

Questions on Part 1 of the consultation

Consultation question 1

Please indicate which option you prefer:

Option 1 supplemented by a different option (see below)

Option 2

Option 3

Option 4

A different option

Please explain the reasons for your preference. If you selected a different option, please explain why and describe your alternative.

Option 1 is the only option of the 4 presented which includes any semblance of a proportionate and risk-based approach to protecting the environment when developing viable hydropower schemes in England and Wales, particularly for high head schemes, while meeting Water Framework Directive (WFD) requirements. This was pointed out at a very early stage in the GPG consultation process.

The principal association representing 91 actual and potential scheme owners, and 80 suppliers of equipment and services, in the UK micro hydro sector has canvassed members' opinions on hydropower regulation. The outcome is that the association is currently discussing with departments and agencies proposals for a simplified regulatory system, incorporating environmental protection. This approach is preferred for micro hydropower schemes because it identifies which schemes meet criteria to ensure a low risk of adverse environmental impact and eliminates for these schemes (which comprise the majority) the need for licensing through an open process of registration.

The proposals are described in the document "Micro Hydro - a case for special consideration - proposals for simplified micro hydropower regulation and funding" which can be downloaded from the organisation's [website](#) and which is also included with this submission. The proposal for registration is based on a set of **principles** for environmental protection and **criteria** for registration which will ensure a low risk of adverse impact; these are intended to meet existing UK regulations and EU WFD requirements. The relevant section and appendix from the proposals are copied at the end of this response.

The reasons for rejecting Options 2-4 are given below.

The association therefore recommends the adoption for the time being of Option 1, with modifications concerning flow variability (see answer to consultation question 2 below), as being acceptable for hydropower schemes where potentially significant environmental or other impact is considered a possibility. The association further recommends that the guidelines should be supplemented for low impact schemes with the [Proposed registration process](#) once this process has been further developed and agreed with the departments and agencies concerned.

Option 2

The WALES scoring system was designed and has been acknowledged as a provisional approximate instrument for regulating consumptive abstraction. It gives meaningless results for small high head schemes. In many cases medium to high head schemes will generate a score leading to a 40% result. No account is taken of the scale of potential effect and hence it is disproportionate.

Options 3 and 4

The CAMS/EFI scoring system does not take account of the site-specific parameters for a hydropower scheme but is based on a coarse analysis of areas of the country which contain some locations with sensitivity. It is primarily an instrument for consumptive abstraction. As with the WALES system, CAMS/EFI gives meaningless results for small high head schemes. No account is taken of the scale of potential effect and hence it is disproportionate.

Options 2- 4

All of these options require abstraction of a proportion of available flow, the proportion varying according to environmental sensitivity.

This method of mitigating perceived potential environmental harm will reduce hydropower output and hence scheme viability in proportion to the level set for the scheme.

All options 1- 4

WFD applicability

The WFD applies to the potential impacts on defined Water Bodies (these all relate to measuring points where catchments exceed 10km² and are not usually applicable to medium to high head micro hydro schemes which return abstracted water usually within the upper reaches of a Water Body). All land-based hydropower schemes return 100% of abstracted water on site or at a lower point in the river basin.

Economic impact

As an example, take a **medium head scheme (35m), designed for a maximum output of 25kW based on design flow of 1.3 X mean flow (Q_{design}=114l/s) on a watercourse with average rainfall of 1800mm, catchment 2.2km²:**

Comparing the impact of all the options, in an average rainfall year this would result as follows:

Option	Sensitivity band	Hands off Flow (HOF)	Proportion of flow available above HOF	Energy generated (MWh)	Energy used by average homes: No of homes	CO2 savings (tonnes)	Proportion of year with no generation
1	High with fish migration issues	Q ₉₀ - rising to Q ₈₀ at Q _{mean}	100%	93	22	55	20%
	No fish migration issues	Q ₉₅	100%	107	26	63	10%
2	"C"*	Q ₉₅	60%	69	17	41	20%
	"A"*	Q ₉₅	40%	47	11	28	40%
3/4	Low	Q ₉₅	45%	51	12	30	40%
	Medium	Q ₉₅	40%	47	11	28	40%
	High	Q ₉₅	35%	38	9	23	50%
* in practice the WALES scoring system will usually weight such schemes in band A if there are fish present and rarely weight any hydro scheme above band C							

This would roughly halve the return on investment and is likely to result in significant numbers of low impact potential schemes not being pursued.

