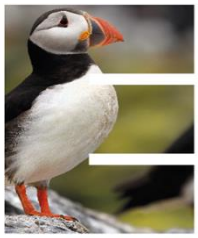

SCOTTISH POLICY GROUP

BRITISH ECOLOGICAL SOCIETY

A summary report from the Pie and a Pint event, held on 19th March 2019 at the Station Hotel, Aberdeen

"Striking the right balance in offshore renewables: ecosystem effects, trade-offs and climate change"

Introduction

Pie and a Pint (PAAP) events are informal information sharing opportunities run by the British Ecological Society (BES) Scottish Policy Group (SPG), and open to anyone with an interest in the topic. This event was held to provoke discussion and debate by professionals, students and policymakers around the topic of natural capital as a conservation tool. Overall, 44 attended, including policy staff from the BES London office and members of the Scottish Policy Group Committee.

The evening began with five invited speakers offering short presentations on the topic that reflected their position and experience. Following a short Q and A, the participants broke out into groups to discuss a number of key questions in more detail, and the evening finished with the opportunity to freely network.

This report reflects some of the key points and discussions from the evening: it is designed to be a summary document, and not a complete transcript.

Speaking session

Each speaker was given a six-minute slot to present their views on the statement, "Striking the right balance in offshore renewables: ecosystem effects, trade-offs and climate change" All questions for speakers were kept until the end of the session. This section highlights the key points from each speaker.

George Lees, Scottish Natural Heritage Policy and Advice Manager, Marine Energy and Development

(*Please note, the opinions expressed are those of the speaker personally and should not be taken to represent the formal position of SNH on any of the matters concerned. The SNH position on these, and wider issues relating to the natural heritage, can be obtained by visiting the SNH website at www.nature.scot*)

Climate change is the biggest threat to our natural heritage

- We recognise the impact of climate change on the natural (and human / social) environment - climate change posing a greater threat to our natural heritage than anything else.

So, we support renewables!

- We have strong in-house policies, linked to Scottish Government (SG) priorities and policies, supporting renewables, primarily as a means of reducing reliance on fossil fuels and thereby limiting climate change.

The key Is getting "The right development in the right place."

- These policies influence our casework responses insofar as we seek to enable marine renewables development in the right place.

But …….

- Even so, we have a statutory obligation to advise regulators - Marine Scotland (MS) in this context - of the local and regional natural heritage impacts that may result from a proposed renewables development. Specifically, under Natura, this means advising where planned development may result in adverse effects on site integrity and thereby Scottish Government being at risk of infraction, if the development were to be permitted.

That means working to find solutions.

- We can and do work with developers and regulators to find suitable mitigation that will enable development to proceed without such impacts

In one sense it is easy for us, as MS have the tough decisions to take.

- It is ultimately down to the regulator i.e. MS, not SNH, to balance long term climate change benefits (as well as more immediate benefits such as employment) against natural heritage and other impacts in coming to their decision.
- MS can and do disagree with our advice sometimes, because of the need to take on board all perspectives, not just ours.

Regarding the consenting process:

There are two parts of the consenting process where environmental impacts are considered, specifically:

- Environmental Impact Assessment (EIA) process where all environmental impacts and benefits are considered; MS use this process to influence decision but are not bound by it. Can include long-term benefits and there is some flexibility.
- Habitats Regulations Assessments (HRA) process - should there be Natura features that may be affected. This process is specific to the Natura features concerned - wider benefits are not relevant. It is statutorily binding and local impacts to Natura features (which can affect site integrity) are not permitted except under the extreme scenario of imperative reasons of over-riding public interest (this explains why MS can't simply permit such developments irrespective of the relative climate change benefits).

In summary long term climate change benefits can be considered within the EIA process but is more difficult under HRA**.**

How to resolve potential conflicts? - Upstream engagement:

- Working up front with SG and industry through, for example, the sectoral plans, to ensure large scale offshore renewables developments are appropriately located from the outset
- Working with developers on resolving any residual impacts predicted, via mitigation.
- Investing in post-consent monitoring and research.

It's also worth emphasising…..

- ~ 13 Offshore windfarms/ demonstrators have been consented in Scotland to date.
- All but 1 of ~35 wave and tidal consent applications to date have been approved.
- Scotland already generates >70% of its own electricity consumption, via renewables.
- On target to meet 100% demand by 2020.
- 10.5 GW renewables operational; 12 GW in planning (3.4GW) or consented (7GW) or in construction (1.4GW).

