

REPORT ON A PUBLIC FORUM

BARRAGE OR WHAT?

Options for Renewable Energy from the Severn Estuary
A National Science and Engineering Week Event hosted at the
University of the West of England; Saturday, 7th March 2009

RSA Wales and Western Region; British Science Association, Bristol and Bath Branch
University of the West of England Institute for Sustainability, Health and Environment; University of Bristol

1. Objectives and Context

This Public Forum aimed to provide a neutral space for members of the public to consider the evidence and to develop their own informed opinions on the strengths and weaknesses of various options which the Department of Energy and Climate Change are examining to exploit the tidal energy of the Severn Estuary. The Public Forum coincided with the Severn Tidal Power Phase One Consultation undertaken by DECC which finishes 23rd April.
(http://severntidalpowerconsultation.decc.gov.uk/feasibility_study_overview)

A second Public Forum is planned for Cardiff on 8 April, outcomes from which will also be fed to the DECC Consultation. Further information, Dr Eric Albone, FRSA, albone@dial.pipex.com or visit www.rsawaw.org.

2. Programme- Presentations

Following a welcome from **Prof James Longhurst**, Co-Director Institute for Sustainability, Health and Environment, UWE, who chaired the Forum, and **Dr Eric Albone**, FRSA, Chair RSA Wales and Western Region and Chair British Science Association Bristol and Bath Branch, the following 15 minute background presentations were made. Powerpoint slides of these presentations will be posted on the RSA Wales and Western Region website, www.rsawaw.org and on the UWE website.

- Context and Overview, **Claire Gibson**, Director, Sustainable Resources, South West of England Regional Development Agency
- Engineering Options, **Prof Colin Taylor**, Head, Dept Civil Engineering, Bristol University
- Implications for Wildlife, **Peter Jones**, RSPB Cymru
- Social and Economic Implications, **Toby Procter** FRSA, Trend Tracker
- Sustainable Development and Severn Tidal Power **Peter Kydd**, Director of Planning and Environment, Parsons Brinckerhoff

3. Programme- Public Engagement.

The Presentations were followed by an hour's **Open Discussion in Small Groups** advised by the speakers with the addition of **Prof Roger Falconer** FRSA, Cardiff University School of Engineering, and **Marc Lee** FRSA, Chairman, Cityforum, all of whom who moved between groups. Notes produced by these groups are attached (**Appendix 1, pages 2-3**) During this session, Claire Gibson moved between groups and compiled her own observations on these and also on the Plenary discussion which followed (**Appendix 2, pages 4-5**)

Finally in the **Plenary Session**, the Groups reported back briefly and further discussion ensued for a further 30 minutes during which time participants completed "**Your Opinion**" feedback forms outlining their own views on the issues (**Appendix 3, pages 6-9**).

**A National Science and Engineering Week Event organized by the
RSA Wales and Western Region in partnership with
the University of the West of England Institute for Sustainability, Health and Environment,
the British Science Association and the University of Bristol
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the Royal Society of Arts and the British Science Association**

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Appendix 1

Notes produced from Open Discussion in Small Groups

Group A

1. Could £20b be better spent in a wider context?
2. Incremental approach – is this feasible? Potential to test new technologies and learn from experience before up-scaling.
3. Questions/Concerns Raised by Group
(notes taken during session by not entered on flip chart)
 1. Concern raised over permanency of Severn Barrage Scheme. If technology improves to make less environmentally damaging options feasible (e.g. tidal reef), it won't be possible to pursue these alternatives after the barrage has been constructed.
 2. Is a phased construction of energy extraction schemes possible to reduce project risk and allow less proven technologies to be developed (e.g. Could small-scale lagoons and coastal impoundment schemes initially be constructed, whilst still allowing potential to develop a full scale barrage / tidal fence / tidal reef scheme at a later date?)
 3. How effective will the energy supplied be in meeting UK demand? Due to the predictable yet variable nature of tidal energy supply, peaks in supply will not necessarily match demand peaks? Technologies for storing energy (e.g. batteries/hydrogen production) were suggested as being very important in ensuring maximum benefit of energy extracted from the barrage.
 4. How will barrage be financed? How will electricity costs be subsidised once barrage is complete?
 5. What is the lifespan of the barrage?
 6. What will be the effects on sediment transport/deposition?
 7. How effective can the barrage be in providing flood / storm surge protection?
 8. Are we investigating the social implications of building a barrage in enough detail? Do Strategic Environmental Assessments take these into account?
 9. What are the implications on shipping? If accessibility of Bristol port is reduced, what implications will this have on UK transport network and associated carbon emissions?
 10. What are the embedded carbon costs in constructing the barrage?
 11. How long will barrage take to construct? Will timescales allow carbon reduction and energy security targets to be met soon enough?
 12. Is too much focus being placed on extracting energy from the Severn to the detriment of alternative renewable energy schemes?
 13. Could the £20 billion required to construct the barrage be better spent? It is very difficult to find out whether the government is ensuring that the most cost-effective, least risk and least environmentally damaging measures for greenhouse gas reduction are implemented, before deciding to invest £20 billion in a Severn Barrage. For example, will alternative means of meeting carbon reduction targets be investigated such as:
 - Reduced energy consumption in the built environment by improved insulation and installation of low-cost solar thermal panels.
 - Increased development of other renewable energy sources such as onshore/offshore wind power, tidal stream turbines (analogous to wind turbines underwater) and wave power devices. Onshore/offshore wind is already a lower cost alternative to the Severn barrage. Although tidal stream and wave power devices are currently more expensive, this is due to their early stage of development and the costs are likely to fall significantly over the coming years as these technologies are improved and rates of production/installation increase.

