

MERSEY TIDAL POWER

FEASIBILITY STUDY: STAGE 3

Socio-Economic Impacts Report

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Project Background

In the face of current and anticipated issues of security of supply and climate change, the need to find local sources of renewable energy has never been more urgent.

The Mersey Estuary has one of the largest tidal ranges in the UK, making it one of the best locations for a tidal power generation scheme. It has the potential to make a significant contribution to the Government's target to secure 15% of UK energy from renewable sources by 2020.

A large scheme could deliver enough renewable electricity to meet the needs of a significant proportion of the homes within the Liverpool City Region, as well as beyond. Any scheme put forward will need to take into account the ecological diversity of the Estuary, which supports internationally important bird habitats.

Phase 1 Pre-Feasibility Study - 'Power from the Mersey'

Peel, in partnership with the NWDA set out to explore the potential, the impacts and the implications of utilising the Mersey Estuary's renewable energy potential for the benefit of the Northwest region.

The Mersey Basin Campaign gave its full backing to the work and a consortium of consultants led by Buro Happold was commissioned in July 2006 to undertake a 'pre-feasibility' Phase 1 Study.

The primary objective of the Phase 1 Study was to undertake a full and open assessment of the options available for the generation of renewable energy and to undertake a preliminary assessment of viability.

A number of potentially viable schemes were identified. The continued development of marine power technology means that others may also need to be considered as the project moves into the next phase.

Meeting 2020 Renewable Energy Targets

An overall timetable was defined to ensure the project supports the policy objective of contributing to 2020 renewable energy targets. The key milestones of the project include submission of applications for planning or other statutory consents by 2012 and commissioning of the scheme by 2020.



Phase 2 Feasibility Study

Peel Energy and the Northwest Development Agency are progressing the project in line with the principles for sustainable development. A feasibility study has been commissioned to assess the options and identify a preferred scheme to take forward for submission of a planning application.

The feasibility study has been led by URS Scott Wilson, EDF and Drivers Jonas Deloitte, and supported by RSK, APEM, HR Wallingford, Regeneris, Turner and Townsend, University of Liverpool, Proudman and Global Maritime.

The feasibility study has been undertaken in three stages as follows:

- Stage 1: Definition of project strategies, data gathering and gap analysis, and selection of long list of suitable technologies
- Stage 2: Appraisal of the long list of technologies and formulation and appraisal of scheme options to identify a shortlist
- Stage 3: Further refinement and appraisal of the short list of scheme options and selection of the preferred scheme.

The project has been pursued in an open and transparent manner, building on the consultation and stakeholder engagement started in the Phase 1 study. An extensive programme of stakeholder engagement has taken place through project advisory groups, consultation with statutory and non-statutory consultees and public consultation targeted during appropriate stages of the project.

Mersey Tidal Power Scheme Objectives

The objectives of the Mersey Tidal Power scheme are:

- (a) To deliver the maximum amount of affordable energy (and maximum contribution to Carbon reduction targets) from the tidal resource in the Mersey Estuary with acceptable impacts on environment, shipping, business and the community either by limiting direct impact in the Mersey Estuary or providing acceptable mitigation and/or compensation;

and in doing so,

- (b) To maximise social, economic and environmental benefits from the development and operation of a renewable energy scheme, including where appropriate:
 - (i) the development of internationally significant facilities and skills to support the advancement of renewable energy technologies and their supply chains,
 - (ii) improvements to local utility and transport infrastructure,
 - (iii) improvements to green infrastructure and environmental assets,
 - (iv) the development of a leisure opportunity and tourist attraction.

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Note on Terminology

This technical report uses a different naming system to the Stage 3 Feasibility Report to refer to schemes variants, as follows:

- IBv2a = A1.02a;
- IBv2b = A1.02b;
- VLHBv2a = A2.01a; and
- VLHBv3a = A2.02a.

If a lower case letter is not used, this is because the operating regime (denoted by the lower case letter) is not relevant.

1 Introduction

- 1.1.1 This report provides an assessment of the potential socio-economic impact of the Mersey Tidal Power project on the North West region. It builds upon the assessment undertaken at Stage 2 using further information.
- 1.1.2 The report also outlines the potential synergy between the construction and operation of Mersey Tidal Power and existing regeneration schemes of relevance within the Liverpool City Region.
- 1.1.3 Three scheme options remained on the list for further consideration following the completion of the Stage 2 Options Report of November 2010 (Document No. 201009):
- impounding barrage in the vicinity of Band A (i.e. a deep water location upstream of New Ferry and Dingle, which has commercial shipping constraints);
 - very low head barrage in the vicinity of Band A (defined as above); and
 - very low head barrage in the vicinity of Band B (i.e. a shallow water location which has no commercial shipping constraints).
- 1.1.4 During Stage 3 a further study has been undertaken in relation to Band B as a potential location and it would appear that there is little benefit in considering Band B further as a potential location for the tidal power scheme.
- 1.1.5 Three schemes at Band A were selected for detailed assessment to inform the identification of a preferred scheme:
- A1.02: unrestricted head, ebb only barrage at Band A;
 - A2.01: restricted head, ebb only barrage at Band A.; and
 - A2.02: restricted head, ebb and flood barrage at Band A.

2 Socio Economic Impact Assessment

2.1.1 A number of broad types of socio-economic benefits of the Mersey Tidal Power project were quantified at Stage 2. These included the following:

- **Construction and commissioning** – Mersey Tidal Power represents a huge energy project with a capital value of up to £5 bn. Underpinning this will be a significant design, development and construction programme. We estimated that the scheme has potential to provide up to 900 full time equivalent (FTE) jobs over the construction period and up to £540m in GVA for the North West economy.
- **Operation and maintenance of the facility** – the ongoing operation of Mersey Tidal Power will generate a variety of economic impacts. We estimated the scheme has potential to support up to 160 FTE jobs (including indirect and induced effects).
- **Other linked benefits** – these include the following:
 - business and cluster development through supply chain opportunities; and
 - regeneration benefits for deprived communities.

2.1.2 Whilst an initial assessment of the possible benefits to the North West was made at Stage 2, it was constrained by a lack of information available at the time. In Stage 3 additional information has become available, which has helped to make the assessment far more robust. However it should be noted that there is still considerable uncertainty surrounding a number of key issues. The range of possible economic impacts has therefore been presented, providing both a low and high estimate. As more information is received in later stages of the project, the assessment of socio-economic impacts will become more accurate and the impact ranges will narrow.

2.1.3 As described in Section 1, three schemes were assessed at Stage 3 – A1.02, A2.01 and A2.02. There appears to be little material difference between A2.01 and A2.02 in terms of the economic impacts they may generate in the UK or the North West region. Indeed, it appears that at this stage of the project, it is difficult to distinguish between all three schemes in terms of the key factors affecting the project's economic impact. For instance, where materials, technologies and labour are sourced from. All the Stage 3 schemes are barrages and therefore use similar power generating technology (with different operating modes). The difference in impact is therefore driven almost entirely by the capital costs of each of the investments.

2.1.4 The report estimates the likely economic impact in the North West and the UK. Where possible, economic impacts for the Liverpool City Region are also estimated.

2.2 Construction Related Impacts

- 2.2.1 The nature and scale of the economic and employment impacts associated with the design, construction and commissioning programme will depend upon a number of factors. These include:
- the overall value of the construction project and the associated inputs of materials and services;
 - the extent to which materials, equipment and services can be and are likely to be sourced locally, elsewhere in the region, the rest of the UK, or overseas; and
 - the extent to which construction labour is sourced locally or further afield.
- 2.2.2 Detailed cost estimates have been provided by the wider project team (Turner and Townsend) for each scheme. However there is still little information available about the geographical sourcing of inputs, which makes it difficult to estimate the spatial pattern of economic benefits (such as FTE jobs and GVA). The assessment has been based on the estimates of sourcing provided by other members of the project team, however it is stressed that these estimates are based on knowledge of previous large scale projects and the project team's collective understanding of where key materials and inputs can be sourced from. While Peel Energy has stated a willingness and preference to source locally wherever possible, the scale of the project and the large quantities involved, mean that Mersey Tidal Power will draw on materials, technology and expertise from all over the world. It is therefore difficult to be accurate about the likely sourcing of these inputs until a detailed procurement strategy is in place for a preferred scheme, however an indicative assessment of the impact at a Liverpool City Region level has been made based on procurement strategies previously employed on large scale projects.
- 2.2.3 In order to supplement estimates, and to make the assessment more robust, similar renewable energy projects, which may offer a useful indication of the geographical sourcing of inputs, have also been considered. This is hampered by an absence of comparable tidal power projects in the UK. However, since the Stage 2 socio-economic impact assessment was undertaken, the Department for Energy and Climate Change has published a detailed study of the potential supply chain for the Severn Tidal Power project (DECC, 2010). This is a much larger project than Mersey Tidal Power and is located in a different part of the country, however it has provided a detailed examination of the inputs and whether they could realistically be sourced from within the UK or further afield. The feasibility study for a tidal power facility in the Mersey completed in 1992/3 has also been referred to; this is now years out of date, but does contain some information about the sourcing of inputs at the time of the assessment.
- 2.2.4 The socio-economic impact assessment model and assumptions would be revised in later stages of the project as more information becomes available.

