



RHONDDA CYNON TAF COUNTY BOROUGH COUNCIL

CLIMATE CHANGE CABINET SUB-COMMITTEE

6th DECEMBER 2022

HYDRO ELECTRIC GENERATION AT DARE VALLEY COUNTRY PARK

**REPORT OF THE DIRECTOR OF CORPORATE ESTATES IN DISCUSSION
WITH THE CABINET MEMBER FOR CLIMATE CHANGE & CORPORATE
SERVICES**

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Roberts, Head of Energy & Carbon Reduction.**

1. PURPOSE OF THE REPORT

- 1.1. The purpose of the report is to provide an overview of feasibility work completed for the development of a high-head Hydro Electric Generation Scheme at Dare Valley Country Park. This report is based on a feasibility study produced by a specialist company that reviewed the viability of a previously considered scheme.

2. RECOMMENDATIONS

It is recommended that Members:

- 2.1. Note the contents of this report as part of the works agenda of the Climate Change Cabinet Sub-Committee and agree a way forward.
- 2.2. Agree further expenditure in the development of these proposals, as detailed within section 10.2, to undertake further design studies which assess the full potential of the project and to help develop detailed project proposals.
- 2.3. Consent to receive further progress reports, at appropriate intervals, in the development of the proposals.

3. REASONS FOR RECOMMENDATIONS

- 3.1. Agreeing to take this project forward to the next stage has the potential to make a positive contribution towards the Council's efforts to increase its renewable energy generation and contributing towards achieving our ambitious carbon reduction targets.

4. PROJECT BACKGROUND

- 4.1. The content of this report provides supporting information for the development of a hydroelectric scheme at Dare Valley Country Park, an outline of which was first presented to the Climate Change Cabinet Steering Group in March 2022.
- 4.2. In RCT's Corporate Plan 2020-24, 'Making A Difference', the Council acknowledged that delivering on our Climate Change commitment is our greatest challenge. In our plan we committed to delivering priorities, all of which will contribute to and benefit from tackling climate change.
- 4.3. Officers have previously given an overview on the ongoing work to investigate the potential for the development of renewable energy utilizing hydroelectric power. These are projects which could be developed by the Council and as such would both contribute to the increase in the renewable energy provision and carbon reduction in the area, thus contributing positively to the Climate Change Agenda.
- 4.4. To achieve the target of net zero, the Council must invest in the development of clean energy generation projects that enable the Council to decarbonize assets across its estate. With grid constraints becoming an issue for RCT and for Wales, the generation of renewable energy utilizing hydro power 'on site', behind the meter, will assist with introducing potential innovative opportunities across the County Borough.
- 4.5. In late 2021, The Green Valleys (TGV), a Community Interest Company, produced a feasibility report on behalf of Rhondda Cynon Taf County Borough Council to assess the potential development of a hydroelectric scheme at Dare Valley Country Park, Aberdare. The site was first assessed in 2014 for feasibility, however, the proposal did not meet the criteria for further advancement at that time. Given the urgency of the current Climate Change agenda and the increasing cost of energy, particularly during 2022, there is now a greater need to implement renewable energy projects.
- 4.6. Dare Valley Country Park is a public park, comprising of 200 acres of woodlands, pasture, and moorland mountainside. The landholding consists of two large ponds to the northwest of the visitor's centre. The project proposal is to install an intake on the existing weir at the upper pond (see Appendices). The powerhouse would be situated on the northwest corner of the lower pond and house the turbine, generator, and control system. Water would be returned to the lower pond from the powerhouse (see Appendix 'A').

5. CURRENT PROJECT DETAILS

- 5.1. The Feasibility Report, produced on behalf of RCTCBC to assess the potential for the development of a high-head hydroelectric scheme at Dare Valley Country Park, provides preliminary information on the hydrological and geographical assessment, development technology, associated project costs and overall project benefits that could be realized, if the project is delivered. The original 2014 report proposed two options for consideration, at different locations at the site, however, based on the more favourable return, this report concentrates only on the implementation of the preferred option, as detailed within the report.

- 5.2. The outline proposals are that a generator is installed and supplied with water from an intake located 400m away from the generator. The intake would utilise the existing weir wall (see Appendices) and would require a prefabricated steel intake box to be constructed with only minor amendments to the existing impoundment.
- 5.3. The report estimates that a typical hydroelectric scheme, in these particular circumstances, will produce a peak power output of 38.3 kW and an average output of 19 kW. This would give an estimated annual Electrical Power Output of 167,879 kWh and would produce a saving of 84 tonnes of Carbon Dioxide per annum. Assuming a 50/50 split between export potential and behind the meter usage, is estimated that over 20 years the project will generate almost £900,000 (based at 6p/kWh export and 15p/kWh intake) and will provide a financial payback period of under 10 years, however further assessment will be needed as the market conditions change (as explained herein).
- 5.4. Further investigation and appraisal will be needed to determine the best option for use of the energy generated, including an assessment into the viability of a private wire arrangement, where all the energy will be used on site. Export options at times of low on-site base load will also be explored.