Consultation question 2

Would you like to make any suggestions for improving or amending any of the options?

If yes, please describe your proposals.

The term “standards” should be substituted by “guidance” since the guidelines are supposed not to be prescriptive but advisory.

Option 1 as described in the consultation paper can be improved in the following ways:

- a) by simply adopting pro tem the current SEPA guidelines for flow regulation for high head schemes: there is no reason to rewrite the SEPA guidelines which are effective in Scotland. However the licensing process imposes an unnecessary burden to applicants and regulators for low impact schemes (see answer to Consultation Question 1 which also proposes that the SEPA guidelines should be supplemented with a registration process).
- b) the regulation in respect of environmental sensitivity needs to be proportionate and include an element of scale/significance in order to be meaningful. Table 1 and Table 2, Section 1 in Annex A to the Consultation document fail to do this. For example many high head schemes with depleted reaches have extremely low environmental sensitivity owing to the absence of life-supporting habitats of any significant scale.
- c) for all schemes with a depleted reach, account should be taken of tributaries entering the watercourse within the depleted reach when determining the constraints on abstraction. This should be stated explicitly in the guidance.

Consultation question 3

To help the Environment Agency and Natural Resources Wales to analyse the responses to this consultation, are you primarily interested in hydropower development in England, in Wales or both England and Wales?

England

Wales

Both

Question on Part 2 of the consultation

Consultation question 4

We will publish revised standards 12 weeks before they come into effect.

Do you have any comments on this approach?

The new SEPA guidelines should be adopted and applied for high head schemes since the present EA guidelines are acknowledged to be inadequate in this respect. As these are additional to low head guidelines, they could be adopted without any delay.

Schemes already with submissions of pre-applications or full applications recorded before the end of any interim period after publication of new guidelines should not be required to meet new more stringent mitigation requirements than have been applied prior to this consultation since those applications will have been proceeding on the basis that the present guidelines apply and costs will already have been incurred. The proposed period of 12 weeks for new guidelines to come into effect would be insufficient unless any change involving significant constraints such as “flow splits” were to be announced at least 8 months before formal publication. Projects at present take at least 1 year, and

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often many years, to reach the stage where definite decisions and commitments related to scheme detailed design, particularly those decisions based on design capacity and precise location, can be taken.

Submitted on behalf of members of the Micro Hydro Association

Gavin King-Smith (administrator) March 2013

To be read in conjunction with the document “Micro Hydro - a case for special consideration - proposals for simplified micro hydropower regulation and funding” which can be downloaded from the organisation’s [website](#). Abstract follows on the pages below.



Proposed registration process

In a recent survey of members of the mha, all responders endorsed a registration approach as simplified alternative to licensing for very low impact hydro schemes (typically 5-30kW capacity, but ranging from 1-100kW). In order to make registration of micro hydro schemes acceptable, many agencies will need to be satisfied that the design and ecological criteria applied will achieve the aims of the present regulation. Scheme developers will therefore need to demonstrate in their submission for registration, and in scheme design documents, that they will provide appropriate ecological protection and will conform to construction guidelines, electrical regulations, and riparian rights. (Ofgem also require registration through the ROOFIT process to gain eligibility for the Feed-in Tariff).

Based on consideration of the survey responses, present regulatory requirements used to permit hydropower, and knowledge of schemes which have been permitted to date, I am proposing a set of simplified principles and specific criteria which could be used for registration of micro hydro schemes. An applicant for registration of a scheme would need to confirm that the complete set of registration criteria will be met and support this with a design statement. Where any of the criteria could not be met, an applicant would be expected to provide additional evidence to satisfy the competent authority that registration was still an appropriate route rather than reverting to the usual licensing process used currently for both high and low impact hydro scheme developments.

The most appropriate location for the register of schemes could be either the planning authority or the environment agency responsible for the area predominantly covered by the scheme (though this could on occasion straddle more than one authority /agency). The registration document and design statement should be available to all authorities.

Principles for micro hydropower regulation and suggested criteria are set out in

[Appendix I Proposed principles and criteria for registration](#) process. These aim to encompass all the existing regulatory principles and processes but in a simplified manner. They are designed to be used as the basis for a front-end procedure for regulation by the agencies (EA, SEPA, NIEA, NRW) thus avoiding the need for prolonged and detailed licensing processes for low impact schemes and reducing the agencies' workload.

