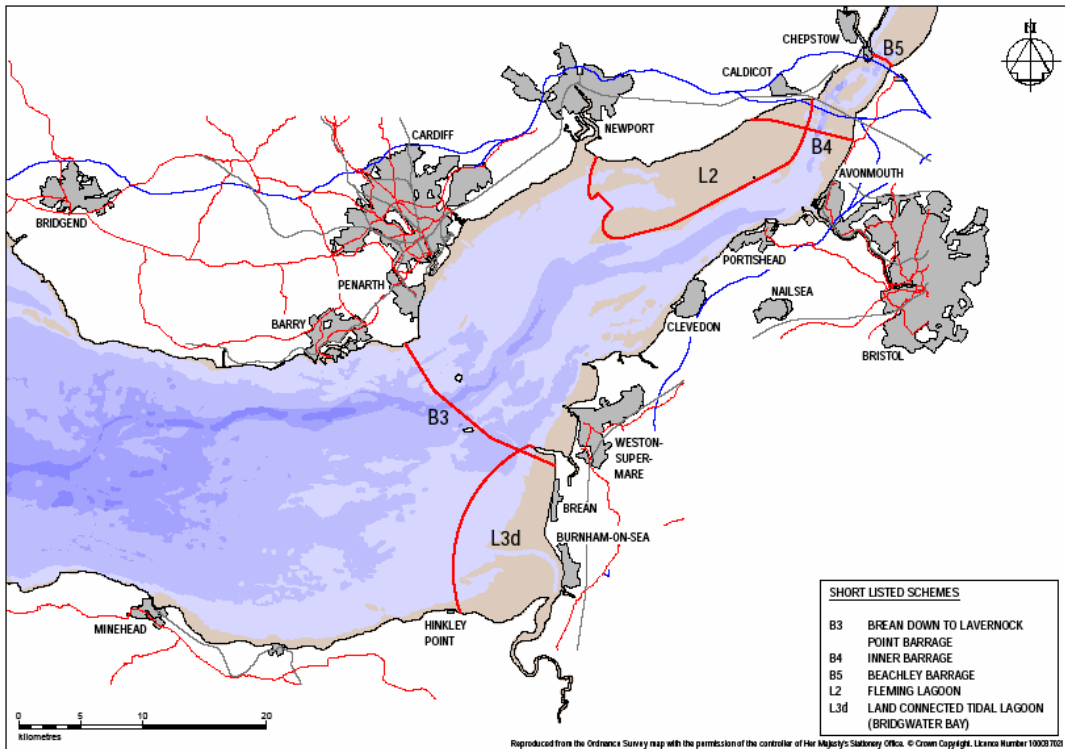


Severn Tidal Energy Conference – Institution Civil Engineers, Bristol 26th February 2009

Key Issues Likely to Affect Small Businesses

A summary of the shortlisted options being considered for the Severn Tidal Power schemes by Department of Energy and Climate Change (DECC) formerly Department Business Enterprise and Regulatory Reform (DBERR) is provided in the figure below.



These options are based around the call for evidence and review undertaken by the governments' consultant Parson Brinckerhoff (PB) during 2008.

It is highly likely that some form of total barrage will emerge as the preferred option based on the following issues:

1. Delivers maximum higher proportion of renewable energy and carbon savings in shortest time, although more upstream locations at or near new and old Severn Crossing deliver much reduced power compared to Cardiff –Weston location, but still greater than lagoons.
2. Provides central government with opportunity for major investment in economy and generation of large number of construction jobs.
3. For a barrage scheme the capital investment per tonne of CO₂ saved is very high at around £3,500/tonne compared to £2,700 for local wind. Although when spread over lifetime of barrage of say 120yrs this equates to £77/tonne/year.
4. Payback on embodied CO₂ is rapid at around 8 months therefore provides government with the quick win it needs in terms of CO₂ reduction to meet long term targets.

Potential Major Impacts on Local Small Businesses

The potential key issues likely to affect small local businesses in the SW with a barrage scheme are considered to be as follows:

