

TIDAL POWER FOR JERSEY THE NEXT STEPS



Recommendations to the Minister for Planning and
Environment from the Tidal Power Commission

January 2011

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The Tidal Power Commission¹ are delighted that a detailed feasibility study has shown that optimism regarding the potential for tidal stream energy from Jersey waters is not misplaced.

Indeed Jersey must be committed to exploiting renewable energies to meet its carbon reduction targets, to increase security of supply and to diversify the local economy. Although tidal stream and wave technologies are still developing and are not near commercialisation there are opportunities for research and development scale arrays in Jersey waters as well as the deployment of other established technologies such as off shore wind turbines.

However, there are a number of key steps that need to be initiated before a detailed commercialisation strategy for any form of renewable energy is reached. These must be addressed urgently – the lead-in time for any large scale project are long with potentially complex environmental investigations and public and stakeholder consultations.

Issues to be addressed in the short term include generic environmental issues, consenting, leasing requirements and associated costs of energy extraction. These initial steps are ‘technology blind’ and will allow the nascent tidal stream technology to mature as well as providing the legal and consenting framework for any renewable energy projects should developers wish to forward an application for this established technology.

Their key conclusions and *recommendations* can be summarised as follows:

Conclusion 1 – Resource feasibility

Jersey’s prime site for tidal stream technology has additional attributes making it attractive to developers of tidal turbines including good existing transmission infrastructure, shallow waters and a less energetic environment; this provides a less challenging engineering conditions. However financial incentives are necessary for the cost of electricity production to compete with the price per kilowatt hour of imported electricity under current market conditions. It is important to recognise that over the coming decade the tidal power industry will develop and technological advances take place for example the emergence of augmented flow technologies. These will increase the economic feasibility of tidal stream projects;

Recommendation 1

The TPC recommends that the Planning and Environment Department should continue the ongoing dialogue to ascertain whether Jersey might be eligible for financial incentives such as Feed-in-Tariffs from, most obviously, the European Continent, but also the UK. If Jersey is not eligible for such assistance it will constrain the speed at which renewable energy might be developed unless alternative funding can be found.

Conclusion 2 – A long term vision

To achieve secure and sustainable energy into the long term, Jersey will need to further displace fossil-fuels with utility-scale renewably generated energy at the if it is to reach the goal of an 80% reduction in carbon

¹ The Tidal Power Commission comprises Constable Daniel Murphy (Chairman), Sir Nigel Broomfield, Alick McIntosh and Mike Liston.

emissions by 2050^{2 3} - notwithstanding its aspirations for demand-side energy efficiency. Moreover the development of tidal technologies locally, or indeed any renewable energy technology, would serve to diversify the energy supply as well as the local economy and increase revenue generation from the leasing of the sea bed and the taxation of development companies. For developers to be attracted to the Island, even if not in the immediate term, there needs to be a strong indication that the Island welcomes development applications for renewable energy technologies, in particular tidal stream technology. This is not a short term project but a long term undertaking requiring incremental investment over the years ahead. The first step would be to ensure that a clear framework for the regulation of the Industry is in place supported by the environmental requirements and leasing details so that developers can be confident that they can forward an application based on clear legal, economic and administrative provisions.

Recommendation 2

The TPC recommend that the States of Jersey should continue workstreams under the guidance of the Tidal Power Commission which remove the uncertainties in terms of generic environmental issues, consenting, leasing requirements and associated costs of energy extraction. Ownership of the seabed to the 12 mile limit lies with the Crown in the right of Jersey i.e. the Duchy of Normandy as represented by the office of Her Majesty's Receiver General and discussions must be concluded in respect of leasing terms and conditions. The conclusion of these investigations will inform the drafting of a Renewable Energies Law for ultimate consideration by the States of Jersey.

Conclusion 3 – Protecting the marine environment

Any developments of renewable energy should not compromise the quality of life of Jersey's people or its biodiversity. Baseline data and stakeholder engagement is essential if a scheme is to be progressed.

Recommendation 3

The TPA acknowledges the proposed spatial planning policies outlined in the new Island Plan will ensure that the environmental and social aspects of any project are rigorously and transparently tested. In addition initial work for an Environmental Impact Assessment has been initiated with key concerns raised around the robustness of baseline environmental data and stakeholder engagement in particular with economic activities such as the fisheries industry.

The initial (pre-scoping) assessment indicates that an Environmental Impact Assessment will be a significant and costly piece of work (c£600k) but it is acknowledged to be an essential part of the process of an application. However, the TPC do not consider it a priority at this early stage and consider that it is likely to be made the responsibility of any developer who is required under the Planning and Building (Environmental Impact) (Jersey) Order 2006 to accompany a planning application with such an assessment.

Conclusion 4 – Joint Channel Island co-operation

It is considered that there is likely to be benefit to the individual Channel Islands working together where there is potential for the achievement of mutually beneficial goals. Particularly important is the parallel development of legislation and consenting regimes across the Islands. This will ensure that the Islands present a coherent and robust framework for the extraction of renewable energy in line with jurisdictions that they may wish to market to.

² This target is in line with European targets under the Kyoto Protocol to which Jersey is a signatory. The draft Energy White paper provides further detail on this target and is expected for public consultation in quarter one 2011.

³ This target is in line with European targets under the Kyoto Protocol to which Jersey is a signatory. The draft Energy White paper provides further detail on this target and is expected for public consultation in quarter one 2011.

Recommendation 4

Continue and develop the remit of the Channel Island Renewable Energy Forum with the aim of ensuring that the highest possible degree of juridical consistency within the Channel Islands is achieved. Continue and develop Jersey's roles within the British Irish Council's Energy sub-groups and use this as an opportunity to share knowledge and ensure that Jersey's (along with other Channel Islands) interests are optimised across BIC Member Administrations and in particular with European Union.