Materials

- 2.2.5 Each of the schemes requires a range of materials including large quantities of sand and crushed rock to build the structure. Large concrete caissons built of aggregates and cement would be needed to house the turbines and generators. A summary of Turner and Townsend's estimates of the quantities required are provided in Table 1.

Table 1: Quantities of key materials required for Mersey Tidal Power project

Material	A1.02		A2.01		A2.02	
	Million m ³	Million tonnes	Million m ³	Million tonnes	Million m ³	Million tonnes
Granular fill	2.58	4.75	2.56	4.71	2.56	4.71
Concrete	1.88	3.76	2.76	5.52	2.71	5.41
-of which aggregates	1.01	2.03	1.49	2.98	1.46	2.92

Source: Based on information provided by Turner and Townsend (see Stage 3 Cost Management Report)

Conversion from m³ to tonnes uses the ratios in the Severn Tidal Power supply chain study (DECC, 2010) although the exact conversion is likely to depend on type of granular fill and density of concrete.

The quantity of concreting aggregates required is assumed to be equal to 54% of the finished concrete – as per the Severn Tidal Power supply chain study.

- 2.2.6 The quantities required are vast and would make this one of the largest civil engineering projects in the UK. Given the scale of the project, the materials would most likely be sourced from a number of different locations but we would expect the majority to be from within the UK, given the high cost associated with transporting these materials long distances by sea.
- 2.2.7 The supply chain study for the Severn Tidal Power (DECC, 2009) looked in detail at the UK's resources of these materials and concluded that UK sources could meet the demand for most of the options considered. Some of the Severn Tidal Power supply chain study conclusions are as follows:
- Materials obtained through the dredging of the estuary could be used as part of the construction process. While the dredged material would not meet the high quality specifications for concrete aggregates, sand and gravel could be used as granular fill for embankment construction, caisson ballast and blinding on the sea bed.¹
 - Up to 2m tonnes of concreting aggregates could be sourced locally (from the Welsh and South West, which both produce significantly more primary aggregates than the North West).
- 2.2.8 The project team have considered the use of dredged material for the Mersey Tidal Power scheme, however as the quality of dredge spoil is unknown at this stage, it is assumed that all dredged material is completely removed from the site and all the materials required for the caissons and cofferdam construction are sourced from elsewhere. This assumption

¹ The exact proportion that could be used would depend on the composition of materials dredged. Only sand and gravel could be used for ballast/embankments while mud, soft clay and soft rock would have to be disposed of.

will be revisited when more is known about the quality of dredge spoil, however at this stage, it is assumed sand and gravel for this stage is sourced from quarries within the North West, as per the 1992 feasibility study.

2.2.9 Table 2 shows sales of primary aggregates by UK region in 2005. North West output was 11.7m tonnes but less than half of this is likely to be suitable for concrete production. It is therefore very unlikely that all of the concreting aggregates that would be required for the Mersey Tidal Power scheme could be sourced from within the region. East Midlands and Wales, two of the North West's neighbouring regions, were very large producers, especially the East Midlands which produced over 36 million tonnes of primary aggregates in 2005. It therefore seems plausible to assume that all of the concreting aggregates would be sourced from within these three regions to minimise transport costs² and carbon emissions. This assumption is corroborated by the fact that the 1992 feasibility study lists quarries in North Wales and Derbyshire as the key sources for concrete materials, with sand coming from local pits. Once the materials have been sourced, it is assumed that the concrete could be batched at local plants close to the site and transported by truck as assumed in the 1992 feasibility study.

Table 2: Sales of primary aggregates by region (million tonnes), 2005

Region	Sand and gravel	Crushed rock	Total primary aggregates
North East	1.6	5.3	6.9
North West	3.7	8.0	11.7
Yorks & Humber	5.3	10.9	16.2
East Midlands	9.2	27.5	36.7
West Midlands	9.3	4.4	13.7
East of England	15.6	0.2	15.8
South East	15.4	1.1	16.5
London	4.0	0.0	4.0
South West	6.9	23.2	30.1
England	70.8	80.6	151.4
Wales	2.7	16.5	19.2
Scotland	8.1	24.7	32.8
Great Britain	82.4	121.9	204.3

Source: DECC, 2010

2.2.10 The Mersey Tidal Power project would also generate demand for steelwork for sluice gates, lock gates, etc as well as turbines which are discussed further in Section 2.4 below. It is very unlikely that these items of mechanical equipment would be supplied from the UK, although some UK companies could provide a significant amount of bulky, less specialised steel components manufactured in their facilities (e.g. Corus). The specialist nature of the design, manufacture and installation of gates, bascule bridges and similar equipment limits the number of providers within the North West or UK. Such equipment is often sourced from suppliers based in the Netherlands who have the experience and capacity to produce and install these facilities.

² Assuming the sourcing is proportional to output in Table 2.

Technology (Turbines and Power Generation)

- 2.2.11 The power generation technology is the one component of the project which relies upon highly specialised expertise and related technology available from a small number of manufacturers. The shortlisted Stage 3 options use very similar power generating technology, so it is assumed there is not likely to be any significant difference between them in terms of specialist suppliers.
- 2.2.12 Evidence suggests that there is little scope for UK manufacturers to benefit from this aspect of the supply chain for the Mersey Tidal Power project. Bulb turbines are produced by a very small number of turbine manufacturers. Only three (Alstom Hydro - France, Andritz Hydro - Germany and Voith Hydro – Austria/Germany) are considered to have the expertise and know-how to handle large projects such as Mersey Tidal Power and can deliver large numbers of units of appropriate quality and design. These three companies have manufacturing facilities throughout the world, including Brazil and China, although none are based in the United Kingdom. According to the Severn Tidal Power supply chain study, these companies also provide many of the specialised components (runners, bearings and generators) which are manufactured in Europe but not the UK.
- 2.2.13 This has been confirmed by the wider Mersey Tidal Power project team who expect the bulb turbines to be designed in Europe and manufactured mostly in South America or China, with some specialist components manufactured in Europe. £75m of the estimated power generation technology cost for each scheme covers fitting and installation costs. Much of this work is also likely to be carried out by suppliers of the turbines who also provide installation services, but could draw upon a small amount of local labour. Even so, the economic benefit to the North West and the UK under this category of impact is likely to be nominal.

Labour

- 2.2.14 The scope to use labour from within the North West and UK during the construction of the Mersey Tidal Power scheme will depend upon a number of factors:
- **Balance between on-site and off-site activity:** the scope to source labour from within the region is greater for those areas of activity which must be conducted on site. If the majority of expenditure is on components which can be fabricated elsewhere and transported to the site, the scope will not be as great.
 - **Procurement/Contracting arrangements:** if the lead contractor is an overseas company or a contractor based elsewhere in the UK they may wish to bring in labour from outside the region. Peel Energy may consider placing clauses in the contract which places a duty upon the winning contractor to ensure that a certain proportion of on-site labour is sourced locally, however these may be subject to procurement regulations if public sector money is used.
 - **Skill level:** Some of the more specialised, higher level skills may need to be sourced from outside the region and in some cases overseas, however there should be a sufficient pool of lower and intermediate skills in Liverpool City Region and the North

West upon which the project can draw. As described above, the lead contractor could put in place workforce development schemes or work with local building contractors to ensure that they are well placed to benefit from sub-contracting work for on-site manual tasks. The feasibility report for the Severn Tidal Power project provides a useful breakdown of the balance of low/intermediate/high skills for each stage of the construction process (see Table 3).

Table 3: Skill content of employment for different construction tasks

Construction stage	Low skill	Med skill	High skill	Key skill sets
Prelims and site overheads	30%	60%	10%	General labourers/ building trades/ civil engineers
Caissons	20%	60%	20%	General labourers/ building trades/ civil engineers
Embankments	30%	60%	10%	General labourers/ building trades/ civil engineers
Navigation locks	20%	70%	10%	General labourers/ building trades/ civil engineers
Surface buildings	20%	70%	10%	General labourers/ building trades/ civil engineers
Mechanical and electrical	5%	50%	45%	Apprentices/ technicians/ engineers
Design and supervision	0%	0%	100%	Professional engineers
Site investigation	10%	50%	40%	General labourers/ building trades/ civil engineers
Ancillary works	20%	60%	20%	General labourers/ building trades and technicians/ professional engineers

Source: WAG (2010)

Note: Low skills refers to manual tasks and is consistent with level 1 or 2 qualifications. Medium skill refers to skilled trades occupations and is consistent with level 3 qualifications. High skill refers to professional occupations, such as engineers, and is consistent with level 4+ qualifications. Each skill level would also require a certain amount of experience.

