



Strategic Environmental Assessment of Proposals for Tidal Power
Development in the Severn Estuary



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Call for Evidence

May 2008



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This document (revision 2, issued on Tuesday 27th May 2008) includes minor revisions to the original document issued on 12th May clarifying the extent of data required under the Call for Proposals and providing additional detail under the Call for Information. It also provides additional information on the context of the Call for Evidence in the Feasibility Study as a whole.

Issued by:

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on behalf of a cross-government group led by the
Department for Business, Enterprise and Regulatory Reform (BERR)



RESPONSE DETAILS

Parsons Brinckerhoff on behalf of a cross-government group led by the Department for Business, Enterprise and Regulatory Reform, invites responses to the Call for Proposals and Call for Information set out in sections 2 and 3 below.

The closing dates for receipt of evidence are listed below. However, it would be helpful to receive earlier responses and it is permissible for respondents to submit interim contributions during the Call for Evidence period.

- Call for Proposals - 13th June 2008
- Call for Information - 11th July 2008

Responses should be sent to the address mentioned below:

Issued on: 12th May 2008
For Call for Proposals, respond by: 13th June 2008
For Call for Information, respond by: 11th July 2008
Enquiries to: Parsons Brinckerhoff, Queen Victoria House, Redland Hill, Bristol BS6 6US
FAO: Severn Estuary SEA Team
Email: SevernSEA@pbworld.com
Tel: 0117 933 9259

CONFIDENTIALITY

It is intended that responses will be made public. If you do not wish all or part of your response (including your identity) to be made public, please state in your response which parts you wish us to keep confidential.

However, information provided in response to this Call, including personal information, may be passed to Government departments and may be subject to publication or disclosure in accordance with the access to information regimes (these are primarily the Freedom of Information Act 2000 (FOIA), the Data Protection Act 1998 (DPA) and the Environmental Information Regulations 2004). If you want information that you provide to be treated as confidential, please be aware that, under the FOIA, there is a statutory Code of Practice with which public authorities must comply and which deals, amongst other things, with obligations of confidence.

In view of this it would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding. Your



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personal data will be processed in accordance with the DPA and in the majority of circumstances this will mean that your personal data will not be disclosed to third parties.

CONTEXT

This Call for Evidence has been developed primarily to inform the Strategic Environmental Assessment (SEA) of proposals for tidal power development in the Severn Estuary being undertaken as part of a cross-government Feasibility Study. The Feasibility Study comprises a number of other work areas in addition to the SEA, and relevant information received through this Call for Evidence will be shared with the other workstreams being undertaken as part of the Feasibility Study. Equally, relevant information arising from the work being undertaken by other workstreams within the Feasibility Study will also be used to inform the SEA. The main workstreams being undertaken as part of the Feasibility Study are:

- **Environmental** – impacts on biodiversity and wildlife, flood management; geomorphology; water quality; compensatory habitat;
- **Engineering and technical** – options appraisal, costs, design and construction, grid linkage
- **Economic** – financing, ownership, energy market impacts
- **Regional** – impacts on business, Severn ports, regional social and economic impacts
- **Planning and consents** - regulatory compliance
- **Stakeholder engagement** and communication

Further information on the Feasibility Study, including its Terms of Reference, is provided in Section 1 of this Call for Evidence and can be found on the BERR website.

1 INTRODUCTION – THE SEVERN TIDAL POWER FEASIBILITY STUDY

On 25th September 2007 the Secretary of State for Business, Enterprise and Regulatory Reform announced a Feasibility Study of tidal range power development in the Severn Estuary. Terms of Reference for the Study were published on 22 January 2008, which are as follows:

“Building on the work of the Sustainable Development Commission and earlier studies, the feasibility study will:

- assess in broad terms the costs, benefits and impact of a project to generate power from the tidal range of the Severn Estuary, including environmental, social, regional, economic, and energy market impacts;
- identify a single preferred tidal range project (which may be a single technology/location or a combination of these) from the number of options that have been proposed;
- consider what measures the Government could put in place to bring forward a project that fulfils regulatory requirements, and the steps that are necessary to achieve this;
- decide, in the context of the Government’s energy and climate change goals and the alternative options for achieving these, and after public consultation, whether the Government could support a tidal power project in the Severn Estuary and on what terms.”

The Feasibility Study is being managed by a cross-government group led by the Department for Business, Enterprise and Regulatory Reform, which includes the Cabinet Office, Department for Environment, Food and Rural Affairs, Department for Transport, Department for Communities and Local Government, Her Majesty’s Treasury, Wales Office, the Welsh Assembly Government, and the South West Regional Development Agency.

