

Policy References

Section 1: Overall Tidal Energy Context Policy References

Reference No	Reference	Author	Date	Brief Description
1	Energy Paper 46, Tidal Power from the Severn Estuary.	Bondi Committee / HMSO	1981	Not available online. This report covers the first major study of tidal power in the UK by the Government appointed committee chaired by Sir Herman Bondi. It was the precursor for the establishment of the Severn Tidal Power Group (see Reference P1).
2	Energy White Paper	UK Government	2007	P144 refers to the Sustainable Development Commission's Study on Tidal Power (Ref 3) and the UK Government's position to consider the findings.
3	SDC Turning the Tide	Sustainable Development Commission	2007	The Sustainable Development Commission produced a suite of reports on tidal power in 2007 which led to the commissioning of the STPFS a year later.
4	The Severn Tidal Power Feasibility Study	UK Government	2010	The STPFS was undertaken by the UK Government between 2008 and 2010 to prepare an SEA for tidal power potential in the Severn. It identified three preferred options for tidal range power development, B3 - the Cardiff Weston Barrage, B4 - the Shoots Barrage and L3d - Bridgwater Bay Lagoon
5	Energy National Policy Statements	UK Government	2011	As part of the changes to the national infrastructure planning regime in 2010, National Policy Statements (NPS) were required to enable the Planning Inspectorate to confirm whether proposals brought forward by their promoters were aligned with Government Policy before recommending approval or refusal.
6	10164 Marine Statement Cov.indd (publishing.service.gov.uk)	UK Marine Policy Statement: UK covering Scotland, Wales, England and	2011	The Marine Policy Statement is an overarching UK framework for preparing Marine Plans which underpins decisions taken on the marine environment. The MPS and subsequent Marine Plans will form a new basis for the marine planning system in accordance with legislation providing a spatial planning approach to marine resources.

		Northern Ireland		
7	Energy Act Supplementary Memorandum	UK Government	2013	When the July 2013 Supplementary Memorandum for the Energy Act was published, paragraph 21 on page 3 included a mechanism by which certain technologies for which generic terms were unsuited (for example, nuclear, CCUS and tidal range) could negotiate different terms.
8	Developments of national significance (dns) - guidance	DNS: Welsh Government	2015	The amendment to the Planning (Wales) Act 2015 has resulted in the implementation of the Developments of National Significance process where nationally significant projects are submitted via the planning route to the Planning Inspectorate Wales. The introduction of the Infrastructure Bill Wales will result in a phased out approach to the DNS for a period of 1 year after the new bill is ratified. After this timeframe the DNS process will be completely replaced.
9	Well-being of Future Generations (Wales) Act 2015 – The Future Generations Commissioner for Wales	Future Generation of Wales Act: Welsh Government	2015	The Future Generation of Wales Act 2015 puts in place seven goals including: a prosperous Wales, a resilient Wales, A more equal Wales, a healthier Wales, a Wales of cohesive communities, a Wales of vibrant culture and thriving Welsh language and a globally responsible Wales. The definition of the Act is “The process of improving the economic, social, environmental and cultural well-being of Wales by taking action, in accordance with the sustainability development principle aimed at achieving the well-being goals”. In Wales there are 48 public bodies covered by the Act and therefore decisions involving public bodies in relation to tidal development in the Severn Estuary will be required to take this Act into account.
10	Environment Act (Wales)	Environment (Wales) Act: Welsh Government	2016	Part 6 of the Environment (Wales) Act 2016 covers Marine Licensing in Wales in relation to activities where Welsh Ministers are the licensing authority. This could relate to schemes within the Severn Estuary depending on the size and scale of the development and the resulting legislation requirements.
11	The Hendry Review	Charles Hendry	2017	An independent inquiry headed by Charles Hendry to advise Government on the benefits and costs of tidal lagoons as an energy resource.
12	NIC Annex on Tidal Power	National Infrastructure Commission	2018	NIC's Response to the Hendry Review where they concluded that the high cost of energy from tidal lagoons could not be justified.

13	Government Response to Swansea Bay Tidal Lagoon	UK Government	2018	Sets out the reasoning for the Government's decision not to award the Swansea Bay Tidal Lagoon a Contract for Difference.
14	Energy White Paper	UK Government	2020	Builds on the PM's 2020 10 point plan by offering a strategy to transition to net zero and build a green economy whilst maintaining affordability.
15	Cost of Generation Report	DESNZ	2020 updated 2023	Levelised cost of energy estimates and assumptions for comparing different types of electricity generation technologies.
16	Environment Select Committee Inquiry on Tidal Power	Environment Select Committee	2021	The Inquiry concluded in a letter to the BEIS SoS that: "Tidal power can offer numerous benefits and potential for the UK, which boasts over 7,500 miles of coastline and unrivalled resources to generate reliable power supplies without the vagaries of sunlight or wind. While we appreciate the Government's concern about the potential initial cost to the taxpayer to support early-stage tidal stream and tidal range structures, the benefits outweigh the costs. Support for tidal stream is likely to lead to a rapid fall in generating costs similar to, if not steeper than, the fall experienced in offshore wind. Tidal range projects are relatively cheap to maintain once the initial costs are paid off, offering – in the longer term – a potentially affordable contribution to make to the UK's renewable energy mix. It is clear that there is a strong current of interest in tidal power, with clusters set to thrive around the UK, if it is given Government backing. It is imperative that the Government fully considers the benefits of this reliable renewable energy and have constructive discussions with the sector."
17	National Grid Future Energy Scenarios	National Grid	2022 and 2023	Sets out four future energy scenarios to achieve 2050: Consumer or System Transformation, Leading the Way and Falling Short. Between 1GW and 8GW is forecast from marine energy by 2050 with the most conservative estimate being 1 small tidal lagoon by 2050. The scenarios forecast future energy demand of between 600 and 850TWh by 2050.
18	RAB Financing Model for Nuclear	UK Government	2022	Guidance on development costs and the nuclear Regulated Asset Base model. A similar model could be applicable to tidal range power providing there was Government support for tidal power.

