

HYDROPOWER DEVELOPMENTS AND THE NATIONAL RIVERS AUTHORITY



NRA

National Rivers Authority

INTRODUCTION

Hydropower is a proven renewable source of energy offering a diverse and secure energy supply which should reduce emissions to the environment.

Additionally, hydropower developments can give direct benefit to the water environment. The Government's policy is to stimulate the exploitation and development of renewable energy sources wherever they have prospects of being economically attractive and environmentally acceptable. The NRA is keen to support this policy through the application of its powers and duties.

Hydropower schemes offer a clean source of electrical energy with no production of pollutant emissions. A scheme with a capacity of 100kW would typically supply enough electricity for about 50 homes. If this displaced electricity generated by currently operating fossil-fired power stations, it would save the emission of around 350 tonnes of carbon dioxide, 5 tonnes of sulphur dioxide and 1½ tonnes of nitrogen oxides per year.

In England and Wales local planning authorities and the NRA have responsibilities associated with hydropower developments.

Information about planning aspects of renewable energy is available in the form of a Planning Policy Guidance Note on Renewable Energy (PPG 22 issued by the Department of the Environment and the Welsh Office, available from HMSO). The role of the NRA for non-tidal schemes is outlined here.

Hydropower is a legitimate use of water resources and consequently the NRA will take such use into account in its management of water resources. It is not the only use and therefore hydropower requirements need to be considered alongside other uses of water. They can have significant local impacts on the water environment, both positive and negative. This leaflet should help those with an interest in developing potential hydropower sites to understand the responsibilities of the NRA and the particular issues which need to be taken into account so that an acceptable scheme is developed.

THE NRA'S RESPONSIBILITIES

The NRA is responsible for the management and protection of the water environment. In respect of hydropower developments these responsibilities include the provision of advice to local planning authorities and issuing

licences and consents under its statutory powers. The NRA and local planning authority should be approached at an early stage with any proposal for a hydropower scheme so that advice may be given on aspects of the proposal.

The NRA will take the following factors into account when considering a potential hydropower development.

WATER RESOURCES

The NRA issues licences as a means of managing uses of water resources. It has duties laid down by law in dealing with applications for such licences and there are rights of appeal.

Although the NRA is supportive of initiatives to develop renewable energy sources there will be occasions when the NRA will find it necessary to oppose specific proposals due to unacceptable impacts upon the aquatic environment or on the rights of existing users of the inland water.

IMPOUNDING LICENCES

An impounding licence will be required for schemes involving the construction or alteration of impounding works such as dams and weirs. An impounding licence allows the level and location of any weir to be regulated in order to ensure, for example, that there is adequate water available for downstream uses.

ABSTRACTION LICENCES

Hydropower schemes which include a physical abstraction from the river by pipe or leat require an abstraction licence. Exceptions include cases where the installation is built into a weir or is directly in line with a river flow, where there is no diversion of flow. Even where an abstraction licence is not required, the use of water for hydropower is recognised and, once established, the NRA must have regard to its existence in granting further licences. All holders of existing rights on a river have to be considered before licences are issued to any new applicants. Arrangements for ensuring that flows downstream are not disrupted to the detriment of existing downstream users and river needs will be of particular interest when a new hydropower scheme is being considered.

The water requirement of a hydropower scheme may be large; sometimes several times the dry weather flow of the river. Although water used for hydropower generation is non consumptive and can be used again downstream, the

PROTECTION OF FISHERIES

The NRA has a duty to maintain and improve fisheries and the prime issue relating to these responsibilities will be to ensure fish a safe passage past the installation. If the hydropower installation is to be at the site of an existing weir which already provides a barrier to migratory fish, the NRA may require the incorporation of an appropriate fish pass.

Where a new impoundment is needed the NRA will consider whether a facility for fish migration is necessary. Where a fish pass is required, priority will need to be given to flow through the pass during the migration season. This is unlikely to have significant impact upon the available flow through the turbine during high flow periods.

Power generators must incorporate appropriate screening to prevent fish being drawn into the turbine system. The NRA will be able to give advice on appropriate screening.

CONSERVATION

The NRA seeks to ensure that the design, construction and operation of works are not harmful to the water environment and that, wherever possible, conservation enhancement features are incorporated. Typical aspects which might attract conservation scrutiny during the environmental impact assessment process are loss of habitat caused by impoundment; downstream river level variation caused by the use of hydropower generators; bank regrading and stabilisation; channel lowering; channel realignment; and the design of in-channel equipment. Visual and landscape aspects need to be given very careful consideration and any archaeological or cultural heritage implications must be taken into account.