The Feasibility Study will consider all tidal range technologies, but not tidal stream technologies (though see paragraph 2.1 below). The Severn Estuary has the second highest tidal range in the world and the prospect of capturing this resource for electricity generation is the subject of the Study. Tidal range is the vertical difference between the highest high tide and the lowest low tide (over 14 metres in the Severn Estuary). Electricity is generated by impounding a large volume of water on the high tide and then passing this water through turbines once a height difference is created. This differs from tidal stream technologies which exploit tidal currents rather tidal level differences to generate power. The majority of tidal stream resource in UK waters is not located in the area of the Severn Estuary covered by this study.

There are two main tidal range technologies - barrages and lagoons. A Severn Barrage would be a barrier between the English and Welsh coasts across the Severn estuary. There are several proposed locations for such a barrage. A tidal lagoon is an artificial impoundment that would be constructed in shallow water areas with a high tidal range, and again several proposals have been made for such developments.

A technical options assessment, in tandem with a Strategic Environmental Assessment ("SEA") of shortlisted options for tidal range energy development in the estuary, will inform the Feasibility Study. An important element of the options appraisal and SEA is the identification of all potential options and an understanding of available information sources on environmental and other impacts. This is being undertaken through this Call for Evidence which comprises two streams:

- Technical information on Tidal Range Proposals for the Severn with a particular focus on any work that may have been undertaken in developing new or existing proposals since the publication of the SDC's Report in October 2007;
- Any other information that may be relevant in considering tidal range proposals and its potential benefits and impacts.

This Call for Evidence invites interested parties to submit (a) evidence based proposals for development which will generate electricity from the tidal range of the Severn Estuary, and (b) other information, which either exists or is under development, which could potentially contribute to the evidence base for the assessment of schemes and the SEA.

2 CALL FOR PROPOSALS

2.1 ELIGIBILITY

This Call for Evidence invites interested parties to submit evidence based proposals for development which will generate electricity from the tidal range of the Severn Estuary.

In the context of the Government's energy and climate change goals, only proposals which are strategically significant in their generating capacity will be considered in the SEA. Therefore each proposal, which could comprise a combination of individual schemes, should have a minimum installed generating capacity of 50MW. Proposals for tidal range power developments which include a contribution from other tidal power technologies may also be submitted.

2.2 EVIDENCE SOUGHT

A key objective of this Call for Proposals, in addition to capturing as much information on potential tidal range power projects in the Severn, is to understand how previous proposals such as those considered in the SDC's Tidal Energy Study, have been further developed. Examples would include changes in navigation requirements, optimisation of energy capture (ebb and flood generation and/or pump assisted generation), non-energy benefits and changes in construction techniques, materials/equipment and programme.

To inform our comparison of proposals, respondents are requested to provide evidence based information which either exists or is under development. As a guide, we are particularly interested in any or all of the following information for individual proposals or, where applicable, combinations of proposals.

- The status of the proposal, including evidence of commercial support, regulatory status, promotional status, and the further steps required for delivery;
- Exact location and area required;
- Technology to be used including scale, form and type of civil, mechanical and electrical infrastructure, together with information on experience elsewhere of the technologies proposed (where this exists);
- Detailed design of the scheme as far as is known;
- The generating capacity (in MW) and total expected annual generation (in TW hours), including load factor and availability;
- Details of proposed operating regimes and cycles, including power outputs and timing;

- Total estimated cost of scheme, including capital expenditure, operation and maintenance and compensatory habitat. This information should be included in a format such that we can calculate a levelised cost of electricity - thus the likely timing of these costs and outputs should be included;
- Expected construction time and lifetime of scheme in years and proposed method/sequence of construction and decommissioning.

Note: Respondents may wish to calculate their own levelised costs (providing they are fully verifiable and sensitivity tests can be performed). In this case, they should use a range of discount rates; without prejudice for future decisions, we suggest the range should be 3.5%-15%.

In addition to the above, the following information would also be desirable:

- Environmental effects (preferably quantified) including effects on hydrology, sedimentation and geomorphology, water quality, sub-tidal and inter-tidal habitats, ornithology, impact on fish, other ecological issues, archaeology, landscape and seascape, and carbon footprint/payback, together with information on mitigation measures;
- Regional impact including ports and commercial shipping, coastal and flood defence, local economy, employment, tourism, commercial fishing, aggregate industry, recreation, ancillary development, marine aggregate dredging and other uses of the seabed;
- Non energy costs and benefits (for example potential transportation links, flood defence etc)
- Compatibility with the electricity network, including grid connection, grid reinforcement, and balancing of the system;
- Construction impacts including local transport issues, accommodation, services, engineering skills, workforce availability, sourcing of materials, supply chain, dredging requirements, de-commissioning;
- Descriptions of non-energy benefits or opportunities associated with the scheme; and
- Brief descriptions of any further studies required to confirm the feasibility of the proposals before initiating design and construction.

Respondents are encouraged to submit as part of their evidence, a simple review of the implications of their proposals in relation to environmental assessment criteria set out in Section 4.

