

rapidly – eg what are the implications on transport demand projections of oil at current or even higher prices? As seas rise around our coasts with a growing population, some difficult technological and societal choices may also have to be made in the future. POST's founders would have seen POST, with its ability to access external networks of experts, stakeholder groups and professional societies, as well-placed to help Parliamentarians exert effective and insightful influence on such issues.

Finally, though it is right that POST be assessed on its value to Parliamentarians and committees, we

should not lose sight of the original objective to help raise the credibility of the parliamentary process as a whole. We believe that technology assessment, by engaging leading experts and stakeholders in the process, helps improve understanding of the parliamentary process. Some of the early POST reports (eg Tunnel Vision, Nanotechnology, Dealing with Drought, the BSE crisis, and Technology Foresight) had a significant impact outside Parliament¹. This, in our view, not only raised Parliament's credibility but also helped inform subsequent dialogues between Parliament and the stakeholders on the issue concerned.

Notes

1. POST's activities to 1998 and those of other countries' equivalent offices are described in "Parliaments and Technology-the development of Technology Assessment in Europe" (N. Vig and H. Paschen eds). SUNY Press, 2000.
2. Report of the Commons Information Committee on POST (Session 1991-2. HC325).
3. Report of the Commons Information Committee on POST (Session 1994-5. HC578).
4. Many examples are in Chris Mooney's "The Republican War on Science". Perseus Books, 2006.
5. <http://www.eptanetwork.org/EPTA/>
6. Norton, M.G., Kass, G., and Allum, N. "Combating Spurious Science". *Science and Public Affairs*, Dec 2007, p18.

The Severn Estuary: A Barrage or a Bore

Robert Freer

Using the very high tides in the Severn Estuary as a free and perpetual source of hydro-electric power looks very attractive at first sight. Until it is examined more closely. A new feasibility study commissioned by the Government has revived interest in this much discussed project.

The basic idea is straightforward and uses established technology. A barrage housing sluice gates and turbines would be built across the estuary. The gates would be opened as the tide floods in and closed at high tide to

impound the water behind the barrage. As the tide recedes the water would be released through the turbines to generate electricity for a few hours until the tide starts to rise again. The turbines would be generating electricity for about a quarter of the day.

But in practice there are some snags. Although the electrical output is predictable (because the tides are predictable) it would vary throughout the year. At the spring and autumn equinox the maximum tidal range at Avonmouth is 40 feet, but it is only about half that during neap tides at the summer and winter solstice. The electrical output would then be correspondingly less.

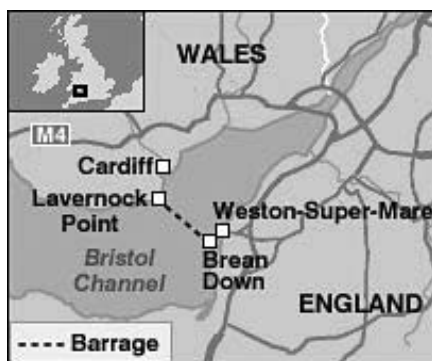
There is also the problem of matching the electrical output to the daily demand for electricity which is supplied by the Grid. The tides are generated by the moon and they rise and fall according to the lunar cycle. High tide occurs at a different time during the day and hence so does the



electrical output. The cycle repeats every two weeks. But we live our lives according to the solar cycle and our electrical demand follows a regular pattern every day.

The national electrical demand supplied by the Grid is low at night (about 35GW) but starts to rise from 5am to a plateau at mid morning. Then it rises to a peak at 6pm (60GW in winter) after which the demand falls again.

When the maximum output from the turbines coincides with the peak electrical demand the power generated (up to 8.6GW) is particularly valuable and would command a high price because it would replace expensive electricity from alternative stand-by plant. But this happens only once a fortnight. At other times the value of





Thomas Fulljames' Proposal for Severn Barrier 1849 - Now the site of the first Severn Bridge

the electricity generated would be progressively less. Electricity generated in the middle of the night would have a low value.

In the present proposals the barrage would be built from Brean Down, a headland south-west of Weston-super-Mare in Somerset, to Lavernock Point between Cardiff and Barry in South Wales. It would be 9 miles long and contain 216 axial flow turbines each of 40MW rated capacity making a total installed capacity of 8,640MW. The annual output would be 17 Twh, which is 5% of the national annual demand of 382 Twh. The annual average load factor would be 23%. There would be 176 sluice gates and two large locks of sufficient size to allow ships to pass through to the Avonmouth docks. A roadway on top of the barrage would provide another road link between Bristol and Cardiff.

Construction would take about 8 years and the cost is estimated to be £15bn but the public may be sceptical of these estimates when they remember the increase in final cost for other major building projects such as the Channel Tunnel, the Scottish Assembly building and the Olympic Games.

The project has the support of the Sustainable Development Commission but has been criticised by birdwatchers who are concerned that intermittent flooding of the estuary may disturb some species of birds. They are seeking alternative habitats to be provided for the birds. A separate Strategic Environmental Assessment study has been started to look into this

and other environmental concerns, but the study may become unnecessary if the birds simply fly away and find their own alternative feeding grounds.

Commissioning reports and feasibility studies can too easily become a substitute for action, giving the illusion of action in place of decision. No amount of studies, however long and expensive, will build the barrage. At some stage a decision to go ahead or not must be taken.

But if the decision is taken to build the Severn Barrage it would be sensible to first build a similar but smaller hydro-electric barrage elsewhere, for instance on the Mersey or the Wyre, to learn about the practical problems during construction and operation.

Is the Severn Barrage a sound investment? It depends what you are trying to achieve and, as always for projects with a high initial cost, on the assumed discount rate. The barrage is a much better investment than building more wind turbines on at least five counts:

- The output is entirely predictable, whereas the output from wind turbines is not.
- It would generate four times the amount of energy that we get from all the present wind turbines.
- The peak output is particularly valuable when it coincides with the peak demand on the Grid.
- The electricity is generated near the major demand centres of Bristol and Cardiff and therefore the transmission costs are small.
- It provides another road crossing of the estuary.

But the barrage cannot generate the secure base load power on which we all depend to run our industries, offices and homes, and without which the country would come to a standstill. Anyone with £15bn to spend on generating low carbon electricity might be better advised to invest it in nuclear power.



Severn Estuary Photo by Tim Britton