19	Updated Energy National Policy Statements	UK Government	2023	The suite of Energy NPS's were updated in draft in 2021 before being consulted on. This document provides the Government response to the updated NPS consultation for energy infrastructure. On P35, " <i>Several respondents questioned the lack of technology-specific guidance for tidal range developments. Respondents wondered in particular whether this approach was in tension with the inclusion, in EN-1, of tidal range among the basket of technologies for which the question of need has been presumptively answered. The government considered the question of technology-specific guidance for tidal range during our initial drafting, and we have not been persuaded by the consultation responses. Our position remains that it would be unwise to impose, before the fact that could be drafted under these conditions of uncertainty would end up being poorly suited to the task. It is important to note however that the lack of technology-specific guidance for tidal range does not preclude tidal range proposals from seeking a DCO under the NSIP regime, nor present any procedural disadvantage or prejudicial implication during the assessment stage. Under the present arrangements, a prospective tidal range development would simply be assessed in light of the generic principles established in EN-1. To further clarify the Government's position on tidal range, we include at Appendix C a detailed specification of the kind and quality of evidence that the Government expects to see before giving any consideration to a specific tidal range proposal.</i> "
20	Appendix C	UK Government	2023	Appendix C provides criteria for tidal range development. It is reproduced in the worksheet called "Appendix C"
21	Revisions to Energy National Policy Statements	UK Government	2023	A revised consultation (closing on 25th June 2023) on National Policy Statements. Tidal Range isn't specifically referenced but the EN-1 NPS will apply to tidal range projects over 50 (or 100MW for offshore) in England and 350MW in Wales.
22	Revised Renewable Energy EN-3 NPS	UK Government	2023	A revised consultation on EN-3 Renewables - p100 to 106 covers tidal stream but there is no reference to tidal range so the guidance in reference C14 is presumed to stand.

23	Contracts for Difference	Low Carbon Contracts Company	Ongoing	A CfD is a long term contractual agreement between a low carbon electricity generator and Low Carbon Contracts Company (LCCC), designed to provide the generator with price certainty over the lifetime of the contract. The contract is awarded through a competitive allocation process which determines the pre-agreed price (the “Strike Price”). New Nuclear and Tidal Range have been able to negotiate CfD terms outside of the regular auction rounds because of their high capital cost and long operating periods. New Nuclear is also using Regulated Asset BAsE (RAB) financing in preference to CfD. A tidal range CfD would typically have a contract length of 35 years compared with auctioned CfD's (such as tidal stream) which have a length of 15 years.
24	Consultation on Contracts for Difference	UK Government	2023	Closed consultation on changes to the CfD from 2024 including proposals to exclude private wire arrangements to offshore oil and gas facilities, policy updates in relation to maintaining the balance between market exposure and investor certainty for CfD holders, the interaction between the CfD scheme and Capacity Mechanism on matters of eligibility and the potential consideration of whether other factors beyond price should be taken into account in contract awards
25	Energy Security Bill Factsheet: Ofgem net zero duty (added 6 June 2023) - GOV.UK (www.gov.uk)	Net Zero: UK covering Scotland, Wales, England and Northern Ireland	2023	The governing body of Ofgem is the Gas and Electricity Markets Authority who have included reference to the net zero targets in now present in the Climate Change Act 2008 in reference to energy schemes within the UK. This decision enables the Gas and Electricity Markets Authority and the Secretary of State a specific net zero duty when completing their legal duties. Ofgem will also be required to consider the net zero targets and 5-year carbon budgets set out in the Climate Change Act 2008 as part of their everyday decisions as a regulator. Therefore, any tidal schemes planned going forwards will be required to take net zero into account.
26	Town and Country Planning Act 1990 (legislation.gov.uk)	Marine Net Gain: Enacted in England in February 2023 as part of the Town and Country Planning Act	2023	The government intends to require developers to demonstrate the Biodiversity Net Gain requirements for NSIPS with a biodiversity net gain statement for NSIPS to be produced later this year. Marine infrastructure undergoing consent through the NSIP and TCPA progress will be defined by the government to clarify how the marine licensing and planning regimes will put into place statutory credits so that both intertidal and coastal projects can meet net gain obligations through payments. It remains to be seen as to whether the devolved nations will also follow Marine Net Gain. The Welsh National Marine Plan will require environmental enhancement of projects and states the definition of ‘enhancement’ applied for this study is closely related to the so-called ‘net gain’ concept, which is generally understood to be a development that leaves the environment or biodiversity in a better

