The Environment Council

Sustainable Development Commission Tidal Power Stakeholder Workshop

27th March 2007 - Aberdeen

Transcript

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212 High Holborn
London WC1V 7VW
tel 020 7836 2626
fax 020 7242 1180
email info@envcouncil.org.uk
www.the-environment-council.org.uk

Registered Charity Number 294075 Certificate of Incorporation Number 2004003 VAT Number 577 8121 11

NOTE ON THIS WORKSHOP REPORT

This transcript was produced by The Environment Council, based on the wall record taken on flip charts during the course of the meeting. It has been produced as a record of the outcomes and outputs of the meeting and to inform non-attendees about the proceedings and discussion.

While the meeting flipcharts serve as a vital record and aide memoire for the participants, they are inevitably quite cryptic in places. This transcript is based upon the flip chart records and so its meaning may not be clear to people who did not attend the meeting. Please contact The Environment Council for clarification if necessary.

Text in italics indicates notes on the process of the meeting.

Produced by The Environment Council

If you have any comments or queries regarding this summary report please contact:

Name: Winsome Grigor
Direct Line: 0207 632 0108
E-mail: winsomeg@envcouncil.org.uk

Registered Charity Number: 294075

The Environment Council

SDC tidal power workshop – Aberdeen, 27/03/2007

Please sign in

Name	Organisation
Kenny MacInnes	Sustainable Scotland Network
Andrew Prior	JNCC
Bill Edgar	EMEC
Jon Wilson	Defence Estates
Archie Johnstone	Northern Lighthouse Board
James Simpson	Scottish Executive
Morag McCorkinaale	Aberdeen Renewable Energy Group
Catriona Prebble	Scottish Renewables
Simon Robertson	NPUWER Renewables
Melanie Hay	Scottish Enterprise
Bill Band	Scottish Natural Heritage
Min Zhu	OFGEM
Maeve O'Keeffe	The Environment Council
Elizabeth Marshall	The Highland Council
Tom Woolley	The Environment Council
June Graham	Scottish Environment Protection Agency
John Thouless	SSE Generation Ltd
Peter Fraser	Royal Institute of Navigation
Peter G Dow	Salmon & Trout Association
Chris Grieve	The Environment Council
Roger Morris	Natural England
Steve Hill	The Environment Council
Paul Neilson	SSE

Outline agenda

- Welcome & introduction
- Presentation from SDC
- Overview for the day
- Presentation on tidal technologies
- SD aspects of technologies
- Government roles
- Acceptability
- Overview of day & evaluation
- Closing remarks from SDC

Working agreements

- One person speaking at a time
- Respect the views of others
- Mobiles etc. switched off
- Chatham House rules i.e. non-attribution

Welcome and introduction – Gives & gets exercise

Participants were asked to introduce themselves to each other within their groups and record one key thing they brought to the day (Gives) and one key thing that they would like to take away from the day (Gets).

Gives	Gets
Blue	
Environmental impacts/benefits and potential constraints	Knowledge & aims of technology and possible future impact
- Broad perspective on marine & renewable energy industry - Promotion of renewable energy	View of other stakeholders' issues and concerns
Neutral viewpoint – hope to make all those aware of potential impact on marine environment users both commercial & pleasure	Improved understanding of socio-economic aspects
Common sense & not to specific in detail	Learn more of individual projects & technologies
Assess impact on migratory fish species	Potential of tidal power development in short, medium & long term
Local impact people & anglers	Impact on need for network capacity & operation
An understanding of the technical aspects of tidal energy technologies	More info to assess & discuss
Network regulation & efficient transmission capacity	The views of other stakeholders regarding the potential impacts of tidal technology
Reducing barriers for renewable energy to access network & markets	Report on process of SDC studies
Coastal management specialist – geomorphology & top down interpretation of impacts	Hope that Developers are aware of potential impact on marine users – both commercial & pleasure
Energy policy priorities	Better knowledge of stakeholders' views
Background to the project	An understanding of the differing priorities of the public vs. stakeholders
Green	
Preliminary understanding of environmental impacts	Appreciation of stakeholder views on tidal
Policy context for renewables	An appreciation for the key concerns of other stakeholders & how it affects what I do
Experience of developing other forms of renewable energy in Scotland	Awareness of the ambitions/needs of tidal energy developments
Pentland Firth concerns	Policy drivers- for marine wave & tidal energy development