These can be particularly important in relation to historic mill sites. Relevant operational issues are the timing of channel works, arrangements for spoil disposal and the opportunities for the incorporation of other conservation features appropriate to the site.

RECREATION

The NRA has a general duty to promote recreational use of all inland and coastal waters. It is necessary to ensure that existing recreational uses or future uses are not compromised. For instance, impoundments may impact on

canoeing and bankworks could impact on riverside access for fishing and walking. This aspect should be considered in respect of any proposals and the views of the NRA recreation staff and relevant outside organisations should be sought. Where possible, opportunities to improve or provide for recreation should be sought.

NAVIGATION

The principal inland waters for which the NRA is the navigation authority are the non-tidal Thames and Medway, plus the East Anglian rivers comprising the Great Ouse and Nene systems, Ancholme, Glen, Welland and Stour.

Any proposal to construct hydropower schemes on a navigable waterway must take navigation interests into account, not only in respect of the scheme's impact on river levels but also its effect on general water safety.

LEGISLATIVE BACKGROUND TO THE NRA'S RESPONSIBILITIES

GENERAL

The NRA's responsibilities cover water resources, water quality, pollution control, fisheries, flood defence, land drainage and navigation together with conservation and recreation on water and associated land.

The relevant powers of the NRA are the Water Resources Act 1991 which regulates abstraction from and impounding of rivers and the Land Drainage Act 1976 (as amended by the Consolidation acts of 1991) which also relates to work in river channels, particularly in providing drainage and avoiding flooding. The Water Resources Act 1991 requires the Authority to maintain, improve and develop fisheries, and the Salmon and Freshwater Fisheries Act 1975 contains a number of provisions relating to fish passes.

In carrying out all these duties the Authority is subject to the requirements of Section 16 of the Water Resources Act 1991 which require that it takes due account in all its statutory and operational activities of the need to further the conservation of the aquatic environment and section 2(2) relating to the promotion of recreation and conservation.

The NRA is also required to implement the Code of Practice on Conservation and Recreation approved by the Minister under Section 18 of the Act.

APPEALS

An applicant may appeal against a decision or the lack of a decision on statutory authorisation. The Water Resources Act 1991 makes provision for appeals to the Secretary of State for the Environment.

SUMMARY

Hydropower constitutes a non-polluting source of renewable energy and its further development will assist in reducing harmful gaseous emissions. In support of the Government's policy to enhance the use of renewable energy sources, the NRA encourages the use of hydropower and aims to co-operate with developers in accordance with its duties, powers and available resources. One of the NRA's aims is to manage water resources to achieve the right balance between the need of the environment and those of the abstractors. Therefore it is necessary that the NRA considers the range of potential impacts that may arise from hydropower development, some of which may be significant. These will be considered by the NRA when it is approached about a scheme.

In order to fulfil its duties it is necessary for a promoter to provide the NRA with adequate technical information so that the impact of a proposed scheme may be assessed in terms of water resources, water quality, flood defence, land drainage and the general water environment.

Although a wide range of issues need to be taken into account in the promotion of a hydropower development, the NRA will do its utmost to match the level of effort required to the significance of the proposed installation upon the water environment.

The NRA should be contacted at an early stage to discuss whether a proposal is likely to be acceptable and how the necessary information should be prepared so that adequate account can be taken of all relevant factors.

Thanks are due to the DTI, ETSU and the hydropower industry who provided assistance in the preparation of this leaflet.

AUTHORISATION	STATUTORY PROVISION	COMMENT
Abstraction Licence	Water Resources Act 1991 Section 24	Not required for "in river" installations where there is no diversion of flow between channels.
Impounding Licence	Water Resources Act 1991 Section 25	Not required if use is made of existing impounding works without significant alterations.
Land Drainage Consent	Water Resources Act 1991 Section 109 Land Drainage Act 1991 Section 23	Applies to any works affecting main river and to the construction of weirs, dams etc. in non-main river.
Requirement for Fish Pass	Salmon and Freshwater Fisheries Act 1975 Section 9	Required at instigation of NRA if waters are frequented by migratory fish.

granting of a licence has implications for upstream development. Normally, once a licence is granted, the holder is entitled to expect that subsequent licences will not reduce the available volume of water. Due to the large volumes of water normally reserved for hydropower, this would often mean that no further upstream abstractions could be authorised. In such cases, rather than decline a hydropower abstraction, it is the policy of the NRA to include provisions to permit further upstream abstractions up to a fixed maximum value. This value would normally be a small proportion of the turbine flow capacity. The average loss of energy production would be small, giving no loss of energy production when flow exceeds turbine capacity.