Group B

1. Could money be better spent on local initiatives- educating people to use less energy- more local generation of energy?
2. More a feeling, a scepticism about the consultation's effectiveness; will decisions be made irrespective of consultation in response to urgent national and global needs?

Group C

1. Timescale- Cost- Nature of the labour force- Employment benefits- Impact on energy poverty- Ecological consequences eg loss of bird life- continuing evaluation of alternative lagoon solutions in centre of estuary- evaluation of energy sources and energy efficiency
2. Technical Questions – Sea Level designed for, alteration of tide level/damping? – Right timing if technology is fast evolving? – Nuclear v Barrage? – Further exploration of the benefits and costs economically? - Off-shore lagoons- why excluded? – Where will aggregate come from? – Build up of silt? – Comparison with La Rance/further research? – Diversity of supply?
3. Evaluation of Process – National not just regional – People not engaged nationally- Nuclear wrong signal to world – Speed of government response and long term planning – We've got to use the Severn? – Fear policy based evidence thinking – Global approach – Better PR of process – Engaged citizenry so not hijacked by big business- South West and South Wales working together well so not taken over by Whitehall – Who pays?

Group D

1. Governance – contracts; Huge consortia +HMG
2. consider alternatives to any Severn Tidal Power, including energy conservation
3. regional economic impacts
4. costs of construction not what you will pay
5. 2010-2014 consent period
post 2014 Cardiff Weston Barrage 5-7 years before energy generation,
Beachley Barrage 4 years, Shoots Barrage-Lagoons 3 years
6. Alternative to any Severn Tidal Power puts energy conservation before environmental problems; assumption Severn Tidal Power is the consumer
7. DoT no need for additional road or rail links. Shoots barrage runs over tunnel, could replace
8. compensatory habitat? East Anglia? Equivalence?
9. Get this consultation into all UK's schools + university Civil Engineering Depts. There is a better solution out there!

Appendix 2

Claire Gibson's Notes Comments made in Discussion Groups

- 1. Strategic**

Security of supply is a significant issue for the UK.
We should focus on energy reduction first, which is a fraction of the cost.
We need to spend more time on discussing the alternatives to reduce our carbon footprint.
More emphasis should be placed on nuclear, solar and biomass energy.
Government needs to change behaviour.
We shouldn't assume that we need to capture the Severn tidal energy.
How would this scheme help those that are in fuel poverty?
Energy pricing is in conflict with policy – it costs more to use less, and less to use more.
Where is the money best spent – big projects or small ones?
- 2. Environment**

How would these schemes impact on the tides?
How could a barrage help address the impact of sea level rise?
Is the study considering the impact on biodiversity and, in particular, the nuisance caused by flies after the Cardiff Barrage was built.
How can we successfully provide a compensatory habitat? Can we really redirect the birds to another habitat?
- 3. Economic**

Will the jobs generated be for local people? How can we ensure some/most of them are?
What will be the impact on Bristol Port?
Have transport links been considered?
Need to consider the impact on Bristol Port within the context of future world trade patterns.
How does a tidal scheme compare in cost with offshore wind?
- 4. Engineering**

Need to explore alternative ways to store energy.
Will it take longer to build a lagoon vs a barrage?
Are we factoring in the problem of disposing of all the concrete at the end of a scheme's life?
Where would the aggregate come from?
- 5. Short List / Embryonic Technologies**

We should consider further the embryonic technologies as their environmental impact could be far less.
We should actually test embryonic technologies first, to ensure we deliver the best solution for the Severn?
How will schemes supported by the fund feed back into the short list discussions?

6. **Process**

Is the timescale going to ensure the most considered scheme is chosen?

How will the timescale influence the final scheme choice?

What would happen if there was a new administration in 12 months time?

Is the study likely to continue? Would decisions be made in advance of an election?

Sceptical about the value of this consultation. Won't this be a political decision at the end of the day?

Need to be clearer on the scope of this consultation – discussing alternatives such as energy efficiency and nuclear is a distraction.