Gives	Gets
Knowledge of tidal sites	Greater understanding of the environment within which tidal power must evolve
Knowledge of NE Scotland industry view & aspirations for tidal power	Understanding of likely environmental monitoring
Renewable energy development experience!	Other stakeholder views
Knowledge of modern marine interests	Agreement to expedite structures development at Pentland Firth
Interest of local communities to attract development/investment at Pentland Firth	Knowledge: How do we best exploit tidal power & overcome constraints?
Ideas for structuring parallel development activities	
Understanding that there is a tidal resource in the Highlands/Scotland – how do we exploit it?	
Red	
Process & engagement understanding	Different stakeholder views vs public concerns
Cables & connections	Stakeholder expectations
Government position	Likelihood & timing of large scale development
Overview information	Wider view of issues
Knowledge of annual migration & human navigation needs. Curiosity regarding technology	Understanding of how information will be presented by SDC
Marine navigation requirements; methodology groups; consultation process	Information to feed back to RIN. Understanding of structures involved and their influence on navigation for animals and humans
Understanding of consenting and potential environmental impacts	Central views of a wide range of stakeholders
Knowledge of companies/general issues	Understanding of how information will be presented by SDC
Broad knowledge of technology & economics of tidal stream devices	Better understanding of wider issues

<u>Points of clarification following presentation by Entec</u>

- Benefits for fish stocks
  - Via habitat creation
  - Restrictions on fishing allows stocks to recuperate
  - Have found that shell fisheries build up around stable structures
- Transport downsides have been included in navigation
- Tidal stream technologies can also take a solid form, similar to a barrage

Points of clarification following presentation by Entec continued

- Funding – some may come from Europe in the future. EU concentrates on research funding, not policy creation
- Area for tidal stream units (e.g. 30 units = 5 km2) depends on type of device. Further research is required.
- Consideration given to animals in tidal streams (e.g. impacts on migration extrapolating from other experience needs further research)

SD aspects of different technologies

Groups of participants were asked to consider the sustainability (Environmental, Social, Economic) aspects of three tidal power technologies. Each group had the opportunity to visit each station and contribute. Entries marked with a star (*) indicate notes made by the first group to visit any one particular station.

Tidal barrages

TIDAL BARRAGES - ENVIRONMENTAL	
Benefits	**Disbenefits**
* Carbon savings (assuming not cancelled out by growth in electricity demand) – potential benefits for people & wildlife	* Significant visual impact
Carbon saving	* Visual
	Visitor impacts on environmental factors including secondary
Transport diversion	
	Inter-tidal erosion and morphological change – long term decline
Design sensitive (e.g. fence not solid vs solid)	Scouring estuary systems; macro change to ecosystems
* Resource availability close to centres of population	* Large area impacts on protected species and sites (birds, Natura 2000)
Concentrated energy production	* Major effect on habitats
	* Presumed dis-benefit to large inter-tidal ecosystem
Combining heat pumps with possible power generating 'marine' CHP	Smothering exposed hard surface communities
Multiple technology benefits	Macro-ecosystem change
Potential technology benefits-caissons	Disrupts tidal transport mechanisms – fish, birds
	Disruption of migratory fish & multiple mortalities

TIDAL BARRAGES - ENVIRONMENTAL	
Benefits	**Disbenefits**
Large number of MWs relative to footprint	* Marine migration routes; Flushing action in estuary removed
* Benefit breeding grounds and marine parks	* We don't know what dis-benefits might be – research needed
	Additional journey time – marine
	Displaced infrastructure – impact elsewhere on natural environment
	Resources aggregate demand
	Could become a toxic collection point – "Nitrogen" bird farms
	Water quality – eutrophication
	* Carbon footprint during construction
	CO2 payback – carbon footprint long-term

TIDAL BARRAGES - SOCIAL	
Benefits	**Disbenefits**
* Improved infrastructure potential	Disruption to community – construction
Improved transport links	Long-term disruption/displacement
* Job creation during construction	Health toxic blooms
Flood management from sea - Agricultural/community benefit - Urban (property)	Impact on SAR (Search & Rescue Operations) – submerged structure at certain states of tide
Flood management facility	Negative tourism impacts – reduce opportunities for leisure
Civic amenity - People	Attracting investment & jobs - short-term, not sustainable
Could act as observation point, congregation point, tourism focus	
Tourism opportunities	Impact on local ports large & small – job losses
Watersport centres	
	Structural failure (unlikely)
Reduce fuel poverty - local	Long term decline in flood protection – potential collapse of structures

