



RENEWABLE DESIGN
CONSULTANTS

RDC and Hydro Projects in the UK

Hydro in the UK



Given the evidence that climate change is becoming more critical across the planet and the environmental imperative to move away from fossil-fuelled power as well as renewed political incentives for sustainable energy, there is an excellent opportunity to focus on the development of small hydro power.

Within the UK there is an estimated 400 MW of small hydropower projects which are technically and economically viable and a number of potential sites are now

emerging for development. This situation has been bolstered by increasingly favourable market trading conditions with establishment of the Renewables Obligation (RO) and Climate Change Levy (CCL) which offers both flexibility to choose the best operational deal and long-term security for the market for green electricity.



Why hydro?

Hydro power is a mature and well-understood technology that offers many advantages over other renewable energy:

- high efficiency and high power density,
- long system lifetime (up to 50 years),
- predictable energy outputs, and
- excellent load factor characteristics.

Developing hydro projects

Developing a hydro site is a complex process and there are several steps to take, involving many agencies and authorities as well as other stakeholders:



1. **Technical Feasibility**
2. **Economic Analysis**
3. **Environmental Assessment and Stakeholder Consultation**
4. **Planning Application Preparation and Submission**
5. **Detailed Technical Design**
6. **Tender Documentation and Process**
7. **Construction Phase**
8. **Operation and Generation of hydropower plant**

Renewable Design Consultants offer the experience required to assist clients through the various stages for development of small hydro projects less than 1 MW.

- Generally there are 5 main stages in this development, as outlined below.
- RDC's approach is to offer contracts that have specific Milestones after each of these Stages.
- Meetings will be held or reports presented at the Milestones which will allow the client to withdraw from the contract if the scheme is judged as unviable at that point.
- Stages 2 and 3 often have to proceed together as they are mutually dependent - i.e. what the Environment Agency (EA) specify in terms of environmental regulations have to be designed into the technical detail of the scheme.

Stage 1: Technical feasibility study and initial economic assessment

- Hydrological analysis i.e. determination of 'Flow' and 'Head' Duration Curves in order to guide the choice of turbine/s.
- Discussion of the potential turbine locations and orientations.
- Calculation of energy output calculations for the potential turbines.
- Initial costing and economic analysis for the potential schemes.

MILESTONE 1 : Choice of the preferred turbine and scheme development

Stage 2: Detailed scheme specification

- Description of the turbine arrangement, identification of the construction work required with scheme general technical specifications and overview drawings.
- Specification of suitable fish and debris screening requirements.
- Grid connection options and discussions with the DNO (Designated Network Operator).
- Detailed costing and economic analysis.

MILESTONE 2 : Check that capital cost and economic payback are acceptable

Stage 3: EA negotiations and planning permission

- Start EA negotiations for licences including discussions on screening arrangements.
- Complete Abstraction, Transfer and Impoundment Licence applications and submit.
- Complete and submit Land Drainage Consent application.
- Consult local authority on planning issues and submit planning application (if required).

MILESTONE 3 : Licences and planning permission granted

Stage 4: Scheme design and mobilisation

- Draft EA Operating Agreement.
- Finalisation of quotations/tenders for technical equipment and infrastructures required.
- Schematic drawings for civil works, M&E equipment and grid connection.
- Programme of works including installation considerations & access for contractor.

MILESTONE 4 : Turbine orders placed and contractor hired

Stage 5: Scheme construction and operation

- Preparation of site and ensuring Health and Safety Plan.
- Management of contractor for civil works.
- Delivery of M&E equipment and installation.
- Commissioning of mechanicals (turbine) and electricals (control panel/grid connection).

MILESTONE 5 : Successfully installed turbine with no adverse environmental impacts

- Stages 1-3 can take up to 6 months, permissions a further 6 months then Stages 4-5 approximately 12 months, making the whole process up to 2 years.
- Depending on the scheme's size and complexity and RDC's scope of work, professional input can take from 8 to 40 days.
- Costing of these stages is based on RDC's daily rate of between £ 320 and £ 360, depending the total amount of contract.
- Professional fees can therefore range from £ 2,800 to £ 12,800.
- Travel is additional, based on £ 0.50 per car mile, or train/air travel at cost.
- Other costs may be added such as data required, maps and licence applications.
- Any expenses in addition to the above, for example required sub-contracts (environmental studies required by the EA, extra surveys or flood risk assessments) will be charged at cost plus 5% (for administration) and will be discussed with the client before engagement of works.

Renewable Design Consultants is currently working with a number of clients in the UK progressing small hydro sites on behalf of owners, in the range of 3 kilowatts to 1 megawatt.

RDC is interested in taking a portfolio of small hydropower sites of similar size and in close proximity through to planning approval and subsequent development. By dealing with the same regulatory authorities the consents may be achieved relatively quickly and this approach will demonstrate the benefits and synergies in having RDC's 'staged approach' to small hydro development.



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