The easy option is often the wrong decision.

Feedback from Workshops

1. Could £20bn be spent on better things in a wider context eg. energy efficiency? (3 groups reported this as one of their two issues but this was actually the subject of last year's consultation on the UK's Renewable Energy Strategy. The subject of this consultation is if we were to capture the tidal energy in the Severn Estuary, what scheme should be implemented.)
2. We should focus more on testing embryonic technologies that could have a reduced environmental impact.
3. How important is this consultation? What influence can we really have? How can we empower local people more? What is going on behind the scenes given the very real problems we are facing in terms of climate change and energy security?
4. We have to use the Severn Estuary to generate renewable energy.
5. Government should continue to engage with stakeholders and the public throughout this work as it is a very important issue.
6. We need to better understand the impact of these schemes on the local and regional economies.

Appendix 3

“Your Opinion” Compilation of Views of Participants’ Feedback Forms

55 people were present

34 “Your Opinion” forms were handed in at the end of the Forum; Participants were aware their views would be forwarded to the DECC Public Consultation.

1 **Should we harness the Tidal Energy from the Severn Estuary?**

23 Yes 1 No 10 Undecided

(one undecided commented, “but it is inevitable I think”)

2. **If Yes to question to Q1 do you favour a Barrage**

6 Yes 1 No, 10 Undecided

If Yes tick if you favour

4 Cardiff Weston Barrage

0 Shoots Barrage

1 Beachley Barrage

0 some other/undecided

3 **If Yes to question to Q1 do you favour a Lagoon**

5 Yes 8 No 10 Undecided

includes 2 responses... “yes but off shore lagoon”

includes 1 response “two lagoons to test new technology”

4 **If Yes to question to Q1 do you favour some other technology**

11Yes 3 No, 8 Undecided

If Yes, please say what it is

1. Fences
2. Mid-channel lagoon
3. Tidal Reef- Evans Engineering
4. coastal impoundment schemes? needs further investigation
5. more research into tidal reef technology
6. small developments- lagoons- allow for further technological developments
7. energy harbour incorporating tidal turbines; wind turbines; PV collectors and desalination
8. investigations into tidal fence and research into other schemes
9. developing technologies
10. would like to see more consideration of less environmentally damaging technologies
11. nuclear power
12. non destructive technology by preference of the technologies under consideration- Evans reef
13. a phased approach to test impacts

5 **What aspect of the various schemes is most important to you or gives you most concern?**

1. that unintended consequences will prove more important than those being considered; we need to do more long term planning but it isn't easy
2. how out of date a barrage may become; should we look at other schemes more closely
3. lack of consideration of wider social alternative ways of dealing with carbon reduction requirements
4. most important – suitability for future energy needs; cost; effectiveness in contributing to security of supply; carbon benefits; most concern – variability of delivery;

- understanding the full range of environmental impacts; how fits with wider schemes for energy saving
- 5. minimising environmental damage
- 6. the likely fictitious nature of this consultation
- 7. total energy generated and potential to reduce carbon emissions/ensure greater energy security; managing risk/uncertainty in a very large-scale project
- 8. whether they will be built as part of a good overall energy strategy, not just as a one-off civil engineering project
- 9. getting this stage of genuine exploration of options right
- 10. cost of unit of electricity
- 11. Port of Bristol, Avonmouth, Portbury; ;lack of scope for future technology
- 12. environmental balance of advantage and over concentration on which scheme rather than whether
- 13. lifespan due to sea level rise or disrupted sediment transport; increased susceptibility to storm surges
- 14. cost, construction time, environmental impact
- 15. shipping, wildlife
- 16. that it is a huge decision and most of us are not equipped to have a real view
- 17. they do not address our immediate energy needs. We need to invest in and develop nuclear energy generation now and then go on to developing renewable energy capture technologies
- 18. environmental impact for any worthwhile output – cost
- 19. the barrage concept presents unknowable impacts on the environment; a barrage will probably not provide “value for money”
- 20. social aspects-price of electricity and how it affects fuel poverty, versus enhancing rate of demand reduction- social issues go beyond jobs, but the jobs balance isn't conclusive; whether the money would be better spent on local generation and demand reduction (need to up the game here)- tidal power not fast enough?
- 21. whatever is done will only encourage greater use of energy- no ultimate saving of green house gas problems. We need an artificial photosynthesis scheme to produce fuels to compensate for cessation of use of fossil fuels- non biological photosynthesis- what are our chemists doing?
- 22. expense and cost of barrage- no one looking at ensuing fuel poverty for most of the population- is priority to be tackled
- 23. cost effectiveness; environmental
- 24. effect on environment around the estuary as concerns wild life and local people
- 25. certainty of cost- economic effect
- 26. environmental impact
- 27. cost, environmental impact
- 28. changes to estuarine geomorphology resulting in erosion, siltation and loss of intertidal habitat; also barriers to migratory fish
- 29. risks of not functioning effectively after a large investment and adverse effects on environment and docks
- 30. habitat destruction-change-creating-moving
- 31. uncertainties of impacts – whether government will take any notice of public consultation! – whether it is possible to recreate habitats
- 32. if the national need to meet energy and carbon targets dictates Severn work, barrage is best. But alternatives- conservation/nuclear need much more work.
- 33. could money be better spent in other ways – impact on Port of Bristol- tidal energy intermittent