Impact Model Assumptions

2.2.15 The Stage 2 socio-economic impact assessment divided construction activity in to four components. The model has been refined in Stage 3 to more closely reflect the estimates of construction cost as provided by Turner and Townsend. Assumptions made for different stages of the construction process are noted below, looking particularly at the scope to use local labour and the scope to source the technologies/materials from within the North West and the UK based on the information above:

- **Cofferdam construction and land reclamation:** Work would take place on site and key skills required would mostly be low to intermediate. Main materials required are granular fill which would be won from North West quarries, and concrete which would be sourced from North West, Wales and East Midlands and batched at local plants.
Potential to source in North West: High and UK: High
- **Navigation locks:** Work would take place on site, but many steel components would be manufactured elsewhere and installed on site by specialist companies. The

navigation locks require huge amounts of concrete (sourced as above) and mostly intermediate skilled labour. **Potential to source in North West: Medium and UK: High**

- **Landside facilities:** Work would take place on site and would be less complex than other stages of the construction project (constructing visitor centre, lock operating house etc). **Potential to source in North West: High and UK: High**
- **Caissons:** Caisson construction would occur in dry dock, towed and floated out to their location on the barrage and lowered onto the prepared foundations. It is assumed that existing port facilities in the region could be put to use as caisson construction yards³. These would also require huge quantities of concrete. **Potential to source in North West: High and UK: High**
- **Power generation technology:** Comprises highly specialised technology only available from a few companies and requires highly specialised skills for installation. **Potential to source in North West: Low and UK: Low**
- **Infrastructure and utilities:** This also includes the mechanical and electrical works. All activity would be carried out on site – connection costs, cabling/pylon costs – mostly using intermediate and highly skilled labour. **Potential to source in North West: Medium and UK: High**
- **Design and supervision fees:** A lot of work would be carried out off site, before construction began, requiring highly skilled civil engineers – but these skills do exist in North West. **Potential to source in North West: Medium and UK: High**

2.2.16 The above list translates into the assumptions shown in Table 4. Given the continued uncertainty surrounding the sourcing of key inputs, the table provides both a low and a high estimate.

³ The Severn Tidal Power supply chain study (DECC, 2010) raised concerns that the local caisson construction yards would struggle to produce the quantities required and production may need to be spread over several sites. However this was only really considered a problem for the Cardiff-Weston barrage which was a much larger scheme than Mersey Tidal Power and required a greater number of much larger caissons.

Table 4: Sourcing assumptions for different construction stages – percentage of cost

Construction stage	North West		UK	
	Low	High	Low	High
Preliminaries, site overheads	75%	85%	85%	95%
Cofferdam construction and land reclamation	80%	90%	90%	95%
Navigation locks	50%	60%	85%	95%
Landside facilities	80%	90%	90%	95%
Caissons	70%	80%	70%	80%
Power generation technology	0%	5%	5%	10%
Infrastructure and utilities	50%	60%	90%	100%
Design and supervision	50%	60%	70%	80%

Source: Regeneris Consulting estimates

Construction Employment Impacts

2.2.17 A provisional estimate of the total potential construction impact of the Mersey Tidal Power project has been made based on the following basis:

- an average turnover per employee across the different construction stages based on the closest 2 digit SIC category; and,
- the translation of man years into temporary FTE jobs using a construction period of 5 years for each of the schemes

2.2.18 On this basis, the potential global employment which would be supported by the design, manufacture and construction activity for each of the options is provided in Table 5.

Table 5: Construction impacts – estimated global employment supported for each year of construction

Scheme	Total person years in employment	Direct jobs (FTE) pa
A1.02	23,800	4,760
A2.01	31,900	6,380
A2.02	31,400	6,280

Source: Regeneris Consulting estimates

2.2.19 This has been combined with the assumptions about sourcing of inputs as described in Table 4 to arrive at estimates of employment supported in the North West and the UK. The estimate of the regional employment that would be supported by the design, manufacture and construction activity for each of the options is provided in Table 6. A2.01 and A2.02 would generate the greatest level of employment (between 3,000 and 3,600 jobs per annum) while A.02 would generate between 2,300 and 2,700 jobs in each year of construction. These results reflect the total expenditure for each scheme which is greatest for A2.01 and A2.02.

- 2.2.20 The construction activity would generate further impacts in a number of distinct ways, namely through supply and induced employment effects⁴. An assumed employment multiplier of 1.5 has been applied to the direct construction jobs (drawing on the Homes and Communities Agency's (formerly English Partnerships) Additionality Guide (English Partnerships, 2004) and knowledge of the regional economy) and 1.7 for the national economy. On this basis, the total employment supported by A1.02 rises to between 3,500 and 4,100 FTE jobs per annum, and between 4,500 and 5,300 for A2.01 and A2.02.

Table 6: Construction impacts – estimated employment supported in North West for each year of construction

Scheme	Person years of employment		Direct jobs (FTE) pa		Total jobs (FTE) pa	
	Low	High	Low	High	Low	High
A1.02	11,300	13,400	2,300	2,700	3,500	4,100
A2.01	15,100	17,900	3,000	3,600	4,500	5,400
A2.02	14,800	17,600	3,000	3,500	4,500	5,300

- 2.2.21 The total employment impact on the UK economy has also been estimated in Table 7. As above, the employment impact would be greatest for A2.01 and A2.02 – in the case of A2.01, this will support up to 4,700 direct FTE jobs per annum and 8,000 jobs in total. A1.02 would support between 3,200 and 3,600 direct jobs, rising to between 5,400 and 6,100 jobs in total.

Table 7: Construction impacts – total estimated employment supported in UK for each year of construction

Scheme	Person years in employment		Direct jobs (FTE) pa		Total jobs (FTE) pa	
	Low	High	Low	High	Low	High
A1.02	16,000	17,800	3,200	3,600	5,400	6,100
A2.01	21,000	23,300	4,200	4,700	7,100	8,000
A2.02	20,600	22,900	4,100	4,600	7,000	7,800

Construction GVA Impact

- 2.2.22 Estimates for total GVA have been calculated using GVA per FTE estimates across the different construction stages in the closest matching sectors. Based on this approach, the scheme with the greatest economic impact (A2.01) would contribute between £1.3bn and £1.5bn in GVA to the North West over the course of the construction project and between £2.0bn and £2.2bn to the UK economy as a whole (see Table 8).
- 2.2.23 The direct GVA generated by the construction of the project calculated in this way represents between 30% and 33% of the capital cost of the project.

⁴ Induced effects stem from workers spending a significant amount of their wages in the surrounding area, providing benefits for local businesses and retailers. Supply chain effects stem from developers sourcing goods and services from the local area, creating additional demand for local businesses.

Table 8: Estimated GVA Impact in North West and UK, £billion

Scheme	North West		UK	
	Low	High	Low	High
A1.02	0.96	1.14	1.54	1.70
A2.01	1.28	1.52	2.02	2.24
A2.02	1.25	1.49	1.99	2.21

Impacts in Liverpool City Region

- 2.2.24 The assessment has also sought to provide economic impact estimates for the Liverpool City Region, however there is still considerable uncertainty regarding some of the key factors which will drive economic impact – particularly the scope to source local labour and materials from within the city region. A large proportion of the data on which the assessment has been based – such as the annual production figures for concreting aggregates – is only available at regional level and the project team has not been able to provide accurate estimates of the potential to source from within the city region.
- 2.2.25 The estimates provided therefore relate to the economic activity associated with the design, manufacture, assembly and construction that would occur in Liverpool City Region. This is not necessarily the same as the economic benefits which will be secured for local firms and workforce. For example, contractors from the city region may undertake activity locally using a workforce from beyond the city region. In this instance the manner in which the economic benefit from this activity would be retained in or would leak out of the city region is both complex and beyond the scope of the available project information at this stage. It is noted however that Peel has a strong track record in recruiting locally and working in collaboration with interventions that ensure that local people are prepared to take up employment opportunities. This will be key to ensuring economic benefits are retained within the city region.
- 2.2.26 With the above in mind, and given that the margins of error are typically larger for smaller areas, the assessment has used a wider range of estimates of impact. However it should be emphasised that the figures should still be treated with caution. The estimates are provided in Table 9 below. The option with the greatest impact (A2.01) would generate between 2,300 and 3,100 employment opportunities in the Liverpool City Region, rising to between 3,000 and 4,000 when multiplier effects are included. This option would also generate between £0.8bn and £1.1bn in GVA.