6. PROJECT FORWARD PLAN AND TIMESCALES

- 6.1. Further detailed survey work is required to confirm the estimates and theories of the options put forward in the feasibility study/report. Additional investigation is also needed into methods of procuring the necessary equipment, should the scheme eventually go ahead. It is recommended that an internal Project Manager (PM) be appointed to oversee further development.
- 6.2. Supplementary studies are required to assess the feasibility of using the electricity generated from the proposed hydropower scheme, on-site, possibly at the Dare Valley Country Park Hotel complex. It is anticipated that this may be feasible via a private wire arrangement, and it is requested that the service of specialists be appointed to further investigate this potential.
- 6.3. Such a report would assess the energy consumption of the Dare Valley Country Park Hotel and all adjacent facilities, which are RCT owned assets on the site. This would help to determine the suitability of such a private wire arrangement, together with the second option of an export arrangement, whereby any unused energy generated could be sold to the National Grid.
- 6.4. As this stage, the report has been informed by the 'high-level' feasibility study, with indicative budget assumptions used, however, should the further assessment now recommended take place, greater clarity will then be provided on the expected project costs.
- 6.5. The essential procedure of obtaining an abstraction license will need to be assessed and the timeline for such a process confirmed (*see section 10*).
- 6.6. Discussions have taken place with colleagues, in other parts of the Council, regarding flood mitigation proposals that may need to take place around the proposed hydro works. Collaboration between service areas will be needed to ensure that works are neither duplicated or contradictory in nature, particularly in relation to the redesign of the weir and the bespoke outlet that will be needed to feed the hydro works.

7. EQUALITY AND DIVERSITY IMPLICATIONS / SOCIO-ECONOMIC DUTY

- 7.1 This report is for the purpose of providing an update and consequently an Equality Impact Assessment is not required.

8. WELSH LANGUAGE IMPLICATIONS

- 8.1 This report is for the purpose of providing an update and consequently a Welsh Language Impact Assessment is not required, however a copy can be made available in Welsh if requested.

9. CONSULTATION

- 9.1 There are no consultation requirements at present with regards to this supporting report. However, should the project proceed to the next phases of development, appropriate consultations will take place as part of the necessary planning approval process.

10. FINANCIAL IMPLICATION(S)

- 10.1. To consider the development of a hydroelectric scheme at Dare Valley Country Park in greater detail, an in-depth design and cost study, by a specialist company would be needed together with specialist environmental studies.
- 10.2. The total budget likely to be required to take the project to the next stage will be in the region of £35,000, and this level of expenditure can be covered from within existing budgets for such works.
- 10.3. At the final quarter of f/y 2021/22, the estimated total budget costs of delivering such a project were in the region of £390,000 (excl' VAT), however, the overall budget figure will need to be reassessed and updated upon the appointment of a Project Manager, and then further refined at each stage of the process.

11. LEGAL IMPLICATIONS

- 11.1. Natural Resources Wales (NRW) regulates many aspects of environmental protection and is particularly involved in the protection of inland waters. The Council recognises that hydropower proposals will need to be considered by several NRW teams and will require several different permits and/or licenses. It is thought that the project could secure a Level 3 Abstraction License, which will be crucial to delivering a cost-effective scheme.
- 11.2. Planning permission is required for any hydropower development and is controlled by RCTCBC. Due to the limited potential impact of this scheme, it is anticipated that the necessary planning permissions will be forthcoming.
- 11.3. Due to the ecological impact, it is recommended that a Tree Survey and Stage 1 Full Habitat Assessment is conducted, to inform the submission of the Planning Application.

12. LINKS TO THE CORPORATE AND NATIONAL PRIORITIES AND THE WELL- BEING OF FUTURE GENERATIONS ACT.

- 12.1. All actions that may arise resulting from the recommendations of the Climate Change Cabinet Sub-Committee report, will take full regard to the seven National Wellbeing Goals.

13. CONCLUSION

- 13.1. This report provides an overview of the feasibility into developing a high-head hydroelectric scheme at Dare Valley Country Park, as an asset owned by RCTCBC. It is recommended that the Climate Change Cabinet Sub-Committee approve the necessary funding to enable the Council to appoint a specialist company to undertake a design study, to help develop this proposal into a full project.

