

Severn Estuary Commission

An independent commission to
explore the potential for sustainable
energy from the Severn Estuary

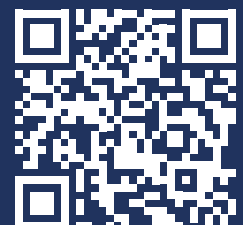
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www.severncommission.co.uk



Western Porth y
Gateway Gorllewin





This document is available in Welsh /
Mae'r ddogfen hon ar gael yn Gymraeg

Contents

[04 Foreword](#)

[06 The Commission](#)

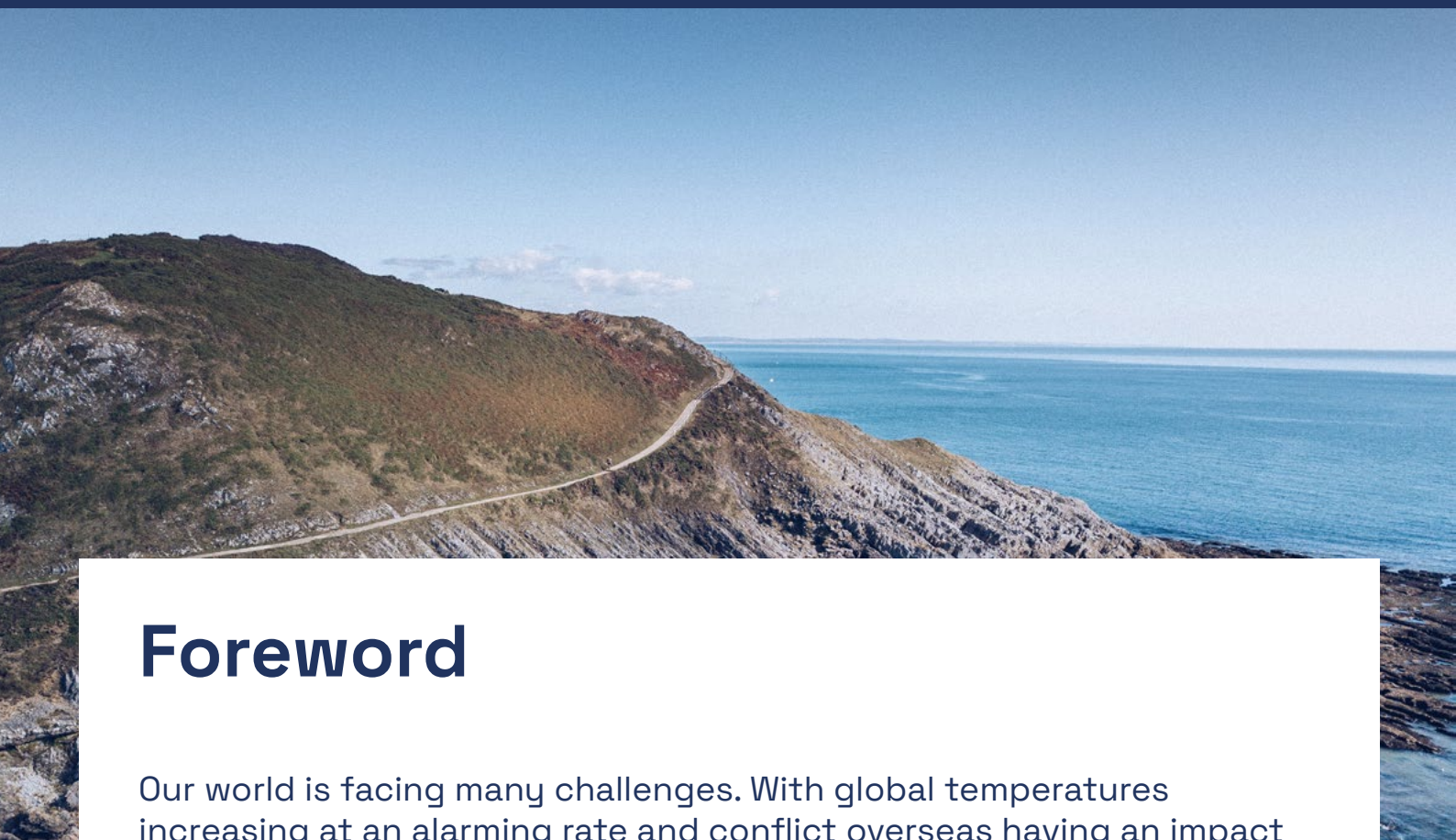
[10 The Severn Estuary](#)

[12 Why now?](#)

[14 Areas of Focus](#)

[16 Next Steps](#)

[18 Severn Estuary Tidal Energy Schemes](#)



Foreword

Our world is facing many challenges. With global temperatures increasing at an alarming rate and conflict overseas having an impact on global energy supply, we need bold solutions if we are going to ensure a ready supply of energy that does not cost the earth.

