Grant Allan [1,2], Michelle Gilmartin[1,2], Peter McGregor[1,2], Kim Swales[1]

THE FORMATION OF A DOMESTIC AND INTERNATIONAL MARKET FOR TIDAL ENERGY TECHNOLOGIES: THE UK ECONOMIC IMPACT

[1] Fraser of Allander Institute, University of Strathclyde, 01415483854, michelle.gilmartin@strath.ac.uk
[2] Department of Economics, University of Strathclyde, 01415483854, michelle.gilmartin@strath.ac.uk

OVERVIEW

World-wide interest in tidal power has increased in recent years, and this is particularly true for the UK, where the vast tidal energy resource around the coast is ranked among the best in the world. An important part of the case for renewable energy is the UK-wide socio-economic opportunities that would be associated with the deployment of devices such as tidal turbines. Domestic expenditures on research and development, production, installation and maintenance of tidal turbine devices could provide a demand stimulus for the local, regional and national economies. In addition, a key driver in developing the UK tidal sector is the economic gain that could flow from the export of tidal devices, technologies and expertise. Significant worldwide tidal resources, including in Australia, Canada, France, Japan, Korea and the US, provide potential for industrial development of the tidal turbine sector on an international scale. In this paper, I aim to quantify such potential benefits of the deployment of tidal energy in the UK.

The benefits of various renewable energy technologies have previously been estimated for a number of projects - most notably wind power developments - with these estimates often used to argue in favour of projects during the planning process. However, it is not always clear from publicly available documents how these impacts have been calculated, making it difficult to compare and evaluate the results, and creating information barriers for policy makers and investors. Numerous uncertainties are involved in estimating the potential effects of such projects, and the overall benefits can be highly dependent on wide-ranging factors, including policy support and the availability of investment funds. As such, estimates of the impact of projects are frequently speculative in nature and/or based only on surveys and consultations with industry insiders. In some cases they attempt to quantify the local employment effects of domestic expenditures, though there are few economy-wide analyses, and, to our knowledge, no explicit assessments of the economic impact of the development of an export market for specific renewable energy technologies. For the UK tidal sector, as yet there are no formal estimates of potential job creation or economic impact assessments, and no estimates of potential export demand that could be associated with the development of the sector.

METHODS

In this paper, we use a twenty-five sector computable general equilibrium model, UKENVI, to estimate the UK economy-wide benefit from a domestic and export demand stimulus to the UK tidal power industry. We consider the impact of expenditures related to domestic tidal device installations on the UK economy, and incorporate estimates of potential export demand. In doing so, we focus on the development of the tidal industry over the eighteen year period 2008 – 2025 inclusive, and draw on a range of estimates relating to: the tidal resource capacity in UK waters; the installation timepath for domestic devices; and the production and maintenance expenditures for domestic device installations. We use export data for the Danish

wind turbine industry to infer the potential export demand for UK tidal turbines. At present, there are no examples in the literature of this kind of analysis relating to the impact of the development of a domestic and export demand for tidal turbine production.

RESULTS & CONCLUSIONS

We find that the development of a domestic market for UK tidal turbines could generate a positive, though modest, increase in economy-wide economic activity, and that the economic boost from export revenues could potentially far outweigh these effects. We also consider the unequal spatial distribution of the tidal energy resource in the UK: since much of the tidal resource is located in Scottish waters, the development of a tidal industry which is concentrated close to resources could give rise to policy co-ordination issues amongst the regional governments. The results of the analysis provide a new and important knowledge base for policy makers and investors' decision-making.