

RIVER AND ESTUARY OF RIVER TAY  
POTENTIAL USE OF TIDES FOR GENERATION OF ELECTRICITY

In 1841 proposals were being made to consider restriction of the width of river Tay to increase the tidal flow over a narrower river and estuary, causing sand to be moved from the bed of the river and out to sea, thus deepening the river approaches to the port of Dundee and making the port more suitable for the larger ships then being constructed and planned.

THE PRESENT:

Recent developments in the technology applicable to the use of natural power to generate electricity, and the growing concern about global warming, and the inevitable large increases in the costs of power whether generated from oil, gas or nuclear power all contrive to direct attention to the use of natural resources as attractive alternatives.

There are three natural sources of energy namely wind power, wave power and tidal power. A great deal of money and resources have been directed to studies on development of these resources and some progress has been made, particularly on wind power (and Dundee has an excellent example at the Michelin factory). Wave power has been getting a lot of favour in recent months. Of these three natural sources of energy, tidal power has been, to a large degree, the forgotten one.

Wind power is an attractive and identifiable use of natural resources for power generation and, having seen large swathes of highland landscape well covered with turbines which are readily available for maintenance and repair and I must admit to having some admiration for development of that source of energy.

Wave power is, by its nature, developed off-shore in areas where frequent and large waves and swell are frequent and it is apparent that off-shore wind power and wave power should be taken together for some aspects of maintenance and remoteness. Pentland Firth and Orkney are two locations being favoured for development of off-shore wind power and wave power installations.

There are problems associated with moving energy from remote wind farms and wave power units over large distances to consumers. In addition, when energy in electrical form is moved from one location to another there is a loss of energy caused by heat generated during the movement and a degree of dissipation of energy. This will occur on a 24/7 basis. Has this been quantified and included in efficiency calculations? I have seen no evidence of that.

In addition because wave power units are mechanical and located in areas where large waves and swell are common (these being essential to wave powered generation of power), I foresee problems in the future mainly because the units will be susceptible to breakdown and, because breakdowns are likely to be caused by heavy weather, access by boat or helicopter for repair will be difficult and dangerous and 'down time' frequent.

## THE FUTURE:

1. To date, there has been very limited recognition of the potential of tidal power for generation of electricity. In my opinion tidal power has many positive aspects and a limited number of potential difficulties and I propose river Tay has many attributes that make it an ideal test area as well as a strong candidate for major investment to utilise the tides in river Tay for generation of electricity.

2. I strongly maintain recognition must be given to the potential of tidal power for generation of electricity in river Tay and the following points trace some aspects of the history of river Tay and lay out sound bases in support of that initiative in the future.

3. Although that is not the purpose for the current discussion, the message maybe taken as an example of lateral thinking i.e. why not narrow the estuary to increase the rate of tidal flow over a smaller area and therefore make generation of power more efficient and financially attractive.

03. For many years there was an electricity generating station in the harbour at Dundee and the power generated was fed into the national grid via overhead power lines, some of which remain to this day in Greendykes Road. It must be recorded the pylons and equipment may not meet current industry standards, but there is a clear precedent for generation of electricity at Dundee Harbour.

4. Whether reclamation of certain areas of the north and south banks of River Tay would meet ready approval is unlikely, but surely there must be appreciation that reclamation would allow construction of housing and civic facilities close to current urban areas without the overwhelming need to provide new and expensive public transport. This would be much more efficient than looking to build even more housing and related facilities in 'green' countryside.

5. Of advantage to Dundee is the availability of riverside engineering facilities with capacity and experience in construction for the North Sea offshore industry and these could provide skills and experience to the project.

6. Further to these potential areas to be reclaimed from River Tay, the reclaimed land may, in fact, fall to the Crown, but there must be recognition that the land be used for such purposes as sports training, recreation and civic amenities including separate cycle and pedestrian pathways, for example. Perhaps such development would at long last see the return to the people of Dundee and Fife access to the shores of River Tay and recall forgotten uses and aspects of their river.

7. Dundee has two Universities and it is anticipated they would be very interested in this venture and be prepared to apply the skills of their faculties and the potential of their student bodies in architecture, design and materials testing, for example. This could lead to the development and design of an overall concept, with early identification of problem areas and engineering requirements. I propose the Universities in Dundee be invited to take an active role in finding problems and developing solutions, and to identify industry requirements associated with this project of this scale.

8. Regarding the long term effects of major reclamation in the estuary and river Tay, I recall some years ago staff at one of Dundee's Universities researched changes in the navigation channels in river Tay and the estuary. This is only one example where existing skills and knowledge are available and of value to this project and should be identified and brought to the table.

9. The volume of water flowing into, and ebbing from, river Tay is substantial and, in a quoted statistic is that tidal movement in river Tay has a greater volume of water than the Thames and Severn combined.

10. I anticipate an early assessment will be required to identify the volume of water flowing into, and ebbing from, river Tay and instruments such as flow-meters will be positioned in many locations positions along the river which, over a period of time, would provide that information. These positions could include, for example, some suspended from the Tay railway and road bridges. In addition, there are three rocks close to the Dundee shore just to seaward of the road bridge, named Beacon Rock, Fowler Rock and Calman's Rock. These rocks are more or less in a north-south line and could also be well utilised to position flow-meters in the assessment period.

Obviously, even an initial assessment phase of this project will need major funding and the complexity of this project is sufficient to require the appointment of a group dedicated to developing an initial profile to ensure the project gets moving.

You may be interested to know that in July 2006, having previously spoken with a reporter, I submitted a similar document to D. C. Thomson, Dundee, but, as that was ignored, D. C. Thomson apparently thought the subject unworthy of the pages of 'The Courier'.