



## DEBATE PACK

Number CDP 2016/0236, Debate day: 6 December 2016

# Tidal lagoons and UK energy strategy

This Debate pack has been prepared for the debate on the **Tidal lagoons and UK energy strategy** to take place in Westminster Hall on Tuesday 6 December 2016 at 2:30pm. The subject for debate has been chosen by Stephen Crabb, MP for Preseli Pembrokeshire.

The House of Commons Library prepares a briefing in hard copy and/or online for most non-legislative debates in the Chamber and Westminster Hall other than half-hour debates. Debate Packs are produced quickly after the announcement of parliamentary business. They are intended to provide a summary or overview of the issue being debated and identify relevant briefings and useful documents, including press and parliamentary material. More detailed briefing can be prepared for Members on request to the Library.

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# 1. Summary

This debate pack is about tidal lagoon energy which is a type of tidal range technology and is different from [tidal stream energy](#). The summary and press articles in this debate pack focus on tidal lagoons but also include some press coverage of tidal stream projects in Scotland and elsewhere in the UK.

Planning permission was granted to Tidal Lagoon Power for a tidal lagoon in [Swansea Bay](#) in June 2015. However, the company are still in negotiations with the Government about a strike price. It is unlikely to be agreed until the [Hendry Review of tidal lagoons](#), commissioned by the Government, is published. It is expected to be released by the end of the year.

## 1.1 The technology behind tidal lagoons

Tidal energy is created by the constantly changing gravitational pull of the moon and sun. It is a reliable source of energy because tides are predictable, and never stop. Tidal resources are at their best when there is a good tidal range and the speed of the current is amplified by the funnelling effect of the local coastline and seabed. Tidal devices work well in narrow straits and inlets, around headlands, and in channels between islands. A diagram showing the tidal flows involved in tidal lagoon technologies is available on [The Conversation](#).<sup>1</sup>

There are [different types of tidal energy](#): tidal stream energy and tidal range technologies such as tidal barrages and tidal lagoons. There have been suggestions of a tidal barrage in the Severn Estuary (the second highest tidal range in the world) for over thirty years. Projects for tidal lagoons in the UK are more recent and were deemed by some experts as a more economical, technically feasible and environment-friendly alternative to tidal barrages<sup>2</sup>, though this view is not universal<sup>3</sup>.

### How does a tidal lagoon work?

A tidal lagoon generates electricity twice in one tide – once when the tide is coming and once when it is going out.

A diagram from the Sustainable Development Commission illustrates tidal lagoon technology is available on [BBC News](#).<sup>4</sup> They work in a similar way from barrages by “capturing a large volume of water behind a man-made structure, which is then released to drive turbines and generate electricity.”<sup>5</sup>

As summarised by Carbon Brief:

The movement of the tide in or out means that a difference in water levels builds up in the lagoon, compared to the water

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<sup>1</sup> ‘How lagoon power works’, George Aggidis, published in The Conversation, [‘How artificial lagoons can be used to harvest energy from the tides’](#), 5 March 2015

<sup>2</sup> Carbon Brief, [‘A rough guide to tidal lagoons’](#), 7 February 2014

<sup>3</sup> RSPB, [‘What are we doing about tidal lagoons? – guest blog by Dr Sean Christian, RSPB Cymru’](#), 19 May 2015

<sup>4</sup> BBC News, [‘The ebb and flow of tidal power’](#), 12 June 2008

<sup>5</sup> Tidal Lagoon Power, [Tidal Technology](#), accessed 1 December 2016

around it, in much the same way as a man-made lock on a river does. Once the difference is big enough, sluice gates are opened – allowing water to rush through the gaps, turning big turbines installed underwater. The rotating turbines generate electricity.<sup>6</sup>

## 1.2 The potential for tidal lagoon energy in the UK

### The Swansea Tidal Lagoon project

On 9 June 2015 planning consent was given for what the Government described as ‘the world’s first Tidal Lagoon’ for generating energy in Swansea Bay. The application, made by Tidal Lagoon Power (TLP), was to construct a man-made, 240MW (megawatt) tidal Lagoon, averaging 14 hours of generation every day.<sup>7</sup>

### Potential benefits

Tidal range technologies are still at an early stage of development and deployment is yet to begin. The Severn barrage plan was fiercely opposed by wildlife charities like [RSPB](#) and criticised in an Energy and Climate Change Committee report which concluded that the case for the ‘economic, environmental and technological viability of the project’ was ‘unproven’.<sup>8</sup> The project was eventually dropped.