TIDAL BARRAGES - SOCIAL	
Benefits	**Disbenefits**
Improved health from reduction in fuel poverty	
Direct Community Benefit Fund	
Reducing climate change - Pride - Community buy-in	

TIDAL BARRAGES - ECONOMIC	
Benefits	**Disbenefits**
More manageable maintenance (downtime)	* Longer term economic development benefits not as significant as other technologies
	* Significant capital costs/unlikely economies of scale
* The main resource at broadly the right end of the British Isles with respect to electrical demand therefore potentially less costly transmissions reinforcements than for more distant renewables	Initial cost high and no guarantee of reduction
On-site transmission – connectivity	
Reliable source of energy – power easily accessed	Publicity disbenefits
Proven technology	Need to relocate ports – new infrastructure and increased transport costs
Long term full life costing	Secondary impacts – transport etc
Publicity benefits	All or nothing
Economic activity	Decommissioning liability
Big business opportunity	
	Environmental impact assessment and other regulatory costs
Uncertainty about costs – fishing	
	Uncertainty about costs to fishing closures – nursery, spawning
* Funding gap to be funded from public purse	Loss of sport fishing and income
Community Benefit Fund	Salmon is supermarket for seals
Employment opportunity - Maintenance - Construction	

TIDAL BARRAGES - ECONOMIC	
Benefits	**Disbenefits**
Bulk of investment will be with indigenous suppliers	
Security of supply	
Improve storage & efficiency	
Coastal protection – leading to tax reduction	

Tidal stream

TIDAL STREAM - ENVIRONMENTAL	
Benefits	**Disbenefits**
* Greater flexibility in locations than barrages	Impact on living species – it would be easy to go for maximum economic benefits and loose sight of the environment and social benefits
	Heavy disturbance in high impact areas
* Less permanent impact – quick/easy to decommission	* Concentrated resource – greater disturbance
	* Ecological impacts from tidal and wave energy
Small scale potential	
* Concentrated resource (less area disturbed)	Impact of cables
Minimal energy loss from this technology – lower thresholds (smaller devices)	Unknown impacts
Lower silting risk	* Changes in coastal processes – erosion impacts/risks
* Early projects can be carefully monitored for future expansion	Decommissioning options – end of life effects. 20 year life may be extended by replacement technology
Structural potential for monitoring stations	* Noise impacts on marine mammals
	* Possible levels of fish and mammal mortality especially collision
* Key means of replacing fossil fuel energy – CO2 savings & climate change mitigation	

TIDAL STREAM - ENVIRONMENTAL	
Benefits	**Disbenefits**
	Lack of environmental knowledge – precautionary approach by regulators hinders/prevents development
	More susceptible to fowling – not yet known?

TIDAL STREAM – SOCIAL	
Benefits	**Disbenefits**
* Potential for jobs especially rural in remote areas – regeneration. Vessel maintenance	Negative impact on local community
* Jobs – not always skilled locals	
	* No benefit for 'saving the grid'
Cash for local community	
	Depends how streams structured – continuity of supply
Local pride – local project self-sufficient. Buy-in from local community needed	
	Loss/impediment of surface and sub-surface marine navigation
Potential for small scale application	
	Impact on/loss of coastal exercise & firing areas
Minimal visual and noise impacts	
Submerged projects have no visual impact	Impact on search & rescue operations
Small scale devices less likely to constrain & obstruct surface & sub-surface navigation	More devices, more inhibitive on navigation than larger solid projects
	Potential loss of landscape aesthetics
	* Projects don't always use local labour

TIDAL STREAM – ECONOMIC	
Benefits	**Disbenefits**
* Generally technologies with low visibility therefore not intruding on tourism in rural areas	Cost of environmental studies to fill information gap. Who will pay? – small projects will struggle
	Large capital cost for research development

