THE BRITISH
WIND ENERGY
ASSOCIATION

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Towards a non-carbon fuel economy:
Research, Development and Demonstration
Submission by the British Wind Energy Association

The British Wind Energy Association (BWEA) welcomes the opportunity to contribute to the inquiry into UK research, development and demonstration in non-carbon energy technologies and provides this submission on behalf of the UK wind energy industry.

BWEA was established in 1978 and is the representative body for companies active in the UK wind energy market. Its membership has grown rapidly over recent years and now represents 218 companies including all grid-connected wind energy now installed and every company with a lease to develop offshore (see Appendix).

Wind energy is widely recognised as an abundant energy resource indigenous to the UK. Most commentators accept that wind is likely to represent at least half of the Government's '10% by 2010' target because of the maturity and low cost of wind energy. Beyond this baseline, continued growth is equally probable. In representing the industry, BWEA is therefore in a unique position to comment on the RD&D measures necessary to ensure continued development of the wind power sector.

BWEA would be pleased to clarify any issues raised and offer any further information the Committee may require.

Nick Goodall
Chief Executive

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1. To evaluate the level of expenditure on R&D in non-carbon energy technologies, by the UK Government, the Research Councils, the Carbon Trust and industry and where it is being directed.

UK state support for R&D in onshore wind has largely ceased. Limited research fundings are available for wind power in the UK through EPSRC, and an even more limited amount through the DTI New & Renewable Energies Programme, including £1.2 million directed to offshore wind and a further £74 million in the shape of capital grants. What monies are available tend not to be directed towards pure RD&D.

Turbine manufacturers do have their own in-house RD&D programmes, but these will be aimed at their own products and take place, in the main, outside the influence of UK factors.

Were RD&D funding available through UK initiatives, we feel that this would help attract manufacturing base back to the UK, which itself would have beneficial effects on the necessary skills level and workforce envisaged for the future wind industry. By way of example, we would cite the instance of Taywood Aerolaminates, a UK company involved in the manufacture of wind turbine blades. DTI RD&D funding allowed this company to become so firmly established in the UK that when a takeover occurred, it was a natural choice that the company and its expertise remain in the UK. The new company, NEG Micon Rotors, are now the largest employers in the UK wind industry.

2. To identify which technologies are, or should be, receiving support and how much investment is directed at research, development and demonstration respectively.

Much is expected of the UK wind industry, and in particular, the offshore sector. The dramatic rate of growth necessary to achieve such aspirations will require support from all quarters, including the maintenance of a solid bedrock research community.

BWEA would also note that although wind energy is a relatively commercially mature industry compared to other renewable technologies in the UK, it is still a fledgling industry and as such there is a need for continued fundamental research to achieve projected costs savings and performance improvements, vital to maintain the viability of the wind industry. Such ongoing R&D includes whole life, accelerated durability and longevity testing, and developing and accrediting dependable systems for predicting output over various timescales.

Specific to the onshore sector, co-generation opportunities should be identified, such as biodiesel, and hybrid wind-solar systems, together with better technology to maximize low wind speed areas.

Looking specifically offshore, foundation designs for wind turbines need to be developed and tested for different seabed conditions; oil, gas and hydropower generation offshore could be combined and transported onshore and technologies need to be developed and integrated to ensure the UK becomes the leader in hybrid wind and hydrogen power.

Furthermore, there are a number of issues that are common to offshore wind, wave and tidal generation technologies. BWEA is working closely with colleagues in the wave and tidal industries to ensure a co-ordinated approach to the development of the offshore renewables sector, including RD&D requirements.

Common	**Wind-specific**
Planning consents	Simulation of active electricity networks
Grid connectivity & embedded generation	Risk reduction
Installation	Foundations
Electricity transmission	Blade fatigue
Environmental studies	Turbine reliability
	Accessibility/Maintenance
	O&M strategies
	Wind resource and forecasting
	Power transmission technologies

The following matrix illustrates the priorities for RD&D spend both by the time period in which it takes place as well as the specific area (research or development) in which it is required.