				state than before. Either way it will need to be considered as part of any tidal development in the Severn Estuary.
27	Environmental Outcomes Reports: a new approach to environmental assessment - GOV.UK (www.gov.uk)	Environmental Outcome Reports consultation: Jurisdiction to be determined once enacted particularly in devolved nations.	2023	As a result of Brexit a new system of environmental assessment is being proposed by the UK government which includes the Environmental Outcome Reports (EOR) detailing proposed new environmental assessment procedures. Once enacted powers will be granted that allow the government and devolved administrations to replace the EU legislation relating to both SEA and EIA processes. The EOR looks to simplify and streamline the environmental assessment process and deliver greener infrastructure for the economy. The assessment criteria for EIA screening will be made clearer and if enacted will relate to tidal renewable projects going forwards. It has yet to be decided by the Welsh Government whether they will follow the EOR process once enacted which could generate cross-boundary legislation differences for development within the Severn Estuary.
28	Written Statement: Introduction of the Infrastructure (Wales) Bill (12 June 2023) GOV.WALES	Infrastructure Bill Wales: Welsh Government	2023	On the 12th June 2023 the Infrastructure Bill was introduced to the Senedd Cymru in a move towards net zero emissions by 2050. A unified consenting process for Wales has been proposed to enhance investment within both renewable energy and significant infrastructure projects. The bill if ratified will apply to both the land and territorial sea which would include any tidal projects in the Severn Estuary. The bill will replace the Developments of National Significance regime consolidating planning requirements under one system. The bill will be of relevance to Significant Infrastructure Projects and aim to enable Infrastructure Consent. This new legislation will contain defined parameters for projects to be assessed and applied against. If passed, the Bill is expected to receive Royal Assent in Mid-2024. The IC regime is expected to be fully operational by Mid-2025.
29	First Minister announces £750,000 fund for tidal lagoon research GOV.WALES	WG tidal lagoon research fund: Welsh Government	2023	In March 2023 the Welsh Government announced funding for tidal lagoon research for three research projects focusing on the deployment of tidal lagoon technology around the Welsh Coastline.

30	Cross Border Marine Planning Guide	Welsh Government and Marine Maritime Organisation	2023	In July 2023 the Welsh Government published The Severn Estuary: A cross-border marine planning guide. The guide considers cross-border policies, implementation and decision-making, governance and environmental, economic and social considerations.
31	The Wildlife and Countryside Act	UK Government	1981	Overarching legislation covering nature conservation
32	The Planning Act	UK Government	2008	An Act to make provision about, and about matters ancillary to, the authorisation of projects for the development of nationally significant infrastructure; to make provision about town and country planning; to make provision about the imposition of a Community Infrastructure Levy; and for connected purposes.
33	The Planning (Wales) Act	Welsh Government	2015	National, strategic and local development planning in Wales. It makes provision for certain applications for planning permission and certain other applications to be made to the Welsh Ministers; to make other provision about development management and applications for planning permission; to make provision about planning enforcement, appeals and certain other proceedings; to amend the Commons Act 2006
34	The Water Environment (Water Frameworks Directive) (England and Wales) Regulations 2017	UK Government	2017	The Secretary of State and the Welsh Ministers, acting respectively in relation to river basin districts that are wholly in England and river basin districts that are wholly in Wales, and jointly in relation to river basin districts that are partly in England and partly in Wales, in accordance with the European Communities Act 1972(1).
35	The Conservation of Habitats and Species (EU Exit) Regulations 2019	UK Government	2019	Provides for continuity of the Natura 2000 network following the UK's exit from the EU.
36	The Environment Act	UK Government	2021	Overarching Environment Act applying to England.

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Section 2: Government Net Zero Policy References

Reference No	Reference	Author	Date	Brief Description
101	Climate Change Act 2008	HM Government	2008	Commits the the Government to legally binding greenhouse gas emissions by 2050 compared with 1990.
102	the Climate Change Act 2008 (2050 Target Amendment) Order 2019	HM Government	2019	Energy policy objectives are driven by the 2008 Climate Change Act and the amendment of the target through the Climate Change Act 2008 (2050 Target Amendment) Order 2019, which commits the the Government to achieving a 100% reduction of greenhouse gas emissions by 2050 compared with 1990 levels.
103	Net Zero Strategy (Build Back Greener)	HM Government	2022	Sets out policies and proposals for decarbonising all sectors of the UK economy to meet the Government's net zero target by 2050.
104	Ten-point plan for a green industrial revolution	HM Government	2020	The Net Zero Strategy builds on the Government's Ten-point plan for a green industrial revolution which was published on 18 November 2020.
105	Powering Up Britain: Net Zero Growth Plan	HM Government	2023	Net Zero policies updated in March 2023 with a suite of publications under the policy paper, Powering Up Britain
106	Green Finance Strategy	HM Government	2023	Strategy to facilitate financing for net zero investment
107	British energy security strategy	HM Government	2022	Strategy to improve UK's security of energy supply during the transition to net zero.
108	Transport decarbonisation plan	HM Government	2021	Plan to decarbonise transportation
109	Industrial decarbonisation strategy	HM Government	2021	Strategy to decarbonise industrial energy / heat use and other emissions
110	Hydrogen strategy	HM Government	2021	Strategy to develop a UK low carbon hydrogen energy industry