The UK is the first major economy to set legally binding commitments to reach net zero. It is essential that we explore all avenues to ensure we have a steady supply of sustainable energy to power this nation.

We have known for a very long time that the Severn Estuary has huge potential to generate clean renewable energy. It has one of the highest tidal ranges in the world, and it has been estimated that it has the potential to generate 7% of the UK's total electricity needs.

There is a universal appreciation of the need to reach net zero, there are new financial models, and new technologies which can mitigate environmental impacts now available. The time is ripe to look again at how we can harness the power of the Severn.

This new initiative has been launched by the Western Gateway, with the support of local leaders, business and universities from across South Wales and the West of England. We have always been a place of innovation as the home of many of Brunel's greatest designs and the world's first hydrogen fuel cell.

The Severn Estuary sits at the heart of our geography. To determine its full potential, we need an independent, fair, and transparent process to review the evidence and make recommendations.

This commission comprises a diverse group of people from scientific, engineering, environmental, financial and stakeholder backgrounds. I have full confidence that it will have the expertise and independence it needs to explore whether using the Severn Estuary to create sustainable power is attainable and viable.

I would like to thank Dr Andrew Garrad CBE and the rest of our Commissioners for agreeing to take this work forward, not only for its potential to combat global climate change but also to understand how we best protect and harness this precious natural resource.

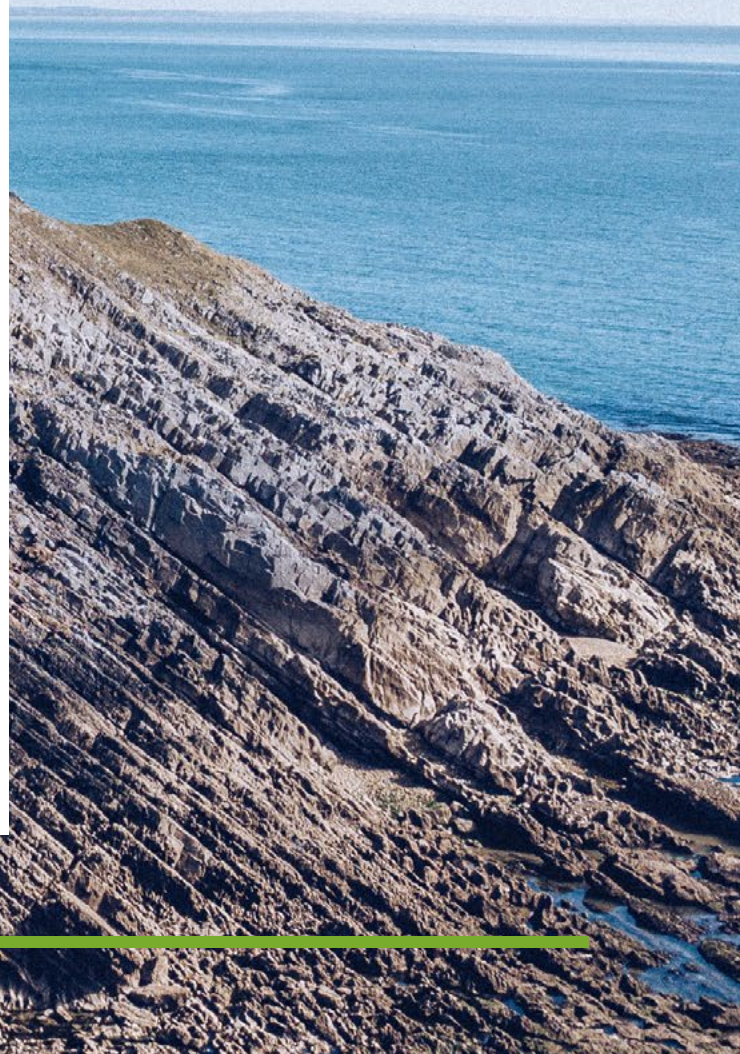
Their findings will guide us in shaping policies, fostering collaborations, and seizing the opportunities that will emerge. Together, we will move towards a more sustainable future, championing the responsible utilisation of our natural resources.



