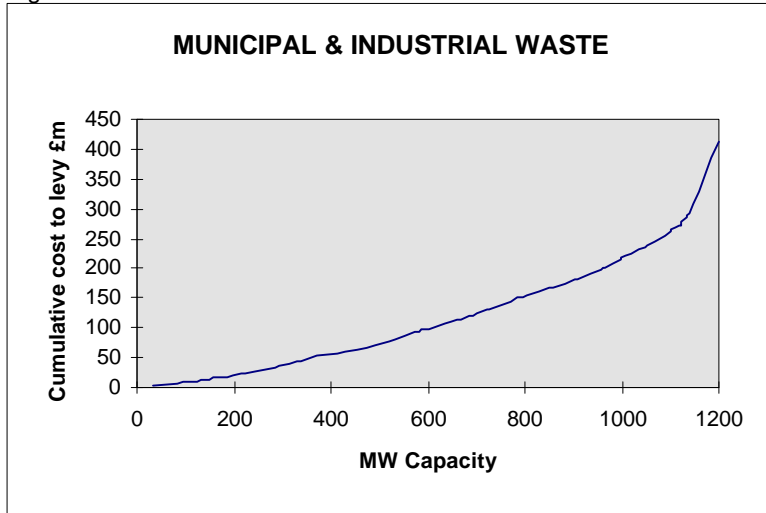


Fig.4

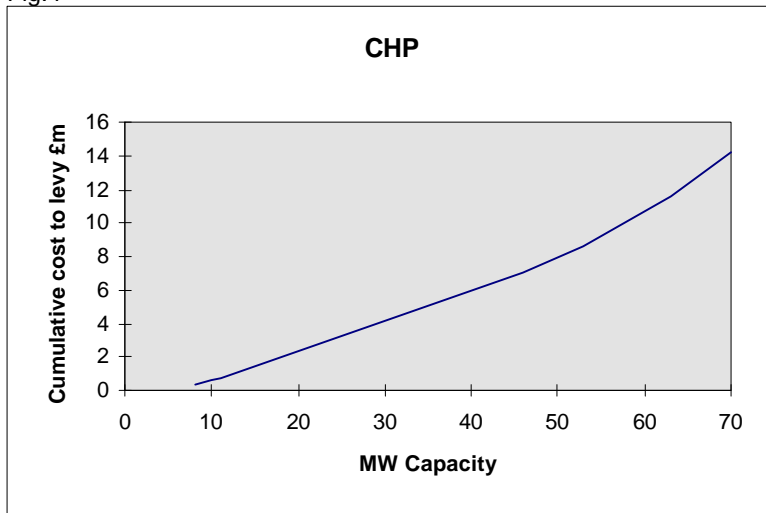


Fig.5

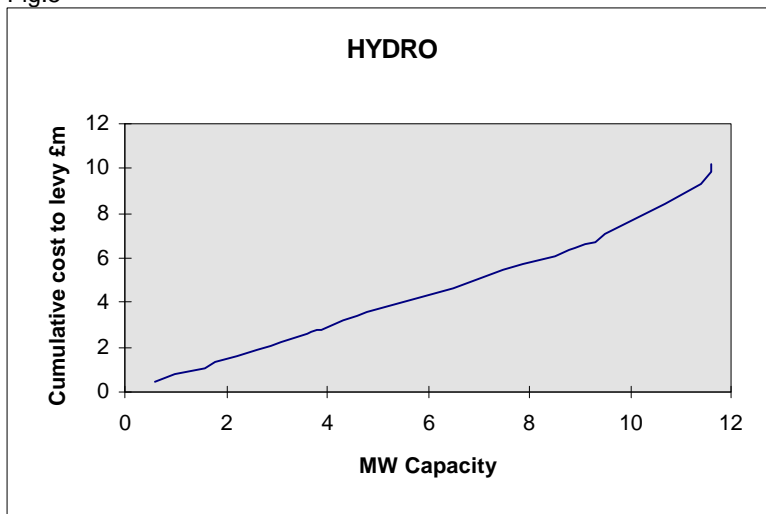


Fig.6

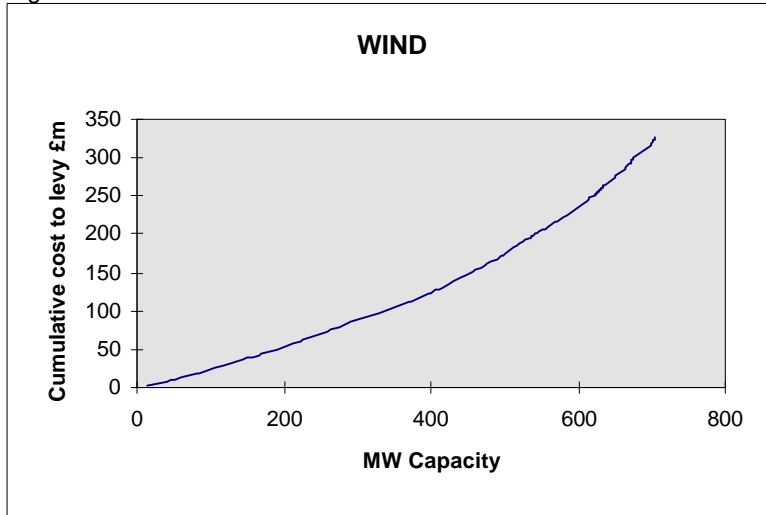
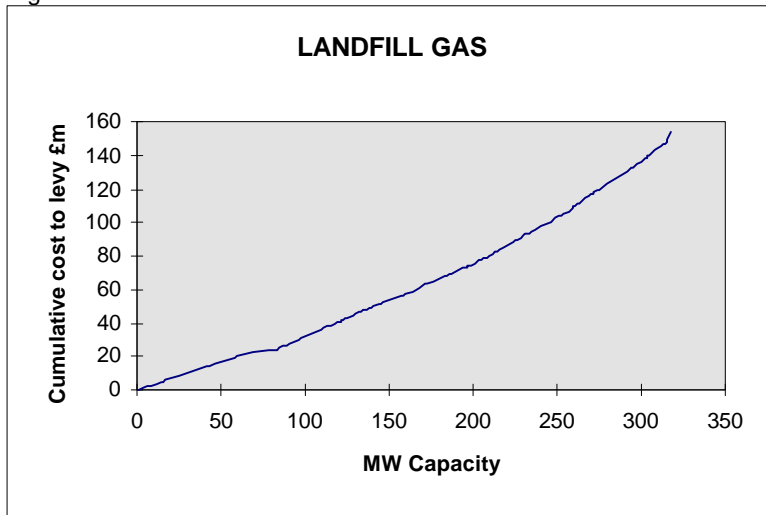


Fig.7



9.14 In considering the total size of the Order, it will be appropriate to take into account future opportunities. Evidence from this and previous NFFO rounds shows a continued convergence towards market price. Whilst an Order bigger than the NFFO4 Order could be achieved from the 408 projects put forward, it seems likely that further capacity could be contracted more economically (that is, at lower prices) if it were deferred until a later date.