111	Heat and Buildings Strategy	HM Government	2021	Plan to decarbonise domestic and commercial heat use in buildings
112	Energy net zero white paper	HM Government	2020	White Paper outlining the Government's proposals to implement net zero by 2050.
113	Sixth Carbon Budget	Climate Change Committee	2020	Sets out the projections for delivering net zero by 2050 looking at all energy sources - anticipates electricity demand to be at least double today's demand by 2050.
114	2022 Progress Report to Parliament	Climate Change Committee	2022	CCC's progress report to Government on their progress to achieving net zero.
115	Climate Change Committee's (CCC) Annual Progress Report 2022 Recommendations	HM Government	2023	Government Response to the CCC's Progress Report.
116	Mission Zero: Independent Net Zero Review by Chris Skidmore MP	Chris Skidmore MP	2023	An independent Review commissioned by the Government in September 2022 to review progress in achieving net zero and recommending actions on what more needs to be done.
117	Government Response to Skidmore Review	HM Government	2023	The Government's response to Chris Skidmore's independent review.
118	Energy Bill 2022-23	HM Government	2023	The Bill is passing through Parliament and covers energy production and security and the regulation of the energy market
119	Carbon Budget Delivery Plan	HM Government	2023	fulfils statutory duties under the Climate Change Act 2008 that enable Carbon Budgets 4-6, which cover the periods 2023-27, 2028-32 and 2033-37 respectively, to be met. The plan estimates that its quantified proposals and policies will give over 100% of savings required to meet Carbon Budget 4 and 5 and 97% of the savings required to meet Carbon Budget 6.
120	The role of local government in reaching net zero, June 2023	UK Parliament	2023	Research note produced by UK Parliament
121	Independent Review of Net Zero	UK Parliament	2023	Research note produced by UK Parliament

122	Electric vehicles and infrastructure	UK Parliament	2023	Research note produced by UK Parliament
123	Government support for marine renewables	UK Parliament	2022	Research note produced by UK Parliament
124	Sustainability of burning trees for energy generation in the UK	UK Parliament	2022	Research note produced by UK Parliament
125	BEIS Spending on action on climate change and decarbonisation	UK Parliament	2022	Research note produced by UK Parliament
126	The future hydrogen economy	UK Parliament	2022	Research note produced by UK Parliament
127	Where will Britain's future energy supply come from?	UK Parliament	2022	Research note produced by UK Parliament
128	Aviation, decarbonisation and climate change	UK Parliament	2021	Research note produced by UK Parliament
129	the Welsh Government Net Zero strategic plan	Welsh Government	2022	Welsh Government Strategic Plan
130	Net Zero Wales: sustainability appraisal	Welsh Government	2021	Sustainability Appraisal for Net Zero
131	Net Zero Wales Carbon Budget 2 (2021 to 2025)	Welsh Government	2021	Carbon Budget
132	Working together to reach net zero: all Wales plan	Welsh Government	2022	Policy and Strategy Paper

Tidal Energy Resources

Reference No	Reference	Author	Date	Brief Description
2.1	Renewables Atlas	ABPmer	2004, updated 2007	Tidal Currents and energy densities for tidal stream energy
2.2	Environmental Mapping	JNCC	current	UK Marine Areas Protected Datasets
2.3	Mitigation and Compensation Opportunity in Marine Consenting	ABPmer	2020	Report for Welsh Government on Mitigation and Compensation Opportunity
2.4	Habitat Creation at Steart Marshes	WWT	2017	A presentation to the Severn Estuary Partnership on the Steart Marshes habitat restoration project
2.5	Severn Estuary Partnership Website	SEP	2023	A comprehensive website with details of projects and other initiatives undertaken by the Severn Estuary Partnership.
2.6	Environment Agency Flood Mapping Resources	EA	2023	Provides access to the Environment Agency's flood mapping resources

Section 3: Severn Estuary Tidal Energy Project References

Reference No	Reference	Author	Date	Brief Description
P1 Cardiff to Weston Barrage (The Severn Barrage)				
P1a	Civil Engineering aspects of the Cardiff - Weston Barrage (STPG)	Kerr, Murray & Severn	1986	Proceedings of a symposium held at the ICE London on 30-31 October 1986. Paper 3 describes the proposal for a tidal barrage between Cardiff and Weston-super-Mare studied by STPG.
P1b	Energy Paper 57, The Severn Barrage: General Report.	Severn Tidal Power Group	1989	Not available online. This report covers the extensive work by the Severn Tidal Power Group (STPG) in the 1980's (jointly funded by UK Government and STPG) on the feasibility of constructing a Severn Tidal Power Barrage between Cardiff and Weston-super-Mare. STPG was a joint venture of Sir Robert McAlpine Ltd, Balfour Beatty Major Projects, ALSTOM Power UK Ltd; Rolls Royce plc, Taylor Woodrow Construction Ltd and Carillion plc.
P1c	Developments in Tidal Power	Various - published by ICE	1990	Proceedings of a meeting held at the ICE in November 1989. Papers 1 to 6, 13,14 and 16 to 18 cover STPG's proposals for the Severn Barrage.
P1d	The Severn Barrage - Definition for a new Appraisal of the Project. Final Report	Severn Tidal Power Group	2002	Only a short summary is available online. This report provides an update on the original work undertaken by STPG for a new Severn Barrage. It was funded by ETSU (a Government energy agency) to recommence the tidal energy debate and was a factor in the then Labour Government including tidal energy in its 2006 Energy White paper (reference C2).
P1e	Cardiff Weston Barrage	Sustainable Development Commission	2007	The SDC Research Report 3 provides detailed analysis of the Cardiff Weston (STPG) Barrage and the Shoots Barrage
P1f	B3 Cardiff to Weston Barrage	Severn Tidal Power Feasibility Study	2010	The STPFS Options Engineering Report Volume 1 gives details of the B3 Barrage alignment that is based on STPG's original Cardiff Weston proposals described in references P1c and P1d. Two variants were studied - one operating in ebb only mode and a second with reversible turbines that could operate in ebb and flood mode as well as pump.