TIDAL STREAM – ECONOMIC	
Benefits	**Disbenefits**
Near shore – easy access, cheaper	Costs on small developers to R&D
	* Remote locations – costs of linkage & losses within the grid
* Quicker results than other technologies	* Less mature technology. Technologies may not be ready for commerciality for 5 years
Potential for multiple, smaller scale and cheaper devices	Maintaining tidal stream more complicated
* Modular construction provides more flexibility and less risk	Costs/difficulties of maintaining devices. Greater risk of downtime
	More cabling/mooring and infrastructure requirements compared to other technologies
* First projects must be allowed to progress quickly to gain experience	
	Requirement for government support
* One of a number of tricks in tool box	
	* Grid will be the key constraint on deployment. Action needed from NGC/OFGEM
CHP potential	
	* Commercial fishing restrictions
Security of supply	
Won't run out or 'peak'	* Commercial navigation restrictions
Free 'fuel' sources – renewables	
Aberdeen UK leader in sub-sea technology – massive potential for industry leaders – ship and employment	
Scottish lead in tidal technology – massive UK opportunity	
Potential for revitalising marine engineering sector - Develop new skills - R&D implications	
Indigenous capability – new business & employment opportunities	
Substantial export opportunities – knowledge and licensing. May need to import if we don't develop in UK	
Global business opportunities based on strong market here	

Tidal lagoons

TIDAL LAGOONS - ENVIRONMENTAL	
Benefits	**Disbenefits**
* Site specific in Scotland (e.g. Solway Orkney)	* Site specific not suitable for all environments
* Avoids habitat change associated with tidal barrages	* Loss of bird feeding areas
CHP possibility	* Impacts on coastal processes, sediment, transport etc
* Green power	
Combine wave & tidal!	Unknown impacts – not tested
* Concentrated energy source – small footprint relative to MWs	* Visual impact at low tide
Not such a large impact on mainland rivers coast line	
Contained impact that can be managed	* Large structure – high embodies energy, visual impact
Baseline environmental & other data	Low efficiency when compared to area impacted – 5km2 for similar output to 30 tidal flow devices
Location flexibility	* Risk of navigational hazards following decommissioning
Post decommissioning – artificial reef/habitat	Loss of less intrusive environmentally damaging micro generation as a result of macro energy high impact developments
	* Extensive civil infrastructure - Raw materials (quarries) - Transport impacts
	Energy balance from concrete manufacture
	Large amount of concrete used - acid by-product
	Increased demand for aggregates – more landward & marine aggregate extraction
	Carbon footprint during construction
	* Long-term impacts of decommissioning of large engineered schemes (compared to micro tidal stream devices)

TIDAL LAGOONS - ENVIRONMENTAL	
Benefits	**Disbenefits**
	* Lifecycle environmental costs – impact vs payback

TIDAL LAGOONS – SOCIAL	
Benefits	**Disbenefits**
* Medium/micro scale of development – potentially less of an impact on surface/sub-surface navigation	* Obstruction of marine navigation routes – loss of navigable waters
	Navigational hazard for commercial & pleasure marine users
Leisure & amenity feature (i.e. wind surfing) – visitor attraction	Navigation – disrupt established routes
Flood defence	Removal of fishing grounds – loss of local employment
Bridge over transport advantage	* Possible loss/constraint of defence training, tests, procurement and research areas
Community opportunities	Construction impacts
* Local employment	* Large visual impact
	Increase flood risk
	Leisure exclusions
	Removal of leisure opportunities

TIDAL LAGOONS – ECONOMIC	
Benefits	**Disbenefits**
Depending on future sea bed ownership negotiation, local ownership	Poorer efficiency than tidal streaming
Possible use of compartments to extend generation times	Very high capital cost
Controllability of output	Higher material & capital cost vs barrage
Compared with tidal stream. Less cable/connection distance therefore less transmission loss	Major decommissioning liability
Sites closed to demand centres/grid	

TIDAL LAGOONS – ECONOMIC	
Benefits	**Disbenefits**
	* Impact on important economic activities (e.g. tourism, agriculture)
* Uses proven hydro technology	
	Removal of leisure opportunities
* Could combine heat energy – have CHPs with adding heat pumps	
	* Sites often not accessible to large population centres
Calming storm surge – flood prevention	
	Loss of inshore fishing opportunity
Infrastructure improvements	Impact on fishing limited area
* Business opportunity	Impact on fishing gear caught on u/w objects
* New business potential	
	Impact on tourism
Aqua-culture possibilities	
	Impact on coastal views
* Local construction	
	Cost of changing navigational charts
* Local employment – labour intensive	
	Obstruction of marine navigation routes
	Impact of macro generation developments on micro generation potential/capacity
	Marine installation effects (e.g. silting of harbours & shipping lanes, displacement of sediment)
	Expect scour in places

<u>Notes on SD aspects of different technologies exercise</u>

- Hard to split economic, environment and social
- Hard to judge knock on benefits/disbenefits from other benefits
- What do we mean by environment?
    - Natural or built
    - Macro or micro levels
- Social benefits
    - Local
    - National

Government roles in supporting tidal power

Groups of participants took part in a facilitated discussion at their tables using the structure set out below.

