Severn Estuary Commission
Comisiwn Aber Afon Hafren

Western Gateway Porth y Gorllewin

Severn Estuary Commission

Recommendations

March 2025

"We want to make Wales a world centre for emerging tidal technologies, and the Severn Estuary is a source of immense potential energy as one of the highest tidal ranges in the world. I welcome the work of the Severn Estuary Commission and I look forward to working with the UK Government and the Western Gateway to make sure that we can harness its potential whilst also protecting this unique asset."

Rebecca Evans MS
Cabinet Secretary for Economy, Energy and Planning

Severn Estuary Commission

"After many years of debate, we now know that the huge potential of tidal energy in the Severn can and should play a key part in our energy supply. I am grateful to the commission for their work to explore this huge opportunity for the UK. Launched by the 28 local authorities that make up the Western Gateway, we are ready to work with both UK and Welsh Governments to see these recommendations become a reality."

Sarah Williams-Gardener
Chair of the Western Gateway

Commissioners

Sue Bartlett-Reed, Founder and Chair, UK Marine Energy Council and Vice-chair, Global Underwater Hub

Peter Davies CBE, former Vice Chair UK Sustainable Development Commission, Sustainable Futures Commissioner and Chair of Climate Change Commission for Wales

Dr Madeleine Havard, member of Pembrokeshire Coast National Park Authority and Chair of Skomer Marine Conservation Zone Advisory Committee.

Chris Mills, President and Chair of the Institute of Fisheries Management and Chair of Afonydd Cymru

Dr Nigel Costley, former Regional Secretary of the South West Trade Unionist Congress

Ian Simm, Founder and Chief Executive of Impax Asset Management Group plc.

Chair's Foreword

The UK's rapidly growing demand for electricity, the war in Ukraine and widespread geo-political instability have focussed everyone's minds on the need for local energy production. There is also a general recognition that our climate is changing dangerously. To date, the parallel biodiversity challenge has not been recognised to the same degree.

We are faced with a conundrum – we know that we need a lot more electricity to meet our decarbonisation targets, and we know that it should be local and low-carbon. Equally we know that all projects have an environmental impact. Balancing the local environmental impact of a project with its broader environmental and economic benefit is the key compromise to be made when considering renewable energy. The Severn Estuary Commission was established to consider the feasibility of electricity production from the Estuary. That same conundrum was the essential theme of our deliberations.

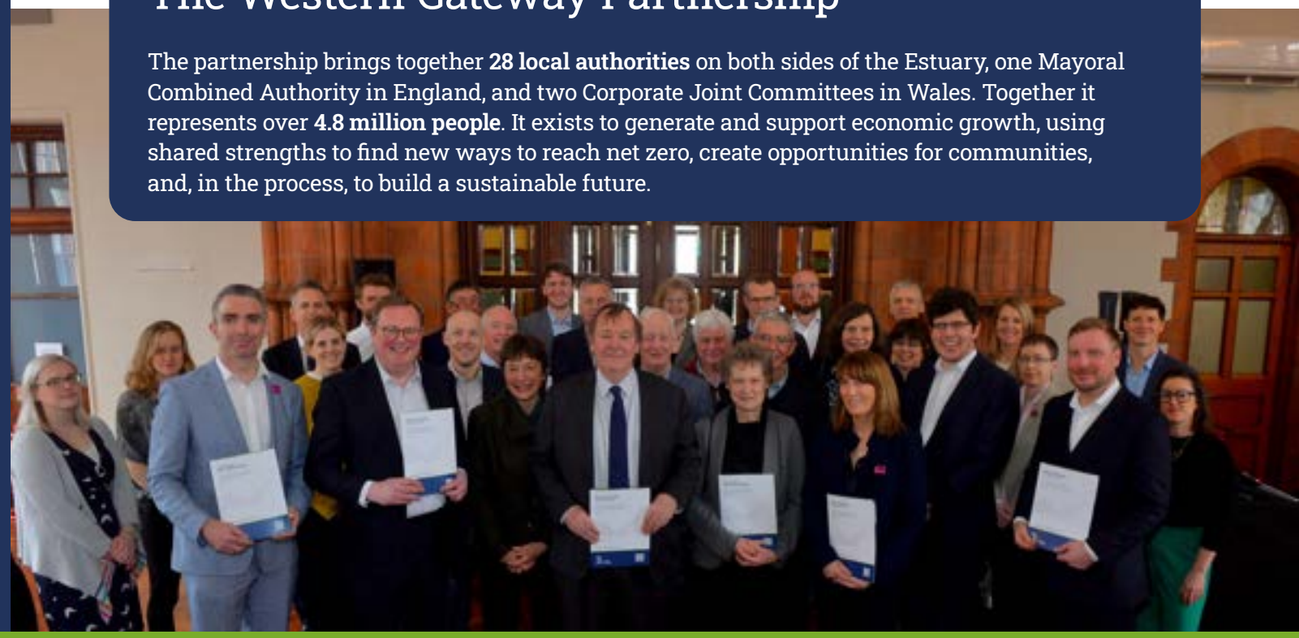
There is a lot of history attached to this subject. We are grateful to those who have provided historical context and technical expertise and to the current experts who have helped us to assess new possibilities. We have also benefited greatly from the support and cooperation of The Crown Estate, the Severn Estuary Partnership and, of course, the many stakeholders whom we have consulted.

