

## **SUSTAINABLE DEVELOPMENT ADVISORY PANEL - 7TH MARCH 2013**

**SUBJECT: FEASIBILITY OF HYDROELECTRIC SCHEME AT GIBBS WEIR**

**REPORT BY: CHIEF EXECUTIVE**

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### **1. PURPOSE OF REPORT**

- 1.1 To inform Members of the Sustainable Development Advisory Panel on the viability of the proposed hydroelectric scheme at Gibbs Weir, Pontllanfraith.

### **2. SUMMARY**

- 2.1 MannPower Consulting Limited has produced a feasibility report related to a proposal for a hydroelectric project at Gibbs Weir.
- 2.2 This report compares the consultant's estimated costs with those validated by the Council's Engineering Services Division, which has determined that the project is not financially viable and will not deliver the proposed non-financial benefits.

### **3. LINKS TO STRATEGY**

- 3.1 The county borough wide assessment of potential locations for hydroelectric schemes was initiated by the Sustainable Development & Living Environment Team and the proposal supports the following strategies and priorities:
- Caerphilly Community Strategy
  - Sustainable Development Strategy, 2008
  - CCBC Corporate Improvement Plan 2009 – 2012
  - Climate Change Strategy for Wales. Welsh Government (2010).
  - One Wales, One Planet (2009), the Sustainable Development Strategy for Wales.
  - Wales Environment Strategy (2006).
  - Caerphilly Climate Change Strategy (2009).

### **4. THE REPORT**

- 4.1 As part of the Rural Development Plan Sustainable Energy Project a desktop study was undertaken in March 2012 by Locogen (a supplier of Archimedean screw turbines and equipment for hydro generation projects) to identify the opportunities for hydroelectric schemes within the county borough. The study identified a number of potential sites and recommended Gibbs Weir on the Sirhowy River, which has an existing weir arrangement, as having the best characteristics for electricity generation, using an Archimedean screw system.

4.2 The benefits of the proposal were stated as:

- The close proximity to Ty Pontllanfraith means that, in principle, electricity generated from the project could be fed direct to the council offices.
- The proposed scheme would compliment the Authority's commitment to sustainable development and the green agenda, giving a positive message reinforcing that commitment.
- Generating our own electricity will make us more resilient to increasing energy prices
- The project will provide an educational tool for local schools and will be reflected as a showcase example of renewable energy generation.
- Development of the scheme will raise understanding and expertise of this type of technology within the Authority
- The project could incorporate an integrated fish pass which would address a problem identified by the Environment Agency - that the current weir prevents the upstream migration of salmon and forms a 'hot spot' for salmon poaching

4.3 Following the initial screening and pre-feasibility work, low head hydroelectric specialist MannPower were commissioned to prepare a feasibility report for the Gibbs Weir proposal. The report concluded that the scheme would be self-financing after an 11-year period, generate an income of £237,000 over a 20-year period and provide approximately 25% of the electricity needs of Ty Pontllanfraith.

4.4 MannPower acknowledges however that the use of Archimedean screws for generating power on a commercial scale is a relatively recent development in the UK. There are therefore a very limited number of case histories and even fewer within the public sector, particularly on main river in a relatively remote location, where access is severely restricted and where there is high potential for vandalism and theft. The estimate costs produced by Mannpower were from experience of 'similar schemes' and had no consideration of specific site conditions. The Sustainable Development Team therefore recommended that the key civil, mechanical, electrical and income estimates be reviewed to reflect the site specific circumstances.

4.5 As a consequence the Engineering Division were requested to validate the site-specific capital/operational/income costs in order to confirm whether the scheme is financially viable and would deliver the non-financial benefits identified.

4.6 Due to the specialist nature of the proposal CCBC's framework consultant Parsons Brinckerhoff were commissioned to validate the mechanical and electrical engineering aspects of the project, whilst also bringing a degree of independence to the estimation process.