Councillor Huw Thomas,
Leader of Cardiff Council

The Western Gateway partnership

The Western Gateway is the Pan-Regional Partnership for South Wales and Western England. The first of its kind to span two countries within the UK, the partnership brings together local leaders, business and universities to reach net zero and drive economic growth. Home to world leading-manufacturing, high tech clusters and areas of outstanding natural beauty, the area has huge potential to become a global centre for digital, net zero and cyber innovation. Together our partnership is working to ensure that our area can deliver on its potential and become an engine of opportunity for the UK.



The Commission

Remit

The Severn Estuary Commission has been established to explore whether there are options for sustainably harnessing renewable energy in the Severn Estuary. The Commission will operate independently from the Western Gateway Partnership's Board, to provide impartial, expert advice and develop a final recommendation.

The Commission will have an open remit to explore a range of options, including looking at what energy technology exists, funding and financing options, how the environment can be protected, social and economic factors.

The Commission's objectives are to:



Potential

Determine the potential for sustainable energy in the Severn Estuary and the contribution it can make to a net zero economy;



Considerations

Understand the key considerations of the Severn Estuary, including the importance of its unique environment; and



Identify

Identify the key challenges and opportunities of developing sustainable energy in the Severn Estuary.

To achieve its objectives, the Commission will engage with key stakeholders, commission research and analysis, and seek expert input, to determine a final recommendation. In delivering this goal, the Commission will be supported by a secretariat and number of experts.

The Commissioners

The Severn Estuary Commission is made up of a Chair, and 5 additional commissioners.



Dr Andrew Garrad CBE

Chair

Andrew is an engineer and businessman and one of the pioneers of the modern wind energy industry. He is regularly voted as one of most influential people in the energy industry. In 1984 he co-founded the consulting company Garrad Hassan (GH) which grew to become the world's largest renewable energy consultancy, employing 1,000 people in 29 countries when he retired in 2015.

Previously he has been President of European Wind Energy Association, Chairman of the British Wind Energy Association, now known as Renewables UK, and was awarded a CBE in 2017 for services to renewable energy. Andrew also chaired Bristol's year as European Green Capital in 2015.

“The Severn Estuary Commission represents a pivotal moment in the area's collective pursuit of sustainable energy solutions. There is still much which needs to be considered and evidence to be reviewed in order to decide whether there is now a viable option to harness the awesome power of the Severn Estuary. Following considerable past attempts, our mission is to navigate the complexities, balance environmental concerns, and unlock sustainable opportunities that will define the future of energy in the Severn Estuary.”

Dr Andrew Garrad



Sue Barr
Commissioner

Sue Barr has decades of experience in offshore energy and engineering industries, and currently is Director of Marine Energy at Simply Blue Group. Sue chairs the UK Marine Energy Council, is Vice-chair of the Global Underwater Hub, a Board member of Marine Energy Wales, and a Non-Executive Director of Marine Power Systems and Pembrokeshire Coastal Forum.

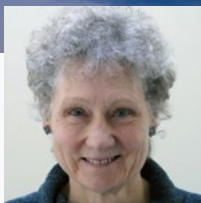
Previously Sue has been a Board Member for Verdant Power Inc, Scottish Renewables and Renewables UK and served 10 years on the Council of the Marine Renewables Industry Association, Ireland.



Peter Davies CBE
Commissioner

Peter's background includes roles as Managing Director of Business in the Community, Vice Chair of the UK Sustainable Development Commission, Sustainable Futures Commissioner for Wales, co-founder of Size of Wales, Chair of the Climate Change Commission for Wales and Wales Council for Voluntary Action.

His current roles include chairing the Dwr Cymru's Independent Challenge group, Community Energy Pembrokeshire, Foundation for Democracy and Sustainable Development, membership of Audit, Risk and Assurance Committee of the Future Generations Commissioner and community custodian for River Simple.



Dr Madeleine Havard
Commissioner

Madeleine Havard is an environmental scientist who worked in the voluntary and statutory environmental sector and as an academic, lecturing in environmental studies with research interests in conservation and marine and coastal management.

She has been appointed to a number of national Boards and Advisory Committees, and currently is a member of Pembrokeshire Coast National Park Authority and Chair of Skomer Marine Conservation Zone Advisory Committee.