P2 English Stones Barrage (Hooker / Shoots Barrage)				
P2a	Civil Engineering aspects of an English Stones Barrage (STPG)	Binnie and Roe	1986	Proceedings of a symposium held at the ICE London on 30-31 October 1986. Paper 4 describes the original proposal for a tidal barrage at English Stones studied by STPG.
P2b	Hooker Barrage	A V Hooker and MRM Partnership	1989	Not available online. This report details work on an alternative barrage at English Stones that improved the STPG design by using high level sluicing to minimise sedimentation and amended the location of the navigation lock as requested by Gloucester Harbour Trustees. It also used Straflo turbines to conserve space.
P2c	Shoots Barrage	Sustainable Development Commission	2007	The SDC Research Report 3 provides detailed analysis of the Cardiff Weston (STPG) Barrage and the Shoots Barrage
P2d	B4 Shoots Barrage	Severn Tidal Power Feasibility Study	2010	The STPFS Options Engineering Report Volume 1 gives details of the B4 Barrage alignment that was derived from the original Hooker Barrage proposals (reference P2b).
P3 Severn Tidal Power Tidal Lagoon Proposals				
P3a	L3d Bridgwater Bay Lagoon	Severn Tidal Power Feasibility Study	2010	The STPFS Options Engineering Report Volume 1 gives details of the L3d Bridgwater Bay Lagoon alignment that was developed to be representative of tidal lagoon proposals in the Severn Estuary.
P4 Swansea Bay Tidal Lagoon (Tidal Lagoon Power plc 2011 to 2020) and Blue Eden derivative				
P4a	Swansea Bay Tidal Lagoon	Hendry Review	2014	The Hendry Review website has extensive information on the development of the Swansea Bay Lagoon.
P4b	National Infrastructure Planning Portal	Tidal Lagoon Power & Planning	2015	The National Infrastructure Planning Portal used to contain all the documents that formed the planning application for Swansea Tidal Lagoon, alongwith transcripts and audio of the DCO hearings. Only a summary of the decisions is now available directly from the site.

		Inspectorate		
P4c	Select Committee Inquiry	UK Parliament	2018	TLP submitted many previously confidential documents to the Joint Select Committee Inquiry in 2018 and they provide a significant reference point for financial / CfD information relating to the lagoon.
P4d	Government Response to Swansea Bay Tidal Lagoon	BEIS	2018	The Government response to TLP's CfD was relatively short but included a summary of their value for money analysis. It also served as the Government's response to the Hendry Review.
P4e	Blue Eden Swansea Lagoon	Swansea Council	2021	Most of the details available in the public domain are the press releases from Swansea Council, Swansea Labour Party and DST Innovations. Specific details on the tidal lagoon are not provided except in headline terms which indicate they are similar, if not identical to, TLP's proposals. The latest proposal supersedes the 2019 Dragon Energy Island concept.
P5 Tidal Lagoon Power Programme (TLP 2011 to 2016)				
P5a	Cardiff Tidal Lagoon	The Hendry Review	2016	The Hendry Review website provides a summary of information on the development of the Cardiff Lagoon.
P5b	Infrastructure Planning Portal	Infrastructure Planning Portal	2016	The Planning Inspectorate has published TLP's scoping documents for Cardiff Lagoon and the statutory consultee's responses.
P5c	Newport Tidal Lagoon	The Hendry Review	2016	The Hendry Review website provides a brief summary of the proposals for the Newport Tidal Lagoon.
P5d	Bridgwater Bay Tidal Lagoon	The Hendry Review	2016	The Hendry Review website provides a brief summary of the proposals for the Bridgwater Bay Tidal Lagoon.
P6 West Somerset Tidal Lagoon (TEES Ltd 2013 to date)				

P6a	West Somerset Tidal Lagoon	TEES	2021	The TEES web site provides summary details of the proposed West Somerset Lagoon. They have also provided a project dossier directly to Western Gateway which has been used as the primary information source. There is also a page on the Planning Inspectorates NSIPS website giving introductory correspondence.
P7 Shortlisted Severn Embryonic Technologies Projects (SETS)				
P7a	Minehead to Aberthaw Tidal Fence	Severn Tidal Power Feasibility Study	2009-10	The SETS programme was commissioned in 2009 and was a match funded programme awarding £500k to three organisations. The IT Power led consortium (STFC) submission comprised a tidal fence using conventional tidal stream technology between Aberthaw and Minehead.
P7b	Minehead to Aberthaw Low Head Tidal Bar	Severn Tidal Power Feasibility Study	2009-10	The Rolls Royce / Atkins submission to SETS comprised the initial design for a new type of turbine and tested it mathematically on two alignments - Aberthaw to Minehead and Cardiff to Weston. The original concept was based on Evans Engineering tidal reef design (see P9b) but was re-engineered by Atkins in their review of Evans' proposal commissioned by the RSPB.
P7c	Minehead to Aberthaw Venturi Fence	Severn Tidal Power Feasibility Study	2009-10	Verd Erg were the third organisation to submit proposals to SETS. Their design was for a low head Venturi Fence (in essence a permeable barrage that created a pressure difference either side of a Venturi Flume which was then used to drive a conventional hydropower turbine). They studied two alignments, this being between aberthaw and Minehead. The other between Cardiff and Weston is covered by P5e.
P7d	Cardiff to Weston Low Head Tidal Bar	Severn Tidal Power Feasibility Study	2009-10	This is the Rolls Royce / Atkins submission to SETS for the Cardiff to Weston alignment. See P7b.
P7e	Cardiff to Weston Venturi Fence	Severn Tidal Power Feasibility Study	2009-10	This is the Verd Erg proposals for a low head Venturi Fence (See P5c) between Cardiff and Weston.
P8 Severn Tidal Power Feasibility Study (STPFS) Unfeasible Short List Projects				