Table 9: Construction impacts – estimated employment supported in Liverpool City Region (FTE jobs) and associated GVA

Scheme	Direct jobs pa		Total jobs pa		GVA (£m)	
	Low	High	Low	High	Low	High
A1.02	1,700	2,300	2,200	3,000	638	856
A2.01	2,300	3,100	3,000	4,000	846	1,145
A2.02	2,300	3,100	3,000	4,000	830	1,126

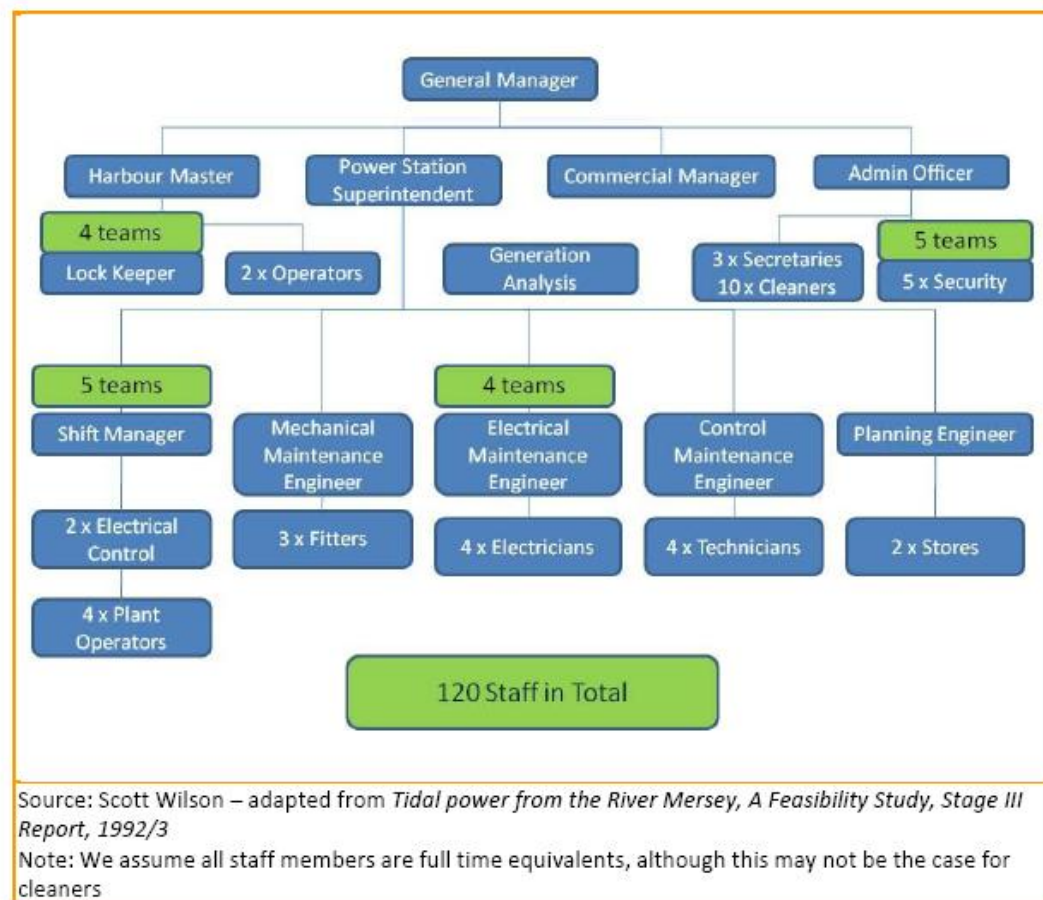
2.3 Operational Impacts

Operation and Maintenance

- 2.3.1 Operation and maintenance costs have so far not been estimated in detail by the project team, but have instead used figures expressed as a percentage of capital expenditure costs. In Stage 2, in the absence of project specific information or any similar tidal power projects upon which to base the socio-economic assessment, information from a number of large wind farm schemes was drawn upon. This was not ideal as the main operation and maintenance costs may in practice be quite different for a tidal power scheme⁵.
- 2.3.2 No significant additional information has been available to develop the assessment in Stage 3. Operation and maintenance costs are again estimated as a percentage of capital expenditure and a breakdown of the different components of expenditure is not yet available. Information on the operation of the facility is also not currently detailed to enable robust estimates to be made of the proportion of regional impacts that might arise in the Liverpool City Region. This requires project specific information on the operation of the facility or the likely value or nature of the supply chain, which is not yet available.
- 2.3.3 The likely structure of the workforce with responsibility for operating and maintaining the facility has been identified by the project team based on the 1992 feasibility study (but updated). This includes estimates of the numbers of staff (120 in total) and their occupations, and is the same for each scheme. The chart is provided in Figure 1.

⁵ Various studies have shown servicing and repair costs to represent a significant proportion of O&M costs on Wind Power schemes whereas on other tidal power schemes, such as Le Rance, they are very low.

Figure 1: Operational staffing chart



- 2.3.4 These staffing numbers have been used to build up operational and maintenance expenditure for each of the schemes, using the same approach as the Severn Tidal Power options appraisal report. It is assumed that an average salary cost would be £40,000⁶ and overhead costs would be equivalent to 50% of the basic salary costs. Annual insurance costs have been assumed at 0.2% of the capital cost whilst annual business rates have been assumed at 0.3% of the capital cost. Annual maintenance contracts have also been included to account for maintenance dredging, bathymetric surveying and other activities that are likely to be contracted out – again it has been assumed that this is equivalent to 0.2% of the capital cost. The annual operating and maintenance costs thus calculated typically represent approximately 1% of the capital costs.
- 2.3.5 The costs shown in Table 10 relate to the actual operation and maintenance of the facility. They do not include downstream costs such as ongoing grid connection charges/ generation tariffs.

⁶ This is the figure used in the Severn Tidal Power Study.

Table 10: Estimated annual operational and maintenance expenditure, £m

	A1.02	A2.01	A2.02
Staff numbers	120	120	120
Staff costs	4.8	4.8	4.8
Staff overhead costs (50% of staff costs)	2.4	2.4	2.4
Business rates	9.6	12.8	12.6
Insurance	6.4	8.5	8.4
Annual maintenance contract	6.4	8.5	8.4
Contingency	4.4	5.5	5.5
Total	34.0	42.5	42.0

Note: Excludes generation tariffs due to a lack of information at the current time.

- 2.3.6 A pattern of sourcing has been assumed based on that used at Stage 2, as shown in Table 11. This is only illustrative, but is based on major renewable energy projects.

Table 11: Assumed pattern of sourcing for operational and maintenance categories

	North West	Rest of UK	Rest of World
Employment and related costs	75%	25%	
Business Rates	100%		
Insurance		100%	
Maintenance Contracts	25%	25%	50%
Other Miscellaneous Costs	75%	25%	

- 2.3.7 Based on these assumptions, the indicative sourcing of goods and services required for operation of the facility (first 25 years only) are set out in Table 12 below for each scheme.

Table 12: Operational impacts – indicative pattern of potential geographic sourcing for each scheme (£m)

Scheme	Total operational expenditure	Indicative expenditure in the NW £m	Indicative non labour expenditure in the NW £m
A1.02	34.0	19.9	14.5
A2.01	42.5	24.4	19.0
A2.02	42.0	24.2	18.8

- 2.3.8 A summary of the annual gross employment and associated GVA supported by each scheme is set out in Table 13 below. The jobs estimates are rounded to the nearest 10, whilst GVA estimates are rounded to the nearest £100,000. The estimates of GVA exclude the direct GVA associated with the production and sale of the electricity – due to lack of information available at the current time.
- 2.3.9 While estimates of the impact in the Liverpool City Region have not been made, it is reasonable to assume the majority of jobs within the facility itself would be within this area, as would between a half and two thirds of the total employment and GVA impact.

Table 13: Gross employment and GVA impact in the North West

Scheme	Jobs (FTEs)				GVA (£m)			
A1.02	120	190	60	370	N/A	7.6	2.4	14.8
A2.01	120	250	70	440	N/A	10	2.8	17.6
A2.02	120	250	70	440	N/A	10	2.8	17.6

- 2.3.10 The differences in operation and maintenance costs provided by the wider project team are driven entirely by differences in the capital expenditure for each of the schemes. However, in practice the difference in the number of turbines (between 28 and 44) would mean that there is some difference in operation and maintenance costs and the associated employment impacts. Operating and maintenance cost estimates would need to be revisited during future stages.

Tourism Impacts

- 2.3.11 There is an aspiration for the Mersey Tidal Power project to include a visitor centre attracting between 60-100,000 visitors per annum. Details of the scale, scope and form of the visitor centre are at an early stage of development (refer to the Stage 3 Landside Facilities Report).
- 2.3.12 From experience of the economic impacts of existing and new visitor facilities throughout the UK, an estimate of the scale of economic impact that a facility attracting this number of visitor could achieve has been made. Clearly this is subject to a great deal of uncertainty and needs to be treated with considerable caution. The nature and scale of economic impacts can vary greatly depending upon, for example, the nature of the visitor offer, the pattern of visiting and use including duration of stay and expenditure, the geographical origin of visitor, etc. In deriving the estimates, assumptions have been based on the performance of a range of urban attractions that cater for the family market, drawing mainly day visitors from within the region.
- 2.3.13 A visitor facility attracting 60,000 visitors per annum could support around 30 jobs (rounded) and £1m in GVA in the North West (see Table 14). A facility with 100,000 visitors could support around 40 jobs and £2m in GVA.