What roles do you think the government should be taking in tidal power?
1. Roles in decision making
2. Roles in financing
   - Research & development
   - Capital investment
   - Ongoing support

Blue

1) Decision-making

Policy
The Government needs "absolute clarity" about its policy line on tidal power. This should be more than a vague section in a white paper.

There needs to be greater clarity between the EU, UK Government, and the devolved administration policy lines.

Environmental issues should be given greater consideration when setting up the policy line.

A main policy should be set by the Government, with less reliance on the regulators to set their own improvised policies (e.g. individual SWOT assessments on each application).

Legislation could be put into place to join up the market. Legislation could also help to tilt the market towards renewables, away from fossil fuels. This is currently illegal.

Consents process
These should be simplified to a one-stop process, and have increased flexibility in terms of access and communications.

There should be a level of certainty in arising at the end-point, and lower the levels of risk involved.

Consultation/Dialogue
Consultation and involvement from all stakeholders should take place at the earliest possible stage.

The Government needs to examine the energy mix in terms of national strategy and local impacts (e.g. local planning rules can allow local energy generation, but selling this electricity to the grid can come up against statutory boundaries). This needs dialogue with regional and national government, and facilitation of local energy generation (consents). The priority should be tilted towards energy solutions.

Government roles in supporting tidal power continued

Planning
The grid cannot be updated/upgraded unless planning legislation is changed at a central Government level. The planning allowances in relation to grid connections need to be reassessed. There is currently a long-term enquiry into this.

2) Finances

Overall role
The Government needs to be transparent about its role and intentions in terms of funding support – i.e. will it be a main player (public system) or the underwriter (private system).

Subsidies
Fossil fuels should be made more expensive, or tidal power subsidised to balance the grid issues faced by renewable power that fossils don't have.

The Scottish Executive has already put in place a market support scheme that not only provides capital support, but also enhances tidal payments for one-year certainty. The group felt this should be extended across the whole of the UK.

R&D
Tidal technologies are very expensive with high funding requirements. Since the Government pays large sums to other non-tidal energy technologies, the Government should pay some money into the large pot for funding tidal research.

Green

- The governments geographically based strategic approach may be a mistake because it assumes the generic availability of options for various locations based on experience at one site. Although any strategy needs guidance from central government, there seems to be a vacuum in direction so it would seem more appropriate for local and regional government bodies to take the lead.

- With Orkney being the primary site for testing of tidal power devices, there may be inconsistencies with the variety of environment types at sites chosen for generation.

- However, Orkney provides a strong focus for industry, which is attractive for developers with Government encouraging people to visit the site.

- There is a need for central government to inject more money into the development of tidal power.

Government roles in supporting tidal power continued

- The role of the Scottish executive is seen as important. A suggested relationship between levels of government could be that central government set a framework for tidal power across the UK with the role of the Scottish Executive (SE) being to implement it. However, there should be strong stakeholder and public feedback mechanisms in this process to make it adaptable and inclusive.

- To an extent there is an argument that the SE does not have enough powers to implement tidal power as an energy option. However, there are powers in place including section 36 of the electricity act. The role of Ofgem in this is influential but it is understood that it is a regulatory body and not one with legislative powers.

- A concept that should be examined in energy policy is that heat and electricity have been viewed separately but both constitute forms of energy and should be considered together.

- Energy companies want targets for tidal power and government bodies should be set up to deliver incentives to meet these targets.

- It is recognised that Scotland is rich in potential energy to be harnessed by renewable power generation technology but at the same time, it is recognised that much of the demand is in the South of the UK.

- The Crown Estates are seen as a block to progress in developing tidal power.

- The Marine Bill requires 5 years of Environmental Impact Assessment (EIA) before any tidal power is installed which is very restrictive to leading industries.