10 POSSIBLE MEANS OF MEETING 10 PER CENT OF THE UNITED KINGDOM'S ELECTRICITY NEEDS FROM RENEWABLES

- 10.1 The Minister indicated in November 1997 that he is carrying out a review of what would be necessary and practicable to achieve 10 per cent of the United Kingdom's electricity needs from renewables by the year 2010. This chapter makes some preliminary calculations along these lines, looking particularly at the potential cost to customers via the Levy.
- 10.2 Present United Kingdom generating capacity is approximately 73,000 MW (of which about 62,000 MW is in England and Wales, 9,000 MW in Scotland and 2,000 MW in Northern Ireland). For some years demand has been increasing at just over one per cent a year. Assuming that this continues, and that the capacity margin remains about the same as at present, total generating capacity might be approximately 83,000 MW by 2010, so 10 per cent of this might be about 8,300 MW.
- 10.3 At present non-NFFO hydro capacity is about 1,200 MW in Scotland and about 100 MW in England and Wales. Approximately 490 MW of capacity is already generating from the first four NFFO Orders, 27 MW from the first two Scottish Renewable Orders and 15 MW from the first two Northern Ireland NFFO Orders. This makes a total of just over 1,800 MW of presently existing renewables capacity. Based on assumptions discussed earlier about completion rates, a further 850-900 MW from the previous Orders, might be expected to commission. Assuming existing renewables capacity continues in place, the total capacity available from renewable sources and contracted projects would be approximately 2,700 MW. If NFFO5 results in an effective capacity of around 550 MW as indicated in the previous chapter, this would imply a total of nearly 3,300 MW. It would require a further 5,000 MW or so of capacity in order to meet the 10 per cent renewable target.
- 10.4 Allowing time for new projects to commission, this implies a programme of about 500 MW per year over the next 10 years. This would be very substantial: over three times what might be expected from renewables Orders to date, and nearly ten times what is presently generating from them.
- 10.5 The Minister's November 1997 statement indicated that the achievement of the 10 per cent target would almost certainly require bringing forward technologies in addition to those proposed for inclusion in NFFO5, including offshore wind and energy crops.
- 10.6 The recent Trade and Industry Select Committee Report (June 1998) said that there is little or no likelihood of the Government's 10 per cent renewables target being met by operation of the free market alone. It recommended that the Government

should continue to use some form of NFFO mechanism in order to bring renewables technologies to the electricity market place in pursuit of the target.

- 10.7 As explained in the previous chapter, there is now evidence that municipal and industrial waste projects are already economic without NFFO support. Taking into account the amount of waste likely to be available and needing to be disposed of, and the revenue from gate fees received by such projects, a further capacity of about 1,000 MW might be assumed to be economically available from such waste-to-energy projects without any cost to the Levy. Predictions of the amount of waste likely to be available suggest that an even greater capacity might be achieved.
- 10.8 The scope for new hydro projects is now severely limited in the United Kingdom, and hydro prices are not falling significantly. There is also little further scope for landfill gas projects because few landfill sites remain available. It is therefore necessary to consider how the remaining 4,000 MW of new renewable capacity might be met by three technology bands: on-shore wind; offshore wind; and energy crops.
- 10.9 The capacity available from on-shore wind will depend on the extent to which suitable sites are available and are granted planning consent. If prices for, say, 1,000 MW could be achieved at or below 2.9 p/kWh (the average price of the projects recommended for inclusion in the NFFO5 Order) and Pool price or equivalent were 2.25p/kWh, the cost to the Levy might amount to about £40-£45 million per year, depending on actual output, bid prices and Pool price levels. The total cost to the Levy, assuming contracts are for 15 years might amount to £600 - £675 million. It is worth noting however that 1000 MW is over three times the expected total capacity from wind from the first four NFFO Orders (which provided a total capacity of approximately 600 MW with an effective capacity of approximately 300 MW), and over 10 times the amount of wind generation capacity so far constructed and operating.
- 10.10 Offshore wind and energy crops are not included in NFFO5. Previously some energy crops projects were included in NFFO3 and NFFO4 and some offshore wind projects in NFFO4. The average price for energy crops in NFFO3 was 9.74p/kWh and in NFFO4 was 5.87p/kWh in 1998 prices. The average price for off-shore wind projects in NFFO4 was slightly lower than the average price for all wind projects of around 3.79p/kWh also in 1998 prices. However, to date none of these projects have commissioned. A consultation exercise was undertaken by the Department of Trade and Industry prior to the Minister's announcement in November 1997 about NFFO5. The summary of the consultation exercise provided in Renewable Energy Bulletin 7 indicates that the trade bodies promoting the more expensive technologies - offshore wind energy and agricultural waste and energy crops - advocated a delay in their inclusion in further NFFO rounds, to give developers time to devise soundly based projects with a real and timely prospect of success. Figures produced by the British Wind Energy Association indicate bid prices of 5-6p/kWh for offshore wind.