Chris Mills
Commissioner

Chris Mills is a scientist by training and started his career in 1978 as a Salmon Biologist at the Salmon Research Trust of Ireland. In 1989, he joined the newly formed National Rivers Authority and over the next 23 years worked in a variety of fisheries, general management, policy, and leadership roles finally becoming Director of Environment Agency Wales (2006-2013).

Now retired, he is currently President and Chair of the Institute of Fisheries Management and Chair of Afonydd Cymru (AC), Chair of Welsh Water's Independent Environmental Advisory Panel and represent AC on a number of Welsh Government, Natural Resources Wales and Wales Environment Link committees.



Dr Nigel Costley
Commissioner

Nigel Costley was the Regional Secretary of the South West Trade Unionist Congress for 24 years. A former apprentice compositor, Nigel retrained several times over to adapt to a digital world. Elected as union officer for the GMPU, he was involved with the massive changes in the printing and design industries.

Nigel is a Board Member of the Hereford and Worcester Training and Enterprise Council, one of the first trade unionists to have such a position. He led the formation of the highly successful Graphical Employment and Training Group, run by and for unemployed printing and graphical workers.

The Severn Estuary

The Severn Estuary and wider Bristol Channel stretches across the border between England and Wales, encompassing a diverse range of ecosystems and playing an important role in the local economy.

The estuary is home to the highest tidal range in Europe, the third highest in the world. Given its significant tidal resource, the potential for harnessing tidal power in the estuary has been the subject of discussion for decades, with some estimates suggesting it can provide up to 7% of the UK's electricity needs. With an increased urgency in tackling the climate emergency, all options for low carbon energy should be explored. However, the estuary is also an area of international importance for wildlife habitats and they are essential to the area's economy.

Millions of people live on the Severn Estuary. It plays a central role in the daily lives of residents in Bristol, Gloucester, Newport, Cardiff, Swansea, and many other places. The regional economy, encompassing industries, energy generation, agriculture, fishing, tourism, transportation, and conservation efforts is closely tied to the estuary. Its shores are home to major industry such as the nuclear power station at Hinkley Point C, the now decommissioned power stations at Oldbury and Berkeley, a diverse industrial base across South Wales, including Port Talbot steel works, as well as a myriad of emerging industries.



Clevedon

It is also a major commercial shipping route with ports at Swansea, Barry, Cardiff, Newport, Sharpness and the two large Bristol Port Company facilities at Avonmouth and Portbury serving as important gateways for international trade and commerce.