Table 14: Tourism impacts – indicative employment and GVA supported

No. visitors per annum	Gross FTE jobs supported in the North West				Gross GVA supported in the North West £m			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
60,000	15	7	4	26	0.6	0.3	0.2	1.1
100,000	25	12	7	43	1.0	0.5	0.3	1.8

2.4 Wider Socio Economic Impacts

Business and Cluster Benefits

- 2.4.1 Tidal power is a slow developing sector. Despite the concept and power generating technology being proven for decades, high capital costs and low rates of return as well as environmental issues have historically deterred investors from pursuing large scale tidal power as a commercial venture. However, many recent technological developments and improvements, both in design and turbine technology have seen the economic costs brought down to competitive levels. Tidal power is now seen as a market with considerable growth potential – RenewableUK estimate that by 2035, the industry will be worth £6.1bn per annum, directly employ as many as 19,500 individuals and contribute in the region of £800m to GVA per annum.
- 2.4.2 A study by GHK (2010) in to ‘New Industry New Jobs’ (NINJ) sectors describes how the UK already has a comparative advantage in the wave and tidal power market and is making significant progress in becoming the market leader. The report claims the private sector knowledge base has now reached a level which other countries will find hard to emulate and the amount of investment in the sector in the UK between 2004-08 represented half of global investment in marine technology development. Based on our own research, these claims appear to be exaggerated. While the UK undoubtedly has a high level of academic expertise in the field and enormous potential due to its natural resource, this report has shown that in terms of the key power generating technologies, the UK’s business base trails other European countries such as Germany and France.
- 2.4.3 The report states that the North West will be one of those regions well placed to benefit based on its natural resource, its maritime heritage and good port infrastructure. It is also home to a number of world class institutes including Lancaster University’s Renewable Energy Group, the Centre for Hydrology and the Proudman Oceanographic Laboratory.
- 2.4.4 Thus far there has been very little mapping of companies actively involved in the tidal power supply chain – mainly because it is such a nascent industry many years behind wind power in terms of its development. Many of the firms active in the supply chain for wind power in the North West would also be well placed to compete in this market. There is a wide range of common infrastructure requirements as well as shared service industries for tidal and wind power projects, particularly in earlier stages of the supply chain (feasibility planning etc), which means these firms with experience of wind power projects will be well placed to benefit.
- 2.4.5 Table 15 looks at each stage of the supply chain for tidal power, assesses its current stage of development and comments on its potential for expansion if a tidal power facility was to be located in the Mersey Estuary. The information in the table was compiled with the assistance of Envirolink who are in the process of mapping the North West’s key companies who could participate in the supply chain for tidal power.

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- 2.4.6 In most areas of the supply chain, the North West has numerous companies who would be well positioned to participate in the supply chain for tidal power schemes. However there is a question over the degree to which many of these firms would benefit from having a tidal power facility in the region, particularly for those firms providing professional services, as proximity to the facility is not considered to be a major advantage.
- 2.4.7 The one area where the North West's manufacturing sector does not have a presence is in terms of manufacturing tidal power technologies. As we have seen, turbine manufacturing is dominated by a few global players, and it is unlikely that any firm could compete at this level, however there may be scope to compete in the market for more specialised components. The potential for these types of business benefits would be considered to be greater if the region had a major testing and research facility, such as NAREC, which can act as a major catalyst for sector activity. This would provide firms and universities with the opportunity to develop their concepts and test prototype devices – thereby providing a stepping stone for developers to take their concept to market.

Table 15: Tidal power supply chain strengths in the North West

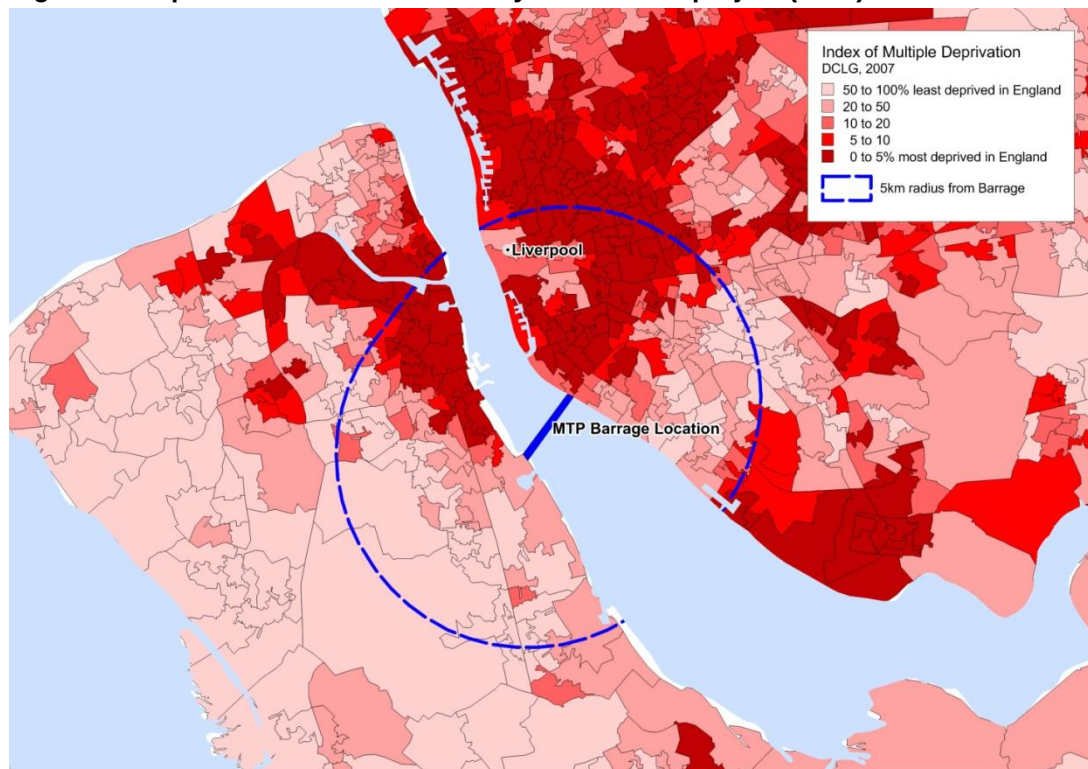
Supply chain stage	E.g. Types of activity	Existing strengths in the North West	Potential for business development from Mersey Tidal Power
Feasibility/survey	Geological surveys, environmental assessment, feasibility assessment	The North West has a large number of such companies - specialising in the types of surveys required for tidal power projects: e.g. APEM (ecology surveys) and Osiris projects (bathymetric and hydrographic surveys). There are also a large number specialising in feasibility assessments, including Parsons Brinkerhoff who led the feasibility assessment for the Severn Tidal Power project.	Potential for business development in the North West may be limited as these firms do not need to be located in close proximity to the facility
Planning	Insurance, legal, planning, finance, power purchase agreements	There are a huge number of legal, planning and finance companies in the Northwest, especially in Liverpool and Manchester, with experience of these types of projects.	Again, limited opportunities for business/cluster development as these firms could be located anywhere.
Design and prototyping	Project Ddsign, mechanical design, electrical system design, civil design, hydrodynamic design, prototype testing	A large number of companies who could provide design expertise in a number of fields – again, large companies who have offices in the North West (URS Scott Wilson, Parsons Brinkerhoff, Galliford Try). There are no prototype testing facilities for power generation technology in the region.	There may be some opportunities if academics, manufacturing businesses or engineers are given access to the facility or its data for research purposes. However the potential for business development would be much greater if the region was home to a prototype testing facility such as NAREC.
Manufacture	Structure, power generation technology, communications equipment, energy coupling systems, power transmission equipment, control equipment	The North West has a strong capability in terms of power transmission and distribution especially with Siemens T&D being located in Manchester. The North West also has strengths in manufacture of electrical components, energy coupling systems and power transmission equipment. Brevini is one prominent example.	The opportunities for component manufacturers in the North West depend on them gaining access to the supply chains of some of the large turbine manufacturers who are based in Europe. The presence of a tidal power facility may give these manufacturers an advantage but this is likely to be greater if they had access to a test facility
Testing/certification	Component testing, full scale testing	Rewinds and J Windsor's plus others. Electrical testing and interconnectors is covered. Verderg have an interconnector facility in Birkenhead on the Wirral.	As above, potential would be greater with a test facility in the region

Installation	Construction/ assembly on site, transportation, cable laying/ grid connection, civil engineering, dredging	A large range of civil engineering companies who could participate in the supply chain, as well as many dredging companies operating out of Port of Liverpool or along the Mersey. The ports infrastructure itself is also a key strength – with facilities with very high capacity at Camell Laird and others	The tidal power scheme will provide a significant boost to businesses located around ports, especially during the construction stage (for caissons, dredging etc). There will also be business development opportunities for local transport companies, civil engineers and grid connection companies (e.g. Manweb).
Operation/ maintenance	Integrity management, recovery and repair, control systems, performance evaluation, reliability management, dredging, bathymetric surveys	The North West is home to a wide range of companies who could provide basic maintenance services for the structure itself as well as control systems. Many of the port based companies could handle maintenance of navigation channels etc, however the expertise for maintenance of power generating technology does not exist within the region.	Again MTP will provide business benefits for those companies based around the ports in Liverpool for maintaining the structure of the facility. The maintenance of the power generating technology would probably call upon the turbine manufacturers who offer add on services such as maintenance contracts.