The Commissioners have approached their work with open minds. There has been plenty of frank discussion and constructive tension. I thank all of them for their hard work.

Andrew Garrad CBE FREng
Chair of the Severn Estuary Commission

The Western Gateway Partnership

The partnership brings together **28 local authorities** on both sides of the Estuary, one Mayoral Combined Authority in England, and two Corporate Joint Committees in Wales. Together it represents over **4.8 million people**. It exists to generate and support economic growth, using shared strengths to find new ways to reach net zero, create opportunities for communities, and, in the process, to build a sustainable future.



Introduction

According to both the National Energy System Operator (NESO) and the Climate Change Committee, the UK electricity demand is set to more than double by 2050. Meeting that demand is critical to the UK Government's growth ambitions in fuelling business and industry. As global events have demonstrated, to ensure the energy security of our nations, generation must be domestic. The UK needs immediate investment in low-carbon energy schemes to meet its target of Net Zero by 2050.

Tidal range energy is a clean, predictable source of energy and, in the Severn Estuary, the UK has one of the highest tidal ranges in the world. A project in the Estuary offers a rare opportunity for the UK to showcase its ability to capture this valuable resource.

Recognising this potential, the Western Gateway Partnership launched the Severn Estuary Commission to examine the available evidence for harnessing the Estuary's tidal range energy. The Commission was asked to engage with stakeholders and experts to determine whether producing sustainable electricity from the Severn Estuary is feasible.

A comprehensive report is available online. This summary report sets out the Commission's approach, deliberations, conclusions and recommendations.

Alongside the Commission, the Western Gateway Partnership is also working closely with the Welsh Government's Tidal Lagoon Challenge to align research, strengthen the tidal range energy evidence base, and better support future decisions.

Overview

After a year's engagement with more than 500 individuals from over 200 local and national organisations, the Severn Estuary Commission has concluded that development of tidal range energy in the Severn Estuary <u>is</u> feasible. Tidal range projects would generate predictable low-carbon energy, independent of weather conditions, help to meet the UK's significant increase in electricity demand, and contribute to the stability of the grid.

The Severn Estuary is of international environmental importance and heritage significance and must be protected. Climate change is already affecting the Estuary, with rising sea levels and water temperatures changing its ecology. There are significant gaps in environmental data and addressing them is crucial to enable proper consideration of development within the Estuary.

Taking account of commercial issues, legislative challenges, and stakeholder views, the Commission has concluded that, at this stage, the development of a large barrage should not be pursued.

The Commission recommends that the UK and Welsh Governments provide policy support for tidal range energy to ensure private sector investor confidence and public sector engagement in environmental research and monitoring. This policy support should be underpinned by a locally led Estuary-wide spatial plan to manage the Estuary as a whole.

A commercially viable lagoon should be developed - a Commercial Demonstration Project. It should use the Regulated Asset Base funding approach and be developed through a predominantly public sector delivery vehicle. It would be the world's first tidal range lagoon, would create economic growth, and provide a better understanding of tidal range energy. Its environmental impact would need to be carefully monitored, and that knowledge should be used to determine whether future developments should take place. A parallel environmental monitoring programme should be implemented to fill broader data gaps.

The Commission urges the Western Gateway Partnership to work with the UK and Welsh Governments to act upon its recommendations.