- In any overarching plan, the government needs to look beyond location and any targets driving tidal power development and consider the environment as well as expectations related to the technology; e.g. is it truly a clean technology? How does it fit with future predicted tide levels? It is important to consider local lives.

- Increased investment from central government is needed for development. This should be available from central government at a level that matches the wider interests of the UK with an option for funds to be topped up by devolved administrations.

Government roles in supporting tidal power continued

- Developers do have a current level of finance to work with but there is a funding gap between research and commercial level generation. The government must be willing to accept that some technologies will fail.

- The marine renewables development fund (MRDF) could help this but it doesn't as; (1) it doesn't fill the identified gap (2) industries are not ready to fulfil the criteria – this fund is only available to commercially generating installations.

- The locational drive behind funding is limiting. In addition, money is needed not only for engineering and it should be recognised that funding should also be available to cover both any environmental assessment activity required and legal activities including engaging local people in development of sites.

- ROCs are helpful, but again only once technology is generating commercially.

- It is unfair to expect tidal power to compete with mature renewables for the same funding. The MRDF came too late but it is a welcome additional funding stream.

- A possible funding mechanism is that of a revolving credit scheme to allow cash flow gaps to be plugged, funded by central government.

- ROCs are seen as a good way of ensuring that the consumer pays for renewable energy, which is considered correct.

- Financial bridging facilities need to be in place to plug the identified funding gap.

- Central government could be the guarantor for any credit scheme that would allow technologies to become commercially viable, retaining shares and returning to the public gains on investment. However, the government must pay money to further the national interest, NOT make money, as it is also the regulator. The government's role should be to create a climate for business with private companies making money as a result.

- The ROCs system provides ongoing support but once commercially viable, this support should be withdrawn.

- Public-private partnerships are a good idea initially but these should be reviewed and adapted once the industry is mature.

Government roles in supporting tidal power continued

- The next 5 years is essential as possible funding for tidal power may be diverted into the 2012 Olympics and investment in nuclear power.

Red

- Tidal power / energy generation is a new industry which needs steering/leadership by central government.
- Joined up, integrated framework through one authority.
- The proposed Marine Bill offers such a framework.
- Important to separate government as the consenting body from government as the promoting body.
- Strategic Environmental Assessment an important mechanism to enable more joined up decision-making.

- Industry wary of the risks of shifting ground that results from the variety of authorities/agencies involved in the current decision-making arrangements – the industry wants stability in the mechanisms provided in order to plan, invest and develop with more certainty.
- Industry wants regulators to have the 'right' brief in order to facilitate development of renewables technology and the industry. Ensuring a balance between the current requirement to 'prove the need' and the potential for licensing developments or projects.

- Some suggested that planning decisions should be made at more local levels or at Devolved Administration level so long as criteria set out in a strategic, integrated framework are met.
- Others disagreed, in order to effect such a suggestion; primary legislation would have to be changed. Any project greater than 1MW is not currently a local decision. There are no plans to change this.

- Central government should have a role in educating stakeholders – providing information about the technologies, their potential impacts and how stakeholders can engage with development proposals.
- Strategic Environmental Assessment could be the mechanism to educate and inform stakeholders.
- SEA could also be the mechanism to determine who are the important stakeholders.

- Environmental Impact Assessment is an important mechanism for consultation on individual project proposals; however, central government should provide guidelines on best practice for developers and other government agencies on the most effective ways to conduct EIA.

Government roles in supporting tidal power continued

Financing

- A view was expressed that government should fund R&D, capital investment and provide ongoing support – as the technology needs to be proven, because the industry needs stability and certainty and because there are connectivity issues.
- Others did not agree.

R&D

- Government should have a role in financing environmental impact monitoring.
- Government should have a role in financing the development of tidal power devices.
- Government commitments on renewables targets suggests there is a role in financing R&D of tidal technologies.
- Strategic Environmental Assessment should be well resourced and funded by government.

Capital Investment

- PFI
- Wires provision – regulator should be providing clear Terms of Reference, clear priorities and include incentives.
- Investors and industry should be responsible for financing capital investment, but government targets on renewables suggest financial assistance from government should be available.

Ongoing support

- Price support from government will engender certainty for industry and investors.
- The renewables obligation and marine supply obligation will help in Scotland until 2010 and 2027 respectively, perhaps these should be extended.