- If everything already consented is built, we have capacity to exceed the 17 GW required to meet 2030 target
- It is not either / or: *either* local impact *or* insufficient renewable energy production – meaning in Scotland we don't have to sacrifice the one to enable the other

In summary - Scotland can safeguard the local environment and be a global leader in the delivery of renewables and the switch from fossil fuels.

Dr Francis Daunt, Centre for Ecology and Hydrology, Edinburgh

- Delivering sustainable development of offshore renewables in our coastal marine environment is paramount because of the high density of important habitats and species that are occurring here. These species are experiencing marked environmental change and a range of other drivers meaning that the effects of offshore renewables must be considered alongside a complex mix of potential causes of change in their wellbeing.
- To undertake accurate assessments of the trade-off between two factors, such as cleaner energy and protecting wildlife, requires two things – an accurate assessment of the needs of each, and how they then interact with each other.

Focus on seabirds:

- This requires a robust baseline understanding of the habitat requirements that ensure their population resilience.
- Seabirds are long-lived species with delayed maturity. They are highly mobile in early life and across the annual cycle. Even for the most restricted populations, migrants travel tens to hundreds of kms from the colony in winter, whereas more extensive migrants travel to the opposite side of the Atlantic or even the length of the globe. This mobile existence is a central part of their ecology, and crucially we understand these periods and phases least, yet this is when most mortality occurs.
- Other factors that are also poorly understood are also central to the ecology of seabirds. For example, the extent to which populations are regulated by density dependence, and the size and structure of meta-populations, driven by exchange between individuals and from different sub-populations.
- Construction of a strong baseline for a species allows the dataset to be queried in particular ways that are pertinent. For example, we can begin to answer what space requirements they have in current conditions, and who they are happy to share that space with. This will of course depend on the requirements of their principal prey and, in turn lower trophic levels on which these prey items depend. We also need to predict how these space requirements will change under climate change, to make decisions that are robust to future change.
- Central to this issue is the extent of buffering that seabirds have to the loss or alteration of their habitats. This resilience to disturbance is a natural phenomenon that individuals face under varying conditions including extreme events. Buffering capacity will vary with age, environmental conditions, time of year and other key factors. Individuals from different populations and species may show common levels of buffering. Understanding the dynamics of buffering at these different biological scales is crucial because we can consider the perturbation from offshore developments as operating in a similar way to other perturbations.

One of the key challenges in analysing trade-offs is the interaction between competing demands. Key points to consider:

- There is a need for a robust way in which to estimate the perturbation caused by offshore renewables on wildlife.
- The key effects on seabirds tend to fall into two main types – lethal effects, of which the best known is collision, and sub-lethal effects such as displacement and barrier effects, whereby the effects act on behaviour and energetics with downstream consequences on demographic rates.

- Sub-lethal effects are particularly challenging, having dogged numerous issues in terms of human/wildlife conflicts for decades. Estimating these effects is challenging and needs to be done based on robust approaches.
- We need to collect appropriate data to quantify collisions, displacement and barrier effects. We need to be clear about our assumptions. We need to understand how these interactions vary with environmental conditions.

There are currently a number of key knowledge gaps in estimating the effects of offshore renewable developments:

- We are having difficulty in developing robust baselines in many seabird species because of the lack of appropriate biological data.
- We have limited understanding of year-round movements of different age classes, of density dependence, and of meta-population dynamics. We have only just begun to predict future change.
- We have a limited understanding of the changes that occur to bird behaviour, energetics and demography from interactions with offshore renewable developments, and how this varies with environmental conditions.
- These are well known knowledge gaps - we need to get in a better position to answer these questions by developing the best fundamental biological framework. This must include a shifting baseline that incorporates predicted change and direct links between renewable developments and the demography of protected species.
- Offshore developments have to consider population-level consequences on protected species. But we can't measure population level effects by measuring populations. Instead, this needs to be done by studying individuals animals.
- Information on individuals can then be used to scale up to populations and meta-populations at the appropriate scale.

Once we get the biology of the system right, then we can begin to address key trade-offs such as that between cleaner energy and protecting wildlife.