6 What aspect of the various schemes most needs further investigation/ information?

- 1. impact re aggregate requirements; embodied energy of construction

2. although the tidal power of the Severn Estuary should be utilised in some way, we should look at it in the context of other energy sources such as nuclear, wind power and geothermal energy
3. lack of consideration of wider social alternative ways of dealing with carbon reduction requirements; need to take account of renewable energy strategy
4. impacts on opportunities for business and tourism in the SW and South Wales; do we know how to build anything than the Cardiff-Weston barrage? viability in establishing sustainable conservation compensation
5. impact on estuarine birdlife
6. what may work that is environmentally the least damaging
7. grid integration and energy storage (all) ; effect on transport networks/emissions from reduced use of port of Bristol (Cardiff Weston barrage); embodied carbon (all), construction time (all)
8. how they fit into the overall environment and energy topology of the region/UK
9. environmental impact – comparison with La Rance – employment issues/opportunities- financing
10. ecological cost
11. technical development to provide continuous generation
12. energy contribution in wider context
13. is it possible to accurately calculate the impacts of such a broad range of influences
14. impacts on birds, fish, sedimentation, rates of energy production
15. Moving birds to a new habitat?!
16. it sounds as if all schemes under discussion throughout the whole country will have to happen eventually
17. the perforated barrier options; also an option not presented- floating tidal energy capture
18. reef and fence possibilities
19. there would seem to be insufficient time in the “study” to provide an SEA that would support an effective decision
20. cost-benefit of wider options needed; carbon benefit of wider options needed; impacts of schemes on local communities/environment locally, such as infrastructure requirements, changing the character of where people live
21. search for alternatives esp restraint of fuel/energy use; a little energy starvation would teach a valuable lesson; reduction of traffic, less airtravel, more surface public transport as alternative to airport expansion
22. lagoons, possibly off shore; problems of sewage leakage
23. whether alternatives to barrages or land aligned lagoons (ie lagoons in centre of the estuary), fences etc would be less environmentally damaging and still sufficiently effective
24. certainty of cost- economic effect; barrage as part of an overall strategy
25. protection for fish- silt- efficiency – ability to iterate and learn from experimentation
26. innovative technology
27. costs, impact on the environment and local economies
28. environmental impact- compensation- moving habitats
29. whether it is possible to make a phased solution- learning on the way- a wider view of a strategic approach for the whole UK- we need to discuss the values first!
30. how will the medium term energy supply need be filled.
31. schools materials

7 How would you rate today’s Forum?

12 Excellent 19 Good 1Moderate Value 1Poor 0 Very Poor

Add any comment- what you found valuable/what we could do better

1. Good mix of information and views; helpful structure and well chaired, thanks!
2. It would have been good to hear opinions of Bristol Port Company.

3. Need more information for debate which is better informed rather than simple expressing views; difficult with lack of advance booking
4. I think we needed information on our current and projected energy needs and how urgently we need to be looking at dealing with how we produce this or reduce it overall; a larger and broader range of people need to attend forums such as this;
5. better advance publicity of the event; you will then get better attendance
6. a dual nuclear reactor would produce more power than the biggest scheme at far less cost and impact
7. the opportunity to discuss with SME was valuable
8. perhaps coffee in groups
9. useful information
10. better publicity before the event
11. demonstrated that there are huge concerns about the value of public consultation

8 Add other comments you wish overleaf →

1. the “what” seemed a larger part, ie asking the public to comment on technical solutions which feed into an overall problem they don’t or haven’t yet fully understood; gave little discussion of actual barrage choice options
2. I have an alternative proposal to the five short-listed schemes- energy harbour which I am going to research
3. I am an ordinary member of the public with no influence but it is a pity more people aren’t enlightening themselves so these Forums are important. The smaller proposals are important but urgency will probably mean the barrage plus lots more similar salvations will have to be the government’s position, I despair there is a lot of apathy out there. It has been really interesting
4. consultation on a specific project/s can be deeper than more general issues.
5. consultation not wide spread enough- national issue
6. please open consultation to Britain’s schools, Civil Engineering Depts at Universities and get them to focus on the problem- there is a newer better solution out there!

9 If you wish to keep in touch please give your contact details here
(27 people left their email addresses)