Conclusion 5 – Extend the mandate of the Tidal Power Commission into a Renewable Energy Commission

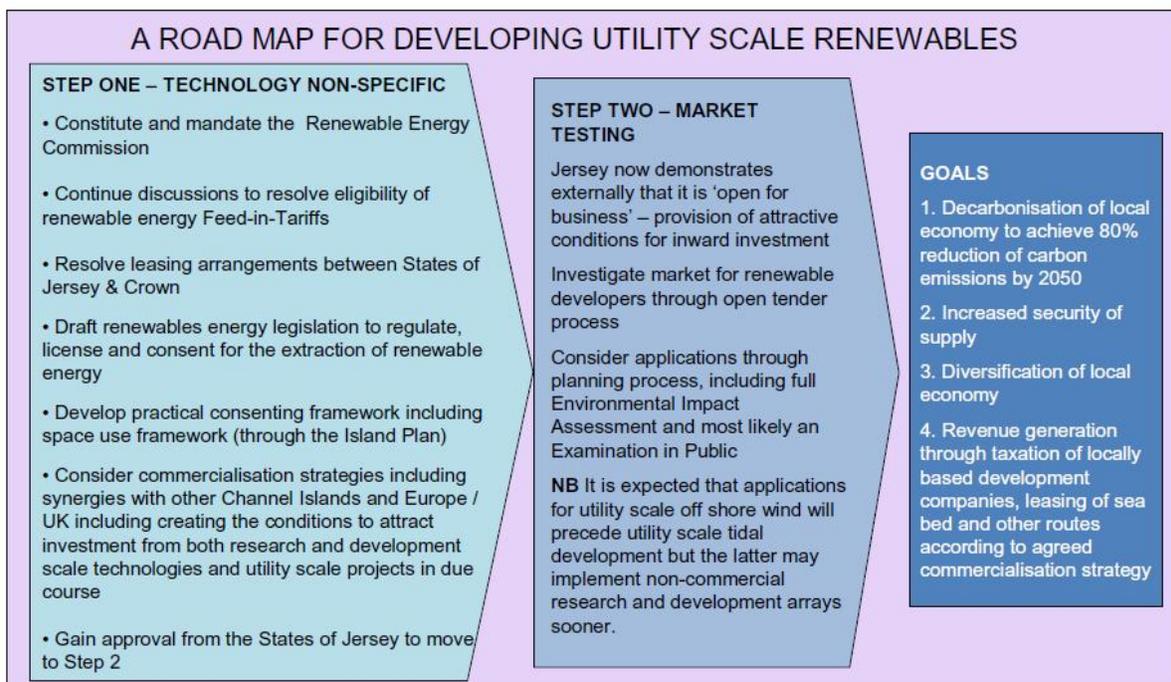
Although the Tidal Power Commission has concentrated on tidal power technology it recognised that there is good potential for off-shore wind farms and the principles of much of their work and their recommendations can be extended to include off-shore wind energy and indeed other marine renewables. To reflect the increased opportunities the Tidal Power Commission should be renamed the Renewable Energy Commission and mandated to continue and extend its work.

Recommendation 5

That the Minister for Planning and Environment reconstitutes the members of the Tidal Power Commission and mandates them as the Renewable Energy Commission to carry out the following workstreams:

i) A phased work plan (see box below) is recommended which prioritises a 'technology-blind' approach, and simply sets out the practicalities for renewable energy generation in Jersey. The workstreams can be continued within the Planning and Environment Department in conjunction where appropriate, with the Economic Development Department, Jersey Electricity plc and other stakeholders under the guidance of the Renewable Energy Commission.

It is anticipated that Step One could be completed (or under way in the case of the draft Renewables Energy Law) by mid 2011 with a commercialisation strategy providing a framework for Step Two.



1.0 Introduction and background

1.1 The Tidal Power Steering Group

The Tidal Power Steering Group was set up in 2008 at the request of the Minister for the Environment⁴ with the broad remit of reporting on the potential contribution 'tidal power' might make to Jersey's energy requirements and the issues which might affect that. The potential for tidal power (among other forms of renewable energy) was explored in the Energy Policy Green Paper 'Fuel for thought?'⁵ as directed within the States of Jersey Strategic Plan 2006-2011 (Commitment Four, 4.3.2).

The Group was tasked with bringing forward a report for the Minister that set out the following and makes recommendations, in respect of marine tidal energy:

- The scope for contributing to Jersey's energy requirements from waters under the control of the States of Jersey;
- The timescale for achieving this contribution;
- What potential obstacles such as permission from the Crown, planning controls and marine user objections exist, and how might they be overcome;
- The economic feasibility of harnessing energy from local waters;
- The funding mechanisms including possible strategic partnerships and access to external funding;
- Activities that could be undertaken in the short term on a "no regrets" basis;
- To explore the technology available to harness tidal power and the current readiness of this technology to deliver a tested solution

An independent report, 'Tidal power for Jersey – Options and Opportunities', was produced in December 2008 with the following key conclusion

The Group are unanimous in believing that tidal power could, in the medium term, make a real and increasing contribution to the energy requirements and security of the Island for the rest of this century. They therefore have no hesitation in recommending that the possibility should be actively pursued.

1.2 The Tidal Power Commission

Following the positive recommendation of the Tidal Power Steering group, The Minister for Planning and Environment agreed that there were a number of critical steps to take and appointed a 'Tidal Power Energy Commission'⁶ (TPC) to carry these out.

⁴ Note that the Alderney Commission for Renewable Energy have executive Commission

⁴<http://www.gov.je/StatesGreffe/MinisterialDecision/PlanningEnvironment/2008/tidalpowergroup.htm>

⁵<http://www.gov.je/PlanningEnvironment/Environment/From+global+to+local+policy/Energy+Policy+Green+Paper+Lunched.htm>

⁶ The Tidal Power Commission: Establishment, Membership and Terms of Reference MD-PE-2009-0093

Fundamental to any progress was the necessity for a detailed resource assessment to be carried out to evaluate Jersey's available tidal resource given the current state of technology. Assuming that such a study confirmed the expectation that Jersey had an economically attractive tidal resource, investigations in the following areas needed to be pursued:

- *Legal* - Confirmation of the legal position with respect to ownership of the seabed and to bring to the States of Jersey legislation to regulate the exploitation of the tidal (and potentially wind) resource. Develop a 'Renewable Energy (Jersey) Law' to regulate the generation of energy from utility scale renewable energy;
- *Environmental* - Detailed investigation of the technical feasibility of tidal power for example biodiversity assessments, bathymetric studies, seabed investigation and undersea grid networks plus any site-specific Environmental Impact Assessments.
- *Partnerships* - Discussions with neighbouring jurisdictions to explore the possibilities for partnerships and export opportunities. In particular, attention should be focused on those opened up if E U regulations are adopted that would allow European Countries to count imported low-carbon renewable energy against their commitments under the Kyoto Protocol.
- *Funding* - Discussions with appropriate bodies to investigate funding opportunities for tidal power. One mechanism might be Joint Implementation Projects which apply to climate change mitigation projects implemented between two Annex I countries. 'Emission Reduction Units' (ERU) are created, acquired and transferred. For example; another Annex I country would wish to invest in a renewable energy project in Jersey. The ERUs generated by that project would count towards that country's emission reductions.

