

**Can Tidal Power Promote Sustainable  
Integrated Coastal Development in  
Bangladesh?**

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**This thesis is presented for the degree of**

**Doctor of Philosophy**

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## **DECLARATION**

I declare that this thesis is my own account of my research and contains, as its main content, work that has not previously been submitted for a degree at any tertiary educational institution.

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## **ABSTRACT**

Tidal power is a clean renewable energy. Furthermore, electricity is acknowledged as a key need for development. However, until recently, due to high capital costs and extensive environmental concerns, few tidal power plants are operative around the world. These problems are now being mitigated by the application of appropriate, modern practices and technologies. In particular the use of small-scale technologies, innovative financing and the involvement of local communities creates the potential for tidal power to be a tool in coastal development. This thesis examines the appropriateness of tidal power in the rural coastal community of Bangladesh, where electricity demand is a major development problem.

Coastal Bangladesh is highly vulnerable to natural disasters, especially from cyclones, tidal surges and the effects of global warming on sea-level rise. Consequently, most of this coastal area has been protected by embankments and sluice gates, which can accommodate the normal tidal head rise and fall. The potential of tidal power to use this infrastructure, together with its associated problems and mitigation measures, have been analysed by comparing existing and potential tidal power technologies around the world, including a proposed Kimberley tidal power project in Western Australia. The research has identified that a significant amount of power could be produced from the tidal range of coastal Bangladesh by using the simple low-cost technology of tidal wheels in the tidal embankment sluice gates. The electricity produced could be utilised by various coastal interests, such as agriculture, shrimp aquaculture and other resource producing activities. However, the real benefits of this technology are that it can be applied in a way that simultaneously enables the development of local infrastructure and the improvement in living conditions of the

local people by creating income generation and employment opportunities in these coastal communities. The thesis puts forward a community based co-management model as a means of effectively integrating tidal power in coastal area management in Bangladesh.

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# **Can Tidal Power Work? A Case Study of Sustainable Integrated Coastal Development in Bangladesh**

## **Abstract**

Tidal power is a clean renewable energy. Further, electricity is acknowledged as a key need for development. However, until recently, due to high capital costs and extensive environmental concerns, few tidal power plants are operative around the world. These problems are now being mitigated by the application of appropriate, modern technologies; in particular the use of small-scale technologies, innovative financing and the involvement of local communities. This thesis examines the appropriateness of tidal power in the rural coastal community of Bangladesh, where electricity demand is a major development problem.

Coastal Bangladesh is highly vulnerable to natural disasters, especially from cyclones, tidal surges and the effects of global warming on sea-level rise. Consequently, most of this coastal area has been protected by embankments and sluice gates, which can accommodate the normal tidal head rise and fall. The potential of tidal power to use this infrastructure, its associated problems and mitigation measures, have been analysed by comparing existing and potential tidal power technologies around the world, including a proposed Kimberley tidal power project in Western Australia. The research has identified that a significant amount of power could be produced from the tidal range of coastal Bangladesh by using the simple low-cost technology of tidal wheels in the tidal



embankment sluice gates. The electricity produced could be utilised by various coastal interests, such as agriculture, shrimp aquaculture and other resource producing activities. However, the real benefits of this technology are that it can be applied in a way that simultaneously enables the development of local infrastructure and the improvement in living conditions of the local people by creating income generation and employment opportunities in these coastal communities. The thesis also puts forward a community based co-management model as a means of effectively integrating tidal power in coastal area management in Bangladesh.

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