2.3 PROPOSALS FEATURED WITHIN THE SUSTAINABLE DEVELOPMENT COMMISSION STUDY

Evidence already provided in relation to proposals which featured in the Sustainable Development Commission “*Turning the Tide – Tidal Power in the UK*” report (October 2007) and associated research studies does not need to be resubmitted. However, this Call for Evidence invites interested parties to submit further evidence which may have a bearing on the evaluation of these proposals. We are especially interested in receiving the following information:

- The proposal to which the evidence relates;
- Supplementary information relating to the proposal, identifying any information provided to SDC which has become superseded – including, but not limited to, construction techniques, materials and equipment, construction programme, modes of operation and associated energy capture (including ebb/flood and/or pump assisted generation), non energy benefits, navigation requirements and updated financial and energy assessments;
- Evidence based information on any parts of the SDC report which respondents wish to dispute or which respondents consider require further review.

2.4 ASSESSMENT OF PROPOSALS

In addition to inviting proposals, this Call for Evidence also invites respondents to provide evidence based information on methods of assessing alternative proposals. We are especially interested in evidence based information on any aspects of the evaluation process described in section 4 which respondents consider require review.

3 CALL FOR INFORMATION

In addition to information on specific proposals, this Call for Evidence invites interested parties to submit information, which either exists or is under development, which could potentially contribute to the evidence base for the initial appraisal of schemes and the SEA. This Call for Information precedes the development of the SEA Scoping Study (and the subsequent public consultation), and the information collected will be used to inform this Scoping Study.

Evidence is especially sought in relation to relevant environmental data and research relating to baseline conditions/status and on the impacts of tidal power projects in the Severn Estuary or generally, with particular regard to:

- Effects on the estuary's hydraulic and geomorphological regimes;
- Associated sub-tidal and inter-tidal habitat changes,
- Ornithological impacts, e.g. consequences of changes in inter-tidal habitats on bird populations;
- Effects on water quality and surface and groundwater resources;
- Effects on fish movements and spawning, arising from physical barriers, and changes in water chemistry;
- Flood risk management and land drainage implications;
- Effects on navigation, sea disposal, marine aggregate dredging, existing and future marine energy development and other uses of the seabed;
- Effects on commercial fishing;
- Landscape and seascape effects;
- Effects on areas identified as of potential archaeological or cultural heritage importance;
- Potential for socio-economic cost & benefits, e.g. in terms of health, tourism and recreation;
- Effects arising from major structures on land use, e.g. agriculture;
- Carbon footprint, resource efficiency and waste.

Information is especially sought for the areas within the Severn Estuary, its tributaries such as the Usk and Wye, and the landward coastal fringe.

For those types of proposal which may entail significant loss of internationally designated habitats, particular considerations will apply. The estuary's existing environmental designations, and the requirements of the European Directives including the Habitats, Wild Birds and Water Framework Directives are of particular relevance. In particular, individual proposals might involve consideration of creating or restoring new habitats to compensate for any damage that may occur to existing, protected habitats. We would particularly



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encourage information on potential compensatory habitats. Evidence is therefore sought in the following areas:

- The availability of areas (including if possible, location and size) that could be enhanced or otherwise modified to provide inter- and sub-tidal habitat compensation;
- Compensation sites would ideally be located within or close to the Severn Estuary but the scale of compensation potentially required necessitates study of potential from a wider geographic area. Evidence is therefore sought for sites nationally and internationally that might provide suitable compensation or act as case studies;
- Evidence for the costs and benefits that may be associated with inter- and sub-tidal habitat creation or enhancement schemes.

Relevant commercial information is also sought on the financing, procurement, and operation of tidal range power developments, or on the marketing of power generated.

4 APPRAISAL OF PROPOSALS

4.1 OVERVIEW

Within the terms of reference of the Feasibility Study, proposals submitted in response to this Call for Evidence will be subject to initial appraisal in relation to their costs, benefits and impact, including potential environmental, social, regional, economic, and energy market impacts.

The Feasibility Study, and the associated SEA, will entail the updating, refinement and amplification of proposals in order to provide sufficient detail for the comparison of alternative proposals on a common basis.

It is not practical to bring all potential proposals to the same level of refinement to inform all the various comparison studies proposed. Therefore, the proposals received in response to this Call will be subject to an initial appraisal of cost, benefit, risks and environmental impact for the purpose of selecting a short list of options which will be developed and assessed in more detail as the Feasibility Study moves forwards.

4.2 METHOD OF APPRAISAL

Quantitative methods of appraisal will be used where sufficient analytical data exist. However, there is a significant amount of information which will require more qualitative methods of assessment. A qualitative scoring scale has been developed for the assessment of environmental impact and this is described in 4.4 below.