Whilst the Commission has so far only considered tidal technologies, the principles of much of their work and their recommendations can be extended to include off-shore wind energy and indeed other marine renewables, which by sharing costly infrastructure would improve the economic feasibility of harvesting the available energy.

The Strategic Plan 2009-2014 in Priority 13 commits to:

'Introduce an integrated energy policy to secure an affordable and sustainable energy supply to meet the changing world energy challenges and underpin economic and social prosperity, including assessing whether the Islands' natural resources could be a future sustainable source of energy.'

This report goes on to describe the progress that the TPC have made towards answering this commitment and provides recommendations to the Minister of Planning and Environment.

2.0 The Available Tidal Resource

2.1 Background

The Tidal Power Steering Group recommended that the next phase of work should be to 'Commission the necessary research into the exploitability of the tides around Jersey including an environmental impact study'. IT Power was appointed in 2009 to carry out a Feasibility Study into the potential for tidal stream energy. Some details within the full study are considered commercially sensitive so a non-technical summary is presented in Appendix 1.

IT Power identified discrepancies in the total available energy predicted to date from the literature and in order to more properly assess the resource some real time survey work was recommended and carried out in January 2010.

2.2 Results

The resource to the North East of Jersey, where the field flow measurements were taken, shows itself to be the best of two prospective sites for the exploitation of tidal energy and has the potential of providing 50% of Jersey's existing electrical demand, with an estimated 360GWh/yr⁷ (see Figure 1). The study concluded that Jersey has a significant tidal stream resource that is likely to be commercially viable, and should be exploited to contribute towards Jersey's carbon reduction aims and energy security.

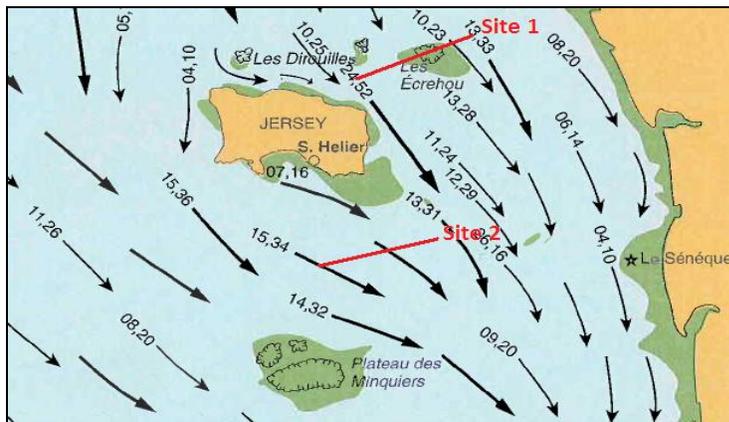


Figure 1 – Chart showing the tidal streams in the Channel Islands⁸

Source – 'Tidal Stream Energy Feasibility Study for the States of Jersey', Non-Technical Summary; IT Power for the States of Jersey July 2010 (Appendix 1)

The resource in the South East, displays lower flow velocities that may be commercially interesting as this dynamic sector develops. An initial resource assessment for a second site South of Jersey's mainland has revealed a resource that may become exploitable in the future as the tidal stream

⁷ This figure is a refined estimate using historic data and field flow measurements. It sits between the Carbon Trust figure (820GWh/yr and RGU figure (282GWh/yr).

⁸ © Crown Copyright and/or database rights. Reproduced by permission of the Controller of Her Majesty's Stationery Office and the UK Hydrographic Office (www.ukho.gov.uk).

industry develops. However, the South site has significantly lower flows than the premium North East site; therefore, unlike the North East site, the South site is not considered to be commercially interesting at the present time. However technological advances are underway in the industry and it may be that as augmented flow technology matures, the sites discussed here become more favourable for development. It must be understood that this is a longer term objective and we have investigated the picture at the current time and state of technology.

2.3 Techno-economic Modelling

It is recognised that Jersey's waters are less energetic than some other prime Channel Island sites for example the Alderney race. However, as nascent technologies develop it is expected that less energetic sites will become of interest for research and development as well as commercial scale exploitation particularly because there are opportunities for capital cost savings associated with electrical and structural work.

It is noted by IT Power that 'Techno-economic modelling has shown that the cost of extracting energy from Jersey's North East site is inline with the first tidal farm economics as predicted by the Carbon Trust and it is estimated that baseline cost predictions lie between 13p/kWh and 27p/kWh depending on which discount rate is used (8 or 15%⁹) and whether optimistic and pessimistic assumptions are used throughout the model for example capital and operating costs, decommissioning costs and annual energy production.

However, at the present time the cost of this energy is substantially higher than the cost for Jersey to import electricity from Europe; therefore, financial incentives such as feed-in-tariffs or quota-based mechanisms (such as the UK's Renewable Energy Obligation Certificates) are required to make a project viable (see more information in Section 6).

However, IT Power note importantly that as the industry develops and associated costs are reduced, less incentive will be required to make investment in the Jersey resource attractive and that Jersey has some notable advantages that add to the viability of a potential tidal energy farm:

- 'Existing infrastructure with an electricity connection to France, reducing the level of capital outlay for a potential project;
- Shallow waters that are deep enough for state of the art tidal energy turbines, yet offer lower capital and installation costs;
- A less energetic environment than the top ten UK tidal sites. This may prove an attractive site for one of the first tidal farms as it offers a less challenging engineering environment'.

