ANGUS COUNCIL
ROADS COMMITTEE
11 OCTOBER 2001
A92 MONTROSE BRIDGE
RESULTS OF TIDAL POWER FEASIBILITY STUDY
REPORT BY THE ACTING DIRECTOR OF ROADS

ABSTRACT
This report details the findings of the Tidal Power Study undertaken by Halcrow to examine the feasibility of a tidal power generating scheme being incorporated into the project for the replacement of Montrose Bridge.

1 RECOMMENDATIONS

It is recommended that the Committee agree:-

(i) to note the results of the Tidal Power Study;

(ii) that the study should not be pursued further at this stage.

2 BACKGROUND

Following the Roads Committee meeting of 12 October 2000 (Report No 1163/00), Halcrow were commissioned as part of their Stage 2 Consultancy Works on Montrose Bridge to examine the feasibility of generating renewable energy from the tidal/river flow within the River South Esk at Montrose Bridge in conjunction with the construction of a replacement bridge structure.

3 DETAILS

The work was undertaken by Peter Fraenkel working as a sub-consultant to Halcrow. The feasibility study has now been completed and a copy of Fraenkel’s report has been placed in the Members’ Lounge.

The conclusions may be summarised as:-

Tidal Barrage

- Whilst a tidal barrage would maximise the energy potential there would be potential problems with scour at the railway bridge, operational difficulties within the Port and major significant environmental impacts on the ecology of Montrose Basin. This option was therefore considered not suitable.
Underwater Turbines

- The maximum depth of water at the bridge at low tide is of the order 4 – 5m, thus restricting the size of underwater turbines to 4.5m which limits the potential energy capture.

- Six rotors are considered optimal for the site. Using more rotors than this would introduce structural problems and may result in causing excess blockage of the flow.

- The rotors may be installed as part of the bridge structure or on an independent stand alone structure. This proposal therefore would not constrain the form of the new bridge which is to be subject to a design and construct tender competition.

Cost – Benefit Analysis and Feasibility

- The flow velocity (measured by St Andrew's University at 2.1 m/s) is lower than anticipated. Halcrow's hydrological modelling techniques suggest a higher flow velocity at 2.85 m/s. The study has considered the viability of the scheme using both the measured and theoretical maximum flow velocities.

- It is feasible to connect into the existing electricity distribution system via a new sub-station incorporating switching gear and control mechanisms.

- The capital costs of the project are dependent upon whether the rotors are supported by the bridge or free-standing. The estimated Capital costs range from approximately £250,000 to £330,000.

- The revenue costs to run, maintain and insure the system are estimated at £17,000 per annum.

- The energy output is dependent on the current flow velocity and has been calculated as ranging from 0.32 gwh/year (2.1 m/s flow) to 0.766 gwh/year (2.85 m/s flow). An energy output of 0.32 gwh/year is approximately equivalent to that required to power 100 households.

- There may be grant assistance for such a scheme although no direct sources have been identified.

- The scheme could be a demonstration project, but unlike wind turbines the technology involved is still at an early stage of development.

- There would be environmental issues raised including the effect on fish and bird movements.

- The estimated net cost to the Council of the electricity generated would be dependent on the capital costs, the amount of grant received and the energy output. However, it would be significantly higher than the 4.5 to 5p per kw price
currently available for power generators (in this case the Council) to sell to the national grid. The scheme therefore is not economically viable.

- The output achievable from such a scheme is not deemed worth further consideration in comparison to that available from other renewable sources.

In consideration of the above and in light of the technological difficulties, depth of water limitations, environmental issues and financial implications to the Council it is not proposed to pursue a tidal power generating scheme further at this stage. It should be noted however that such a system is technically feasible and could be reconsidered at some time in the future should the environmental problems be overcome and the costs become economically viable.

4 FINANCIAL IMPLICATIONS

There are no additional financial implications as a result of this report.

5 HUMAN RIGHTS IMPLICATIONS

There are no human rights implications arising from the proposals in this report.

6 CONSULTATION

The Chief Executive, the Director of Finance, the Director of Law & Administration, the Director of Planning & Transport and the Director of Property have been consulted in the preparation of this report.

7 CONCLUSION

The report by Halcrow and their sub-consultants indicates that the provision of tidal power generation at the A92 Montrose Bridge site is not, currently, economically viable either in combination with the replacement structure or on a stand alone basis.

R W McNeil
ACTING DIRECTOR OF ROADS

NOTE:
No background papers, as defined by Section 50D of the Local Government (Scotland) Act 1973 (other than any containing confidential or exempt information) were relied on to any material extent in preparing the above Report.

IAC/JSG
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