P8a	L2 Welsh Grounds Lagoon	Severn Tidal Power Feasibility Study	2010	The STPFS Options Engineering Report Volume 1 gives details of the L2 Welsh Grounds Tidal Lagoon alignment that was proposed by Fleming Energy in response to a Call for Proposals in 2008.
P8b	B5 Beachley Barrage	Severn Tidal Power Feasibility Study	2010	The STPFS Options Engineering Report Volume 1 gives details of the B5 Beachley Barrage alignment that was proposed to assess whether there were any benefits from siting a barrage upstream of the Severn / Wye confluence.
P9 Severn Tidal Power Feasibility Study (STPFS) Unsuccessful Long List Projects				
P9a	B1 Minehead to Aberthaw Tidal Barrage	Severn Tidal Power Feasibility Study	2008	Phase 1 of the STPFS covered a number of projects which were reported on in the January 2009 Interim Options Analysis Report (IOAR) authored by Parsons Brinckerhoff (now WSP). These and other relevant reports were published as part of the STPFS Phase 1 Consultation but are no longer available on-line. The projects listed in P9 were not shortlisted. This included a very large conventional barrage between Minehead and Aberthaw.
P9b	R1 Tidal Reef	RSPB / Atkins	2008	Evans Engineering submitted a proposal for a Tidal Reef, also described in the IOAR. The original design was reviewed independently by the RSPB who employed Atkins and their report is available on line - the original proposal is detailed here as the proposed modifications by Atkins matured into Projects P7b and P7d.
P9c	B2 Cardiff to Hinkley Point Barrage via Weston	Severn Tidal Power Feasibility Study	2008	This proposal, submitted by Shawater, was based on the STPG design for a conventional tidal barrage between Cardiff and Weston (see P1) but with an extended embankment that landed close to Hinkley Point. Shawater was dissolved in 2015 having run into financial trouble in 2012.
P9d	U1 Severn Lakes	Severn Lake Company	2008	This proposal is for a large 1km wide causeway between Cardiff and Weston incorporating the tidal turbines but also providing a structure for private development and leisure lakes. The owner of Severn Lakes continues to market the concept although it did not progress beyond Phase 1 of the STPFS. The IOAR summarised the details.
P9e	L3c Peterstone Flats Tidal Lagoon	Severn Tidal Power Feasibility Study	2008	This proposal was developed as a conceptual lagoon by the STPFS team to enable the effects of tidal lagoons to be studied and compared with the performances of tidal barrages. It is a tidal lagoon near Cardiff and had a slightly inferior performance to the Bridgwater

				Bay lagoon which was shortlisted and acted as the generic lagoon model.
P9f	L3a English Grounds Tidal Lagoon	Severn Tidal Power Feasibility Study	2008	This proposal was developed as a conceptual lagoon by the STPFS team to enable the effects of tidal lagoons to be studied and compared with the performances of tidal barrages. It is a tidal lagoon directly off Clevedon. It was inferior in performance to the Bridgwater Bay lagoon which was the lagoon selected to be shortlisted and act as the generic lagoon model.
P9g	F1 Minehead to Aberthaw Tidal Fence	Severn Tidal Power Feasibility Study	2008	This proposal was for a tidal fence comprising tidal stream turbines on an alignment between Aberthaw and Minehead. As costs were above £200/MWh, it was not shortlisted for further study but instead directed at the parallel Severn Embryonic Technologies Scheme (SETS) - see Programme P7.
P9h	U1 Cardiff to Weston Tidal Fence	Severn Tidal Power Feasibility Study	2008	This proposal was for a tidal fence comprising tidal stream turbines on an alignment between Cardiff and Weston. After initial study, amendments were made to locate it between Aberthaw and Minehead.
P9i	L3e Bridgwater Bay Offshore Lagoon	Severn Tidal Power Feasibility Study	2008	This proposal was developed as a conceptual lagoon by the STPFS team to enable the effects of offshore lagoons (promoted by Friends of the Earth at the time) to be studied and compared with land connected tidal lagoons. The IOAR found that it was more expensive than an equivalent land connected lagoon as it required longer and deeper lengths of marine wall.
P10 Hafren Power Severn Barrage				
P10a	Corlan Hafren Proposals	UK Parliament	2013	Evidence presented to the Select Committee Inquiry. There is also a presentation produced by Hafren Power (Severn Barrage Project - An Introduction - April 2013) which is not available on line.
P10b	Select Committee Inquiry Report	UK Parliament	2013	The Select Committee Inquiry Report on "A Severn Barrage" - their review of Hafren Power's proposals and the Government's Response
P10c	Review of Business Case for Bristol Port Company (confidential)	WSP	2013	A confidential report commissioned by the Bristol Port Company to review the Hafren Power Severn Barrage Business Case

P11 Stepping Stones Tidal Lagoon				
P11a	Stepping Stones Tidal Lagoon Conceptual Design	WSP	2014	Public Document outlining work undertaken by Parsons Brinckerhoff (now WSP) and Black & Veatch on the design of a conceptual tidal lagoon between Rhoose and Aberthaw aimed at overcoming some of the challenges identified by the STPFS.
P12 Great Western Power Barrage				
P12a	Great Western Power Barrage proposals	Great Western Power Barrage Team (no corporate entity)	2023	Web site proposal for a new tidal barrage between Lavernock Point and Hinkley Point.