Severn Estuary Commission

Key Findings

Supporting the UK's Net Zero and energy security goals

In parallel with delivery of Clean Power 2030, the new Government has set the provision of secure, low cost, low carbon, energy as a priority to meet the post-2030 increase in demand for electricity. This goal aligns with the Welsh Government's Net Zero Strategic Plan.

NESO's 2024 Future Energy Scenarios all state that 3-5 GW of tidal range energy will be needed by 2050. Every year, NESO updates its Future Energy Scenarios (FES). All scenarios include tidal range energy projects in the 2040 to 2050 decade. NESO is working on its first Strategic Spatial Energy Plan (SSEP), a nearer term plan, which will be updated regularly. The Commission expects tidal range energy to be covered in future iterations as more detailed information becomes available on the timing and development of projects.

The Severn Estuary, with its 14m tidal range, is the largest tidal energy resource in the UK. Alone it could supply up to 7% of the country's current electricity, potentially making it a significant part of the solution to the UK's energy needs. Given the long planning and development lead times, if it is to contribute to achieving net zero by 2050, then development should start as soon as possible. Use of this resource aligns with the Government's strategy to become a "clean energy superpower", ensuring the availability of reliable, indigenous energy that reduces dependence on fossil fuels and imported energy. As part of a diverse renewable energy mix, tidal range complements offshore wind, solar, and nuclear, enhancing grid stability and energy security.

Technology is mature and ready to deploy

Tidal range technology is well understood. There are schemes operating elsewhere in the world, albeit as barrages rather than lagoons, but the principle is the same. The technology can be deployed today without requiring further advances. However, in the UK, it has never had formal government support and has, therefore, failed to attract investment. The commercial obstacles are not engineering in nature but are associated with the unusual size and long construction time.

Environmental considerations and climate adaptation

The Estuary is highly protected and recognised as a wetland area of international importance. It contains a designated Ramsar site, a Special Protection Area and a Special Area of Conservation. Parts of the Estuary are designated as Sites of Special Scientific Interest and it also contains National Nature Reserves. Climate change is already affecting the Estuary, with rising sea levels and shifting habitats altering the ecological balance. Despite much study, there are significant gaps in environmental data, and previous work has highlighted the need for systematic monitoring to support informed decision-making. Addressing these gaps is crucial to ensure that any development complies with environmental regulations and that its impact is mitigated effectively.

The Commissioners noted the concerns of environmental stakeholders who were opposed to a barrage but saw value in a smaller scale pilot lagoon project.

La Rance Tidal Barrage, France

Severn Estuary Commission

Economic and industrial growth opportunities

The clean energy industry, which includes tidal power and floating offshore wind, is one of eight growth-driving sectors identified in the new national industrial strategy. Its declared aim is to focus on the highest potential growth-driving sectors and create high-quality jobs right across the UK. Investment in tidal range projects can help achieve that goal.

The Commission's assessment of a range of example tidal lagoon projects shows that they have the potential to create between 30,000-220,000 job years and £1.6-12 billion GVA during the construction phase. This benefit would increase significantly if it were determined that there was environmental and commercial merit in proceeding with a wider programme.

The Severn Estuary area has scope for the development of new supply chains with the infrastructure for a wider programme. There is space and grid connectivity in the Estuary area and there is potential availability of skilled construction labour post-Hinkley Point C. There is also an opportunity for tidal range energy projects to facilitate some regeneration of the more deprived areas in South Wales.

The Estuary is the home to much commercial activity with major ports on its shores which may be disrupted by a tidal range project. The ports were unanimous in their opposition to a barrage. Their reactions to lagoons were mixed.

Due to environmental impacts, legislative barriers and the impacts on ports and other commercial activities, the Commission concluded that, at this stage, the development of a large barrage in the Severn Estuary should not be pursued. A lagoon project would provide both engineering experience and real-world monitoring of environmental effects. Development of a tidal lagoon therefore offers a positive alternative to a barrage.

Electrical system benefits

Tidal range projects contain inherent storage ability and hence can deliver both low-carbon electricity and much needed grid system support. Unlike the main-stream renewables, wind and solar, tidal range energy, while variable, is highly predictable. Projects in the Estuary would be close to centres of demand thereby reducing transmission line length and cost compared to other renewable generators.