2.4 Summary

- Jersey has an economically visible tidal stream resource that is likely to become even more appealing as the technologies and marketplace develops.

⁹ At the present stage of tidal power development a discount rate of 15% is more appropriate. However, as the industry continues to develop the discount rate available is likely to fall to around 8%.

- Techno-economic modelling has shown that the cost of extracting energy from Jersey's North East site is currently in line with the first tidal farm economics as predicted by the Carbon Trust¹⁰ and it is estimated that baseline cost predictions lie between 13p/kWh and 27p/kWh.
- Predicted energy costs lie substantially above the cost of imported electricity from Europe and so to develop tidal power at the utility scale currently, capital incentives and/or Feed-in tariffs are required. These are not available locally and so Jersey's eligibility for European subsidies must be established or alternative and novel funding mechanisms considered.
- Jersey has additional attributes making it attractive to developers of tidal turbines including good existing transmission infrastructure, shallow waters and a less energetic environment so providing a less challenging engineering environment.

3.1 Ownership of the sea bed

It has been established that the ownership of the seabed to the 12 mile limit lies with the Crown in the right of Jersey i.e. the Duchy of Normandy as represented by the office of Her Majesty's Receiver General.

Discussions with the UK's Crown Estate have confirmed that they have no expectations in the involvement of any seabed leasing arrangements. They recognise that the responsibility for Jersey's seabed lies with the Duchy of Normandy.

The Commission are in dialogue with HM Receiver General as to the arrangements that will be negotiated for Jersey for the Island to be able to exploit the sea bed for the purposes of harvesting renewable energy. Synergies with Guernsey are expected since they are in the same position. The expectation is that any revenue gained from the leasing of the sea bed from the Crown would be returned for the benefit of the people of Jersey.

3.2 Consenting and regulating the extraction of renewable energy

The Commission believe that in the event of furthering the potential for renewable energy a locally appropriate regulatory regime will be required. It is essential that this regime mirrors best practice in other jurisdictions if we are to be able to export energy.

The necessary local enabling legislation that would be required in order to control and regulate marine renewable energy systems within Jersey's 12 mile territorial limit is being scoped. It is anticipated that this law will set out a consenting and licensing regime that will account for:

- recognises existing relevant legislation e.g. FEPA (The Food and Environmental Protection Act as enacted in Jersey)
- the operation, deployment or use of renewable energy devices;
- management or decommissioning of renewable energy devices;
- regulation of health and safety in relation to renewable energy systems;
- the creation of safety zones and navigation orders.

¹⁰ The Carbon Trust, the Marine Energy Challenge, 2004

3.3 Summary

- Ownership of the sea bed to the 12 mile limit lies with the Crown in the right of Jersey i.e. the Duchy of Normandy as represented by the office of Her Majesty's Receiver General;
- Discussions with the HM Receiver General have commenced to identify the sort of lease arrangements;
- A legal framework for a consenting and licensing regime for the extraction of renewable energy from the sea bed is required that mirrors best practice with jurisdictions that we might wish to export energy to;
- Law drafting time has been sought by the planning and Environment Department in 2011 to draft a 'Jersey Renewable Energies Law'.

Despite the obvious advantages of renewable energy, it is important to ensure that the environment and quality of life of Jersey citizens are not compromised.

4.1 Spatial planning frameworks - The draft Island Plan 2011-2014

Good spatial planning is a critical component in the successful harvesting of large scale renewable energy with minimum environmental impact. The process of Strategic Environmental Assessment (used primarily in assessing schemes) Environmental Impact Assessment (used primarily in assessing specific cases) are the tools used to assess and mitigate the impacts of proposed renewable energy schemes and assess each case on its merits.

However, it is important to have a guiding policy framework at the Island wide level and this can be embedded in the new Island Plan which is currently under review. Proposed policies within the White Paper draft Plan are in favour of renewable energy installations both at the exploratory, appraisal or prototype phases or at the utility scale as long as environmental considerations are thoroughly assessed.

The following extract from the draft Island Plan White Paper shows the recommended policies. This will be assessed as part of the 'Examination in Public' of the Island Plan in September 2010 but final presentation to the States of Jersey in 2011:

Extract from the Island Plan White paper¹¹

'Exploratory, appraisal or prototype off-shore utility scale renewable energy proposals will be encouraged where they have:

1. *Produced an Environmental Impact Assessment in accordance with the Planning and Building (Environmental Impact) (Jersey) Order 2006 that demonstrates inter alia:*
 - a. *detailed engagement with all stake holders;*
 - b. *that there will not be an unacceptable impact on features of ecological, archaeological or historic importance, on hydrology or coastal processes, nor the marine, intertidal or coastal environment;*

¹¹ <http://www.gov.je/PlanningBuilding/LawsRegs/IslandPlan/IslandPlanReview/Pages/IPRCoreDocs.aspx>

- c. there will not be an unacceptable visual impact;
- d. there will not be an unacceptable impact on the character of the immediate and wider landscape;
- e. there will not be an unreasonable impact on neighbouring uses and the local environment by reason of noise, odour, pollution (to air, water or soil), visual intrusion or other amenity consideration during construction, operation and decommissioning; and
- f. It will not prejudice the safe operation of shipping and/ or Jersey Airport;
- g. there will not be any unacceptable impacts as a consequence of any associated infrastructure required to service the site.

2. Included an appropriate monitoring programme and detailed restoration proposals which satisfies the requirements of the Minister for Planning and Environment.

The granting of an application for exploratory, appraisal or prototype proposals will be for a specific time period and without prejudice to any subsequent application to develop fully operational projects at that location’.

The Examination in Public of the Island Plan in Sept and Oct 2010, concentrated upon these proposed policies and the Inspectors concluded ⁽¹²⁾

11.14’.....As an island, with a lengthy coastline compared with its land area, relatively shallow seas and strong tidal streams, Jersey is well placed to be an exemplar for off-shore energy generation. Rightly, the policies include stringent safeguards, and there will be other important material considerations such as the Ramsar designations.