4.3 INITIAL APPRAISAL OF COST AND BENEFIT

The costs and benefits of proposals will be subject to initial appraisal by estimating against a common 2008 baseline and to a sufficient level of accuracy to inform broad comparisons to be made of:

- The credibility of the proposals taking into account the availability of the information listed in section 2.2 above;
- The cost of construction and operation;
- The timescale required for planning, design, construction, commencement of operation, and delivery of full generating capacity;
- The installed generating capacity and annual energy output;
- The expected contribution made to the UK's climate change and energy policies and targets;
- The cost of power generated (estimates on costs and energy generated on a year by year basis through the life of the project using a range of discount rates between 3.5% and 15% as detailed in Section 2.2.

- The extent and cost of environmental compensatory habitats required under the Habitats Directive.

The following will also be subject to interim appraisal on a qualitative basis:

- The risks involved in the delivery of the scheme and its operation;
- Compatibility with the electricity network, including grid connection, grid reinforcement, and balancing of the system;
- Other significant non-energy benefits and dis-benefits, including any headline environmental and regional issues. such as impacts and proposed mitigation on ports and commercial shipping, transportation links, availability of resources, and coastal/flood defence and employment benefits, for example;
- Construction impacts and decommissioning issues.

The outcome of this appraisal will be reviewed in conjunction with the initial appraisal of environmental impact.

4.4 INITIAL APPRAISAL OF ENVIRONMENTAL IMPACTS

The initial appraisal of environmental impacts will principally entail review of the environmental risks posed by each proposal, in relation to the key environmental issues identified in Section 3. These issues will therefore comprise the assessment criteria for this initial appraisal. Consideration will be given to risks to receptors (anything that is likely to be adversely affected) located both in the Severn Estuary, its tributaries such as the Usk and Wye, and the landward coastal fringe.

The initial appraisal will include review against the current requirements of the Habitats, Wild Birds and Water Framework Directives. Where insufficient data or information is available to make an objective qualitative appraisal, this will be clearly identified to enable a subsequent review of the impact of such unknowns to determine its sensitivity within the context of developing a short-list of proposals.

Each proposal will be assessed against the criteria above and graded according to the qualitative scale provided below.

Scale	Definition
++	The proposal may have a major positive effect in relation to assessment criterion.
+	The proposal may have a positive effect in relation to assessment criterion.
0	The proposal is unlikely to have any effect in relation to assessment criterion.
-	The proposal may have a negative effect in relation to assessment criterion.
--	The proposal may have a major negative effect in relation to assessment criterion.
+/-	The proposal may have both positive and negative effects in relation to assessment criterion and the balance cannot be determined at this stage.



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This initial appraisal will also act as a precursor to, and will inform, the full strategic assessment of short-listed options to be undertaken within the SEA process.

4.5 SELECTION OF SHORT LISTED OPTIONS

Once the proposals have been appraised, they will be compared against a set of evaluation criteria which will cover all of the factors considered in the initial appraisal. The factors will be weighted to reflect their relative importance in relation to the overall legislative and policy context.

Proposals supported by credible evidence which demonstrates a significant advantage over other proposals, and which demonstrates a reasonable expectation that they can be delivered within the legislative context, will be short listed.

It is expected that details of the initial appraisal and short listing of proposals will be published as part of public consultation on the scope of the SEA towards the end of this year.

FURTHER INFORMATION

Further information on tidal power development in the Severn Estuary, the Government's Feasibility Study and the SEA process can be obtained from the following sources:

- Details of the Severn Tidal Power Feasibility Study can be found at:
<http://www.berr.gov.uk/energy/severntidalpower>
- The press release for Secretary of State for Business Announcement (25 September 2007) can be found at:
www.gnn.gov.uk/environment/fullDetail.asp?ReleaseID=317256&NewsAreaID=2&NavigatedFromDepartment=True
- The SDC's report "*Turning the Tide – Tidal Power the UK*" can be seen together with the supporting studies at www.sd-commission.org.uk/pages/tidal.html
- Information on the SEA process can be found at the following sources:
 - European Parliament and Council of the European Union (2001). *Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment*: http://europa.eu.int/eur-lex/pri/en/oj/dat/2001/l_197/l_19720010721en00300037.pdf
 - European Commission (September 2003). *Implementation of Directive 2001/42/EC*:
http://europa.eu.int/comm/environment/eia/030923_sea_guidance.pdf
 - Office of the Deputy Prime Minister, Scottish Executive, Welsh Assembly Government and Department of the Environment in Northern Ireland (September 2005). "*A Practical Guide to the SEA Directive*":
www.communities.gov.uk/index.asp?id=1501988
 - Office of the Deputy Prime Minister (November 2005). *Sustainability Appraisal of Regional Spatial Strategies and Local Development Documents*:
<http://www.communities.gov.uk/index.asp?id=1161341>