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Title: Tidal Power on a Global Scale: Feasibility and Contribution to Energy Growth in the Developing World

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Category: Marine Renewable Energy

The need for clean, renewable sources of electricity and the continued growth of the world's least developed countries indicate the need for all avenues of renewable electricity generation to be pursued. This research identifies developing regions and countries that have both the necessary physical and desired socio-political resources to create a promising environment for tidal power development. As an emerging and rapidly evolving technology, in-stream tidal power holds great promise but is not without its obstacles which necessitate further inquiry. This work aims to help address one of these obstacles; the need to accurately identify potential sites for tidal development. Nova Scotia has a clearly identified tidal resource and a unique opportunity to foster the development of the tidal industry and export these technical and knowledge based skills around the world.

A total of 57 developing countries were analyzed from several perspectives including; tidal range, presence of tidal current influencing geographic features, proximity to electricity load centers, and the country's approach to renewable energy technologies. While several areas of the world such as the coasts of Canada, the UK, and South Korea have well known resources the waters surrounding these 57 nations have scarcely been studied.

Four unique geographic features were identified to cause favorable conditions for tidal power with these being; 1) inlets, 2) island groups, 3) peninsulas and 4) estuaries. The promising geographic features were selected based on a review of completed tidal energy resource assessments from Canada and the UK. These features were isolated as they were seen to induce an increased tidal current velocity, a key determinant in a site's potential for in-stream tidal power development. To help distinguish between features of varying potential, a graded ranking system was adopted and implemented through the use of GIS software. Data on each country's tidal range (low to high tide) has also been compiled and mapped in the software to highlight areas that contain both high ranges and promising geographical features.

A graded ranking system was also employed to develop a ranking system that could be used to identify the variance in countries' socio-political preparedness for renewable energy technologies. Whether or not countries have established renewable energy policies, if they readily take advantage of international funding schemes such as the Clean Development Mechanism, proximity of potential tidal resources to load centers and if they are heavily dependent on fuel imports will help to indicate countries that may be best prepared to facilitate tidal development.

Assessment of the primary layer in this research, the physical layer, has allowed for 17 countries to be identified as having a significant physical tidal resource. Applying the subsequent socio-political layers allowed for this list to be further refined to just seven countries. Many other interesting findings have emerged including countries that may be well suited for specific technologies based on physical resource requirements of those technologies (ie; small channel, minimum flows, etc) as well as countries of extremely low potential for tidal power development.