4.2 Environmental Considerations

A tidal energy farm off the coast of Jersey would require an Environmental Impact Assessment (EIA) in accordance with Island Planning (Jersey) Law 1964 (as amended¹³). Within the EIA process, a developer presents a systematic prediction of the likely and potential environmental effects of a new development.

This process identifies adverse impacts before project development, thereby allowing project changes to be made to avoid impacts before they are realised. This approach also allows the developer, the public and the authorities to fully understand the effects of project development, and thus supports objective and transparent decision-making in the project consenting process.

The product of the EIA process is an Environmental Statement (ES), which is a document containing all pertinent data and information required to achieve EIA consent.

A pre-scoping assessment for an EIA for the site of interest was outlined by the ITPower Study that addressed the following areas :

- *Physical Environment* - Including assessments of the current flow regime and sediment transport and the physical and biological characteristics of the channel, any impacts on local tidal and wave regimes;

¹² <http://www.gov.je/Government/Pages/StatesReports.aspx?ReportID=487>

¹³ The States of Jersey, Planning and Building (Environmental Impact) (Jersey), 2006

- *Marine Ecology* – Including benthos and plankton, fish and shellfish, marine mammals and birds;
- *Human Activities* – Commercial fisheries, shipping traffic and recreational activities;
- *Onshore Activities* – Including impact to terrestrial flora and fauna, visual impact and rises in noise levels;
- Other factors – Including *inter alia* radar, cultural heritage, noises, Electromagnetic Propagation and social and visual impacts.

Another consideration would be the gaining of a licence under FEPA (The Food and Environmental Protection Act, as applied to Jersey) and the application process for such a licence and environmental investigations it would cover would run concurrent to the EIA process.

4.3 Stakeholder engagement

As part of the feasibility study carried out by ITPower some stakeholders were consulted to gain an initial appreciation of the type of issues that would be of concern should a scheme be progressed. Meetings were held with representatives from The National Trust for Jersey, the Jersey Fisherman’s Association, Save our Shoreline and the Marine Section of the Societe Jerseyaise. It is acknowledged that this is in no way a comprehensive list of stakeholders but it was thought useful to commence discussions with a sample of stakeholders at this early stage.

The Fisheries Industry were extremely concerned at any scheme that would have the potential to disrupt economic activity either by excluding commercial fishing activity or displacing effort elsewhere into surrounding waters.

The National Trust, Save Our Shoreline and the Marine Section of the Societe were broadly supportive of the potential for tidal power but concerned about the proximity of the area of interest to the Ecrehous, Ramsar site. It was raised that through, long-term ecological baseline studies would need to form the basis of any EIA and proposed mitigation.

Stakeholder engagement is a critical component of the EIA process and good practice dictates that a Stakeholder Consultation Plan is developed comprising of the following:

- Identify all relevant stakeholders;
- Provide them with the information in a useful format;
- Be open and honest about what an individual project involves;
- Engage with stakeholders in a variety of different ways, enabling everybody to have their opinions heard and their ideas taken seriously.

4.4 Further work

It is estimated that the likely cost of the EIA will be in the region of £600k and take up to two years to complete. A number of baseline surveys have been recommended by IT Power:

- Geophysical Survey: Bathymetry, seabed features and obstructions, geological info, wave & current measurements;
- Geotechnical Survey: CPT investigation and / or borehole at each turbine location;
- Marine Traffic Survey: At least two seasonal surveys of 28 days each;
- Mammals and Cetaceans Surveys: Four seasonal surveys and a monitor;
- Fisheries Resources Surveys: Four seasonal surveys and catch data from fisheries bodies;

- Ornithological Survey: Monthly surveys over at least one year;
- Environmental Baseline Surveys: Including benthic surveys and grab samples;
- Terrestrial survey: For onshore substation and cable route.

It is not recommended that these surveys are carried out without further detailed analysis of the extractable resource or a commercialisation plan in place. This is because the costs of the EIA work should be borne by the developer and depending on the route forward agreed by the States of Jersey. It is not yet clear who this developer might be.

4.5 Summary

- Good spatial planning is essential to ensure that any scheme does not compromise the ecological, economic and aesthetic value of the site and its environs.
- The draft Island Plan proposes a criteria-based assessment system to ensure that any scheme fully accounts for all the potential impacts it may bring about.
- A detailed Environmental Impact Assessment is critical to the assessment of any scheme and must be based on long-term (at least two seasons) ecological data. Stakeholder consultation and involvement is fundamental to this process to ensure that the concerns of all are thoroughly investigated and accounted for. An open dialogue should be maintained to ensure that all stakeholders are involved with any advancement in this area even if this is prior to an actual development application.
- Several baseline surveys are required as part of the EIA process which are likely to cost in the region of £600k.
- It is not recommended that further detailed environmental assessment or survey work is carried out without further detailed analysis of the extractable resource or a commercialisation plan in place. This is because the costs of the EIA work should be borne by the developer and depending on the route forward agreed by the States of Jersey it is not yet clear who this might be.

A key recommendation from the Tidal Power Steering Group's report was to 'Open talks with the other Channel Islands to see if there is willingness in principle to join in a collaborative effort to exploit tidal resources'. It is considered that there is likely to be benefit to the individual Channel Islands working together where there is potential for mutual goals.

5.1 Channel Islands Renewable Energy Forum (CIREF)

In October and November 2009 an executive group of officers representing Alderney, Guernsey, Sark and Jersey met with the aim of setting up the Channel Islands Renewable Energy Forum. It was proposed that this would be for the initial period an officer / executive¹⁴ led group in its initial stages. The remit of the group is as follows

- Ensuring a consistent approach in the Channel Islands particularly towards: –
 - i. The undertaking of Regional Environmental Assessments and Environmental Impact Assessments;
 - ii. Consenting – ensuring a similar high quality approach;
 - iii. A shared approach to the UK/Europe (e.g., regarding ROC’s, interconnection, etc.);
 - iv. A shared infrastructure – e.g., CI grid connectivity;
 - v. Sharing of developer Information and moving towards a common intellectual resource.
- Ensuring the Channel Islands are not seen as a “soft option” for development. The development of consistency and transparency

CIREF has met on 4 occasions since its inception and has proven to be a useful discussion forum where information exchange and updates form the main agenda. It is expected that there will an extension of the forum to include non-executives and political representatives to ensure that talks continue at all levels of involvement

5.2 Renewable Energy and the British Irish Council

The Jersey Administration participates in the Renewables Energy workstream as well as the grid Infrastructure workstream within the Energy section of the British Irish Council Environment sub group; BIC(E)¹⁵. The remit of the former group includes the exchange of best practice on marine environment and research issues and the identification of key opportunities for ongoing collaboration across Administrations.