	Short term (1-2 yrs)	**Med. term (2-5 yrs)**	**Long term (5+ yrs)**
Research		Condition monitoring	Larger turbine designs, novel designs
Development	Planning consents, installation, foundations, risk reduction	Environmental, embedded generation, monitoring of machines, reliability, wind forecasting	Transmission options (eg hydrogen)

Note: Timescale is when the product is required and not when the RD&D should be carried out

3. To assess the skills base and the state of RD&D for different technologies

The UK renewables industry is at risk of being hampered by the lack of engineering graduates and other qualified personnel. This could affect not only the capabilities for future expansion but could also result in the UK loosing the early-mover advantage it currently holds in the field of marine renewable technologies. An active research presence in Universities and

research institutes would ensure a steady stream of students equipped with up-to-date knowledge; these graduates will be a vital input into a rapidly growing industry.

Furthermore, Britain has an excellent technology pool from its experiences over the last 30 years in oil and gas. Technology and personnel transfer from oil and gas and 'sunset' industries into offshore renewables will be a key factor in the success of this new sector. Equally, 'joined up thinking' and promotion of wind energy opportunities to UK companies that can be a part of a greater wind energy supply chain would also encourage an appropriate skills.

4. To establish how government policy on energy RD&D is formulated, implemented and evaluated and the nature of coordination between department, external agencies and industry.

There is a need for co-ordination in Government policy on energy RD&D between departments, agencies and industries. BWEA is in agreement with the recommendations of the PIU report, specifically that a dedicated national research centre be established to boost the profile of energy research and attract high calibre scientists into the field.

However BWEA notes that such a centre will almost certainly be geographically distributed as it is hard to imagine a single site with the correct skills and infrastructure to carry out work on wind, wave and tidal energy as well as, for instance, the hydrogen economy.

A wide-reaching industry forum (which BWEA would be pleased to assist in organising) to take soundings from the wind and related technologies would be a helpful activity.

5. To establish the level of and rationale for international collaboration in energy RD&D and how the priorities are determined.

Notwithstanding EU-led R&D programmes which require cross-boundary collaboration and tend towards demonstration rather than deployment, there is potential for RD&D through trade partnership with other countries.

BWEA feels that international collaboration would be of benefit. Offshore renewables in particular has many trans-boundary issues, such as fisheries, navigation and impacts on birds. Equally, the needs and experiences of the different countries in RD&D, construction, maintenance, operations etc are very similar and should be shared wherever possible in order to minimise costs.

BWEA believes that there is a potential need for a set of international technical standards for offshore wind farm construction and operation and that the adoption of such would be of significant value regarding issues of financing and insurance.

6. To examine the effect on energy RD&D of privatisation, liberalization, regulation and changes in ownership in the sector.

The overall effect of privatisation and liberalisation on energy RD&D has been very negative. RD&D budgets of privatized companies have shrunk dramatically; the emphasis is on the short term and this is exacerbated both by the demands of the stock market and a volatile energy market. In addition corporate RD&D is rarely associated with technologies (such as the hydrogen economy) that do not have near term financial payoffs.

There needs to be a greater funding focus directed towards the supply chain, for example, helping British companies to diversify current technologies, develop new technologies and plants and keep abreast of new technological advances.

7. To make comparisons with overseas competitors.

BWEA is in broad agreement with the findings of the October 2001 IEA report on R&D in the Wind Energy Sector[1]. The study brought together 17 countries as well as the European Commission, to identify the appropriate level of wind energy research out to 2020.

The report indicates that, although costs have already fallen dramatically, if wind energy is going to supply 10% of the world's electricity needs by 2020, cost reductions in the technology of 30-50% are still necessary, which would enable wind power, particularly from the offshore sector, to be price-competitive with conventional generation technologies. The report notes that R&D work could contribute up to 40% of those cost reductions.