The main obstacles to tidal lagoon technology deployment are financial and political. Some have estimated that the technology has the potential grow; the Centre for Economics and Business Research (CEBR) estimated that

A fully operational tidal lagoon infrastructure industry (as represented by the six proposed lagoons) could produce as much as 8% of the UK’s electricity needs – enough to power 7.9 million homes.<sup>9</sup>

The same research found that up to 6,400 jobs could be created in the UK to operate and maintain the [six lagoons](#) that Tidal Lagoon Power Ltd plans to build. Benefits expected from the Swansea Bay lagoon itself include the creation of over 2,800 construction jobs as well as up to 40 permanent roles in tourism related industries. Overall the construction of multiple lagoons could boost investment and GDP according to the research,

The same research suggested 30 TWh of electricity per year could be generated for 120 years (the lagoon’s lifespan), which could help reduce fossil fuel imports by £0.5 billion by 2030 and reduce the UK’s annual emission target by 0.9%.<sup>10</sup>

<sup>6</sup> Carbon Brief, [‘A rough guide to tidal lagoons’](#), 7 February 2014

<sup>7</sup> Department of Energy and Climate Change, [Swansea Bay Tidal Lagoon project gets green light on planning](#) 9 June 2015

<sup>8</sup> Energy and Climate Change Committee, [A Severn Barrage?](#), 21 May 2013, Vol. I, para.117

<sup>9</sup> Centre for Economics and Business Research, [The Economic Case for a Tidal Lagoon Industry in the UK](#), July 2014, p.10

<sup>10</sup> Ibid.

Research from The Crown Estate reached more conservative conclusions and found that tidal lagoons could generate up to 25 TWh per year.<sup>11</sup> This is enough to supply around 12% of UK electricity demand (at 2013 levels) according to the Government.<sup>12</sup>

Due to the predictable pattern of tides, tidal lagoon technology is also hailed as a way to increase UK energy security with a reliable supply of energy that does not suffer from meteorological conditions like wind or solar power.<sup>13</sup>

Tidal Lagoon Power recently produced a new analysis that claims that the lifetime cost of Swansea Bay tidal lagoon would be the same as Hinkley Point C's (£25.78/MWh).<sup>14</sup>

### Financial challenges

The strike price and the investment costs have both been cited as challenges to the deployment of tidal lagoons in the UK.

Construction of the Swansea Tidal Lagoon would be a major infrastructure project with overall estimated costs for the project of £1 billion. Funding has been and is being sought from private investment.

The project also requires subsidy from the Government in the shape of a strike price<sup>15</sup> under the Contracts for Difference scheme.<sup>16</sup> In 2014, the company Tidal Lagoon Power initially argued that it needed a strike price of £180 per MWh for 90 years.<sup>17</sup>

It then requested a strike price of £168/MWh for 35 years (still far above that of other forms of renewable energy or Hinkley Point's £92.50).<sup>18</sup>

It was reported that the Government rejected this price, which led the energy firm to ask for £96.50/MWh.<sup>19</sup>

A strike price and contract has yet to be agreed with the Government. On 10 February 2016, the Government announced an independent review into the feasibility of Tidal Lagoon energy in the UK. Originally it

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<sup>11</sup> The Crown Estate, [UK Wave and tidal key resource areas project – Summary report](#), October 2012

<sup>12</sup> Department for Energy and Climate Change, [Guidance – Wave and tidal energy: part of the UK's energy mix](#), 22 January 2013

<sup>13</sup> Centre for Business and Enterprise Research, [The Economic Case for a Tidal Lagoon Industry in the UK](#) July 2014

<sup>14</sup> reNEWS, [‘Lagoon cost ‘same as Hinkley’’](#), 11 July 2016

<sup>15</sup> Contracts for Difference (CfD) work by fixing the prices received by low carbon generation, reducing the risks they face, and ensuring that eligible technology receives a price for generated power that supports investment. CfDs also reduce costs by fixing the price consumers pay for low carbon electricity (known as the **strike price**). This requires generators to pay money back when electricity prices are higher than the strike price, and provides financial support when the electricity prices are lower. For more information, see House of Commons Library, [Energy Policy Overview](#), 23 June 2016.

<sup>16</sup> Department for Business, Energy and Industrial Strategy, [Electricity Market Reform: Contracts for Difference](#), 26 February 2015. More information on Contracts for Difference can be found in the House of Commons Library note on [Energy Policy Overview](#).

<sup>17</sup> The Times, [‘Giant lagoon to generate power and pleasure’](#), 7 February 2014

<sup>18</sup> BBC News, [Swansea Bay's £1bn tidal lagoon hit by delay](#) 2 October 2015

<sup>19</sup> Financial Times, [‘Tidal power’s potential faces a review as £1bn lagoon stalls’](#), 9 February 2016

said the review was expected to report in autumn 2016.<sup>20</sup> However it is yet to report.

## Political concerns

The Government had expressed some concerns about the value for money of tidal range technologies in the Severn estuary (where the Swansea tidal lagoon project is located):

The 2-year cross-government Severn tidal power feasibility study could not see a strategic case for public investment in a Severn tidal scheme in the immediate term, though private sector groups are continuing to investigate the potential.<sup>21</sup>

Nevertheless, Tidal Lagoon Power obtained planning permission for this project in June 2015 (see below). The Government submitted it to [review](#) in February 2016 on the basis that more work needed to be done to understand how cost-effective this technology could be for the UK energy mix. The results of the Hendry review are expected to be published before the end of the year. This is covered in section 4 of this debate pack.

In a Written Statement on 5 October 2016, the Welsh Government set out its position on the Swansea Bay Tidal Lagoon, Ken Skates, Cabinet Secretary for Economy and Infrastructure said:

[Extract]

Our commitment to renewable energy projects, including tidal lagoons, is set out in our new Programme for Government, "[Taking Wales Forward](#)". We support tidal lagoons because they provide an opportunity to grow a vibrant Welsh industry that delivers prosperity aims in parallel with directly delivering against our decarbonisation commitments.