- 10.11 If prices in the range 5p/kWh to 6p/kWh could be achieved for off-shore wind projects and for energy crops, for example, as a result of economies of scale and greater investment in the development of the technologies, the cost to the Levy of 3,000 MW of such capacity might amount to £610 - £830 million per year depending on output and Pool price levels. The total cost to the Levy, assuming contracts are for 15 years might amount to £9 - £12 billion.
- 10.12 To summarise, assume that about 5,000 MW of capacity is required to meet the 10 per cent target, and that this could be met by 1,000 MW of additional waste projects at no cost to the Levy, and 1,000 MW of additional on-shore wind projects plus 3,000 MW capacity from offshore wind and energy crops. At an assumed future Pool price (or equivalent) of 2.25p/kWh in real terms the cost to the Levy might amount to about £650 - £875 million per year depending on actual output and Pool price levels. The cost to the levy of NFFO3 and NFFO4 is expected to amount to about £100 million per year (at capacity levels assumed) plus an additional £19 million or so for NFFO5 at the suggested capacity levels. The total cost to the Levy of meeting the 10 per cent target from renewable sources, therefore amounts to some £770-£995 million per year. The total cost to the Levy, assuming contracts are for 15 years therefore amounts to some £11-£15 billion. This would require a Levy rate over the 15 years of between 6 and 8 per cent approximately.
- 10.13 It might be argued that renewables prices could decrease further over time. But so could Pool and contract market prices, under the pressures of greater competition. If a lower Pool price of 2p/kWh is assumed, for example, the total cost to the Levy increases to £850-£1,100 million per year, or some £13-£16 billion in total assuming 15 year contracts.
- 10.14 These are significant costs to customers, much greater, for example, than any costs of revising trading arrangements or opening competition in supply to all customers. It is for consideration whether the benefits of renewable energy justify incurring them.

11 FUTURE ARRANGEMENTS

Revision of Contractual Arrangements

- 11.1 A number of significant changes affecting the electricity market are in prospect which will necessitate changes to the arrangements for future renewables Orders, and some revisions also to arrangements for this and for previous renewables Orders. Independently of these changes, there is scope for improving the contractual arrangements for supporting renewables.
- 11.2 At present, under Section 32 of the Electricity Act 1989, the obligation to comply with NFFO Orders relates only to the public electricity suppliers. There is no corresponding power to impose similar obligations on other suppliers. The market is being opened to competition in supply for all electricity customers as from later this year. As competition grows it will become increasingly anomalous, and may be positively undesirable, for obligations in respect of renewables to continue to be placed on some suppliers in the competitive market and not on others, even if the additional costs continue to be met through the Levy.
- 11.3 Moreover, the Government and OFFER have proposed that PES distribution and supply activities should be more fully separated, including separate licensing of these activities. Legislation to effect such changes is likely to reduce or remove the present distinction between first and second tier suppliers. This will raise the question whether it will remain appropriate, or even possible, to place future renewables obligations on the present PESs and not on other suppliers. In addition, separate licensing leads to the possibility of distribution and supply being carried out under separate ownership. The PESs which are presently required to contract for renewables may not continue to exist in their present form.
- 11.4 OFFER has recently undertaken a review of electricity trading arrangements in conjunction with the DTI. This review recommended replacing the existing Pooling and Settlement arrangements with market based trading arrangements more like those in commodity markets and competitive energy markets elsewhere. Under the present NFFO arrangements Pool Selling Price is used as the reference price to calculate the reimbursement to contracting PESs and the cost of each project to the Levy. Under the proposed new trading arrangements there would not be such a price. The mechanisms for reimbursing PESs from the Levy in respect of both existing and future NFFO contracts will need to be revised on the basis of an alternative reference price.
- 11.5 Present NFFO contracts reimburse renewable generators for output at a flat rate, independent of when output is produced. There is no incentive on renewables generators to maximize output at times of day or year when it is most highly valued, or to take responsibility for the predictability of times and volumes of output. Under present Pool trading arrangements, there is no incentive on renewables generators to contract with suppliers or customers to hedge Pool Price risk. Under the proposed future trading arrangements, there would be inadequate