BWEA also notes the findings of the Energy Research Review[2] specifically the table contained in Annex B: 'International Government Expenditure on Energy R&D'. Key data from this table is included below; the numbers speak for themselves. The UK is home to the greatest wind resource in Europe, if not the world, yet has the third lowest per capita R&D spend on renewables. Although DTI has announced that it intends to increase R&D spend in 2001 to £18m[3]; on a per capita basis this represents only £0.31 and still leaves the UK well down in both European and international rankings. Such 'back of the envelope' calculations take no account of the fact that the other countries are almost certain to have announced increases in their R&D budgets for renewables.

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[1] 'Long term research and development needs for wind energy for the time frame 2000 to 2020' IEA R&D Wind Executive Committee. October 2001

[2] Chief Scientific Adviser's Energy Research Review Group – recommendations to inform the PIU's Energy Policy Review. Undated

[3] DTI's New and Renewable Energy Policy Document. Section 3 – Form of Support.

	Year*	Total R&D Spend £m	Population m	Per capita R&D spend. £
Portugal	1999	0.89	10.0	0.08
Belgium	1998	0.90	10.2	0.09
UK	1999	7.56	58.6	0.13
France	1999	8.78	58.7	0.14
Canada	1998	5.56	30.6	0.18
Spain	1999	13.22	39.6	0.33
Italy	1998	22.41	57.4	0.39
Germany	1999	48.19	82.1	0.58
USA	1999	170.67	274.0	0.62
Japan	1999	84.61	126.3	0.67
Austria	1998	6.97	8.1	0.86
Netherlands	1998	14.40	15.7	0.91
Sweden	1999	8.33	8.8	0.94
Norway	1999	4.58	4.5	1.02
Finland	1998	5.79	5.1	1.14
Denmark	1999	10.99	5.3	2.07

** R&D spend is shown for the most recent year available*

Appendix: Membership of BWEA at 13th September 2002

Sponsoring
Amec Wind
Bonus Energy A/S
GE Wind Energy
National Wind Power Ltd
Powergen Renewables
Renewable Energy Systems Ltd
ScottishPower
Shell International Renewables Ltd
TXU Europe

Company
ABB New Ventures GmbH
AEA Technology Environment
Aegis Rubber Engineering
Airtricity Development Ltd
Alstom T & D Ltd
ATCO Power Generation Ltd
B9 Energy (O&M) Ltd
Babtie Group Limited
Bond Pearce Solicitors
Bouygues Offshore
British Energy plc
Brodies W.S., Solicitors
Clarke Energy Ltd
Clean Energy Company Limited
Conoco Global Power U.K. Ltd
Corus
CTC Marine Projects
D.N.V.Consulting
Dowding & Mills Engineering Services
Econnect Ltd
Ecowind
Edison Mission Energy Limited
Edmund Nuttall Limited
ELSAM A/S
Energia Hidroelectrica de Navarra SA
Energiekontor (AG)
ENERTRAG UK Ltd
Entec UK Ltd
Entergy Wholesale Operations
Ernst & Young
Force 9 energy Ltd
Fortis Bank
Fugro Limited
Garrad Hassan & Partners Ltd
Global Marine Systems Ltd - Energy Services
GREP A/S
Halliburton KBR
Hyder Consulting Limited
Hydro Soil Services
Ingenco Ltd
Investec Bank (UK) Limited
J P Kenny
John Brown Hydrocarbons Ltd
John Mowlem & Company plc
Keliston Engineering Ltd
Kier Construction Limited
London Power Company
MacRoberts Solicitors
Masons
Mayflower Corporation plc
McCarthy Tetrault
Met Office
Miller Insurance Group
Morgan Cole
Nabarro Nathanson
NaREC
National Grid Company
Natural Power Consultants Ltd
NEG Micon UK Ltd
Nordex UK Ltd
Norton Rose
Nsure Renewables
Offshore Energy Resources Limited
Pirelli Cables Ltd
QinetiQ Ltd
R.D.C. Ltd
Renewable Solutions Ltd
REpower Systems AG
RJ McLeod (Contractors) Ltd
Royal & SunAlliance
Schneider Electric
Scottish & Southern Energy plc
Seacore Ltd
SLP Energy Ltd
Sonsub Limited
SP Dataserve Ltd
Tomen Power Corporation UK Ltd
Total Energie Developpement S.A.
Tractebel Energy Engineering
Trinity House
Triodos Bank
United Utilities Green Energy
Vattenfall
Vestas - Danish Wind Technology A/S
Warwick Energy Limited
Wind Prospect Ltd
Windelectric Ltd
Windforce Energy Development Ltd
Windjen Power Limited
Wragge & Co
Yorkshire Windpower Ltd
Your Energy Ltd

