REPORT OF THE HEAD OF TIDAL PROJECT DEVELOPMENT

MERSEY TIDAL PROJECT UPDATE

1 PURPOSE OF REPORT

1.1 This report provides a summary of recent progress in the Mersey Tidal Power project, summarises the findings and outlines the trajectory of the project and proposed next stage of development. This report is based on the paper provided for the 28th February Combined Authority. Any feedback from this meeting can be provided during the presentation on the day.

2 RECOMMENDATIONS

2.1 It is recommended that the Liverpool City Region Combined Authority Overview & Scrutiny Committee:

(a) Note the progress in developing a viable tidal energy scheme;

(b) Agree to receive regular updates during Phase 3 of the project; and

(c) Note the CA’s intent to recruit or second a small in-house team, supported by external consultant experts, to undertake this next phase of work.

3 BACKGROUND

3.1 The Liverpool City Region (LCR) has one of the UK’s largest tidal ranges and a strong track record in supporting offshore renewable energy, providing the opportunity to harness the power of our tides to generate a plentiful, predictable supply of green energy. The Mersey Tidal Power Project can supply our growing electricity needs and cement our position as a global green leader.
4 SUMMARY OF PHASE 1, 2017-2018

4.1 The CA procured global engineering consultancy Arup to complete a skeleton outline business case (SOBC) for a tidal energy scheme in 2017. Arup completed this report in 2018, focusing on a tidal barrage and two lagoon options. The work demonstrated the potential deliverability of a major energy scheme, leading the CA to commit to a further development phase in 2019.

5 SUMMARY OF PHASE 2, 2019

5.1 In April 2019 the CA procured a consortium of technical, commercial, financial and legal advisors led by Arup, in addition to appointing a Head of Tidal Development to lead the further development of scheme options.

5.2 The CA also formed two panels that contain industry experts and academics to provide advice throughout this second phase:
   1. The Arup Assurance Group was established to be an impartial, expert body to review and challenge the consortium’s work.
   2. The Mersey Tidal Commission Steering Group led by Brent Cheshire, the Mersey Tidal Commission’s independent chair, comprises industry experts and academics who provide scrutiny of the project findings and make recommendations to support decision making.

5.3 Following review of the SOBC, the CA, Arup consortium and panels together concluded that phase two work should focus on an options appraisal with further technical, financial and environmental investigation, in particular to improve energy output modelling and the cost base of the barrage option; a whole energy market analysis that could better place the tidal scheme in the UK’s energy system and in government’s plans for net-carbon neutrality by 2050; and the development of a clear strategic case for the project.

5.4 Together, these elements would enable the CA better to interrogate option viability and, crucially, to improve its case with government for Mersey Tidal to receive support.

5.5 Phase two outputs comprise a functional options appraisal for a tidal barrage and lagoon varieties; a whole energy market analysis capable of supporting engagement with government on tidal’s role in the country’s future energy mix; and a complete strategic case for the project.

The section below summarises key findings from the work.

5.6 Options Appraisal

5.6.1 The options appraisal constitutes the main body of the development work and includes technical, financial and environmental analyses for the potential options.
5.7 Technical

5.7.1 The technical analyses included a review of the SOBC design assumptions and further feasibility stage work to provide more accurate costs for the schemes (e.g., geotechnical desk study, rock armour review, caisson & sluice structure review, analysis of turbine size and number, review of rates). Refinement of the energy generation modelling was also carried out with support from turbine manufacturers to ensure inclusion of the state-of-the-art in turbine technology and operation.

5.7.2 This work led to a reduction in costs from the SOBC estimates and an increase in energy generation, improving the viability of the schemes. Scope for further cost savings and increases in energy generation were also identified for future work.

5.8 Financial

5.8.1 Each project option underwent financial analysis to identify a range of government support requirements, known in the renewable energy industry as contracts for difference. The analysis revealed a material, encouraging reduction in required subsidy from the SOBC. It did not, however, fall to the level now required by offshore wind, which as a sub-sector has benefitted from 15 years of public support and private innovation. Costs of tidal could reduce in a similar way. The project's value for money case resides in offering a comparable cost to nuclear and carbon capture and storage with less complex or controversial technology, and on providing a low "whole energy system" cost.

5.9 Environmental

5.9.1 The River Mersey and Liverpool Bay is one of the most highly designated marine and estuarine environments in Europe. The designations have built up over decades and reflect the significant biodiversity of the river, estuary and bay and the complex, interdependent nature of the habitats from coastal dunes to inter-tidal mudflats. The River Mersey has also formed the largest and most comprehensive remediation projects stretching over the last thirty years to redress the impacts of the region's historic industrial and mercantile processes.