The energy sector is a key sector for the Welsh economy based on our natural resources, the long tradition of generation and a pipeline of major future investment. This includes the first of Tidal Lagoon Power's projects, Swansea Bay Tidal Lagoon, which is estimated to create 1,900 jobs during construction with significant opportunities to develop supply chains for the wider community.

We have been engaging with Swansea Bay Tidal Lagoon for a number of years across a range of areas and we continue to do so during the current Hendry Review, the UK Government's Independent Review of tidal lagoons, to ensure Welsh businesses and the local economy gain maximum benefit. We are servicing this important project in a cross-government manner and have already provided support on a range of areas including skills and the supply chain.

The tidal lagoon has the support of the Swansea Bay City Region Board and other partners in the region who recognise the potential value of the project to Swansea, the Swansea Bay City Region and Wales as a whole.

Whilst I recognise the project requires a number of agreements yet to be reached, I am excited at the prospect of placing Wales at

<sup>20</sup> Department of Energy and Climate Change, [Review of Tidal Lagoons](#) 10 February 2016

<sup>21</sup> Department for Energy and Climate Change, [Guidance – Wave and tidal energy: part of the UK's energy mix](#), 22 January 2013

the forefront of the development of a tidal range sector across the UK.<sup>22</sup>

In the Westminster Hall debate on 8 March 2016, the Minister of State at DECC set out the UK Government position as follows:

[Extract]

Let me be clear that this Government continues to recognise the potential for the deployment of tidal lagoons in the UK. The scalability of the technology is of genuine interest to us. We are attracted to the proposed Swansea bay tidal lagoon because of its potential to unlock larger, more cost-effective developments elsewhere in the UK.

There is speculation, following recent announcements, that this Government have kicked the project into the long grass. The simple truth is that the developer's current proposal for a 35-year contract is too expensive for consumers to support, and the deliverability of the wider lagoon programme is too uncertain at this point.

In parallel, there will be an independent review to assess the strategic case for tidal lagoons and whether they could represent good value for consumers.

The Government have already requested a supply chain plan and map from the developer. We are very pleased that the UK content of the project is likely to be up to 65% and that the Welsh content is likely to be about 50%.<sup>23</sup>

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<sup>22</sup> Welsh Government Written Statement [Swansea Bay Tidal Lagoon](#) 5 October 2016

<sup>23</sup> 08 Mar 2016 | House of Commons | [607 cc65-91WH](#)

## 2. Press articles

The following is a small selection of recent press and media articles relevant to this debate. Please note: the Library is not responsible for the views expressed in, nor the accuracy of, external content.

### **Tidal lagoons**

#### **A crazy tidal scheme re-emerges from the deep**

The Telegraph, November 26, 2016

<http://www.telegraph.co.uk/news/2016/11/26/crazy-swanea-bay-tidal-scheme-has-re-emerged-deep/>

#### **Once we were a sea power - now let's harness the power of the sea**

The Daily Telegraph, November 1, 2016

<http://www.telegraph.co.uk/news/2016/11/01/britain-has-always-been-sea-power---now-lets-harness-the-power-o/>

#### **Give support to Swansea Bay tidal lagoon project, government told**

The Guardian, May 5, 2016

<https://www.theguardian.com/politics/2016/mar/10/swanea-bay-tidal-lagoon-energy-project-hinkley-point-wales>

#### **Tidal lagoon energy review to give 'clarity'**

BBC, 10 February 2016

<http://www.bbc.co.uk/news/uk-wales-politics-35541862>

#### **Swanea Bay tidal lagoon - what does the Government's review mean for the project?**

Wales Online, 10 February 2016

<http://www.walesonline.co.uk/business/business-news/swanea-bay-tidal-lagoon-what-10870949>

#### **Swanea Tidal Lagoon project faces delays**

The Guardian, 2 October 2015

<http://www.theguardian.com/environment/2015/oct/02/swanea-tidal-lagoon-project-faces-delays>

### **Swansea Bay tidal energy scheme wins planning permission**

The Guardian, 9 June 2015

<http://www.theguardian.com/business/2015/jun/09/swansea-bay-tidal-energy-scheme-on-brink-of-winning-planning-permission>

### **Other tidal schemes**

#### **Scottish mainland gets electricity from tidal power for first time**

The Independent, November 17, 2016

<http://www.independent.co.uk/news/uk/home-news/electricity-scotland-mainland-generated-first-time-tidal-power-renewables-energy-a7419421.html>

#### **EU plans euro 320m funding boost for budding ocean energy industry**

The Guardian, November 9, 2016

<https://www.theguardian.com/environment/2016/nov/09/eu-plans-320m-funding-boost-for-budding-ocean-energy-industry>

#### **The day Scotland quietly ushered in an energy revolution;**

The Independent, October 18, 2016

<http://www.independent.co.uk/environment/the-day-scotland-quietly-ushered-in-an-energy-revolution-a7366891.html>

#### **Wave power first as Scots turbines feed the National Grid**

The Daily Telegraph, August 30, 2016

<http://www.pressreader.com/uk/the-daily-telegraph/20160830/281844348063999>

#### **Shelved £70m Anglesey tidal project could power up again**

Daily Post, 29 April 2015

<http://www.dailypost.co.uk/business/business-news/shelved-70m-anglesey-tidal-project-9142798>

#### **£70m tidal power scheme off Anglesey is suspended**

BBC online 1 September 2014

<http://www.bbc.co.uk/news/uk-wales-north-west-wales-29023425>

### 3. Press releases

#### **Tidal Lagoon Power**

[Tidal Lagoon Sector worth over £70 Billion to UK Industry](#)

3 Oct 2016

Tidal Lagoon Power today launches 'Ours to Own', a report on the scale of the British industrial opportunity as presented by tidal lagoons, available [here](#). The company has at the same time launched a tender for the design and construction of a new £22m Turbine Manufacturing & Pre-Assembly Plant in Swansea Bay, to be the beating heart of a Made in Britain tidal lagoon turbine industry.