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Appendices to follow:

Appendix 'A' ~ Site Orientation

Appendix 'B' ~ Impoundment at the Upper Lake

Appendix 'C' ~ Typical Impoundment of A Hydro Scheme

Appendix 'D' ~ Revised Impoundment at the Upper Lake

Appendix 'A' ~ Site Orientation

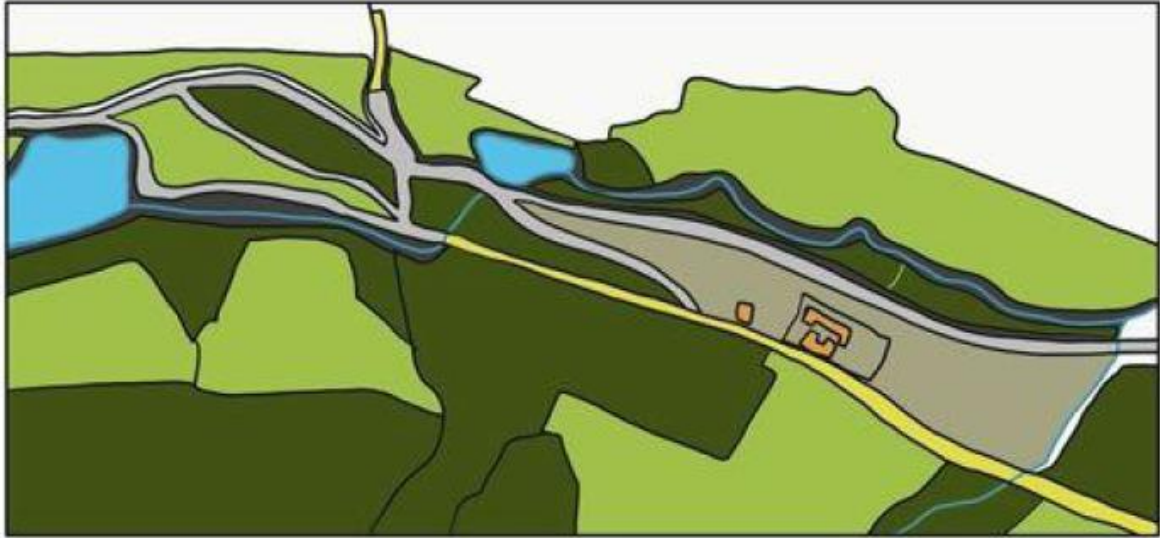


Figure 1: Map illustrating the main watercourse features on site. The best hydropower resource is between the two lakes (blue) with the grid connection taking place at the hotel/visitor centre (orange)

Appendix 'B' ~ Impoundment at the Upper Lake (Existing)



Figure 2: Existing Impoundment on the Upper Lake.

Appendix 'C' ~ Typical Impoundment of a Hydro Scheme (Example)



Fig 3 shows another hydro scheme of a similar nature

Appendix 'D' ~ Revised Impoundment at the Upper Lake (Example Only)

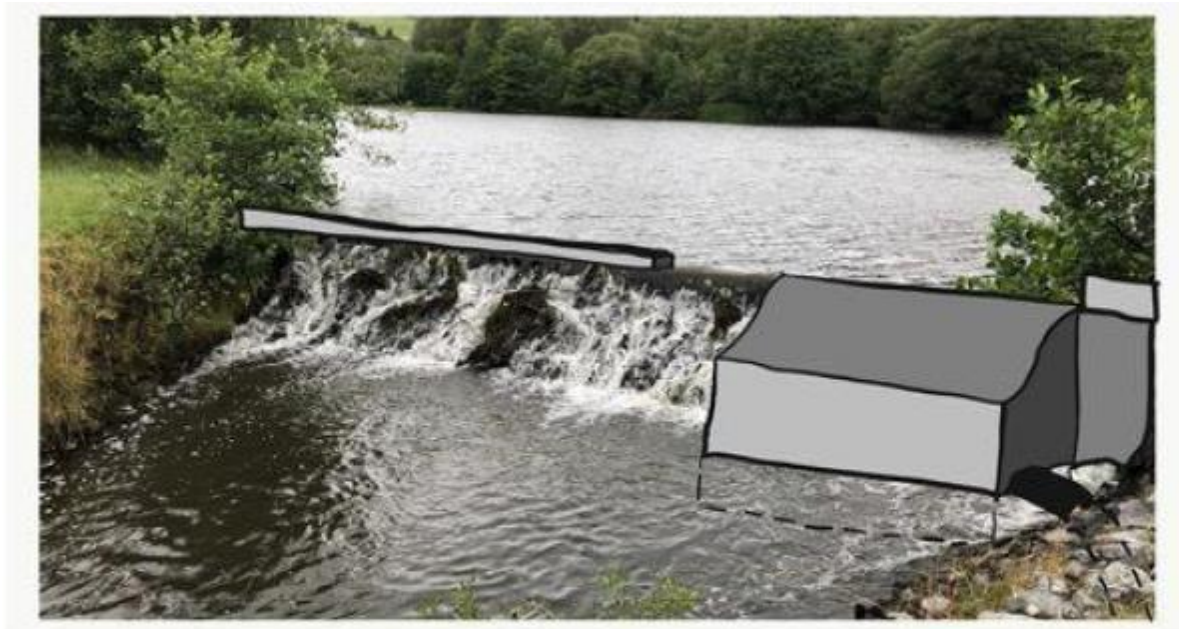


Figure 5: Recommended Intake Location. Outline Intake Design Sketch utilizing existing weir wall, prefabricated steel intake box and only minor amendments to the existing impoundment (adhering to the prospective NRW Requirements for 70/30% flow split and Q95 Hands Off Flow).