Acceptability

This process used an open-space technique in which participants were asked to add their input on an individual basis, as opposed to in groups, under the headings provided relating to acceptability issues arising from different tidal power options. Participants were given the freedom to visit any of the stations they chose and to spend as much time at each as they wanted within the time given. The stations were set in the context of the exercise on the sustainability of different tidal power options.

What key things need to change to make tidal power more acceptable?

Tidal power (generic)

Tidal power (generic) - Changes	
Benefits	**Disbenefits**
Maximise economic benefits (indigenous industry creation)	Increase knowledge base
Integrate devices into proposed structures	Streamlined planning process to allow timely decision-making
Commitment to well resourced E.I.A.	Better information on acoustic outputs from tidal farms/large scale developments
Make full use of Scottish SEA (due end Mar07)	Consent marine projects quickly – planning
Long term funding and incentives	Spatial planning can be wrong – needs quality input and flexibility
Exploit Scottish lead in tidal stream and wave development	A more joined up licensing & consultation system
National awareness in Scotland of potential to develop	2-3 years to get a S36 consent will kill tidal before it starts
Greater information/awareness to ensure informed debate	Certainty on the scale/size of tidal energy devices
"Uptake" forecasts to indicate likely spatial impacts	Consideration of cabling & potential to fund under-grounding
Accelerate indigenous technology development	Need shift towards local generators for local consumption
Research into environment impacts funded by central government	
Better understanding of environmental impacts	
Grid investment in underground & undersea cables	
Exploit Aberdeen's capability as a global sub-sea development/management culture	
Strategic approach to tidal – both types and within whole energy supply/source	
Location strategy to guide infrastructure and grid	

Tidal power (generic) - Changes	
Benefits	**Disbenefits**
A spatial planning/allocation system	
Need clear government policy	
Consistency in approach to assessing environmental impact	
Siting/design guidance to facilitate the selection of technologies	

Tidal barrages

Tidal barrages - Changes	
Benefits	**Disbenefits**
Fully exploit the benefit of output controllability	Nothing will make barrages acceptable. It is "make your mind up time for government"
Simultaneous development of barrage & any grid upgrades required	Assurance of no adverse impacts on estuarine sites designated for wildlife. Research needed to increase knowledge base
	Further research required
	More potential for IP generation
	Proper and full consultation with marine users
	Greater understanding of environmental impact
	Require a better understanding of the dynamics of flow – bredding and developing organisms. Potential impact on marine plankton etc

Tidal stream

Tidal Stream - Changes	
Benefits	**Disbenefits**
Revolving credit guarantee scheme needed	Avoid sensitive or unusual tidal habitats
Maximum benefit to UK supply chain	Much better understanding of tidal stream interactions with biological. Systems are required before action. Uncertainty
Build on Scottish lead in tidal technology	Research/monitoring is needed to confirm that collision risks are acceptably small
Extend financial support across UK	Improve knowledge on environmental impacts – should simplify planning
Maximise existing skills and develop new ones	Underwater/monitoring is needed to confirm that collision risks are acceptably small

Tidal Stream - Changes	
Benefits	**Disbenefits**
Support indigenous technology & suppliers	Underwater noise levels to be kept at levels which do not displace wildlife
Exploit Aberdeen's global energy network & sub-sea expertise	Fear of failure has been greatest/most costly dis-benefit
Essential change needed to deliver some projects	Requirement for improved govt support particularly at R&D stage
Project management/development teams for specific locations needed	Site specific (energy) resource assessments
Maximise potential for multiple energy source utilisation	Improved efficiency and reliability of technology
Funding to assist developers in environmental impact assessment	More "relaxed" approach to environmental impact for demonstrator projects
Make grid capacity available - regulation	Reduce development and investment risk
Align grid upgrades/new build with resource locations	Need for proving technology – funding required
Convince business and the public that this is the way forward	Resolve potential conflicts with other users of the area
Believe in benefits and fully fund a site specific generation type	Solve grid issues
Statutory renewable energy targets for planning consultants	Potential to fund undergrounding & cables
Once projects are delivered capability will be proved and wealth created more will follow	Regulatory framework to facilitate appropriate grid provision
Prove the technology – get experience	Ensure adequate monitoring at early stage
Accurate quantification of cost to government of meeting ministerial targets for renewable energy	Greater understanding of environmental impact
Better coordination of funding agencies	Strategic Environmental Assessment (England & Wales)
Public & private partnership structure needed	Identification of mitigation opportunities to minimise environmental impacts
Expedite developments to prove benefits value	Fast consent process
Proper & full consultation with marine users	
Tidal stream will only become more acceptable when real projects are delivered	
Using marine heat with power CHP will give greatest efficiency	
Agreement over level of energy extraction which can be taken without change to	