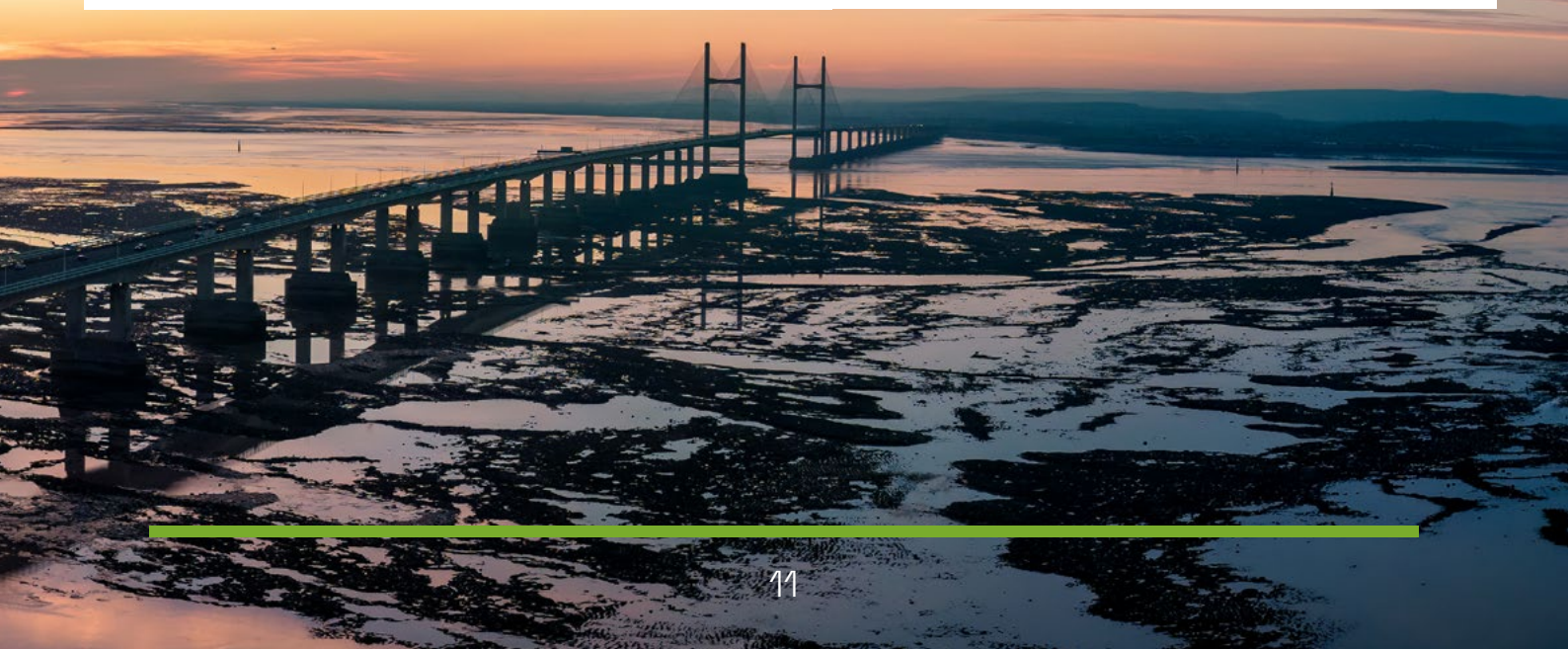
Port Talbot

The Severn Estuary plays a role not just in the local and regional economy, but in the United Kingdom as a whole. The economic activities in this region are closely tied to the estuary's unique geographical and environmental features, making it an important asset for both England and Wales.

The Severn Estuary is of international environmental importance as its unique tidal range creates an environment that is home to a diverse range of unique ecosystems, including salt marshes, mud flats, and tidal flats. Each of these support rich biodiversity and act as vital habitat for migratory birds, fish, and various plant and animal species. This dynamic environment provides essential nursery grounds for fish, helps mitigate coastal erosion, and stores carbon. It plays an important role in climate change mitigation.

The estuary holds several important environmental designations that reflect this ecological importance: Special Areas of Conservation, Special Protection Areas, Sites of Special Scientific Interest, National Nature Reserves, and Areas of Outstanding Natural Beauty. It is therefore vital that any development places the estuary's international, European and national nature conservation significance at its centre.

It is also important to remember that the estuary is at risk of change, with uncertainty as to how it, its rivers, and its species may respond to the effects of a changing climate. Climate change will likely impact the Severn Estuary and its surrounding areas through rising sea levels which will, intensify flooding and erosion, disrupt delicate ecosystems, and pose threats to the region's infrastructure, communities, and economy. These changes will alter the balance of ecosystems, threatening biodiversity and the livelihoods of those dependent on them. The associated risks to public health, social well-being, and the economy underscore the urgent need for both mitigation and adaptation strategies to address the challenges posed by climate change.





Why now?

The Severn Estuary offers huge potential for low-carbon energy generation in several ways. In particular, there have been numerous tidal energy projects proposed, and yet none have been implemented. What has changed to justify taking a fresh look at energy in the Severn Estuary?

- Increased urgency in achieving net zero to mitigate the effects of climate change, with ambitious targets set by both UK and Welsh Government.
- Instability in global energy markets arising from an imbalance of supply and demand and exacerbated by the war in Ukraine.
- The need for long term security of cost and supply of affordable low carbon energy generation.
- Innovative new technology that mitigates environmental impacts.
- Recognition of the benefits of co-locating energy assets, such as hydrogen.
- Financing large infrastructure projects has always presented challenges, new financing models have demonstrated their applicability to large projects over the past decade.
- The necessity for a diversity of energy types as we move to an energy system increasingly based on variable, but predictable renewable energy.
- The UK must re-power wind turbines, replace solar panels, and upgrade electricity grids to achieve its net zero ambitions by 2050. There is an urgency for a review of tidal power policy to capitalise on existing knowledge and increase relevant workplace and supply chain skills.



- Recent reviews such as [Hendry Review](#) on tidal lagoons in 2017, and [Mission Zero - Independent Review of Net Zero](#) by Chris Skidmore MP, have highlighted the UK's world leading potential in tidal energy. National Grid's Future Energy Scenarios includes between 1GW and 8GW of tidal power in their 2023 forecast to 2050.