2.5 Regeneration Benefits and Access to Employment

2.5.1 As noted above, both the construction and operation of Mersey Tidal Power is likely to create and support employment across the North West. Many of the opportunities would be within the communities around Liverpool and Wirral. These are both areas that experience some of the highest levels of deprivation in the UK and are home to pockets of very high unemployment. The map below circles all those lower super output areas which fall within 5km of the alignment of the Stage 3 schemes. Over half of these areas fall within the 20% most deprived in England and over 30% fall within the 5% most deprived. There are currently over 10,500 job seekers allowance claimants living in this area, equivalent to 6% of the population compared to a regional average of 3.9% and a national average of 3.5%.

Figure 2: Deprivation around the Mersey Tidal Power project (2007)



2.5.2 The Mersey Tidal Power project is expected to generate employment requiring a broad range of skill levels. The highly specialised employment opportunities are likely to attract labour from outside the region and would not provide significant benefits for these areas. Likewise, many of the professional employment opportunities may be sourced within the region but are likely to be too highly skilled for people in local communities. However the project would also generate demand for low and intermediate skilled labour in construction related activity, which could provide opportunities for local people, enhance the performance of the construction sector locally and support the economic vibrancy of the

surrounding area. Experience elsewhere on wind farm projects has demonstrated the considerable scope for local labour to be utilised in the construction and operation phase.

- 2.5.3 Based on the estimated breakdown of construction employment by skill level for each of the construction stages of the Severn Tidal Power project (see Table 3), it is estimated that between 700 and 1,000 of the annual employment opportunities during the construction stage would be accessible, low skilled positions such as general labourers, while a further 1,900-2,500 would require intermediate skills (see Table 16). The scale of the employment requirement would suggest that winning contractors would almost certainly need to recruit locally. The construction industry is prone to large fluctuations in demand at regional level, meaning companies need to take a flexible approach to recruitment. While the winning contractors may be able to bring in specialist staff for certain parts of the construction process, they would be unlikely to have access to the volume of workers required for the low skill and intermediate skill tasks within the North West. This presents a significant opportunity to secure employment benefits locally.

Table 16: Employment opportunities by skill level

Scheme	Person years of employment		Jobs per annum	
	Low skill	Intermediate skill	Low skill	Intermediate skill
A1.02	3,700	9,500	700	1,900
A2.01	4,900	12,400	1,000	2,500
A2.02	4,800	12,100	1,000	2,400

Note: estimates are based on total global employment opportunities created during construction period as in Table 5.

- 2.5.4 The scale of benefits accruing to the local area would only be maximised if workforce development and job matching programmes are introduced at an early stage to ensure local people benefit from these opportunities. As far as possible, the lead contractor should be encouraged to work with local agencies in order that local people receive the support that will enable them to access these jobs – through apprenticeships etc. There are numerous examples of interventions targeted at local people which have been linked to major construction projects, none less so than Wirral Waters⁷, where Peel Holdings have worked closely with the Council to ensure that local workless people will benefit from employment opportunities.
- 2.5.5 Plans are being formulated to support a construction employment integrator project which includes both job guarantee and employer partnership agreements. As the scheme progresses, it may be advantageous for the developers to work with local partners to see how the scheme could be expanded or tailored to prepare local people and businesses for the opportunities that emerge through Mersey Tidal Power.

⁷ Wirral Waters is in itself a very large construction project lasting over a 30 year period. The construction periods for the two are likely to cross over which will generate huge demand for construction workers in the North West and may create some skill shortages. This will be explored in more detail in later stages of the project.

3 Synergies With Existing City Regional and Local Regeneration Schemes

3.1 Introduction

- 3.1.1 In order to inform the development of a preferred scheme for the Mersey Tidal Power project, the synergy between the construction and operation of Mersey Tidal Power and existing regeneration schemes of relevance within the Liverpool City Region have been considered. Given that the nature and location of all three Stage 3 schemes is similar, it is not appropriate to appraise each scheme separately, as there is likely to be little variation between them.
- 3.1.2 A brief commentary is also provided on the implications for Mersey Tidal Power project of the forthcoming change in organisation and governance of economic development support and strategic planning at the regional and sub-regional level, in terms of strategic planning and regeneration objectives.

3.2 Liverpool City Region Wide Regeneration Initiatives and Schemes

Wirral Waters

- 3.2.1 Building on the first two successful stages of the Wirral Waters regeneration project launched by Peel Holdings in 2006 (Northbank East and Former Grain Warehouses), the East Float development scheme seeks to create an internationally recognised city waterfront.
- 3.2.2 The scheme was formally approved by the Secretary of State in November 2010. The scheme forms the heart of the Wirral Waters project and comprises 17 million square feet of mixed use floor space. The scheme includes a mixture of commercial, tourism, educational and cultural activities as well as up to 13,200 new homes.
- 3.2.3 Once constructed, it is estimated that the East Float development will deliver over 20,000 new jobs and be home to up to 30,000 new residents over a period of 30 years.
- 3.2.4 There are strong synergies between the potential regeneration benefits of Mersey Tidal Power and the delivery of commercial, educational and tourism development through the Wirral Waters scheme. Both schemes would increase the visitor offer of the city region and the provision of educational facilities at Wirral Waters could potentially in the long term allow for skills development relevant to a low carbon economy. Both schemes would create employment opportunities for local people.
- 3.2.5 The development of commercial infrastructure could potentially allow for the location and agglomeration of renewable energy businesses and supply chains on the Wirral.

- 3.2.6 Adjacent to Wirral Waters, Peel has unveiled plans to build a £130m International Trade Centre, to house 1,000 Chinese companies that want to trade in the UK and Europe.
- 3.2.7 Synergy between the two projects can also be found at the strategic level, as both seek to deliver Peel Holdings' Ocean Gateway investment strategy.

Liverpool Waters

- 3.2.8 The Liverpool Waters vision involves regenerating a 60ha historic dockland site to create a world-class, high-quality, mixed use waterfront quarter on currently disused dockland in north Liverpool. Based on a long-term programme, Liverpool Waters seeks to deliver over 14 million square feet of mixed use floor space of residential, visitor attractions and supporting uses, office/commercial and local shops and services.
- 3.2.9 An outline planning application for the scheme was submitted to Liverpool City Council in October 2010 and is expected to go to planning committee in summer 2011.
- 3.2.10 Similarly to the Wirral Water scheme mentioned above, there are clear synergies between the construction and operation of Mersey Tidal Power and the proposed Liverpool Water scheme. Both schemes would boost the city region's visitor offer and the development of commercial infrastructure could potentially allow for the location and agglomeration of renewable energy businesses and supply chains in north Liverpool. Both schemes would create employment opportunities for local people.
- 3.2.11 Synergy between the two projects can also be found at the strategic level, as both seek to deliver Peel Holdings' Ocean Gateway investment strategy.
- 3.2.12 In the March Budget the Government confirmed that one of the new flagship enterprise zones will straddle the Mersey. It will cover the major regeneration projects Liverpool Waters and Wirral Waters.
- 3.2.13 The plans provide for incoming firms and developers to receive tax breaks, fast-track planning and a 100 per cent business discount worth up to £270,000 over five years.
- 3.2.14 The sites were chosen because run-down dockland areas are ripe for "imaginative" regeneration.

Brand New Brighton Phase 2

- 3.2.15 Phase 2 of the 'Brand New Brighton' development is ongoing. The £60 million project will provide a new supermarket, cinema, budget hotel, outdoor lido, associated leisure and restaurant offer and public realm improvements in New Brighton and seeks to create over 700 new jobs within the local economy.
- 3.2.16 The development is programmed for completion in August 2011.

- 3.2.17 The delivery of the 'Brand New Brighton' scheme and the operation of Mersey Tidal Power will both boost the city region's tourism sector and create employment opportunities for local people.

Central Village Liverpool

- 3.2.18 The £160 million Central Village scheme led by Mere Park will deliver new hotels, residential apartments and public parking as well as retail outlets, restaurants, bars, cafes, offices and extensive new public spaces to the area surrounding Liverpool Central Station.
- 3.2.19 The delivery of the Central Village scheme and the operation of Mersey Tidal Power will both boost the city region's tourism sector and create employment opportunities for local people.