Swansea Bay Tidal Lagoon has been brought forward as a pathfinder project for UK and international tidal lagoons at full-scale. Tidal Lagoon Power has over five years worked with the supply chain to write Welsh and British industry into the DNA of this new global market from the outset.

Ours to Own sets out how Britain's first mover advantage in the production of major components for tidal lagoon turbines, generators and turbine housings at Swansea Bay can be sustained and grown as the tidal lagoon sector scales in the UK and worldwide.

"British industry sees a number of attractions in tidal lagoons – predictable energy generation to maintain security of supply, the potential for long term cost reduction with deployment at scale, and significant opportunities for British manufacturing during construction", comments Jeremy Nicholson, Director, Energy Intensive Users Group.

The immediate opportunity is for the UK's engineering, construction, steel and manufacturing industries to win contracts totalling over £800m at Swansea Bay and over £6bn for the first project to employ its template at full-scale at Cardiff.

In addition to significant value captured through project design, services and operations, as well as more than half a billion pounds of investment in new UK industrial facilities, the report finds the potential value of the tidal lagoon sector to UK industry to be:

Domestic market for Made in Britain tidal lagoon turbines and generators = £17bn

Domestic market for Made in Britain tidal lagoon turbine housings = £24bn

Exports to international tidal lagoon market = £30bn

"This report captures the hard work of today's industrialists to ensure tidal lagoons are British-engineered, that the manufacturing supply chain is British, and that we seize and own what can be a seventy billion pound sector for this nation. It is an extraordinary opportunity, explains Mark Shorrocks, Tidal Lagoon Power's chief executive.

"180 years ago Brunel built the Great Western Railway and we still celebrate that British manufacturing and engineering success today. A

roll out of tidal lagoons will be of equally significant scale and will also benefit our country for over a century”.

“It is a textbook case”, says Roger Evans MBE, Chair of the independent Tidal Lagoon Industry Advisory Group. “We have the natural resource, we need the power and we have the manufacturing skills to take on the challenge ourselves. A huge domestic market creates the ideal conditions for standardisation and mass manufacture, giving the UK a competitive edge on the world stage.”

“Perhaps the most appealing aspect of this plan is that it zooms in on those hard-to-reach corners of the Welsh and national economy”, says Robert Lloyd Griffiths OBE, Director, Institute of Directors, Wales.

The 100m long Turbine Manufacturing & Pre-Assembly Plant will be located between the Kings and Queens Dock at Swansea Bay, following a competitive tender of potential locations for the facility last year. The facility will receive major turbine components from manufacturers across Wales and wider Britain, with all machining and pre-assembly of the sixteen 7.2m runner diameter turbines required by the pathfinder tidal lagoon taking place on site. The facility, future proofed for exponential market growth, will initially employ up to 100 skilled workers, with an additional 150 project workers accommodated in an onsite office welfare area. Further tender details are available at [www.sell2wales.gov.wales](http://www.sell2wales.gov.wales) .

## **Department of Energy & Climate Change**

### [Head of Independent Review of Tidal Lagoons announced](#)

6 May 2016

The Independent Review of Tidal Lagoons will be led by industry expert Charles Hendry, supported by a team of seconded civil servants.

The Independent Review of Tidal Lagoons will be led by industry expert Charles Hendry, supported by a team of seconded civil servants.

Charles Hendry brings a wealth of experience to the role. He was Minister of State for Energy from May 2010 until September 2012. Since leaving ministerial office Charles Hendry has undertaken a wide range of roles, including as President of the British Institute of Energy Economics, chair of the Forewind Consortium from 2013-2015, and Commissioner of the UK Pavilion at the Future Energy Expo in Kazakhstan 2017.

The review will assess the strategic case for tidal lagoons and whether they could play a cost effective role as part of the UK energy mix. The review will also help establish an evidence base to ensure all decisions made regarding tidal lagoon energy are in the best interest of the UK. Its findings are expected to be announced in the Autumn.

The terms of reference for the review were made public in the announcement of the review on [10 February](#).

**Department of Energy & Climate Change**[Review of Tidal Lagoons](#)

10 February 2016

Today, Wednesday 10 February the Government announced an independent review into the feasibility and practicality of tidal lagoon energy in the UK.

Tidal lagoons have the potential to provide the country with clean and secure energy. Whilst progress has been made to understand this technology, more work needs to be done to determine whether they present value for money. In recognition of this, we have commissioned a review of the technology to improve our understanding of how tidal lagoons could contribute to the future of the UK's energy mix in the most cost effective way.