incentives on them to participate actively in markets for electricity contracts, including the forwards and future markets, the short-term bilateral market and the balancing market. If some 10 per cent of generation capacity is to be subject to arrangements such as NFFO, failure to address the question of incentives on renewables generators could restrict or distort competition in the market and increase costs to other market participants.

- 11.6 In the light of the considerations discussed above, it is appropriate to consider significant revisions to the present arrangements for supporting renewables generation, including both the nature of the powers to make renewables Orders and to make reimbursement of additional costs, at present contained in Sections 32 and 33 of the Electricity Act 1989, and the form of the contracts with renewables generators and the contracting parties. One possibility might be a subsidy payment per unit of output paid direct to the renewable generator (or through a supplier in the case of existing contracts), fixed at the time that the renewables Order is made, with the balance of the generator's revenue to be derived from contracts which he would negotiate in the market. Further consideration needs to be given to these issues.

12 CONCLUSIONS

- 12.1 408 projects with a total capacity of 2579 MW have been submitted for this Order. For each technology band bid prices have been at a lower level than under NFFO4.
- 12.2 It is possible to set an Order for 850 MW, approximately the same size as the NFFO4 Order, at an average price of 2.51p/kWh, about 32 per cent lower than for NFFO4. This would involve selecting 72 projects with the lowest bid prices, mainly from the bands for municipal and industrial waste and landfill gas and to a small extent from the bands for wind and CHP. At the assumed completion rates these projects might be expected to result in about 540 MW of effective capacity. The total additional cost to electricity customers of such projects, over and above Pool price, might be about £160 million over the next 15 to 20 years.
- 12.3 An alternative means of meeting an Order for approximately the same capacity might include fewer waste projects and more landfill gas and wind projects, at an average price of 2.73p/kWh, about 26 per cent lower than for NFFO4. The total additional cost to electricity customers of the 166 projects such projects, over and above Pool price, might be about £275 million over the next 15 to 20 years.
- 12.4 Different sizes or compositions of Order might be considered. For example, more CHP projects could be included in line with the Government's commitment to CHP, and more landfill gas projects could be included to make use of an otherwise environmentally harmful and wasted resource.
- 12.5 Evidence from this and previous NFFO rounds shows a continued convergence towards market price. If this continues, further capacity could be contracted more economically at a later date.

Annex

TENDER CONDITIONS

In submitting tenders, applicants acknowledge that they accept and will abide by provisions set out in the Information Notes and the Tender Conditions which are set out below and in the Tender Pack Guidance Notes.

1. Applications and Submissions

- (a) Applications and Submissions must be made by the due dates and times specified herein and must be accompanied by the VAT inclusive non-refundable fees of £117.50 and £470 respectively.
- (b) The Application For Tender Pack must be completed and received before 16 January 1998 and the Tender Submission must be submitted no later than 1 May 1998.
- (c) The Tender Submission must be complete and all information provided must be consistent. The information given in the draft schedules and the Technical Questionnaire must be compatible.
- (d) A change of Applicant will not be allowed during the period covering the submission of tenders to awarding contracts.
- (e) The Applicant must provide one named contact with an address in the UK. (All communications will then be addressed to the contact).

2. Capacity

- (a) The project must represent “new capacity” as defined in the Further Guidance to the RECs in REB 7.
- (b) Where the capacity of the Facility is to be phased, there must be no more than six phases over the Contract Term.

3. Technology Band

The project must be capable of complying in all respects with the relevant Technology Band descriptions as defined in the Further Guidance to the RECs in REB 7.