Step Clever

- 3.2.20 The £22 million Step Clever joint programme which operates across Liverpool City Council and Sefton Metropolitan Borough Council, seeks to support a variety of initiatives that encourage business enterprise. The programme focuses on the wards of Linacre and Derby in Sefton and Anfield, Everton and County in Liverpool and provides enterprise management, advice on skills and training and business start up.
- 3.2.21 There is a strong synergy between the construction and operation of Mersey Tidal Power and the Step Clever programme. The implementation of the Step Clever scheme will help to raise local skill levels and improve enterprise rates within Sefton and Liverpool. The construction and operation of Mersey Tidal Power will provide an opportunity for local people to access intermediate–low employment opportunities and also provide an opportunity for entrepreneurial activity linked to renewable energy businesses and supply chains.
- 3.2.22 Synergistically, the Step Clever scheme and the construction and operation of Mersey Tidal Power could potentially allow for workforce development in those deprived areas of Sefton and Liverpool targeted through the Step Clever Scheme.

Mann Island and Museum of Liverpool

- 3.2.23 The final stages of the £120 million Mann Island mixed use scheme are currently being completed. The site is located between the Pier Head and the Albert Dock and the scheme seeks to deliver dockside cafés and restaurants, shops, public spaces, a new exhibition venue, 376 apartments and 140,000 sq ft of high quality commercial office space.
- 3.2.24 The £65 million Museum of Liverpool which is located within the wider Mann Island site is due to open in summer 2011.

- 3.2.25 The delivery of the Mann Island scheme and the Museum of Liverpool alongside the operation of Mersey Tidal Power will both boost the city region's tourism sector and create employment opportunities for local people.

Kings Dock Masterplan

- 3.2.26 Liverpool City Council, the Homes and Communities Agency and Liverpool Vision are working on plans for a new exhibition hall on vacant land to the south of the Liverpool Echo Arena. It has been estimated that the hall could provide an additional 8,100 sq m of sub-divisible flat floor space for trade, leisure and corporate fairs, dinners, music and entertainment events.
- 3.2.27 In parallel with this, and in recognition of changes in the housing market, the partners are commissioning a new masterplan for the remaining vacant land at Kings Dock, with a focus on uses and opportunities that will enhance the city's visitor economy and support the exhibition hall.
- 3.2.28 Both Mersey Tidal Power and the Kings Dock masterplan would create employment opportunities for local people and will help boost the city region's tourism offer.

Mersey Coastal Park

- 3.2.29 Launched in early 2010 the Mersey Coastal Park Strategy is a £10m programme designed to regenerate 6.5km of coastline between Rock Ferry and Eastham Country Park over the next ten years. Six projects make up the Strategy, these are:
- Rock Ferry Waterfront Regeneration Scheme;
 - Rock Park Conservation Area and Esplanade;
 - Shorefields Community Park;
 - Newlands 2 Bromborough Landfill Site;
 - Wirral International Business Park; and
 - Eastham Country Park.
- 3.2.30 Both Mersey Tidal Power and the Mersey Coastal Park schemes will help create employment opportunities for local people and will boost the city region's tourism offer. It is understood that any tidal power scheme would require a vehicle access/walkway across the Mersey to enable inspection of and access to the structure for operations and maintenance. There is potential subject to detailed assessment and design for this aspect to be enhanced to provide a permanent and dedicated public walkway and cycleway from shore to shore. This would provide a range of additional benefits arising from such connectivity including improved access to employment, health benefits and tourism benefits such as direct linkage to the Mersey Coastal Park.

The Mersey Gateway Project

- 3.2.31 The Mersey Gateway project was given planning approval in late 2010. The project will deliver a new crossing over the River Mersey between the towns of Runcorn and Widnes, together with improvements to related highways and tolling of the proposed bridge together with tolling and de-linking of the existing Silver Jubilee Bridge.
- 3.2.32 It is anticipated that the implementation of the scheme will lead to employment opportunities, together with training, and increased accessibility and improved public transport the scheme has the potential to develop the conditions for a healthy labour market.
- 3.2.33 There is synergy between the employment and training opportunities likely to be provided between Mersey Tidal Power and the Mersey Gateway project.

3.3 Local Regeneration Initiatives and Schemes

South Docks Waterspace Strategy

- 3.3.1 Liverpool south docks owner British Waterways has commissioned Baca Architects to prepare a development strategy for the docks. The strategy will:
- recommend options to unlock the full potential of the waterspace and establish the docks as a world class waterway;
 - introduce proposals for sustainable, innovative and multi-functional use; and
 - provide landowners and investors with a coherent approach to forward planning.
- 3.3.2 Both Mersey Tidal Power and the future implementation of a South Docks Waterspace strategy are likely to create employment opportunities for local people and boost the local area's tourism offer.

Liverpool Garden Festival Restoration Project

- 3.3.3 The Liverpool Garden Festival Restoration Project is a landmark restoration scheme which will bring back into public use the waterfront park first created for the 1984 Liverpool Garden Festival. The project is led by landowner Langtree and supported Liverpool City Council, NWDA and the Land Trust. The objective is to develop a new residential community aligned to a high quality waterside park linking the City Centre and Otterspool promenade.
- 3.3.4 The final restoration works are being completed at the park and the park is due to reopen in spring 2011. This restoration is the first step in the regeneration of the site which will ultimately see new residential development sitting alongside the park.

3.3.5 Before the economic downturn there were plans for 1,300 new homes on the site. The landowner Langtree remains committed to delivering a park and new residential development on the site in the long term.

3.3.6 Both Mersey Tidal Power and the Liverpool Garden Festival schemes are likely to create employment opportunities for local people and boost the local area's tourism offer.

South Liverpool Strategic Regeneration Framework (SRF)

3.3.7 Published in February 2011, the SRF seeks to guide and promote the continued redevelopment and improvement of the South Liverpool International Gateway. The aim of the SRF is to ensure the coordinated delivery of quality new development by providing strategic planning, development and design guidance.

3.3.8 There are strong synergies between the construction and operation of Mersey Tidal Power and the objectives of the SRF, such as creating employment and skills development opportunities and providing opportunities for the growth of renewable energy businesses and supply chains within the International Gateway area.

Ellesmere Quays Scheme

3.3.9 The Ellesmere Quays scheme is a 28.9ha mixed use development scheme in a prominent position fronting the River Mersey adjacent to the M53. Plans for the scheme are currently being progressed by Peel Holdings and could include up to 5,500 homes with complementary commercial, retail and leisure space.

3.3.10 Both the Mersey Tidal Power and Ellesmere Quays schemes are likely to create employment opportunities for local people and help boost the local area's visitor offer.

3.4 Northwest Development Agency and Liverpool City Region Local Enterprise Partnership (LEP)

3.4.1 Following the Government's decision to abolish Regional Development Agencies (RDAs) by April 2012, the Government is putting into place a range of structures and initiatives to enable a degree of strategic planning, one of these measures is the creation of Local Economic Partnerships (LEPs).

3.4.2 The Government's Local Growth White Paper was published on 28 October 2010 and lists some of the roles that LEPs may take on, those relevant to Mersey Tidal Power include:

- working with Government to set out key investment priorities, including infrastructure and supporting or coordinating project delivery;
- coordinating proposals or bidding directly for the Regional Growth Fund (RGF); and
- making representation on the development of national planning policy and ensuring business is involved in the development and consideration of strategic planning applications.

- 3.4.3 This list omits some existing responsibilities of RDAs, such as inward investment, innovation, and access to finance, which will be led by central government.
- 3.4.4 The Liverpool City Region LEP bid document, which was submitted to DCLG and formally approved in late October 2010, commits to establishing the region as a top international and national investment location based upon global trade, science & innovation, manufacturing and tourism.
- 3.4.5 The bid indicates that in order to create economic growth and jobs within the private sector the LEP would concentrate on major projects such as Liverpool SuperPort, the Mersey Gateway, Liverpool Waters and Wirral Waters. The bid document states that the LEP will seek to develop the long-term sustainability of the economy through:
- accelerating the creation of new business;
 - making best use of public sector funds to induce private sector business investment and to maximise private sector leverage;
 - delivering a step change in our economic performance by prioritising our investment activity in transformational areas, such as the Visitor Economy; Knowledge Economy; Liverpool SuperPort and the Low Carbon Economy;
 - increasing the number of residents who are in work;
 - increasing the scale of economic activity and developing global markets;
 - working with business to produce a demand led programme of investment in skills and learning; and
 - promoting economic growth and meeting the demands of the low carbon agenda.
- 3.4.6 The construction and operation of Mersey Tidal Power would help deliver many of these long-term priorities.
- 3.4.7 Importantly, the bid document states that:
- “There is strong support for exploiting renewable energy opportunities ... our proximity to the River Mersey offers us the potential to benefit from tidal power.”*

4 Conclusions

4.1 Socio Economic Impact

- 4.1.1 The socio-economic assessment has been able to draw upon much more information than at Stage 2. As such, the estimates in this report represent a more robust assessment of the potential socio-economic impact of the Mersey Tidal Power project. It should be noted however that there are still significant gaps in the information which will not be resolved until a detailed construction planning exercise and procurement strategy are in place for the preferred scheme. To reflect this uncertainty, both a low and a high estimate of the possible economic impact of each of the options has been presented. Whilst the overall scale of impact is still subject to this range, this is not the case for the difference between schemes.