4.7 A detailed financial matrix is attached at Appendix 1. An inflation figure of 3.5% per annum is applied to the operation and maintenance costs, as well as the income from energy generation.

4.8 A summary is detailed in the table below:

<b>Item</b>	<b>MannPower initial estimate</b>	<b>CCBC/Parsons Brinckerhoff's estimate</b>
Estimated Total Costs including Development Fees	£326,100	£605,000
Estimated Annual Operating and Maintenance Cost	£6,250	£8750
1st Year Net Revenue	£29,139	£24,538
Simple Payback Period	11.2 yrs	25.1 Yrs
20-Year Unlevered NPV	£237,000	- £122,990

- 4.9 The outcome of the financial assessment review has confirmed that the hydroelectric project is not financially viable and has the potential to cost the authority approximately £122,990 over a 20 year period.
- 4.10 In addition, the liability for the weir remains with the council and no provision has been made for the potential costs and loss of income as a consequence of vandalism of the installation, delays due to major component failure or the eventual decommissioning of the hydroelectric installation.
- 4.11 It has been mentioned earlier in the report that the existing weir effectively prevents the upstream migration of salmon and is a hot-spot for salmon poaching. It has been established that the existing weir is the responsibility of the authority in terms of maintenance. Whilst the weir visibly appears to be structurally sound it is nevertheless approximately 40 years old and is clearly situated in a very aggressive environment. The Environment Agency have however confirmed that should the hydroelectric project – which would have incorporated a fish pass-not proceed, subject to the approval of the authority, they have secured European funding to remove the whole of the existing structure in order to resolve the issue related to salmon migration and poaching. This would be at no cost to the authority and will eliminate a long-term liability.
- 4.12 It is recommended that the authority do not proceed with the hydroelectric scheme at Gibbs Weir for the following reasons:
- The business case is not financially viable.
  - Due to its relative remoteness and poor accessibility, Gibbs Weir does not lend itself to use as an educational tool for local schools and will therefore not realise the desire of visibly demonstrating the Authority's commitment to sustainable development.
  - There are concerns due to the remoteness of the site that vandalism and theft would be a major issue, as not all of the equipment can be fully enclosed for operational reasons. (The adjacent civic amenity site is prone to regular occurrences of theft despite the provision of security fencing and operational CCTV).
  - The salmon migration and poaching problem posed by the weir will be resolved by its removal by the Environment Agency.

## **5. EQUALITIES IMPLICATIONS**

- 5.1 This report is for information purposes, so the Council's Equality process does not need to be applied.

## **6. FINANCIAL IMPLICATIONS**

- 6.1 There are no financial implications arising from this report, as it is an update on the viability of the scheme. However should the hydroelectric project at Cwmcarn be taken forward there will be implications on funding for detailed design work and licensing and capital costs for implementing a scheme.

## **7. PERSONNEL IMPLICATIONS**

- 7.1 There are no personnel implications arising from this report

## **8. CONSULTATIONS**

- 8.1 See list below. The report has been amended to accommodate all comments received during consultations.

## **9. RECOMMENDATIONS**

- 9.1 That the Gibbs Weir hydroelectric project is not taken forward.
- 9.2 The Environment Agency be given approval to remove the existing weir structure.
- 9.3 The feasibility of providing a hydroelectric scheme near Cwmcarn visitors centre be explored further and be the subject of a future report.

## **10. REASONS FOR THE RECOMMENDATIONS**

- 10.1 For the reasons set out in the report

## **11. STATUTORY POWER**

- 11.1 There are no statutory powers

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Background Papers:  
Parsons Brinckerhoff - Feasibility Study Review  
MannPower Consulting Limited – Design Study  
Loco<sub>2</sub>gen – Study report  
Carbon Trust – Carbon Management Renewable Energy Report

Appendices:  
Appendix 1: Gibbs Weir – Financial matrix  
Appendix 2: Location Plan and Photographs