The review will commence this spring and it will help establish an evidence base to ensure all decisions made regarding tidal lagoon energy are in the best interest of the UK.

We expect that Tidal Lagoon Power, the proposed developers of Swansea Bay Tidal Lagoon, and other industry stakeholders will take part in the review while discussions about Swansea Bay Tidal Lagoon continue.

*Energy Minister Lord Bourne commented:*

Tidal Lagoons on this scale are an exciting, but as yet an untested technology. I want to better understand whether tidal lagoons can be cost effective, and what their impact on bills will be - both today and in the longer term.

This review will help give us that clarity so we can determine what role tidal lagoons could have as part of our plans to provide secure, clean and affordable energy for families and businesses across the country.

The review will consider:

- An assessment of whether, and in what circumstances, tidal lagoons could play a cost effective role as part of the UK energy mix;
- The potential scale of opportunity in the UK and internationally, including supply chain opportunities;
- A range of possible structures for financing tidal lagoons;
- Different sizes of projects as the first of a kind;
- Whether a competitive framework could be put in place for the delivery of tidal lagoon projects.

This review will take place in consultation with the relevant Government departments – in particular DECC and HMT for financial aspects.

Further information about the review will be set out shortly.

## **The Project**

### [Tidal Lagoon Swansea Bay](#)

[Accessed 17 February 2016]

Our aim is to create a power plant that provides something positive for everyone who lives in the vicinity of Swansea Bay. We hope that the lagoon will be viewed and used as a core local amenity and tourist attraction. We have a strategy for it to become an art and cultural icon and major Welsh recreation and sports centre. Besides renewable energy generation our plans for the lagoon include:

#### *Recreation and tourism*

Cycle paths and promenade walkways.

Recreational fishing opportunities, including platforms and wall access.

Visitor Centre to cater for the estimated 70 to 100,000 visitors per year.

#### *Sports*

Sports training facilities for local and national use.

National and international sporting events in sailing, open water swimming, triathlon and rowing.

#### *Education and art*

Education programmes and resources to help young people develop their skills and knowledge around environmental themes.

An arts programme to create a forum for artists, scientists and communicators to stimulate the production of local community art.

#### *Job creation*

Up to 1,900 jobs will be created and sustained during the construction of the lagoon

About 35 jobs will be created in quarrying stone for the seawall

Approximately 31 permanent jobs will be created in operations and maintenance

Approximately 50 permanent jobs will be created in the visitor facilities.

#### *Will this help the coastal regeneration plans for South Wales?*

The Project holds the potential to form a cornerstone development of the Swansea Bay City Region and to stimulate a vibrant waterfront economy. Our ambition is that the substantial lagoon investment will bring positive regeneration benefits to Swansea Bay and South Wales.

The Non-Technical Summary of the Environmental Statement provides basic information on all elements of the Environmental Impact Assessment including the issues above. Detailed information on this assessment is provided in Chapter 22 of the Environmental Statement, Economy, tourism and recreation, available [here](#).

*How much will the Project cost?*

The Project will cost £20 million to achieve a development consent order, with an overall project cost of about £1 billion to achieve construction and connection to the national grid.

*Who is funding the Project?*

Private investment will be used to develop the tidal lagoon. Equity shareholders in the development phase include the local community, Tidal Lagoon Power staff members, high net worth individuals and corporations (including Prudential). Further information on the investment opportunity is available [here](#).

*How will it affect my electricity bill?*

One of the Project's objectives is to enable a low cost, locally generated, electricity tariff for residents around the Bay area. Given existing legislation this is not straightforward to achieve, but it is one of our main goals, and a precedent has been set for cheaper energy for homes within a set radius of a wind farm in Cornwall. We are exploring how we can follow this lead within current and proposed legislation.

*Are you supported by a government incentive scheme?*

Tidal range technologies (including tidal lagoons) are able to apply for a Contract for Difference (CfD), which is this Government's mechanism for supporting low carbon power generation. For more information about the economics of tidal lagoons, watch a video based upon a study by consultants, Poyry, [here](#).

*Can I invest in the development?*

Later this year we hope to be able to offer securities to the general public as part of the construction phase financing in line with our proven commitment to offer community ownership.

**Cardiff University**[Swansea Bay Tidal Lagoon](#)

4 December 2013

The Swansea Bay Tidal Lagoon could generate a £300M spend in Wales, create 1850 jobs and support the creation of £173M of gross value added for Wales within its three year development phase.

That's according to a new report published by the University's Welsh Economy Research Unit, Cardiff Business School on the economic effects associated with the construction, development and operational stages of the Lagoon.

Key findings include:

- A capital investment of £756M of which £300M will be spent in Wales (40%);
- Potential additional output in Wales of £454M and £173M GVA in the three year development phase;
- Over £5M annual local spend during the operational phase;

- A further potential £1.5M-2.1M per annum GVA to be achieved through associated leisure opportunities;
- Approximately 5540 person years (1850 FTE) of diversely-skilled employment in Wales during the three year construction period;
- Creation of 60 long term operational jobs and up to 90 additional jobs linked to visitor spending.

Led by Professors Calvin Jones and Max Munday, the economic effects assessment is based on a model developed by the University to track the existing and potential economic impacts for Wales of different electricity generation technologies.