Dr Carol Sparling, SMRU Consulting

- The development of renewable energy sources to meet our energy needs is a hugely important part of the mitigation of climate change.
- The Intergovernmental Panel on Climate Change (IPCC) said that if governments were supportive, and the full range of renewable technologies were deployed, renewable energy could account for almost 80% of the world's energy supply within four decades.
- The Chair of the IPCC said the necessary investment in renewables would cost only about 1% of global GDP annually. This approach could keep greenhouse gas concentrations to less than 450 parts per million, the safe level beyond which climate change becomes catastrophic and irreversible.
- But with any new industry and technology, there are uncertainties about the potential impacts on wildlife and ecosystems.

Focus on marine mammals:

- With offshore wind the main concern is about the underwater noise generated by pile driving during the installation of the foundations for turbines, although vessel activity causing both the potential for collisions and disturbance is also of concern.
- Several studies have shown that porpoises are displaced from the area around pile driving activities - distances up to ~20 km, with the time for activity to return to pre-piling levels varies from a few hours to a few days.
- Tagging studies of seals have shown some responses to piling noise with reduced densities while piling is occurring but densities return to baseline within two hours.

- For marine mammals and offshore windfarms, the potential impact on mammals is mainly only during the construction phase - it's a temporary disturbance away from the area where the windfarm is being constructed but all data collected to date suggests that this disturbance is temporary and that densities return to pre-impact levels within days and in gaps between piling.
- As technology develops and as the industry gains experience, this part of the process is getting shorter.
- In terms of trade-offs, we need to find a way to appropriately balance the risks of impact with the benefits of renewable energy (RE) development.
- Without the RE industry there won't be any future biodiversity to worry about.

But: are we getting it right? Are we addressing these issues at the right scale?
There are two related areas where more work is needed - strategic planning level and cumulative impact assessment.

Strategic planning
- Strategic Environmental Assessment (SEA) doesn't take the ecology of highly mobile species into account. This makes things difficult for developers as well as resulting in environmental concerns.
- Scotland is getting better at this – there is strategic monitoring to inform SEA, leading on dolphin and porpoise conservation strategy which takes the focus off any one particular industry.

Cumulative assessment
- Current legislation requires that individual projects carry out cumulative assessment - basically most Cumulative Environmental Assessments (CEA) in practice are complete guesswork.
- CEA should be a strategic responsibility not restricted to any one industry - there needs to be a focus on the development of methods to allow the prediction and assessment of the aggregate effects of all activities on the marine ecosystem at a co-ordinated and strategic level, taking into account costs and benefits of different activities so that activities can be regulated from the top in a co-ordinated fashion.
- There's no point in the offshore windfarm industry doing their own strategic assessment, oil and gas doing another, some industries not having to do any (e.g. shipping, fishing) – as this leads to an uneven playing field and because renewables is the new kid on the block, and the regulation is developing, the RE industry seems to be bearing the brunt of the concern...

Monitoring
- We have not always got it right at the appropriate scale. This highlights the importance of co-ordinated, question driven monitoring. NOT repeating the same token tick box exercise at every single site and learning nothing.
- Scotland is starting to get this right through the regional advisory monitoring groups, but there is still a long way to go on this in the rest of the UK.

Zoe Crutchfield, Marine Scotland, Head of Licensing Operations Team

Protection of nature conservation is taken into account, but:
- There is a need to encourage and maintain industry as jobs are also important.
- There is a need to balance economic development against other drivers.
- There is a scarcity of energy supply! Securing sufficient supply of energy is important.
- Security of food – there is a need to maintain shipping and fishing fleets.

It is the job of Marine Scotland to advise – but ultimately the decision rests with the Ministers.
There will be trade-offs:
- One receptor's right place is not necessarily another's.
- Receptors have different levels of protection.

- Ecosystem based assessments would be great!

There is a need to think about timescales as well as spatial scales. These could be more strategic.
We also need to ask, what is the opportunity cost of the precautionary approach.

Professor Beth Scott, University of Aberdeen

Policy of mitigating climate change
Should mitigating climate change be our most important policy?
Absolutely yes! For two reasons:

1) If we allow climate change to run away it will be catastrophic. The worst-case scenarios are horrifying, with the seas increasing temperature at such rapid rates that they outstrip anything seen in human (*homo sapien*) history. There will also be changes in sea-level rise, in acidification and a change in the levels of storminess which will mean large changes in mixing in our oceans that can lead to huge changes in our plankton production and also in the timing of plankton production – all leading to large changes to marine ecosystems.
2) All of these things are predictable because they are related to physical changes. Physical changes are much easier to predict than biological changes. The high predictability of climate change means that there is a very high certainty that these events will happen.