5.9.2 The river and coastal environment are a dynamic and complex system. The effects of climate change are already being felt through more severe weather events such as storms and coastal flooding leading to reshaping of coastal and river features.

5.9.3 A team of environmental specialists from Arup and ABPMer completed desktop analysis of the project options. This included an assessment of assets and systems in place in the river and the bay at present, using 2D hydrodynamic modelling to understand how they would be affected by various options of deployed technologies such as a barrage or lagoon in specific areas of search.
5.9.4 The results have demonstrated the flexibility of the latest turbine technology, with two-way generation and pumping, to replicate the natural tide levels and thus mitigate the environmental impacts to a large extent. Further work is required, with more detailed modelling, better to understand this and represent some of the more minor effects with greater accuracy. There is also further scope for mitigation in operation as well as opportunities for environmental protection and enhancement.

5.9.5 Environmental performance will become a key driver in both option selection and project deliverability.

5.10 Whole Energy Market Analysis

5.10.1 The urgent need to address climate change has become increasingly recognised as a regional, national and international priority.

5.10.2 In July 2019, the Liverpool City Region declared a climate emergency and reinforced the target of making our region carbon neutral by 2040. At the same time the UK Government wrote into law the requirement for the UK to bring all greenhouse gas emissions to net zero by 2050. Emission reductions from our energy sector will play a vital role in achieving our net zero ambitions.

5.10.3 In order to understand where an LCR tidal project would fit into this emerging UK energy system, the Arup consortium conducted a whole energy market analysis. The findings, which are in-line with recent studies from government and National Grid, show that in order to meet our net zero target we are likely to need around twice as much electricity by 2040 as we produce today with a doubling of peak demand due to the electrification of previously carbon-intensive activities.

5.10.4 The precise makeup of the UK’s new clean energy mix is still being formed, but it is becoming clear that wind, solar PV and nuclear power alone cannot fulfil UK’s power demand due to issues such as intermittency, cost, deliverability and social licence. The speed and certainty of deployment is becoming a significant issue as major coal and nuclear plants, such as Fiddlers Ferry, are reaching the end of their working life.

5.10.5 Tidal in the Mersey or Liverpool Bay can be scaled to deliver significant volumes of clean, predictable power close to a large consumer base. It complements other technologies such as wind with a significant opportunity for technology transfer and shared local supply chains further reducing cost and delivery risk.

5.10.6 Tidal alongside further wind, municipal solar and hydrogen production would form an integrated energy generation system that would meet the City Region’s requirements for the future.
5.11 Strategic Case

5.11.1 Mersey Tidal's strategic case is built on three pillars:

5.11.2 To achieve government’s legislated net carbon neutrality by 2050, tidal provides a “no regrets” complement to government’s efforts in nuclear and carbon capture and storage (CCUS). It can be competitive with both at low risk.

5.11.3 The North West has a looming energy shortfall that a tidal scheme can best fill. Energy demand is forecast to double by 2050, not least thanks to electric vehicle demand. North West production and infrastructure risks falling behind without a large scale intervention like tidal.

5.11.4 Tidal is good for the energy system: it is predictable, zero carbon, can help balance the system as a whole and could facilitate key developments in hydrogen (which itself is critical to the UK’s carbon reduction plans).

5.12 Stakeholder Engagements and Communications

5.12.1 In Q1 2019, the team developed a stakeholder engagement and communications plan, this provided clear direction on who needed to be engaged throughout this phase. The key messages focussed on building a case for tidal in relation to the energy gap and understanding at a high level the potential impact of each option following the technical developments and analysis.

5.12.2 The environmental groups appreciated early engagement to gain an understanding of how the project was being developed and the potential options under review. This is a technical project and the delivery team made an effort to ensure it was communicated in a clear manner to non-technical audiences.

5.12.3 The Mersey Tidal Commission Chair and Steering Group members played a key role in raising the profile of the project and the Chair presented at select events this year including the Danish Energy Investment Conference in London and the NP11 Conference in Hull.

5.12.4 Further engagement with Orsted, The Crown Estate and BEIS has taken place during this phase to keep them abreast of project developments.

5.12.5 There are a range of key stakeholders that are following this project with interest and it has been recognised that in a future phase of work this will require additional resource and coordination.

6 TRAJECTORY OF PROJECT

6.1 The subsidy requirement for the project has fallen with the work in Phase 2 but there is still work to be done to drive this down further. The whole energy system benefits and bespoke nature of a 120 year asset life may also warrant
a more bespoke support mechanism than used for nuclear power or other renewables.