Investment and financial viability

The Regulated Asset Base (RAB) model presents the most effective funding approach for tidal range projects, offering a fair balance between investor confidence and consumer protection. This model has been successfully applied to major infrastructure projects such as the Thames Tideway Tunnel, and is proposed for Sizewell C, demonstrating its potential to attract long-term investment in capital-intensive developments. The Government has estimated that, if Sizewell C were to proceed, then consumers would be expected to save circa £30bn over the project's lifetime compared with other financing methods. On a pound for pound basis, similar, or better, results would be expected for tidal range projects.

Government support, with both policy and financial engagement, will be required to de-risk initial commercial projects and attract private capital. If an initial project proves successful it will establish investor confidence, opening the door for future tidal range projects across the UK.

Recommendations

The Commission's main recommendations are listed below. More detail is provided in the main report available online.

01 Governments to recognise the role of tidal range energy in the UK's future electricity supply and support its development as an industry

The UK and Welsh Governments should align their policies to support tidal range energy as part of the UK's future electricity supply, integrating it into national and regional frameworks for net zero and energy security. A Tidal Range Energy National Policy Statement would further establish clear policy backing, confirm government commitment, enhance investor confidence, and enable public sector investment in environmental research and monitoring. Alongside this, NESO should review its Strategic Spatial Energy Plan to include tidal range potential. The immediate priority is to develop a governance structure, spatial planning approach, and capacity-building strategy, involving key national infrastructure bodies to support long-term tidal range development.

02 Develop a Commercial Demonstration Project to demonstrate potential and evaluate environmental effects

In parallel a tidal lagoon should be developed - a Commercial Demonstration Project (CDP). As well as generating a substantial amount of low-carbon electricity, its purpose would be to understand the energy and socio-economic benefits of such a project and to provide a platform for full scale evaluation of its environmental impact. This initial project must be commercially viable and financeable. It should be co-designed by engineers and environmentalists working together and with a comprehensive plan for mitigation and compensation. If it were found to be both commercially and environmentally acceptable then it could be the basis for a series of lagoons either in the Estuary or around the UK coast.

03 Create a regional plan to enable the better management of the Severn Estuary

A new regional plan should be developed to enable the management of all activities, not limited to energy projects, in the Severn Estuary. It would include an Estuary wide spatial plan, with a strong cross-border governance structure to ensure consistent interpretation of UK and Welsh legislation. It would deliver an integrated approach to environmental research, planning and management, and engage stakeholders, potentially through the Severn Estuary Partnership, to secure both public and industry support. This form of spatial planning would be forward thinking and allow for a decision-making framework which considers the energy, environment and socio-economic impacts of large and critically important infrastructure, such as, but not limited to a tidal lagoon.

04 Develop funding and financing framework to unlock private investment

HM Treasury should expand the application of a funding and financing framework based on the Regulated Asset Base model to cover tidal range energy projects, thereby unlocking potential for public and private finance.

05 Take a public sector led initial development approach – a Project Delivery Vehicle

The Western Gateway Partnership, collaborating with UK and Welsh Governments, should work to establish a Project Delivery Vehicle for the CDP. Comprising relevant public and private sector interests, this vehicle would lead the development, convene relevant stakeholders, promote collaboration and drive progress. It would also work to secure public funding to support the high-risk development phases for early projects, which seem unlikely to attract private finance. It would then encourage private finance institutions to enter into the construction phase for which there appears to be significant appetite.

06 Invest in research and monitoring to address current gaps in the environmental data and evidence

There should be public sector investment in research and monitoring to address current gaps in the environmental data and evidence. Whilst the CDP would expand the knowledge of tidal range energy development in the Estuary, further work is needed to provide other necessary data.

07 Take a strategic approach to mitigation and compensation delivery

The Project Delivery Vehicle, with the support of the UK and Welsh Governments, should work with other interested bodies on a strategic approach to habitat compensation delivery. They should assess the feasibility of delivering mitigation and compensation for tidal range development in the Severn Estuary at the necessary scale. Compensation should be delivered in a UK-wide strategic manner, ensuring that measures are effective, proportionate, and aligned with broader environmental and policy goals.