The British Irish Council Summit meeting was held in Guernsey on June 25th 2010 and the theme of the summit was renewable energy. A key outcome was an endorsement from the BIC administrations to commence engagement with the European Commission on marine renewable issues via a letter requesting the commencement of a constructive dialogue with the EC and to discuss ways in which the Commission can support both the sector itself and the efforts of the BIC Member Administrations.

The TPC eagerly awaits the outcomes of this approach.

Prior to the main meeting on the 24th June, a Marine Renewable Energy Seminar was held which was a useful opportunity for knowledge exchange particularly with the Scottish administration which, along with its’ partners, is a leader in this field.

5.3 Approaches to the UK

After the British Irish Council summit In June 2010, the Chairman of the TPC approached the incoming UK Minister for Energy and Climate Change, Charles Hendry MP. The intention was to formally open dialogue with the incoming administration and in particular explore the likely

¹⁵ <http://www.gov.je/BritishIrishCouncil/Members/Pages/About.aspx>. The BIC was created under the Agreement reached in multi-party negotiations in Belfast in 1998 to promote positive, practical relationships among its members. Its Members are the governments of Ireland, Britain and the devolved Administrations of Northern Ireland, Scotland and Wales and the Crown dependencies of Jersey, Guernsey and the Isle of Man.

direction of policy in the UK. The hope is that an opportunity will arise to explore in more detail some of the national and international ramifications of the tidal energy element in the overall spectrum of renewable energy and in particular to understand the regime of financial incentives that may be applicable to the Channel Islands.

The TPC await the return correspondence with interest.

5.4 Summary

- Continue and develop the remit of the Channel Island Renewable Energy Forum to ensure that cross-jurisdictional consistent working within the Channel Islands is optimised. In particular attention should be paid to the parallel development of legislation and consenting regimes across the Islands. This will ensure that mutual goals are met and that the Islands are seen externally as presenting a robust framework for the extraction of renewable energy in line with jurisdictions that they may wish to market to.
- Continue and develop Jersey' roles within the British Irish Council's Energy sub-groups and use this as an opportunity to share knowledge and ensure that Jersey's (along with other Channel Islands) interests are optimised across BIC Member Administrations and in particular with European Union.

6.1 The requirement for external investment

It has been established in Section 2 that the price of Jersey's renewable energy to be extracted is in excess of the price of imported electricity. Thus, in order for a project to be viable, it is essential that financial incentives such as feed-in-tariffs or quota-based mechanisms (such as the UK's Renewable Energy Obligation Certificates) are available. If these are not then alternative funding mechanisms will need to be investigated until the industry develops and associated costs are reduced meaning fewer financial incentives will be required to make investment attractive.

Approaches have been made to the UK government (see Section 5.3) and the European Union (see Section 5.2) to open the dialogue about the Island's eligibility for such incentives

6.2 Commercialisation Strategy

As discussion progress with the EU and UK progress, it will become clear whether Jersey can access external funding sources. This will inform the commercialisation strategy recommended to the States of Jersey.

The most beneficial outcome would be that Jersey is able to export renewably generated electricity to a third party and receive a subsidised price per kilowatt hour for doing so. This would allow a project to more quickly come to fruition.

However, if Jersey is excluded from such subsidies then bringing a project forward is considered considerably less likely since the achievable market price for the energy would be insufficient to recover, let alone provide a return on, the capital expenditure required to extract it. That is not to

say that future market conditions would not favour extraction of the resource but that it would considerably disfavour advancement in renewable energy in the near future unless an alternative funding mechanism be found.

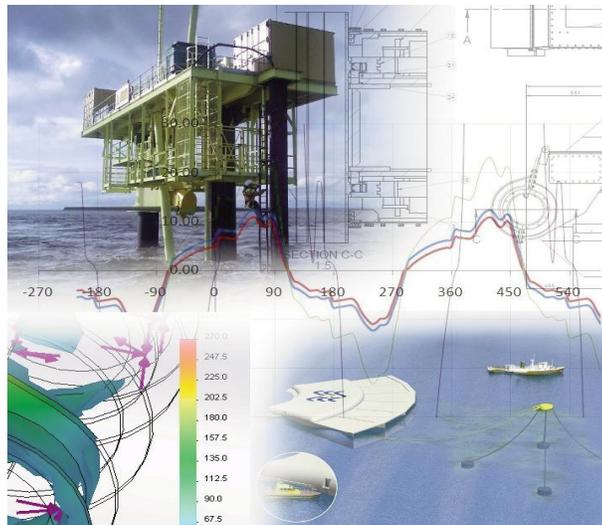
6.3 Summary

- For any project to proceed it is critical for Jersey to have access to financial incentives such as Feed-in-Tariffs etc. Dialogue with the UK and the European Union has been opened to investigate the applicability of the options to the Island.
- A commercialisation strategy will become clearer once discussions in respect of leasing the sea bed and Jersey's access to external funding become apparent.



States of Jersey

Tidal Stream Energy Feasibility Study for the States of Jersey



Non-Technical Summary

14th July 2010

ITP/UKP1091

The States of Jersey

Client contract No.: Letter of intent issued on 07 September 2009

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Non-Technical Summary V1.1

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NON-TECHNICAL SUMMARY

Introduction

The States of Jersey has carried out an initial assessment into the potential for tidal power and, advised by a Tidal Power Steering Group, believes that *'tidal power could, in the medium term, make a real and increasing contribution to the energy requirements and security of the Island for the rest of this century'*. The Group recommended that the possibility should be actively pursued and was provided the mandate to undertake further studies that would enable a more complete understanding of the opportunity.