The proposed Swansea Bay Tidal Lagoon will be the world's first, purpose-built, tidal energy lagoon, capable of generating predictable, renewable electricity for over 120,000 homes for over 120 years.

It also aims to create jobs, support onshore regeneration, promote tourism, and even foster art, sport and healthy living.

Professor Jones said: "We estimate that the £300M of regional spending evenly spread over a three year development period starting in March 2015 will result in a total of an additional £454M of additional output in Wales. This means for every £1M spent in the region, an estimated further £0.52M of economic activity is supported. Around half of this, almost £223M, is in the construction sector, with manufacturing and production the next largest portion at £170m. We estimate around £34M of output in financial and professional services would be supported, largely comprising project management, planning and engineering activities."

Professor Munday added: "The focus of job creation and support in manufacturing and construction sectors is important in the context of current challenges facing the Swansea Bay and Welsh economies. In the Swansea case economic inactivity rates are relatively high at 29%, and with nearly 5,000 Job Seekers Allowance claimants in September 2013. In Wales as a whole, following the recession, manufacturing employment has fallen by over 40,000 people and with around 30,000 jobs lost in the construction sector. There are connections between jobs losses in the two sectors with poor performance in terms of construction output linking through to lower demands placed on elements of the manufacturing sector. Larger strategic projects such as Tidal Lagoon Swansea Bay integrating construction demand with local manufacturing inputs and new industry will be an important means of strengthening prospects in these important parts of the regional economy.

"Furthermore, it is important to note that Tidal Lagoon Swansea Bay is first of an expected network of projects and construction and manufacturing employment connected with this first build could possibly be used in future lagoon builds in Wales and elsewhere. In addition to this, Tidal Lagoon Swansea Bay will continue to have economic and employment benefits over the many decades of its operational lifespan."

Mark Shorrocks, Chief Executive Officer, Tidal Lagoon Swansea Bay explains: "Swansea Bay will be the first in a series of developments in Wales and the wider UK such that supply infrastructure developed as part of this project could gain additional opportunities in the long term in serving a wider network of lagoon projects. We want to see a minimum 50% of Welsh content for our first tidal lagoon and will work with Welsh industry to ensure that the region capitalises on its first-mover advantage to serve subsequent tidal lagoon developments."

"We want to see the Swansea City region become the Supply Chain Hub for all tidal lagoons and are working up plans for a large scale assembly facility in the Swansea City Region. We want to build excellence in marine construction of turbine housings and secure all critical components for hydro turbines in the UK with the majority from Wales. We also want to build part of the generators in Wales. We have assembled a best-in-class consortium of UK and international industrial businesses to establish local production facilities and supply chains to serve Tidal Lagoon Swansea Bay and future developments. We are confident from our work so far with representatives of Welsh industry that Wales has the skills base, experience and scalability to serve a larger UK tidal lagoon industry."

## 4. Parliamentary materials

The following is a selection of recent business relevant to this debate. To search for more parliamentary business relating to this, or any other topic, please use Parliamentary Search.

### **Parliamentary Questions**

#### [Swansea Bay Tidal Lagoon Project](#)

**Asked by:** Mr Williams

I thank the Minister for that response. He knows, I am sure, how important the project is to Swansea bay and Wales, and it's potential for very good news for the renewable sector across the UK. Despite the somewhat gloomy timetable—the end of the year, the Minister says—does he anticipate that the Hendry review will give the Government the assurances that they need to deliver their manifesto promise and proceed with a pioneering project that is critical to the south Wales economy and the future of the UK energy mix? In short, can we get on with it?

**Answering member: Jesse Norman | Business, Energy and Industrial Strategy**

I am grateful to the hon. Gentleman for that helpful clarification at the end. It is widely understood that there is support for the project among many colleagues. The Government have received an early draft, but we await receipt of the final report, which is due by the end of the year. We will give it the careful consideration that such an important issue deserves.

**08 Nov 2016 | Oral answers to questions | House of Commons | 616 c1384**

#### [Tidal Power: Swansea Bay](#)

**Asked by: Mullin, Roger**

To ask the Secretary of State for Business, Energy and Industrial Strategy, what assessment he has made of the value for money case for Swansea Bay Tidal Lagoon; and whether that assessment has been shared with the Hendry Review team.

**Answering member: Jesse Norman | Department for Business, Energy and Industrial Strategy**

The Department's assessment as to whether the Swansea Bay Tidal Lagoon can be considered to be value for money is currently underway. No assessment has been provided to the Hendry Review team.

**02 Nov 2016 | Written questions | House of Commons | 50847**

[Tidal Power: Swansea Bay](#)**Asked by:** Kinnock, Stephen

To ask the Secretary of State for Business, Energy and Industrial Strategy, when he plans to announce a decision on the Swansea Bay Tidal Lagoon.

**Answering member: Jesse Norman | Department for Business, Energy and Industrial Strategy**

We will consider the findings of the independent review of tidal lagoons, which is due to report by the end of 2016, before deciding how to proceed.

**02 Nov 2016 | Written questions | House of Commons | 50103**

**Asked by: West, Catherine**

To ask the Secretary of State for Business, Energy and Industrial Strategy, what level of funding his Department has allocated to schemes that encourage investment in tidal energy in each of the last five years.