Potential Impacts

- 4.1.2 A Mersey Tidal Power scheme would bring significant economic benefits to the local and regional economies through direct and indirect employment.
- 4.1.3 Liverpool, Wirral and Knowsley are some of the most deprived areas in the UK, with pockets of high unemployment, and these communities in particular would be likely to benefit from local employment opportunities.
- 4.1.4 In addition to direct employment and supply chain opportunities during the construction and operation of the scheme, the area would also benefit from an influx of visitors and associated investment.

During Construction

- 4.1.5 Estimates have been made of the number of direct jobs that could be created during the construction and operation of A1.02, A2.01 and A2.02, building on the assessment undertaken at Stage 2 with additional information. As the power generating technology used is the same for all three schemes, the main difference between them in terms of economic impacts is driven by the capital value of each scheme, and associated inputs of materials and services.
- 4.1.6 The likely source of materials, technology and services has been estimated based on experience of previous large-scale projects and availability of key inputs. To maximise local benefit there is a preference to source locally wherever possible, but the nature and scale of the project is such that the construction would be likely to draw on sources from across the world. Similar renewable energy projects have been used to inform the assessment, including the potential supply chain study undertaken by DECC for the Severn Tidal Power project (DECC, 2010).

- 4.1.7 The quantities of key materials such as sand, aggregates and cement would make this one of the largest civil engineering projects in the UK. It is assumed that these key materials would be sourced from within the UK, but the quantities required could not be supplied from the Liverpool City Region and North West alone. Some steel components may need to be sourced from overseas as there are limited facilities in the UK, and the turbines and power generation equipment would most likely be sourced from elsewhere in Europe or Asia, where existing suppliers are located.
- 4.1.8 There is scope to use local labour for many aspects of the construction, although some of the more specialised skills may need to be sourced from outside the region or overseas. Studies undertaken for the Severn Tidal Power project provide a breakdown of low, intermediate and high skills for each stage of the construction process (DECC, 2010).
- 4.1.9 Employment estimates for the construction period are set out in Table 17 below. Supply and induced employment effects have also been estimated as a factor of the direct employment estimates to give an estimate of the total number of jobs. Low and high estimates are shown as a range in each table cell, reflecting the level of uncertainty in the estimates. At this stage the margins of error are typically larger for the assumptions around the sourcing of construction and manufacturing and this is reflected in the ranges shown.

Table 17: Estimated construction employment impacts per year of construction

Scheme	Estimated annual employment (FTE jobs)					
	Liverpool City Region		North West		UK	
	Direct jobs pa	Total jobs pa	Direct jobs pa	Total jobs pa	Direct jobs pa	Total jobs pa
A1.02	1,900 - 2,400	2,500 – 3,100	2,300 – 2,700	3,500 – 4,100	3,200 – 3,600	5,400 – 6,100
A2.01	2,500 - 3,200	3,300 – 4,200	3,000 - 3,600	4,500 - 5,400	4,200 - 4,700	7,100 – 8,000
A2.02	2,500 - 3,200	3,300 – 4,200	3,000 - 3,500	4,500 – 5,300	4,100 – 4,600	7,000 – 7,800

- 4.1.10 The estimates relate to the economic activity associated with the design, manufacture, assembly and construction which will occur in the Liverpool City Region. This is not necessarily the same as the economic benefits which will be secured for firms and workforce within the city region. For example, contractors from the Liverpool City Region may undertake activity within the city region using a workforce from beyond the city region. In this instance the manner in which the economic benefit from this activity would be retained in or would leak out of the city region is both complex and beyond the scope of the available project information at this stage.
- 4.1.11 Of the direct jobs during construction, around 700 – 1,000 are estimated to be low skilled positions and around 1,900 – 2,500 could require intermediate skills. This represents a significant opportunity for employment for local deprived areas.

- 4.1.12 The potential impact on GVA has been estimated based on the employment figures in Table 17. A2.01 could contribute between £1.28bn and £1.52bn in GVA to the North West over the construction period and £2.022bn-£2.248bn to the UK economy as a whole (see Table 18 below).

Table 18: Estimated GVA impacts over construction period

Scheme	Estimated GVA impacts over construction period (£M)					
	Liverpool City Region		North West		UK	
	Low	High	Low	High	Low	High
A1.02	692	890	960	1,142	1,544	1,721
A2.01	927	1,192	1,280	1,520	2,022	2,248
A2.02	909	1,172	1,255	1,492	1,985	2,208

During Operation

- 4.1.13 Estimates of the likely structure of the workforce required to operate and maintain the tidal power plant are the same for all three scheme variants considered, totalling around 120 staff. Together with assumptions on average salary costs, overheads, insurance, business rates and maintenance contracts, the annual operating and maintenance costs typically represent around 1% of the capital costs (see Financial Acceptability for capital cost estimates). A summary of the annual gross employment and GVA in the North West likely to be supported by each scheme variant over the first 25 years of operation is provided in Table 19 below.

Table 19: Estimated employment and GVA impacts in North West during first 25 years of operation

Scheme	Estimated employment (FTE)				Estimated GVA (£m)			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
A1.02	120	220	60	380	4.8*	8	2	14.8
A2.01	120	270	80	470	4.8*	12	3	19.8
A2.02	120	260	80	460	4.8*	12	3	19.8

* This includes the direct GVA generated by people working at the facility but excludes direct GVA from production and sale of electricity due to lack of information at this stage

- 4.1.14 There is not sufficient information on the operation of the facility at this feasibility stage to robustly estimate the proportion of regional impacts which might arise in the Liverpool City Region. Whilst it is reasonable to assume the majority of jobs within the facility itself will be the Liverpool City Region based, we do not have enough project specific information on the operation of the facility or the likely value or nature of the supply chain to make quantified estimates of the impact. It is anticipated that between half and two thirds of North West employment/ GVA impacts would occur in the Liverpool City Region.

- 4.1.15 A visitor centre could be provided for any scheme, and would be expected to receive 60,000 – 100,000 visitors per year. Such a visitor facility could support around 30 – 40 jobs and £1m – £2m in GVA in the North West. Again detailed information on the operation of the visitor centre or the likely value or nature of the supply chain is not yet available to enable quantified estimates of the impact within the Liverpool City Region to be made. It is anticipated that between half and two thirds of North West employment/ GVA impacts in relation to a visitor centre would occur in the Liverpool City Region.
- 4.1.16 The incorporation of a testing and research facility within a scheme could act as a major catalyst for additional economic benefits for the region.
- 4.1.17 Benefits to the local and regional economy could be maximised through the procurement strategy, by sourcing materials and labour locally where possible.

4.2 Synergies with Existing Regeneration Initiatives and Schemes

- 4.2.1 Strong synergies exist between the proposed operation and construction of Mersey Tidal Power and existing regeneration initiatives and schemes within the Liverpool City Region.
- 4.2.2 At the local level synergy is found between the construction and operation of Mersey Tidal Power and existing regeneration schemes and initiatives which seek to create employment opportunities for local people (including the development of employment infrastructure) and increase the visitor offer of local areas.
- 4.2.3 In relation to skills development and creation of employment opportunities, it is clear that the construction and operation of Mersey Tidal Power provides an opportunity to marry opportunity with need, particularly in relation to the creation of low and intermediate employment opportunities.
- 4.2.4 Despite the forthcoming change in the organisation and governance of economic development support and strategic planning at the regional and sub-regional level, there continues to be a clear synergy between the likely benefits of Mersey Tidal Power and strategic planning and regeneration objectives, such as increasing the number of residents who are in work, increasing the scale of economic activity and the pursuit of a low carbon economy across the Liverpool City Region.
- 4.2.5 Collectively the plethora of existing and planned regeneration initiatives such as Liverpool and Wirral Waters, enterprise zone status, Museum of Liverpool and Mersey Coastal Park will have a significant impact on the attractiveness of Merseyside as a location to live and invest. The Mersey Tidal Power scheme will only serve to reinforce this and add to the future strength and attractiveness of the area by providing a major piece of energy infrastructure providing local employment, tourism and GVA benefits.

5 References

DECC (2010) *Severn Tidal Power: Supply Chain Survey Report*

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English Partnerships (2004) *A Standard Approach to Assessing the Additional Impact of Projects*

Welsh Assembly Government (2010) *Severn Tidal Power Feasibility Study: Phase 2 Regional Economic Impacts Study*