6.2 All the pathways to achieving net-zero carbon GHG emissions require significant, additional generation capacity and support for high-risk (in terms of economics and deliverability) or untested technologies such as large scale nuclear and carbon capture and storage as well as the provision of significant amounts of unpredictable, intermittent renewables. The whole system cost implication of this are still being investigated but there is a strong consensus that as this is better understood, policy space will emerge to support the inclusion of lower risk stabilising technologies such as tidal range energy.

6.3 The predicted increases in electricity demand both locally and nationally will put increased pressure on government to ensure a stable and secure electricity supply. The availability of a clean, predictable, low risk regional source of power will bring increased value as this becomes more pressing.

6.4 In short, Mersey Tidal must continue to reduce its options to a single preferred option, improve its financial position and capture a valuable place in the Northwest and UK’s energy mix.

7 PROPOSED NEXT STEPS

7.1 The next phase is planned to run over two years and will focus primarily on;

- Government engagement to influence policy
- Environmental work necessary for the next phase
- Detailed energy and hydrodynamic modelling
- Detailed cost analysis and engagement with supply chain
- Funding and delivery model development

7.2 It is expected to result in a preferred option to take forward for development funding.

8 RESOURCE IMPLICATIONS

8.1 Financial

Summary financial position;

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<thead>
<tr>
<th>Financial year 2019/20</th>
<th>Actual costs</th>
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<tbody>
<tr>
<td>Available Budget</td>
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<tr>
<td>Carry forward from 2018/19</td>
<td>£223,331</td>
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<tr>
<td>Legal, Technical and Financial advisors</td>
<td>£918,040</td>
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<td>Project management resource</td>
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**Project development costs**

<table>
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<tr>
<th></th>
<th>Amount</th>
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<tr>
<td>Internal project delivery resource</td>
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<tr>
<td>Project development costs</td>
<td>£450,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>£1,200,000</strong></td>
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**Budget Financial year 2020/21**

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<th><strong>Forecast costs</strong></th>
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<tr>
<td>Internal project delivery resource</td>
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<tr>
<td><strong>Total</strong></td>
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**Budget Financial year 2021/22**

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<th></th>
<th><strong>Forecast costs</strong></th>
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<tr>
<td><strong>Total</strong></td>
<td><strong>£1,200,000</strong></td>
</tr>
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8.1.2 The cost of the next phase has been budgeted at £2.4million over 2 years (2020-2022). This CA budget includes £1.2m for 2020-2021 and this would cover the appointment of an internal project development team with potential for secondments and a budget for external advisors and project development.

8.1.3 The proposed way forward results from an options analysis that sought to maximise speed of progress with affordability, and to secure optimal expertise for a complex project in a specialised arena.

8.2 Human Resources

The above budget assumes we will be able to recruit the necessary staff. If this is not possible, the CA will secure secondments or consultancy to fill the requirements. There are not expected to be any issues, redeployments or industrial relation issues because of the recruitment and/or procurement process which will ensure transparency and a fair selection process.

8.3 Information Technology

Several new staff will be required to use specialist engineering software as part of their normal duties. The running of this software requires powerful computer processing capabilities so there will be a need for additional IT support in this area.

9 **RISKS AND MITIGATION**

9.1 A project risk register has been established and is regularly reported on, capturing project specific risks and mitigation. There is also a construction risk register which reflects the construction risks of the project and mitigation strategies. This are live documents which are updated as the project progresses.
10 EQUALITY AND DIVERSITY IMPLICATIONS

10.1 Subject to approval the recruitment and selection process for the project team will follow the recruitment and selection policy and/or competitive procurement, which is an open and transparent process to ensure we appoint the best candidates in line with the LCRCA equal opportunities policy.

10.2 The project will also uphold equalities legalisation in all aspects of delivery, for example ensure communication and engagement methods are accessible for all groups and seek balanced representation on governance panels.

11 COMMUNICATION ISSUES

11.1 The project team has actively engaged with over 50 organisations throughout the past year.

11.2 The development of a Mersey tidal project is a key element of the Metro Mayor’s manifesto and featured in the City Region’s Devolution Agreement. It is an exciting, long-term infrastructure project of national significance, which has received a heightened level of interest from national media and politicians over the past year, particularly in reference to the climate emergency and increased global interest in climate change.

11.3 The next phase of work will include a dedicated strand on engagement and communication, both to create policy space for the proposals and to inform stakeholders of progress.

12 CONCLUSION

12.1 This report provides an update on the progress of the Mersey Tidal project. Further updates reports will be provided at key milestones.

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