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ETF RESEARCH PRIORITIES

(Prepared by James Pierce-Higgins (BTO) and the ETF Coordinator, presented at the 2nd Meeting of the ETF, Bonn, Germany, 14-15 September 2017)

CHAMPION PLUS

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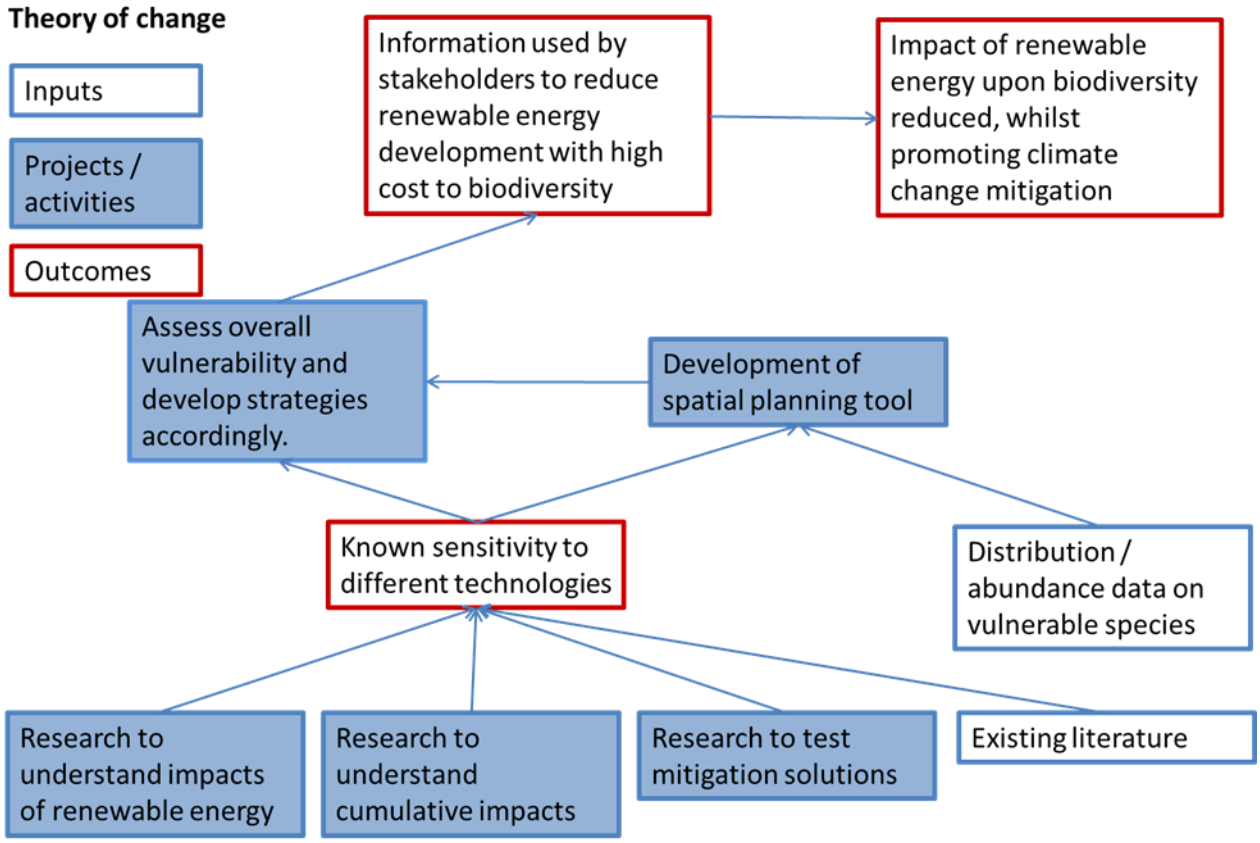
ETF RESEARCH PRIORITIES

Introduction

Climate change poses a significant and increasing risk for biodiversity, ecosystems and society. In response the Paris agreement aims to limit global climate change to 1.5°C warming, requiring urgent mitigation of greenhouse gas emissions, particularly through large-scale deployment of renewable energy. There is good evidence that many forms of renewable energy are associated with potentially negative impacts of biodiversity, whether through habitat conversion, (e.g. in the case of biofuels or hydropower), or disturbance, displacement and collision (e.g. such as with wind turbines). The first step to resolving the tension between renewable energy deployment and biodiversity loss is evidence: evidence of impacts of different energy options, information about the location and abundance of vulnerable species/habitats to inform spatial planning, and evidence about the effectiveness of potential solutions to renewable energy (mitigation), which combine to indicate overall vulnerability.