1. Closure of the barrage would result in the deposition of 85% of presently mobile sediments in the deeper channels and tributaries,
2. Settlement of material on foreshore mudflats will induce a profile change from low and concave to high and convex making access from the seaward side by boat much more difficult. Areas like Lydney docks may well silt up without significant maintenance dredging. Funds to compensate for this type of mitigation need to be built into any economic assessment from the beginning.
3. With retained depths local wind-waves will be active for longer at the margins of the estuary increasing the erosion rates along the margins and destabilising banks creating a flatter marshier edge.
4. Current water quality in the estuary is typified by significantly high nutrient levels and loadings compared to other UK estuaries, however the high turbidity means algal productivity is typically low and eutrophication not seen as a major threat. All this will change with the barrage.
5. Siltation of fringes would result in less useable river edge. Reduced leisure/amenity value. Siltation in smaller tributaries may give rise to upstream flooding in these areas which could extend many miles upstream.
6. Cost of dealing with long-term estuary problems may fall to those at a local level and these mitigation costs need to be lobbied for and accounted for as part of any economic assessment from the beginning.
7. Shortened discharging time = affect some existing drainage schemes. Local drainage control might be required to control saline intrusion. Drainage issues could be dealt with technically, they are likely to cost between £24.5M and £61.9M.
8. Fish numbers in the estuary may decline due to changes to spawning and feeding grounds, delays to migration and movement and high injury and mortality rates from turbines. Lobbying for more fish friendly turbines will be critical to protecting the fishing based tourism industry on the Wye and Usk.
9. The estuarine/lagoon system behind the barrage would be capable of retaining more oxygen due to reduced salinity but increased temperature and increased phytoplankton activity and high levels of nutrients are likely to more than offset the benefits of increased oxygen retention. There is a high likelihood for the potential for eutrophication (nutrient enrichment and creation of algal soup!) to be severe.
10. A net migration of labour into the Severnside region could have a significant impact on the demand for accommodation during the construction phase in an area that is already under pressure from rising population.
11. Siltation may counter the positive benefits in terms of leisure/amenity value. Possible options for land reclamation may reduce volume of lagoon = reduced power generation.

12. Increased land values rely on the lagoon increasing aesthetic value of the area – converse could happen (eutrophic swamp areas and mosquito's)
13. Changes in seabed (from sand-based substrate to a mixed substrate of sand and mud) would most likely impact on the quality of sand resources, and therefore on the economic viability and environmental implications of extraction/dredging. There is the potential that this business activity could disappear, although could be mitigated by increase in business opportunities arising from the need for maintenance dredging of key sites e.g. Lydney Docks and Sharpness.
14. Such a high level of demand may lead to upward pressure on the prices of aggregates, which could have negative economic effects regionally and nationally as they would have to be imported.
15. Suggestion is also put forward that due to size of Barrage it could distort energy market therefore it has been identified that there is a need to ring fence the barrage electricity in effect giving it special priority and a guaranteed income. Hopefully this will be countered by Feed In Tariffs applying to small businesses who generate renewables.
16. Any scheme is likely to remobilise sediment within existing stable sediment sinks some of which contain radioactivity from historic discharges or from sinks where radionuclides have accumulated, this is likely to result in increased doses to members of the public in the area (critical group) and the prevalence of radionuclides within biological systems. Changes in water quality, as a result of the proposed schemes, may also affect the biological activity, bioturbation (biological turnover) and chemical stability of radionuclides associated with sediments. The same goes for heavy metals deposited in the Severn Estuary. This could have a critical impact on long term viability of tourism and fisheries.
17. The creation of a more acquiescent lagoon that progressively becomes fresher and more nutrient rich (eutrophic) is likely to give rise to increased numbers and prevalence of mosquitos and chironomid (midge) species. This has been observed with the Cardiff Bay barrage and caused significant problems even on this much smaller scale. Couple with increasing temperatures due to climate change the potential for marked increases in vector born (mosquito spread) diseases is a real and significant issue.

Given the above potential impacts on local businesses and their viability it is recommended that the FSB develop a strategy for lobbying, that as a minimum, addresses the above issues and requests they are investigated as thoroughly as possible as part of any strategy. The FSB also needs to stress the need for the Government to assess the potential economic impacts on local businesses to ensure that these are quantified and mitigated where necessary. One way of addressing this is for the project to be assessed utilising the Local Economic Multipliers approach, known as LM3, where investment strategies can be reviewed and measured in light of the benefits they bring to generating local wealth within communities and businesses.

A more detailed summary of Socio Economic Benefits and Impacts is included below.

The current lead on Sustainability and Local Economic Impacts is Clare Gibson of SWRDA. claire.gibson@swrda.org.uk
She freely admits that they have as yet not engaged on a local scale with small businesses and the potential impacts, the majority of work to date having focussed on macro scale economics. She has suggested that the FSB needs to ensure that it engages via the SW regional business forum.