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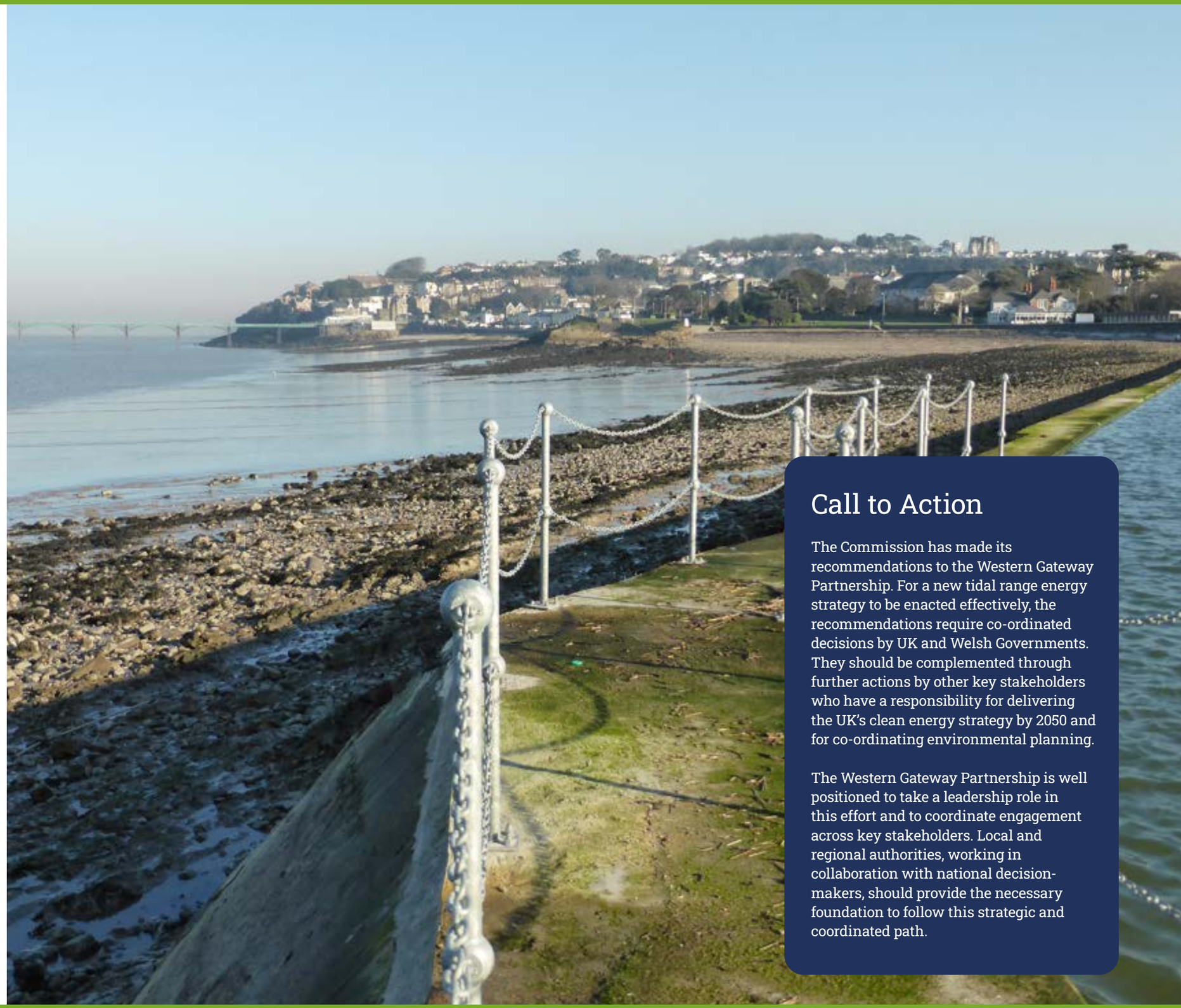

Call to Action

The Commission has made its recommendations to the Western Gateway Partnership. For a new tidal range energy strategy to be enacted effectively, the recommendations require co-ordinated decisions by UK and Welsh Governments. They should be complemented through further actions by other key stakeholders who have a responsibility for delivering the UK's clean energy strategy by 2050 and for co-ordinating environmental planning.

The Western Gateway Partnership is well positioned to take a leadership role in this effort and to coordinate engagement across key stakeholders. Local and regional authorities, working in collaboration with national decision-makers, should provide the necessary foundation to follow this strategic and coordinated path.

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To follow the progress of the Commission, please visit our website:

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severn.commission@western-gateway.co.uk