4. **Project/Site**

Unless stated otherwise in the relevant Technology Band:

- (a) each project must be capable of being awarded a NFFO 5 contract and being commissioned without reference to the success or failure of any other project by the same or a related applicant taking part in any NFFO (or the Scottish Renewable Order process);
- (b) each project must be a stand alone project by reference to a specific and separately identifiable site which must not overlap with the site of another project submitted under the same technology band by the same (or a related) applicant;
- (c) no changes to site location will be allowed;
- (d) in respect of any site, an applicant may put forward one project only for each technology band;
- (e) where an applicant applies for separate projects on adjacent or neighbouring sites, he cannot put forward a submission in respect of an amalgamation of any of the projects proposed for such adjacent or neighbouring sites.

5. **Bid**

- (a) Only one unconditional bid will be allowed to be made by each applicant in respect of each project (which will be frozen as explained in paragraph 45).
- (b) Applicants must comply with the requirements of the Bid Form.

6. **Questionnaires and Supporting Evidence**

All questions (relevant to Technology band) in the Questionnaires must be answered fully and any required supporting evidence must be provided

7. **Land Ownership**

Written confirmation must be provided that the applicant owns or leases the site and has access thereto or that the landowner(s) is prepared to enter into negotiations in respect of the site and access thereto.

8. **Connection**

Applicants must include a valid, up to date, budget cost for connection to the electrical network of the host REC (or if applicable, NGC) covering contestable and non-contestable work. The budget cost for the non-contestable element of the work must be obtained from the host REC (or if applicable, NGC).

9. **Fuel Supply/Power Source Data**

(a) **Wind Power**

Data must be provided of site wind resource over a minimum period of

12 months which must include at least 13 weeks continual measurement on site and which shall include measurements made over a winter period taken prior to the closing date of 1 May 1998 for submission of draft contract schedules, Technical Questionnaire and supporting evidence.

(b) **Hydro Power**

Confirmation must be provided by the closing date of 1 May 1998 for submission of the draft contract schedules, Technical Questionnaire and supporting evidence:

- (i) that an abstraction licence and, if required, an impounding licence is held; if not, evidence must be provided that discussions have taken place with the Environment Agency;
- (ii) on the method used to derive the annual mean flow on site from one of the following alternatives:

- (a) mean flow data covering a minimum of 15 years of existing flow records for the watercourse concerned which is available from the Institute of Hydrology;
or

- (b) on the basis of 15 years rainfall data from the relevant catchment area making due allowance for absorption, run-off and evaporation rates to calculate the river flow at the off-take point for the generating station; or

- (c) on the basis of on-site data over a period of 2 years, normalised to the mean average rainfall over a period of at least 10 years.

(c) Landfill Gas from Existing Landfill Sites

- (i) Confirmation must be provided that the Facility will be fuelled by gas derived from a landfill site on which, at some time prior to 25 November 1997, controlled waste was deposited or disposed of in compliance with conditions of a waste management licence issued under Section 36 of the Environmental Protection Act 1990.
- (ii) Data must be provided on pumping trials in the form of continual measurement to assess the gas resource on site. The measurement must be taken over a period of not less than 30 days prior to the closing date of 1 May 1998 for submission of the draft contract schedules, Technical Questionnaire and supporting evidence.
- (iii) The applicant must produce evidence by 1 May 1998 of his right to use the gas in the Facility.

(d) Municipal and Industrial Waste

- (i) Data must be provided of the source, quantity and quality of the fuel supply with the submission to OFFER of the Economic and Commercial Questionnaire by the closing date of 1 May 1998; and
- (ii) in the case of municipal and industrial waste CHP projects, information must be provided that there are, or there are reasonable prospects of obtaining, contracts with third parties to supply the relevant heat capacity (subject to the awarding of a NFFO 5 contract). This information must be provided with the submission to OFFER of the Economic and Commercial Questionnaire by the closing date of 1 May 1998.

10. Submissions must comply with Renewable Energy Bulletin No 7 published by the Department of Trade and Industry.