

**SUSTAINABLE DEVELOPMENT ADVISORY PANEL -
17TH JANUARY 2013**

SUBJECT: CWMCARN FOREST - HYDROELECTRIC SCHEME UPDATE

REPORT BY: DEPUTY CHIEF EXECUTIVE

1. PURPOSE OF REPORT

- 1.1 To update Members of the Sustainable Development Advisory Panel on the feasibility of developing a hydroelectric scheme at Cwmcarn Forest.

2. SUMMARY

- 2.1 The feasibility and financial viability of generating hydroelectricity from the Nant Carn watercourse at Cwmcarn Forest has been investigated. It is concluded that the site is potentially suitable and the financial payback period could be 10 years or less. There are though several issues that would need further work and clarification before the project could be fully endorsed. Furthermore significant capital investment would be required to take the project forward.

3. THE REPORT

- 3.1 The Nant Carn watercourse drains a 5.2km² catchment and flows through the Cwmcarn Forest recreation site and joins the Ebbw River at Cwmcarn. A lake has been formed by locally damming the watercourse and the topography downstream of the lake presents an apparently attractive opportunity to utilise the flow and the head differential to generate hydroelectricity.
- 3.2 Zitec Renewables Ltd were commissioned in March 2011 to carry out a feasibility study. This study concluded that the site indeed had potential and made recommendations in terms of a suitable installation. The key elements of the recommended installation were as follows

Type	Cross flow turbine
Head	10m
Predicted Output	42,500 kWhrs per annum
FITs and Export revenue	£9,700 per annum
Energy costs saved	Depends upon usage
Capital cost	£80-£100k
Maintenance costs	Not yet known
Payback period	8-10 years

- 3.3 The feasibility study assumed watercourse flows derived from a theoretical catchment model. If actual flows were significantly less than those assumed then the viability of the project could be in jeopardy and therefore Walliford Hydro Solutions Ltd (WHSL) were commissioned in April 2012 to measure actual watercourse flow over a 6 month period. The rainfall during the monitoring period was abnormally high but WHSL corrected the gathered data to reflect

average rainfall and WHSL reported that in conclusion, actual average flows in the watercourse should exceed those predicted by the theoretical catchment model.

- 3.4 Access for construction is good at the upstream end of the proposed location but the bank adjacent to the watercourse becomes progressively steeper and more wooded downstream. Nevertheless, there appear to be no insurmountable obstacles to construction.
- 3.5 With the exception of the inlet weir and the outlet flume the proposed system would be fully enclosed and should not be attractive to vandals.
- 3.6 The reliability of the technology and the frequency of routine maintenance have yet to be fully established but the costs associated with both will need to be allowed for within the overall budget. Regular cleaning of the inlet filter grill arrangement will be required.
- 3.7 Some of the generated electricity could be used by the Authority buildings but as much of the electricity will be generated at night when demand is low it is likely that more than half of the energy generated would be exported to the grid.
- 3.8 The watercourse flow measuring station is still in place and gathering data and it is proposed that the data is next downloaded in Spring 2013.
- 3.9 Whilst the Authority owns the land adjacent to the watercourse the ownership of the watercourse has not yet been established.

4. LINKS TO STRATEGY

- 4.1 The work of the Sustainable Development & Living Environment Team supports the following strategies and priorities:
 - Caerphilly CBC Sustainable Development Strategy, 2008
 - Caerphilly CBC Climate Change Strategy (2009).

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 progress only. Clearly if the scheme is taken forward there will be implications on funding for detailed design work, licensing, capital and maintenance costs for the scheme. Furthermore there will be revenues from feed in tariff and export tariffs and reduced energy charges to the Authority.

7. PERSONNEL IMPLICATIONS

- 7.1 There are no personnel implications arising from this report but if the scheme was implemented the inlet grill arrangement would need to be manually cleaned regularly. Possibly twice or three times weekly.

8. CONSULTATIONS

- 8.1 See list below. The views of the consultees have been reflected in the report.

9. RECOMMENDATIONS

- 9.1 That the Panel notes the positive progress made to date and the potential to generate hydro electricity at the Cwmcarn Forest site. If and when funding is available further work will be required to define the scheme and to quantify project risks.

10. REASONS FOR THE RECOMMENDATIONS

- 10.1 As set out in the report.

11. STATUTORY POWER

- 11.1 There are no statutory powers.

Author: Mark Williams – Building Consultancy Manager

Consultees: Paul Rossiter – Energy & Water Conservation Officer