Infrequently, it may be necessary to make provision to amend how much upstream water can be licensed to other abstractors. Normally this would be achieved by granting a time limited licence and the duration of the licence (perhaps 10 or 20 years) would take account of circumstances associated with the installation, including the investment in the scheme.

ABSTRACTION CHARGES

Abstraction charges comprise a one-off application charge, plus an annually recurring charge. Charges are made in accordance with the annually updated "National Rivers Authority Scheme of Abstraction Charges". For 1993/94 the Application Charge is £100 excluding VAT, whereas the annually recurring charge varies according to NRA region as indicated in the published scheme. In accordance with the legislation, no annual charges are payable for abstractions for hydropower generation where the capacity is not more than 5 megawatts.

RIVER FLOW GAUGING STATIONS

The NRA owns and operates many stations which measure the flow rate or level in rivers. They are used for river management purposes and the NRA will need to satisfy itself that a hydropower scheme will not adversely effect this important NRA activity.

LAND DRAINAGE AND FLOOD DEFENCE

In some cases, a hydropower scheme may affect land drainage and possibly flood defence. The construction, operation or alteration of impoundments may raise upstream or downstream water levels. Even if the changes in level are relatively small they can impair field drainage and increase flood risk. If the river profile is altered, changing channel velocities may affect bank stability. In many cases, land drainage concerns can be overcome by appropriate design.

Once the NRA is satisfied that the design of the impoundment or other channel works will not create or exacerbate land drainage or flood defence problems, a consent will be issued by the NRA under the Land Drainage Act (1991) or Water Resources Act (1991).

WATER QUALITY

Hydropower schemes can be of benefit to water quality in that some types of turbine lead to increased oxygenation of the river which is of benefit to fish. Also, trash screens installed to protect turbines can assist in removing water borne debris.

A potential effect might be where a hydropower scheme prevents adequate dilution in parts of the river system when water is not returned to the channel immediately adjacent to the point of abstraction, or when there are multiple channels and the effect of the hydropower scheme would be to transfer water from one channel to another. In situations where the maintenance of water quality objectives depends on an adequate minimum flow being achieved at all times, specific requirements stipulating minimum discharges will be written into the licence issued by the NRA.

In a few special cases, where there is significant water storage, impounding water will result in increased residence times in the affected reach and this may cause increased plant and algal growth and could result in siltation upstream of the weir. Silting can cause problems if it is cleared by flushing downstream, but physical removal by dredging may be beneficial.

The use of anti-fouling agents or chemicals will be subject to strict control by the NRA.

Statutory Water Quality Objectives (SWQOs) are expected to be introduced progressively from 1994. Part of the process of setting SWQOs is to consider the potential uses of rivers and therefore it will be necessary to take account of the use of hydropower in the setting of these objectives.



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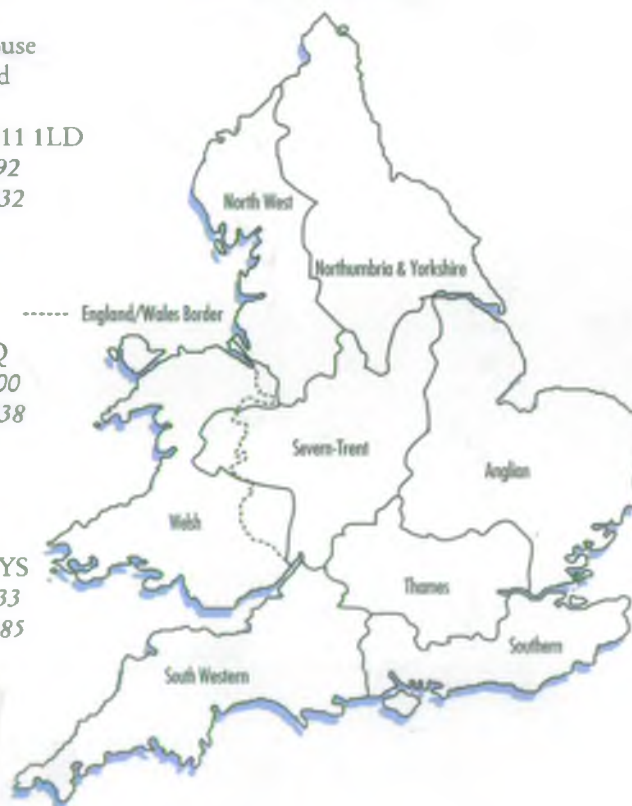
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