**Answering member: Jesse Norman | Department for Business, Energy and Industrial Strategy**

Over the past five years, solar photovoltaic (PV), wind, wave and tidal electricity projects have received support from either the Renewables Obligation (RO) or the Feed-in Tariff (FITs).

Expenditure through the Renewables Obligation in 2011/12 to 2015/16 can be broken down by power generation technology shown in the table (£million in nominal prices). Solar PV and some small-scale onshore wind are also supported by the Feed In Tariff scheme, but costs are not available disaggregated by technology. Total support is shown below (£million).

**Expenditure on Renewables Obligation (RO) and Feed-in Tariffs (FITs) £ million**

	2011/12	2012/13	2013/14	2014/15	2015/16
Onshore wind	482.6	557.1	755.6	786.8	803.0
Offshore wind	371.1	698.5	988.7	1108.0	1429.7
Solar PV	0.1	0.9	34.9	133.9	264.8
Wave & Tidal	0.1	0.4	0.4	0.1	0.2
<b>TOTAL RO</b>	<b>1457.7</b>	<b>1991.3</b>	<b>2599.3</b>	<b>3114.2</b>	<b>3743.2</b>
<b>TOTAL FITs</b>	<b>151.0</b>	<b>506.0</b>	<b>691.0</b>	<b>866.0</b>	<b>1110.0</b>

*Renewables Obligations: Source Ofgem:*

[www.ofgem.gov.uk/environmental-programmes/ro/contacts-publications-and-data/publications-library-renewables-obligation](http://www.ofgem.gov.uk/environmental-programmes/ro/contacts-publications-and-data/publications-library-renewables-obligation)

[www.ofgem.gov.uk/publication-and-updates/renewables-obligation-ro-annual-report-2014-15](http://www.ofgem.gov.uk/publication-and-updates/renewables-obligation-ro-annual-report-2014-15)

[www.renewablesandchp.ofgem.gov.uk/Public/ReportManager.aspx?ReportVisibility=1&ReportCategory=0](http://www.renewablesandchp.ofgem.gov.uk/Public/ReportManager.aspx?ReportVisibility=1&ReportCategory=0)

*FITs: Source Ofgem:*

<https://www.ofgem.gov.uk/environmental-programmes/fit/contacts-guidance-and-resources/public-reports-and-data-fit/levelisation-reports>

The Contracts for Difference Scheme opened for delivery from 2015/16 onwards. No projects started deploying in 2015/16 so no payments were made.

**18 Oct 2016 | Written questions | House of Commons | [47450](#)**

### [Water Power](#)

**Asked by: Gardiner, Barry**

To ask the Secretary of State for Energy and Climate Change, if her Department will maintain the 2014 commitment to ring-fence spending through the Contracts for Difference (CfD) for 100MW of marine energy in the UK and make the full 100MW available to developers during the 2016 CfD auction process.

**Answering member: Andrea Leadsom | Department for Energy and Climate Change**

In July 2014 the Government announced a 100MW minimum for wave and tidal stream technologies, including capacity from both the Renewables Obligation and Contracts for Difference, to the end of the first Delivery Plan period in 2019.

During the Budget on 16 March 2016, the Government announced the budget for CfD auctions this Parliament and that the Contract for Difference allocation round, planned to open later in 2016 will be available for projects with a Target Commissioning Window starting in the 2021/22 delivery year. We will be publishing further details in relation to the next allocation round, including on strike prices and whether there will be any minimum allocation later for wave and tidal stream technologies in due course.

**26 May 2016 | Written questions | House of Commons | 37477**

### [Tidal Power](#)

**Asked by: Hanson, Mr David**

To ask the Secretary of State for Energy and Climate Change, what assistance she plans to provide for the development of tidal stream power technology.

**Answering member: Andrea Leadsom | Department for Energy and Climate Change**

That the UK has deployed the world's first commercial scale tidal stream turbine MCT SeaGen, a 1.2MW project.

The world's first multi-turbine tidal stream array, MeyGen 1A, received £10m in DECC innovation funding and will be deployed in the UK this year. We are looking at what more we can do to support these developing technologies.

**12 May 2016 | Written questions | House of Commons | 905007**

[Tidal Power](#)**Asked by: Sturdy, Julian**

To ask the Secretary of State for Energy and Climate Change, what plans her Department has to consider the potential of other tidal energy technologies as part of its review of tidal lagoon technology.

**Answering member: Andrea Leadsom | Department for Energy and Climate Change**

The independent review, which Government announced on 10 February, will focus exclusively on tidal lagoons. It will not extend to other forms of tidal technology such as barrages or tidal stream arrays.

In October 2010, the Department published the results of the *Severn Tidal Power: Feasibility Study*. The review concluded it did not see a strategic case for public investment in a tidal barrage in the Severn estuary, but the outcome of the feasibility study did not preclude a privately financed scheme. This conclusion still stands

Tidal stream technologies operate on a fundamentally different basis to tidal lagoons. It would not, therefore be appropriate to include them within the scope of the review.

**03 Mar 2016 | Written questions | House of Commons | 28929**

[Tidal Power: Swansea Bay](#)**Asked by Baroness Featherstone**

To ask Her Majesty's Government when they expect work to commence on the Swansea Bay Tidal Lagoon.