Section 4: Other UK Tidal Range Project References

Reference No	Reference	Author	Date	Brief Description
West Coast				

4.1	Solway Firth Tidal Barrage	Mott Macdonald, Halcrow and RSK and Solway Energy Gateway	2009 to 2011	The Feasibility report is not available on line although a 2011 update from Solway Gateway is. The Report identified a number of potential tidal power projects and identified that the intermediate barrage between Southernness Point and Beckford offered the best rate of return, albeit with significant environmental challenges.
4.2	West Cumbria Tidal Lagoon	The Hendry Review	2016	The Hendry Review website provides a brief summary of their proposals for the West Cumbria Tidal Lagoon. Energy estimates are taken from the Hendry Review but estimates of cost are not available.
4.3	Duddon Estuary Tidal Barrage	Parsons Brinckerhoff (now WSP)	2010	Not available on line. Parsons Brinckerhoff (now part of WSP) prepared a feasibility report for Britain's Energy Coast on a tidal barrage / road / power crossing on the Duddon Estuary in 2010. BEC published the report on line but it has not been available on line for some time, possibly because the project proved not to be feasible due to land held in inalienable trust by the Nation Trust which would have been required for one of the landing points.
4.4	Morecambe Bay	Northern Tidal Power Gateway	2019	This is an update from the North West Chamber of Commerce providing some background to a proposal to form Northern Tidal Power Gateways Ltd (NTPG) with the intension of building tidal barrages across Morecambe Bay and the Duddon estuary, with dual carriageways connected to each other, either through or around Barrow-in-Furness, to the M6 in the south and to the A595 north of Millom.
4.5a	Wyre Barrage	Natural Energy Wyre	2016	Natural Energy Wyre was established as a successor organisation to Wyre Tidal Energy and developed proposals for a slightly larger projects than the original ETSU proposals studied by RES for Wyre Tidal Energy.
4.5b	Wyre Barrage	RES for Wyre Tidal Energy	2011	Not available on line. Parsons Brinckerhoff (now part of WSP) were asked to review the RES (Sir Robert McAlpine) report on the original ETSU proposals for a Wyre Barrage at Fleetwood.
4.6a	Mersey Barrage	Liverpool City Region Combined Authority	2022	Latest published update on the LCRCA's proposals for Mersey Tidal Power

4.6b	Mersey Barrage	WSP	2016	Confidential report produced for Peel Energy reviewing the costs and benefits from Peel Energy's original 2011 Proposals
4.6c	Mersey Barrage	Peel Energy	2011	Ocean Gateway's website giving details of Peel Energy's 2011 reports (no longer available on the internet).
4.6d	Mersey Barrage - Developments in Tidal Power	Various - published by ICE	1990	Proceedings of a meeting held at the ICE in November 1989. Papers 7 to 10, cover the Mersey Barrage.
4.7	Port of Mostyn Tidal Lagoon	Port of Mostyn	2020	A press release published on the Port of Mostyn web site describing their proposals for a tidal lagoon in the Dee Estuary.
4.8a	Colwyn Bay Tidal Lagoon	The Hendry Review	2016	The Hendry Review website provides a brief summary of their proposals for the Colwyn Bay Tidal Lagoon.
4.8b	North Wales Tidal Lagoon	North Wales Tidal Energy Website	current	The web site provides an overview of the proposals for a tidal lagoon spanning the North Wales coast from East of Llandudno to the Dee Estuary. The exact location and size has yet to be determined.
4.9a	The Wash (2008)	The Wash Tidal Barrier Corporation	2008	The Wash Tidal Barrier Corporation plc is a private company, founded by Cambridgeshire-based entrepreneur Peter Dawe specifically to promote and build a barrier. The Company is now dormant with no assets.
4.9b	The Wash (2023)	Centre Port Holdings	2023	The Centre Port website states annual energy production of 800GWh per year from an impounded area of 780sq km and presents a combined tidal power and container port facility across the Wash.