Tidal Stream - Changes	
Benefits	**Disbenefits**
hydrology/sedimentation	
Mechanism to fast track most promising designs/technologies	
Accelerated programs for proving 20 year design life	
Using structures as communication/transport links between islands	
Incentives for application of proven oil and gas sub-sea technology to renewables	

Tidal lagoons

TIDAL LAGOONS – Changes	
Benefits	**Dis-benefits**
Greater awareness of tidal lagoons	Viability of concept needs to be proven
Local community benefit	Environmental research
Proper & full consultation with marine users	Greater understanding of environmental impact
Fully exploit the benefit of controllability of output	Pilot study required
	DTI report on feasibility of tidal lagoons was highly dismissive. Industry believes this may not be the case
	Not convinced this is viable in UK – Barrage option would!?
	There will be dis-benefits so government must make its mind up

Overview of day - Final discussion

Marine S.E.A.

- UK wide documentation will take on board work being done in all regions
- SDC final report will look at generic issues & impacts; second part of report will look at the Severn
- Important to have project management team for Pentland Firth (not headed by an academic)
  - Need someone with a lot of project management experience
- Perception that if localised too much it won't be effective
- Why is study not looking at wave?
  - Focus on Severn wouldn't take account of variety of marine resource
  - Report aims to look at differences between tidal technologies

Overview of day - Final discussion continued

- Engagement with commercial & leisure users of marine environment is a challenge because of disinterest – more of the groups attending
- Cardiff workshop because of Severn
- Pentland Firth is also of importance & disappointment was expressed as to lack of these groups attendance – however, they were invited
- Heat is greater than 50% of energy use in UK but has apparently been forgotten (references to 'CHP' on carousel output actually refers to the 'heat pump' concept)
- Speculative provision of grid capacity would require change to regulatory framework (existing framework doesn't allow for this)

Action points

Action	Who	Completed
Email invitee list to attendees of this workshop	TEC	Sent with joining instructions on or after the 16th of March 2007
Email SDC presentation (including links to other processes) to this group	TEC	Circulated 3rd of April 2007
Email ENTEC presentation to this group	TEC	Circulated 3rd of April 2007

Messages to the SDC

Throughout the day participants had the opportunity to leave messages for the SDC on a specially designated message board.

- Carbon footprint - The carbon lifecycle has been frequently referred to as (in this workshop) a justification for tidal power. However, there will need to be clear guidance and protocols on how this is done – this is not simple & could be a large burden for developers if required.

- Tidal lagoons - DTI report on feasibility of lagoons was dismissive – "can't be done economically". Energy utilities believe this may not be the case, such opportunities should be facilitated/left open and not closed as this report has the danger of doing.

- Climate change - #1 priority -> Tell regulators! - The overriding importance of talking climate change should be filtered to all institutions involved in consenting to ensure they receive the timely attention and likelihood of success which they should receive if this is truly a top priority.

Messages to the SDC continued

- Financing - Support is focused on leading generation of technologies but there is a danger that some as yet little developed technologies may in fact be an even better solution. We don't want to miss these opportunities. Funding should support all stages of device developments.

- Urgent need for accelerated development program - Run in parallel 3 expert development groups with a coordinator for each site
  - Academic – environmental impct analysis
  - Engineering – bespoke designs and testing in specific sites
  - Legal & financial – how to structure projects for finance

- It is not clear how the project will differentiate between 'views' obtained from the workshop and 'evidence' provided by consultants. There is a lot of information/knowledge available that is not being collected by consultants (whose consultation process seems limited).

- Spatial planning - Is only as good as those who write it – it could be wrong or not fully informed therefore needs to be flexible and preclude developments outside of preferred areas.

- Knowledge gaps need to be addressed – much of what has been captured today is informed opinion rather than evidence. Research is required if these projects are to be promoted.

- Who will own these structures – private or public?