The Western Gateway Partnership considers that the time is right to explore again whether there are feasible options for sustainable energy in the Severn Estuary.



Hinkley Point C

Areas of Focus

The Independent Commission's research will focus on evidence-based policy and strategy formulation to determine whether there are feasible sustainable energy options for the Severn Estuary.

A critical success factor in delivering this work will be through learning the lessons from previous projects and proposals and informing Government policy on the potential benefits. The Commission will use the comprehensive evidence base set out in previously published work as a foundation.

An initial assessment of the current evidence base has identified the following areas for further research and policy development:

- contribution to grid stability and other energy system benefits (for example working with green hydrogen production facilities)
- understanding, through whole system analysis, marginal cost of tidal power over its lifetime and potential benefits to future generations
- developing a model application for using innovative forms of funding and financing for large tidal power projects, such as Regulated Asset Base (RAB) financing or other alternative
- taking a more nature centric approach to project evolution
- understanding the potential socio-economic effects from the development of tidal power, including potential supply chain benefits but also attitudes and needs to inform better policy support

- understanding non-technical barriers in the development of tidal power
- development of low cost/high impact support mechanisms to facilitate tidal power development
- reviewing “stranded asset” and “end-of-life” decommissioning options
- developing a greater understanding of environmental challenges and potential solutions.

The Commission recognises other projects already being developed by others such as through the Welsh Government Tidal Lagoon Research Challenge and will seek to collaborate and build on this.

Integral to the success of this work will be to ensure that key stakeholders are able to engage in the process and provide their expertise and knowledge. The Commission will actively involve stakeholders in its considerations, taking a range of input into account, with a view to developing a shared understanding of the key issues.

Next Steps

The Western Gateway's Severn Estuary Commission will follow a comprehensive process, with stakeholder involvement and periodic publication of reports online. The Commission's objective is to finalise its findings and recommendations by early 2025. The next steps and process that will be undertaken are as follows:

Launch:

In early 2023 the Commission will finalise the scope and objectives of their work, and develop a work programme through clarifying key issues, challenges, and opportunities.

Stakeholder Engagement:

Throughout the process, the Commission will engage with stakeholders to gather their perspectives, expertise, and concerns, providing opportunities to contribute their insights and recommendations.

Finalisation:

In early 2025 the Commission will finalise its findings and make recommendations to the Western Gateway Board and UK and Welsh Governments.

Information Gathering:

This may include scientific studies, existing reports, government reports, stakeholder submissions, public consultations, and expert testimonies. The aim is to build upon the strong evidence to understand what has changed.

Analysis and Evaluation:

The Commission will analyse the information and data collected, considering the diverse perspectives of stakeholders. This process will aim to identify the most practical and sustainable solutions.

2024

2025

Severn Estuary Tidal Energy Schemes



- ① Swansea Bay Tidal Lagoon (TLP)
- ② Minehead to Aberthaw Venturi Fence
- ③ Minehead to Aberthaw Tidal Reef
- ④ Minehead to Aberthaw Low Head Tidal Bar
- ⑤ Minehead to Aberthaw Venturi Fence
- ⑥ Minehead to Aberthaw Tidal Barrage
- ⑦ Minehead to Aberthaw Tidal Fence
- ⑧ Stepping Stones Tidal Lagoon
- ⑨ Bridgwater Bay Lagoon (TLP)
- ⑩ West Somerset Tidal Lagoon
- ⑪ Hafren Power Severn Barrage
- ⑫ Bridgwater Bay Offshore Lagoon
- ⑬ Cardiff to Weston Barrage (The Severn Barrage)
- ⑭ Cardiff to Weston Low Head Tidal Bar
- ⑮ Great Western Power Barrage
- ⑯ Cardiff to Weston Tidal Fence
- ⑰ Severn Lakes
- ⑱ Cardiff to Weston Venturi Fence
- ⑲ Bridgwater Bay Lagoon
- ⑳ Cardiff to Hinkley Point Barrage (via Weston)
- ㉑ Cardiff Tidal Lagoon (TLP)
- ㉒ Peterstone Flats Tidal Lagoon
- ㉓ Welsh Grounds Lagoon
- ㉔ English Grounds Tidal Lagoon
- ㉕ Shoots Barrage
- ㉖ Newport Tidal Lagoon (TLP)
- ㉗ Beachley Barrage



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**Western
Gateway**

**Porth y
Gorllewin**



To follow the progress of the Commission,
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