Dealing with trade-offs
Are we dealing with trade-offs effectively?
A resounding no!

- In most cases we are not taking climate change into account when we are looking at current choices in our marine planning.
- The main reason we are most likely not taking this into account is that what is being predicted is unprecedented change. This is a change that we have never seen in our lifetimes nor in the lifetimes of any past generations.
- We are not well equipped as humans for unprecedented change.
- Climate change events are predictable. It is predictable that we will have many more extreme events if we allow climate change to go past the 1.5 ^{O}C temperature limit.
- What if we could use that same level of physical predictability to help us be more certain about which areas we should be thinking about protecting? Which areas of our seas are better to be used as places for large-scale renewables and which areas that are best used for fishing and other activities, now and into the future?
- From outcomes of a range of our projects and analyses (and those of other international researchers) - it is clear that there is good scope for using the predictability of physical environments to make forward projections of locations where preferable habitat for predator-prey interactions occurs.

Questions of Scale
Are we looking at scale correctly?

- We are doing things for the global good of reducing our CO_2 emissions but we also need to consider what the effects are on a local scale.
- Scotland is blessed with huge amounts of renewable energy; we have 25% of Europe's wind and tidal energy in just UK waters. We can produce much more renewable energy than is needed in the UK and therefore be exporters of this energy source.
- The DC cable solution has now been solved and so power can be exported far and wide without losing most of it along the way.
- One of the solutions in terms of the intermittent power of renewables is to have a system of DC cables linking up large areas of Europe and even onto the African continent such that when it's sunny somewhere and when it's windy elsewhere or when the tides are predictably running - this can all be put into a system that can be shared across very large areas.

- Whilst local effects are important, there is a need to consider that there aren't that many locations in the world where there is this much renewable energy on offer and if we don't produce it here how is that energy going to be produced?
- As we've seen in Scotland, the wave and tidal industry can be halted with just small changes in UK policy.

Lastly…

- If I did have a magic wand that worked I would wave it to make all of the energy companies and the governments get together to produce massive floating wind platforms that can be floated out into a deeper oceans - away from our coastal seas. They would be made up of individual 50 MW devices with massive arrays of these floating structures producing 10's of gigawatts of energy. These arrays would be creating hydrogen and would be serviced by vessel fleets running on hydrogen.
- I suggest this so that we wouldn't have to use the most productive areas of our near shore coasts as is planned at the moment. But that isn't going to happen in the near enough time and we are going to have to have some mixture of static wind, floating wind, tidal stream, tidal lagoon and wave power. That mixture is also a good thing as diversity is always better and more resilient than any single approach.

Workshop session

The speaking session was followed by group discussions. Participants broke into smaller working groups, and discussed the following questions:

1. Should mitigating climate change be the most important policy driver?
2. Are we dealing with trade-offs effectively?
3. Are decisions being made at the right scale?

The key points from the discussions across all groups are summarised below.

Should mitigating climate change be the most important policy driver?

- There was a strong consensus that delivering climate change policy should be the most important consideration.
- However, at the heart of this question lies the problem that there is currently no 'hierarchy of policies', and prioritisation in tackling climate change would be easier if there was a hierarchical structure.
- In order to enact a hierarchy, and give precedence to climate change, the following issues need to be addressed:
    - Future benefits need to be recognised in legislation, so that short-term losses can be properly assessed against long-term gains.
    - Short-term losses, e.g. impacts on biodiversity, could be minimised through harmonisation of policies, including the use of specific compensatory measures to reduce 'other pressures' (e.g. pollution, habitat loss, fisheries management etc.).

How do we choose places for renewable devices?

- What has been the impact so far of renewables? And why should we stop using renewables if they don't have a negative impact on the environment?
- There are areas where we know we shouldn't put renewables. But does having certain known protected places mean that other areas which may need protection don't get protected? How do we equally consider the risks to all places?

Gaps in scientific knowledge:

- We need to understand meta-population structures to be able to make scientifically informed decisions about where we can and can't have renewables.
- We don't know how meta-populations are structured, so we can't have a strategic look.

- We need to understand more about what we are protecting.
- There are many uncertainties at different levels.
- We should step away and look at climate change, large scale, strategic level, overall effects, not just think about the individuals.
- We need the right information to balance reducing carbon vs protecting marine mammals where offshore power comes from.

The legislation is outdated:

- Special Areas of Conservation are based on old Natura legislation. We need to update the legislation, but this will be a massive challenge!