The States of Jersey commissioned a resource assessment and feasibility study to evaluate the potential of utilising tidal stream energy from the waters around Jersey. The scope of the study includes the following:

- Available Resource
 - Resource modelling of the flows around Jersey including site surveys
 - Techno-economic modelling of potential tidal stream developments
- Working with other Jurisdictions
- The Electricity Grid
- Environmental Impacts
 - Environmental impact scoping investigation
- Other Constraints and Issues
 - Outline of the leading technologies
 - An investigation into a commercial strategy to develop tidal power in Jersey.
 - Brief evaluation previous research into the States of Jersey's wave and offshore wind resource.

Energy Context

The Jersey Electricity Company is the sole distributor of electricity on the island. Traditionally the island has generated electricity locally from generators run on fossil fuels; however, energy has been increasingly imported from France via two subsea one-way interconnectors. At present the majority of Jersey's electricity is generated from nuclear power stations in France.

In 1998 the Channel Island Electricity Grid (CIEG) was set up between the JEC and Guernsey Electricity, to manage the import of electricity and cooperation between the two electricity companies. Guernsey and Jersey are connected by a subsea power cable, and Guernsey's also meets its electricity demand with electricity from continental Europe via the Jersey/France interconnectors.

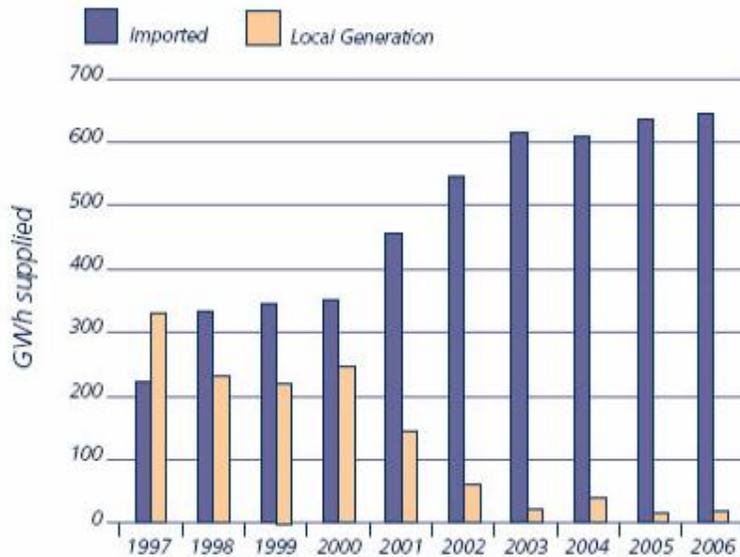


Figure 1 – Electricity Supply Mix of Jersey¹⁶.

Figure 1 shows how Jersey’s energy mix has altered over recent years. Interestingly, there has not been significant increase in the total annual electricity demand over the last ten years; in 2006 Jersey’s annual electricity demand was approximately 650GWh.

Resource Investigation

Driven by commitments to reduce carbon emissions, energy security and the opportunity of a new industry for the island, the States of Jersey are pursuing its interest in exploring potential renewable energy capabilities on and around the island. Previous work undertaken by the Carbon Trust¹⁷ and also the Robert Gordon University¹⁸, both in 2005 shows that there is a significant resource around the States of Jersey although there is some variation in the estimated scale.

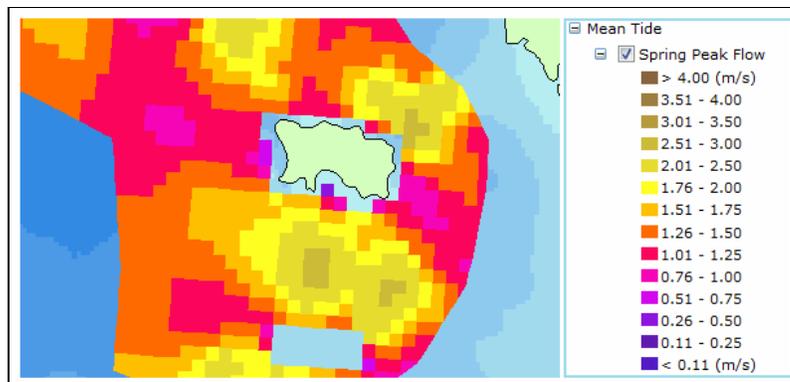


Figure 2 – Mean Peak Spring flow velocities around Jersey¹⁹.

¹⁶ Jersey Electricity Company, website: <http://www.jec.co.uk/>

¹⁷ The Carbon Trust, Phase 2 UK Tidal Stream Energy Resource Assessment, 2005

¹⁸ Tidal Stream Resource Assessment for the Channel Islands area, the Robert Gordon University, 2005

¹⁹ BERR, UK Marine Renewable Energy Resources Atlas, 2007

This study has considered the resource in more detail, reviewed historical data and undertaken field flow measurements.

The study has concluded that Jersey has a significant tidal stream resource that is likely to be commercially viable, and should be exploited to contribute towards Jersey's carbon reduction aims and energy security. The resource to the North East of Jersey, where the field flow measurements were taken, shows itself to be the primary site and has the potential of providing 50% of Jersey's electrical demand, with an estimated 360GWh/yr²⁰. The resource in the South East displays lower flow velocities that may be commercially interesting as this dynamic sector develops.

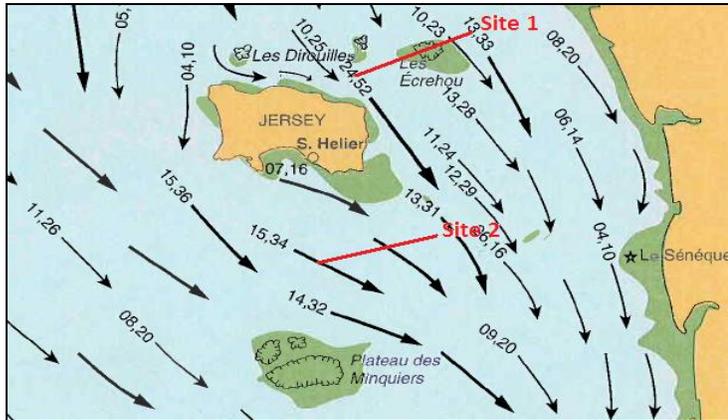


Figure 3 – Chart showing the tidal streams in the Channel Islands²¹

An initial resource assessment for a second site South of Jersey's mainland has revealed a resource that may become exploitable in the future as the tidal stream industry develops. However, the South site has significantly lower flows than the premium North East site; therefore, unlike the North East site, the South site is not considered to be commercially interesting at the present time.