Section 5: UK Tidal Stream Project References

	Reference	Author	Date	Brief Description
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Reference No				
S1	EMEC Tidal Stream Test Site	EMEC	current	Established in 2003, the European Marine Energy Centre (EMEC) Ltd is the world's first facility for demonstrating and testing wave and tidal stream devices and energy converters. It is located in the Pentland Firth.
S2	Meygen Tidal Stream Development	SAE Renewables	2010	The MeyGen tidal stream energy project is owned by SIMEC Atlantis Energy Ltd. MeyGen was awarded an Agreement for Lease for the Inner Sound tidal development site in 2010 by The Crown Estate. The Inner Sound Agreement for Lease is for 398MW of installed tidal stream energy capacity and will be consented in two separate phases. Phase 1 has been consented and is sub-divided into 3 further phases
N1	Fair Head Tidal Stream Project	Fair Head Tidal (DP Marine Energy and BDME)	2011	The Project was awarded a Crown Estate licence in 2011 and construction was expected to start in 2018 but the project now appears dormant with no reference to it on the DP Energy website. However, the TCE subject matter expert confirms that there is still strong institutional support for tidal stream development at this location.
N2	Torr Head Tidal Stream Project	Northern Ireland Department for the Economy	2019	Project no longer being pursued following Open Hydro's corporate failure in 2019.
N3	Strangford Lough Demonstration Project	SEA Renewables	2008	Original 1.2MW tidal stream demonstration project commissioned in 2008, decommissioned in 2019
W1	Skerries Tidal Array	Tethys OES Environmental Metadata	2016	Withdrawn in March 2016 following SAE or Simec Atlantis' purchase of the original developer.
W2	Minesto - Holyhead Deep	Minesto	2021	Would share the land based grid connection with the Morlais development.

W3	Morlais - Holyhead	Menter Mon	2021	EIA completed and planning consent granted for the first stage. Habitat impacts are on land cable routes (<1km) and substation at Parc Cybi (for first stage) and Orthios 132kV grid connection point for the full development.
W4	Bardsey Island - Enlli Tidal	Nova Innovations	2023	Withdrawn in March 2023 due to lack of existing grid infrastructure on the Llyn Peninsula
W5	Ramsay Sound	Tethys OES Environmental Metadata	2012	The Ramsay Sound demonstration project was a limited time device test which is now completed. The site may be developed again in the future if a developer showed interest. Tidal Energy Ltd have been declared insolvent.
W6	META Test Site, Pembrokeshire	META Website	current	The META test site is not grid connected and has no current tidal devices in operation.
E1	Perpetuus Test Site	Perpetuus Web Site	current	Test site near Southampton for up to 30MW, JV with Orbital Marine for first 20MW, developing a build - own - operate delivery model (2023) for subsequent construction (2025 or later)
E2	Tidal Stream Potential Locations	Jan 2012 Cardiff University Paper by Kadiri, Ahmadian, Bockelman n-Evans, Falconer	2012	Potential Sites based on minimum current data per Cardiff University published paper (A review of the potential water quality impacts of tidal renewable energy systems Jan 2012, Margaret Kadiri, Reza Ahmadian, Bettina Bockelmann-Evans, Roger A. Falconer)

Section 6: International Tidal Energy Project References

Reference No	Reference	Author	Date	Brief Description
E1a	La Rance, Brittany, France	EdF	1967	EdF's information page on the 240MW tidal barrage at La Rance and its primary features

E1b	La Rance - 50 Years Operational Feedback - Lessons Learned BHA Conference 2009	EdF	2010	Not available on line. A document prepared by EdF's Vincent De Laleu describing 40 years of operation at La Rance.
E2	Oosterschelde Tidal Power project	OES Environmental	2015	Tocado began developing the Oosterschelde Tidal Power project in 2008 and in 2015 installed five T2 turbines (0.25MW each) onto a 50 meter long structure on the Eastern Scheldt Storm Surge barrier. Tocardo went into bankruptcy in 2019 but a joint venture of QED Naval and Hydrowing acquired them in 2020. Their operating licence for this project expires in 2030.
C1	BaiShakou Tidal Power Station	OES Environmental	1978	A 960kW tidal power plant on the Shandong Peninsula in China with 8 turbines built into a lagoon. It was developed in phases with the last four turbines being installed in 1987. It ceased operations in 2011.
C2	Jiangxia Pilot Tidal Power Plant	OES Environmental	1980	A 4.1 MW tidal power station with six bulb turbines installed in phases between 1980 and 2014. It is located in Yueqing Bay, East China Sea, near the city of Wenling, China.
C1	Annapolis Royal	OES Environmental	1984	The 20MW Annapolis Royal was the first tidal power station constructed in North America in 1984. In 2019, a vital component failed in the Strflo turbine / generator and decommissioning was started in 2021 because they could not achieve a fish licence necessary to undertake the replacement works.
C2	Open Hydro Tidal Stream Turbine, Bay of Fundy	Halifax Examiner News Report	2019	A 2MW Open Hydro tidal stream turbine installed in 2018 was abandoned in 2019 when Open Hydro was refused further funding by its parent company.
C3	FORCE	Fundy Ocean Research Centre for Energy	current	FORCE is Canada's lead research facility for tidal stream technology, created to better understand how this technology can play a role in Canada's clean energy future and help respond to climate change impacts (like ocean acidification, sea level rise, and coastal erosion). At its test site in Minas Passage, Bay of Fundy, FORCE provides offshore and onshore electrical equipment to connect devices to the power grid, and conducts monitoring and research to understand any potential environmental effects.
K1	Sihwa Tidal Energy Plant	OES Environmental	2011	The 254MW Sihwa tidal power plant was completed in 2011. It was installed on an existing impounding lake that had been constructed in 1994. It is the largest tidal power plant in the world.

K2	Uldolmok Tidal Power Station	OES Environmental	2009	The 1MW Uldolmok Tidal Current Power Pilot Plant produces tidal current energy using a cross-flow Helical Turbine (1 m diameter x 2.5 m length). It is located at a tidal stream test facility in South Korea in the Uldolmok Strait in the Yellow Sea, at Jindo Island.
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