A recent project (research) has quantified the vulnerability of bird and bat species to collision with wind turbines and scoped the potential magnitude of impacts overall to 2050 under future scenarios of climate change mitigation. However, more work is required to further quantify the impacts of renewable energy on biodiversity, particularly to fill knowledge gaps, to combine that information with appropriate information about the location of sensitive species for strategic spatial planning, and to assess the potential for mitigation to reduce renewable energy impacts. These research needs are elaborated in more detail below and can broadly be summarised in the following theory of change.



Potential research areas

Research to understand impacts of renewable energy. Some technologies have been subject to considerable research and their impacts are relatively well understood (e.g. onshore wind turbines) at least in areas where they have been widely deployed and on species they interact with (Schuster et al. 2015 Env Manag, Thaxter et al. 2017 Proc Roy Soc B), although there remain challenges when predicting population-level impacts. Others, however, are relatively little studied (e.g. solar) and urgently require new field research to be assessed. Whilst it would be possible to scope and identify some potential research priorities now (e.g. review of biofuel impacts based on existing literature, field studies of impacts of solar power), it might be useful to hold a workshop of experts to review and scope what we know about different technologies and how they impact different species and how that knowledge varies between regions, in order to more rigorously identify future research priorities for informing practice on the ground. Then, through time, that research should be funded to improve our knowledge base. This should include consideration of transmission lines.

Research to understand cumulative impacts. There is increasing evidence that individuals within a population may interact with a number of potential renewable energy developments, which can then have a cumulative impact on that population. Additional effects of other pressures may also affect population sensitivity to renewable energy. Further, population responses to impacts will vary with carrying capacity, density-dependence and in relation to meta-population dynamics (e.g. differing between source and sink populations), which can make accurate assessment challenging in complex environments (Humphreys et al. 2016 SWBSG Commissioned report number 1505). There is an urgent need to develop appropriate tools and guidance for developers and regulators to help them assess cumulative impact, and to consider what threshold of impact may be acceptable.

Research to test mitigation solutions. There is some research to develop potential mitigation solutions to reduce the impacts of particular developments on certain species (e.g. altering turbine height, operating short-term shut-down of wind turbines during periods of high collision risk, implementing agri-environment scheme options in bioenergy crops). This research requires reviewing and synthesising, to identify whether there is sufficient evidence to promote particular solutions in different contexts, and to identify knowledge gaps for further assessment.

Development of spatial planning tool. A critical tool for reducing impacts of renewable energy is an appropriate spatial planning tool (e.g. Bright et al. 2008 Biol Cons, Gove et al. 2016 PLoS ONE). As information on likely impacts of different renewable energies become available, this can be combined with information about the distribution / abundance of potentially sensitive species to identify vulnerability hotspots to be avoided, or to identify potential locations of least conflict (subject to confirmation by impact assessment). There is potential to adopt this approach to assess the potential risk of government commitments following the Paris agreement, and to develop tools to suggest how such commitments may be fulfilled with minimal impact upon biodiversity.

Assess overall vulnerability across different technologies. Key to reducing the impacts of renewable energy upon biodiversity is an assessment of the relative vulnerability of species to different technologies in different regions, in relation to likely energy producing capacity in those regions. With such information, it will be possible to start to assess, for particular regions, which forms of energy should be favoured as a means of reducing impacts (see http://ww2.rspb.org.uk/Images/energy_vision_summary_report_tcm9-419580.pdf). By synthesising the information about the impacts of different renewable energy options, the potential for mitigation and potentially factoring in cumulative impacts, it should be possible to develop much clearer guidance for stakeholders to inform decision making.

Questions for discussion

The following questions will then be discussed in plenary.

1. Are any major research areas missing?
2. Do you know of ongoing research or active proposals for work in these areas?
3. What are the energies / species / habitats / regions of greatest concern to you, where potential impacts might be greatest?
4. Which research areas would you prioritise?
5. How would you like to see this work programme taken forward?