Regulatory focus:

- EIA regulations are focused on receptors, not climate change.
- Nature conservation sometimes trumps reduction in carbon emissions.
- Regulations tell us to look at individuals rather than look at climate change overall.
- Environmental regulations look at receptors and take away overall change impact.
- We need to consider carbon reduction contributions and each scheme, and we need a better framework for analysing trade-offs.
- Scotland could take a lead in policy innovation.

Are we dealing with trade-offs effectively?

No!

- Trade-offs between offshore renewables and nature / socio-economics impacts operate at different scales: global and local and both scales should be considered.
- There is a lot of information on the effect/trade-offs at the local scale, but little on global scale, especially regarding cumulative effect. This is missing some focus.
- A need was identified for decisions to be more interactive across sectors; with the suggestion that, because of current sectoral-based decision-making, not all potential compensatory measures have been explored.
- There may be benefits to climate structure infrastructure, e.g. 'no-take zones' around wind farms.
- Time-scales could be the key challenge in managing trade-offs, because legislation currently requires a proof of 'no negative impact on individual assets' (e.g. natural protected features/habitats/species), but these short-term impacts need to be traded off against the longer-term risk posed by climate change.
- Protective legislation designed in a pre-climate change era needs to be modified.

We need appropriate frameworks as currently we don't have them:

- We are constructing them on an ad hoc basis.
- We don't have the equivalent frameworks for marine as we do for terrestrial.
- We need a better framework for impacts to better understand how to make the decision between different trade-offs.
- Take tools we have on land, cost of energy, natural capital, etc, need to bring that into things.

Monitoring is important for decisions around renewables:

- Monitoring needs to inform future decisions.
- Monitoring is needed to understand cumulative impact, adaptive management.
- Availability of EIA data and sharing of data is key for making informed decisions.

Further considerations:

- Broader, non-monetary values need to be considered, intrinsic value of some of the things which need to be protected.

- We need to consider a lot of other things, such as health, etc, so must consider social impacts.
- The sea is owned by us, not landowners.
- What is the social cost of energy.
- We need to understand the lifecycle of CO_2 better

Are decisions being made at the right scale?

No!

- Decisions are made at a project level, and the emergence of a broader sectoral plan will help.
- However, cross-sectoral decision-making would be required; the group had the ambition that this could be unified at a 'sea' scale, i.e. a 'North Sea plan'.
- This would require policy leadership that garners a broader set of expertise than is currently being utilised; furthermore, pan-European differences in approach may also limit this ambition, and these limitations are unlikely to be resolved in the current climate of UK-European politics.

Government scale:

- Needs to be more strategic, more controlled: institution scale.
- There needs to be intergovernmental cooperation.
- EU might say where you can't, but not where you should, put renewables.
- We need a political champion for joined-upness.
- Needs to be strategic/top-down.

We need a wider perspective:

- Fighting for Natura sites, letting other sites go because it wasn't designated many years ago.
- The economy must work for society, not the other way.
- Go back and look at much wider perspective, people do have to prioritise and look at scale.
- There's nothing coming from NERC, but they have recently showed interest in wind energy.
- Scotland could do more to encourage tidal energy developments.

Other points made:

Need to reflect the urgency of climate action:

- We need to put immediate policies in place.
- More proactive government is needed.
- But there needs to be a sense of urgency to be able to take action
- We should also reduce energy demand from consumers.
- Energy is quite easy, energy security, rather than what needs to be done to tackle climate change in the long-term.
- CC has not been a priority for voters.
- Assuming we have political will, what should be the geographic scale?

Getting stakeholders on board / How to inspire change:

- How do you get that response and individual change? Is it by marketing?
- Give people a "carbon conscious"
- What should the scope be? What energy plans should it cover?
- Should cover ecology
- Within energy plan take into account ecology!
- Consider biodiversity as a priority
- Ecological economics
- A lot of win-win perspectives

Final thoughts:

- There should be stronger international control and consequences over not meeting climate targets by a given country.
- Climate change is not restricted by country borders, but policy and actions often are.
- There is not enough communication and knowledge exchange, especially between industry and regulators (most likely because they compete for the same space and resources). Data and reports should be open access.

Conclusions

The workshop provided an opportunity for interested parties to discuss and debate ideas regarding the trade-offs that need to be considered when developing offshore renewable energy to mitigate climate change. The BES - Scottish Policy Group would like to thank all the speakers for providing such a stimulating debate, and to all the attendees for participating in the workshop.