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				<p>projects. Engineering uncertainties would need to be resolved. BUT the rail tunnel needs constant pumping to keep it 'dry', and maintenance costs must be considerable – what is the remaining life-expectancy. Could make value assessment of replacing this ageing infrastructure with new rail link on the barrage. Should also be able to fit this in with Govt strategy for improving public transport links etc. Dewatering costs from existing rail Tunnel pumping offset by high water quality which is sold into supply and used for Magor Brewery.</p>
			'Ancillary developments alongside the barrage, could ultimately make the whole project unsustainable' (ENDS Report, 393, pp 12).	
			Statement by WAG minister of the 'Golden Triangle' for waterfront development and Cardiff Airport expansion.	
1.3	Coastal defence and flooding protection	High water level would be reduced by 1m, which would protect low-lying areas upstream	<p>Changes in sedimentary regime and morphology could cause erosion to the banks. Would require expensive modifications and upgrades to the flood defenses upstream</p> <p>Also, isn't the flood risk from the rivers in areas upstream exacerbated by the creation of tidal lagoon?</p>	<p>More information is required on management of coastal erosion and flood risk.</p> <p>Calculation of the net flood risk benefit would be important.</p>
			Cost of dealing with long-term estuary problems may fall to those at a local level.	Assessment of localised flooding due to tidal surge, extreme rainfall coinciding with barrage low and high tide.
		A barrage developer may seek to use some of the land (that would not be		

		considered for coastal defences due to its low value in terms of protecting life and property) in a compensatory habitat package, as required under the EU directives.		
			Siltation of fringes would result in less useable river edge. Reduced leisure/amenity value. Siltation in smaller tributaries may give rise to upstream flooding in these areas.	
			Shortened discharging time = affect some existing drainage schemes. Local drainage might be required to control saline intrusion. Drainage issues could be dealt with technically, costing between £24.5M and £61.9M.	Erosion assessment, flood risk, consequence assessment, fluvial geomorphology, river basin management, water and sediment contamination assessment, remediation and modelling, catchment studies and sustainability.
1.4	Employment	The barrage would create a substantial number of jobs - 200,000 per year for the construction phase and 30,000-40,000 per year in Years 2 to 5 of the project	Data and assumptions are out of date.	Assessment of local job creation (i.e. will all expertise be imported from other areas of UK/overseas)
			A net migration of labour into the Severnside region could have a significant impact on the demand for accommodation during the construction phase in an area that is already under pressure from rising population.	
1.5	Development and housing	A barrage would have the potential to create new opportunities for development at regional and sub-regional levels in the south west England and in South Wales.	Siltation may counter the positive benefits in terms of leisure/amenity value. Possible options for land reclamation may reduce volume of lagoon = reduced power generation.	Social economic pressures Increased demand for land vs. energy. Study required.
		At a local level the barrage would affect communities at Lavernock Point		

		on the Welsh side and Brean Down/Weston on the English.		
		The barrage could result in the creation of a more attractive estuarine environment, which in turn could lead to an increase in land value and the potential for prospective development.	There is a risk that a barrage would be seen as a vehicle for delivering a much larger development project. Increased land values rely on the lagoon increasing aesthetic value of the area – converse could happen (eutrophic swamp areas)	Modelling assessment bringing in the prediction of eutrophic areas etc which could then feed in to an economic assessment of land values/urban development potential etc.
			For a private sector-led project, the relatively high discount rate required by investors may lead to additional incentive on commercial and residential development. This could fundamentally change the dynamic of the project. Lead to a reduction in the carbon savings that a barrage could achieve due to increase in ancillary emissions.	
		SDC recognises the need to build additional homes in areas that relieve some of the acute pressure in other areas i.e. east England. Built as desirable and functioning communities. (Sustainable).		A strategic overview of development pressures in the regions bordering the barrage would need to be taken. Including the likely influx of new residents and businesses, and the long-term needs of the area. * the carbon footprint this development brings with it. (offset by BREEAM assessment etc
				Comprehensive review of the regional economic and strategic planning implications of development and a broad assessment of the net carbon balance.
1.6	Leisure and tourism:	Level of recreational activity would be increased (5-20%) due to the creation of less severe conditions.	Build up of muddy sediment = only usable for low draft boats.	Assessment of the likely affects on the affected areas for amenity use – these will be broad ranging – riverine and estuary areas, recr. Fishing, water quality (bathing

				etc),
		Possible that a reduction in turbidity may help support an increase in shellfisheries.	An increase in shellfisheries would depend on water quality. Need to check locations, but also potential loss in existing shellfish areas.	A full appraisal would need to include a review of current fishing practices in and around the estuary. An evaluation of the impacts of a barrage should provide evidence of the likely impacts on fish stocks and water quality
		During construction phase a very large quantity of aggregates for fill and concrete could be sourced locally (minimisation of transport related carbon emissions).	Changes in seabed (from sand-based substrate to a mixed substrate of sand and mud) would most likely impact on the quality of sand resources, and therefore on the economic viability and environmental implications of extraction.	Assessment of need and potential supply bringing in assessment of areas which will/may be lost to the aggregates industry if barrage is built. Liaison with BMAPA – could provide assessment for them directly?
			Such a high level of demand may lead to upward pressure on the prices of aggregates, which could have negative economic effects regionally and nationally.	Impact on aggregate values for marine dredging.