**Answered by Lord Bourne of Aberystwyth | Department for Energy and Climate Change**

On 10 February the Government announced that it will commission an independent review to assess the strategic case for tidal lagoons and whether they could represent good value for consumers. We anticipate that the review will be completed in the autumn.

The Government is currently in the first phase of a Contract for Difference negotiation with the developer of the proposed Swansea Bay tidal lagoon project. At present there is no timeframe for how long the negotiation process may take. The timeframe depends on a number of factors, many of which would be outside the control of the Department.

The work programme and the construction timetable for the proposed lagoon are matters for the developer.

**10 Feb 2016 | Written question | House of Commons | [HL5656](#)**

**Swansea Tidal Lagoon** [[HC Deb 13 Jan 2016 c 848-49](#)]

**Derek Thomas (St Ives) (Con):** What steps the Government are taking to establish a tidal lagoon in Swansea? [902947]

**The Secretary of State for Wales (Stephen Crabb):** I recognise that the proposed Swansea tidal lagoon project has the potential to establish Wales as a major hub for tidal power, creating thousands of jobs and attracting millions of pounds of investment. Robust due diligence is, of course, essential in the interest of taxpayers, who would incur the cost of any subsidy through their energy bills.

**Derek Thomas:** Dean Quarry in my constituency is likely to be the source of stone for the tidal lagoon. For over a year, local residents have been concerned about that because it is an important tourist area and marine conservation zone, and we believe there are cheaper areas from which to source the stone. Does the Minister agree that the impact on the environment and the economy is too great and that other sources of stone are available? Will the Government look for places other than Dean Quarry to get the stone?

**Stephen Crabb:** I am aware of the issue raised by my hon. Friend, who is as ever a powerful and effective voice on behalf of his constituents. Planning applications in relation to Dean Quarry would be dealt with by the Marine Management Organisation and local authorities, which should absolutely take into account local concerns.

**Christina Rees (Neath) (Lab):** Local businesses across Wales are eagerly anticipating the investment that the tidal lagoon will bring. It would be a travesty if the UK Government were to pull the plug on the lagoon, so can the Minister confirm that they remain committed to the project and to agreeing a strike price for the tidal lagoon?

**Stephen Crabb:** The hon. Lady is right: this is a big, potentially very exciting and significant project. It is also a project that is looking for a large amount of public subsidy and intervention, and it is absolutely right—not that we would expect Opposition Members to understand this—that when we are dealing with large sums of taxpayers' money, there needs to be due diligence.

**Mr Speaker:** Last but not least, I call the Chair of the Environmental Audit Committee.

**Huw Irranca-Davies (Ogmore) (Lab):** Swansea Bay tidal lagoon and the other potential lagoons that may result from it provide amazing opportunities for exports of intellectual property, technology and supply chains across south Wales. Will the Secretary of State at least commit to making it happen and doing it as soon as possible?

**Stephen Crabb:** I repeat the answer I gave to the hon. Gentleman's colleague. We recognise that this is a potentially very exciting and significant project, in delivering low-carbon renewable energy over a long period. We need to look carefully at the finances to ensure that it delivers value for taxpayers, who will be asked to put a large amount of subsidy into the project.

**Debates**

**Westminster Hall Debate**

[Swansea Tidal Lagoon](#)

08 Mar 2016 | House of Commons | 607 cc65-91WH

## 5. Further Reading and Useful links

### **Tidal Lagoons**

Tidal Lagoon Plc [website](#)

Commons Library Debate pack [Potential economic effects of Swansea Tidal Lagoon](#), 7 March 2016

Department for Energy and Climate Change (DECC) [Swansea Bay Tidal Lagoon: potential support for the project through the CFD mechanism](#)  
23 January 2015

Centre for Economics and Business Research Ltd, [The Economic Case for a Tidal Lagoon Industry in the UK Report for Tidal Lagoon Power Ltd.](#),  
July 2014

Welsh Economy Research Unit, Cardiff University, [Turning Tide: the economic significance of the Tidal Lagoon Swansea Bay](#), November 2013

### **Other tidal energy schemes**

#### *Scotland*

Scotland has [substantial wave and tidal energy resources](#). The [European Marine Energy Centre](#) (EMEC), wave and tidal test facility, has over a decade of real-sea experience. There have been more grid-connected marine energy converters deployed at EMEC than at any other single site in the world and the centre remains the world's only accredited marine energy laboratory. The Pentland Firth and Orkney Waters is the site of the world's first commercial scale leasing round for marine energy

#### *Wales*

Morlais Marine Energy, [West Anglesey Demonstration Zone](#)

### **Tidal energy and UK energy strategy**

Department for Business, Energy & Industrial Strategy, [Wave and tidal energy: part of the UK's energy mix](#) [accessed 30 November 2016]

Wave power is much more predictable than wind power – and it increases during the winter, when electricity demand is at its highest. Tidal stream energy is also predictable and consistent. It is estimated the UK has around 50% of Europe's tidal energy resource, and a study in 2004 estimated the UK's technical resource at around 16 terawatts per hour per year (TWh/year) (4% of overall supply).

Commons Library Briefing paper [Energy Policy Overview](#) 24 June 2016

## DEBATE PACK

CDP 2016/0236

Debate day: 6 December

2016

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