Economic Modelling

Modelling undertaken in this study identifies the opportunity to develop tidal stream technology for less energetic waters. The opportunities for capital cost savings with electrical and structural work have been considered for market leading technologies, in order to evaluate the commercial potential of Jersey's tidal stream resources. Techno-economic modelling has shown that the cost of extracting energy from Jersey's North East site is inline with the first tidal farm economics as predicted by the Carbon Trust. However, at the present time this cost of energy is in excess of the cost for Jersey to import electricity from France; therefore, financial incentives such as feed-in-tariffs or quota-based mechanisms (such as the UK's Renewable Energy Obligation Certificates) are required to make a project viable. As the industry develops and associated costs are reduced, less incentive will be required to make investment attractive.

²⁰ This figure is a refined estimate using historic data and field flow measurements. It sits between the Carbon Trust figure (820GWh/yr and RGU figure (282GWh/yr).

²¹ © Crown Copyright and/or database rights. Reproduced by permission of the Controller of Her Majesty's Stationery Office and the UK Hydrographic Office (www.ukho.gov.uk).



Figure 4 - MCT's Seagen Tidal Turbine in Strangford Lough²².

Due to the stage of development of the tidal stream industry it should be noted that economic assessments are based on technology and figures that are continually changing; therefore, technology development should be regularly monitored when considering tidal energy projects in the future.

In addition to the significant tidal resource, Jersey boasts other advantages that add to the viability of potential tidal energy farms:

- Existing infrastructure with an electricity connection to France, reducing the level of capital outlay for a potential project.
- Shallow waters that are deep enough for state of the art tidal energy turbines, yet offer lower capital and installation costs.
- A Less energetic environment than the top ten UK tidal sites. This may prove an attractive site for one of the first tidal farms as it offers a less challenging engineering environment.

Route Forward

An environmental impact assessment scoping study has been undertaken, highlighting the considerations and investigations needed to develop the tidal stream sites of Jersey. Jersey's Ramsar sites have been taken into account and discussed. In addition, preliminary stakeholder engagement has commenced. Risks to the development of tidal stream projects in the area have been explored and commercialisation strategies have been identified.

²² Picture taken from Marine Current Turbines, website: <http://www.marineturbines.com/>

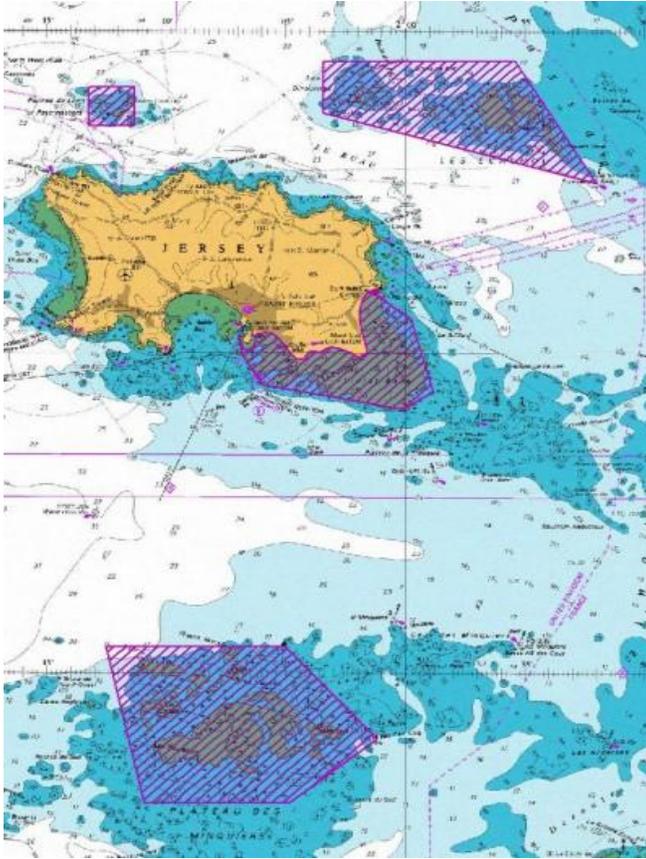


Figure 5 – the Ramsar sites of Jersey

The ownership of the sea bed up to the territorial sea limit of 12 miles belongs with the Crown in the right of Jersey which is embodied in the office of Her Majesty's Receiver General in Jersey. This has been confirmed by the States of Jersey and by the Crown Estate. A route to commercialisation has been outlined with the aim of maximising the value in the tidal stream resource for the States through increased knowledge and by de-risking the process of project development. It is also noted that tidal stream energy is not a fully mature market and there are considerable risks associated with early implementation, which the States can avoid if it chooses to do so. The next steps to commercialisation for tidal stream energy in Jersey are outlined below:

1. Negotiations with the Receiver General with regards to the terms and conditions for the use of the sea bed.
2. Development of the necessary regulatory and consenting framework.
3. Further technical investigations to gain confidence in the available resource.
4. Environmental studies to gather baseline information, taking into account the special considerations of the site (i.e. Ramsar) and stakeholder consultation.

In Summary

There is a considerable tidal stream resource in the North East of Jersey, which is commercially interesting. The route to maximising the value of this resource for the States would be to remove the uncertainties around it in terms of generic environmental issues, consenting, leasing requirements and associated costs with energy extraction. The

timescale to commercialisation is mostly dependent on two aspects, the availability of proven tidal stream devices and the demand for electricity generated from the resource. Understanding that proven technology is not yet commercially available and that there is no early imperative to utilise power generated from the resource, allows the States of Jersey to develop the asset and processes for developing it, thus ensuring that it creates the best value in its tidal stream resource.