Correspondent
A2Sea A/S
ABP mer
AEI Cables Ltd
Aeon Wind Power Limited
Agrilek Limited
Allen & Overy
All-Energy Opportunities
Ambient Energy Ltd
Andaray Engineering Ltd

Anglesey Wind & Energy Ltd
Baywind Energy Co-operative Ltd
Bendalls Engineering
Bosch Rexroth Ltd
Brooks Ltd, Compact Orbital Gears
Brown McFarlane Ltd
Cable Installation Management Ltd
Cambrian Engineering (Cymru) Ltd
Casella Stanger Ltd
Charles W. Taylor & Sons Ltd
Chris Blandford Associates
CNS Subsea Ltd
Collett Transport Ltd
Cornwall Light and Power Co Ltd
Coupe Foundry Ltd
Cumbria Windfarms Ltd
Cwmni Gwynt Teg Cyf
Dansteel Ltd
DM Energy
DP Energy Ltd
DSB Offshore Limited
Dulas Ltd
E4environment Limited
EA Gibson Shipbrokers Ltd
Eclipse Energy
Eco Energy UK PVT Ltd
EcoGen Ltd
eeegr, East of England Energy Group
Elequip Projects Limited
EMU Ltd
Energy for Sustainable Development
Energy Workshop tbc
Enskilda Securities
Enviros Aspinwall
ESB Power Generation, Renewables
Fairfield Mabey Ltd
Farm Energy Ltd
GPA Partnership
GreenPower
Halcrow Group Ltd
Hammond Suddards Edge
Heath Lambert Group
Hedley Purvis
HR Wallingford
Hydrosearch
Impax Capital Corporation
Inframan Ltd
IPA Energy Consulting
IPSA Power Ltd
IT Power Ltd
Landscape Design Associates
Marlec Engineering Co Ltd
Martineau Johnson
McGrigor Donald
Mersey Docks & Harbour Company
Metoc plc
North British Wind Power Limited
North Energy Associates Ltd
Oceantecs Limited
Orga Suisse S.a.r.l
Osborne Clarke
PMSS Ltd
Posford Haskoning Ltd
Proven Engineering Products Ltd
Qufab Construction
Renew North
Renewables North West
ReSoft Ltd
RMB Engineering Services
RSK Environment Limited
Ruston Wheb
Scott Wilson Oceans
Seabed Scour Control Systems Ltd
Stephenson Halliday
Stewart Group Limited
Strategic Alliance Services
Tetro Energy Limited
Thales Geosolutions
Theodore Goddard
Titan Environmental Surveys Ltd
Titan Maritime (UK) Ltd
TLT Solicitors
TMEnvironmental Power
Toby Manning Limited
Underwater Security Consultants Ltd
unit[e]
Vector Instruments
Wavegen
West Coast Energy Ltd
Western Windpower
Wichita Co. Ltd
Wind Hydrogen Limited
WindGeneration Ltd
WKN Offshore Tech. GmbH
Wrigleys Solicitors

Academic

Centre for Economic Renewable Power Delivery
Centre for Sustainable Energy
CLRC, Rutherford Appleton Laboratory
CREST
EcoTech Charitable Trust
Heriot-Watt University
National Energy Foundation
Open University
UMIST
University of Durham
University of the West of England