Appendix I Proposed principles and criteria for registration process

The proposed criteria following this page are designed to meet the *precautionary principles below* (which apply to all hydropower schemes). Hydropower schemes seeking registration will need to meet the principles by taking the actions noted in the bullet points.

A hydro scheme should not:

risk significant damage to or reduction in the fish population in the river basin as a whole*

- screen the entry of water at the abstraction point and screen outflow to avoid access to turbine
- limit disturbance of water and bed of watercourse at outflow
- ensure a hands-off flow (where water available) which will provide sufficient river bed coverage and flow so as to sustain any important habitat or food resource
- where there is significant use by fish of any affected reach of water (as judged by qualified walk-over survey and where appropriate electro-fishing): if there will be any weir re-construction or new structure exceeding the height of natural obstacles, provide suitable alternative fish passage up and down the watercourse and protect fish spawning habitat (e.g. weirpools) against adverse changes in flows

reduce availability of water habitat for fish or other protected species in a river basin*

- ensure a hands-off flow to provide sufficient river bed coverage and flow to sustain any important habitat or food resource (when water is available)
- mitigate adverse changes in sedimentation resulting from impoundment changes by mechanical means

increase risk of flood damage from a watercourse

- demonstrate that the net effect of raising the level of the watercourse or impoundment, and of diverting water from existing flows, does not significantly increase the potential risk of flooding surrounding land or property or reduces the risk

impact other (prior) water uses adversely or should compensate those affected

- contact all other affected users (e.g. livestock farmers, fish farms, canoe clubs, water companies) and agree any mitigation measures needed to allow continued use or agree compensation

damage land habitat of protected species

- in areas known or likely to provide critical support to protected species, conduct qualified ecological walk-over surveys to determine population and to confirm no significant impact from building or operating the hydro scheme – design mitigation measures if necessary
- avoid identified breeding or dwelling sites when building access tracks, foundations, laying pipes, etc.

create unacceptable noise in a populated or frequented area

- fit turbine houses with sound insulation if located in such an area

create unsightly structures in urban areas or places of natural beauty

- build small turbine houses using appropriate materials

create electrical or other safety risks

- notify/obtain connection offer from DNC via the appropriate procedure
- meet current electrical installation standards
- erect suitable barriers and signs where there could be risk of public access to moving equipment

* these principles address Water Framework Directive requirements for quality standards of watercourses designated as Water Bodies.

REGISTRATION CRITERIA FOR MICRO HYDRO SCHEMES

In order to meet the above principles, the applicant will be required to confirm that the following criteria are met (under three headings: Design, Ecology, Other):

Design

1 **the design flow/capacity (DNC) relationship** falls within the following bounds.:

any scheme where design flow $\leq Q_{70}$ and DNC $< 100\text{kW}^1$

schemes where design flow $> Q_{70}$ and $\leq Q_{\text{mean}} \times 1.5$ ($\approx Q_{20}$), capacity (DNC) $< 50\text{kW}$, and residual flow in any depleted reach immediately below the abstraction point always exceeds Q_{95} (when available) or Q_{90} where fish are present (see 6 below)

2 **design flow** $\leq Q_{\text{mean}} \times 1.5$, and **residual flow** immediately below the abstraction point always exceeds Q_{95} (when available) or Q_{90} where fish are present (see 6 below)

3 **depleted reach**

either there is a $>1:20$ (5%) average gradient measured along the depleted reach

or the habitat in a shallower depleted reach is of no ecological significance in the context of the river basin (see 6 below)

or there is no depleted reach (as in an on-weir scheme)

4 **the height of the intake structure** does not create an additional flood risk and is lower than the highest natural obstacles (to fish) in the depleted reach where fish are present (see 6 below) and upstream *or* agreement has been reached with the local fisheries body for mitigation (e.g. a series of pools stepping up to the weir crest)

5 **the catchment area** of the watercourse above the intake is $< 10\text{km}^2$ for a design flow of $Q_{\text{mean}} \times 1.5$; the area could be increased proportionally for design flow $< Q_{\text{mean}} \times 1.5$ or flow split schemes – i.e. catchment (km^2) $< 10 \times (Q_{\text{mean}} \times 1.5) / Q_{\text{design}}$

Ecology

6 a qualified² walkover survey, or local expert opinion, has confirmed that in respect of expected changes in the geomorphology and ecological habitat afforded by the depleted reach (where there is one) :

either there are no protected fish or other protected species ,

or the population that could potentially be affected is insignificant in relation to the remaining population in the same river basin

and the design will ensure that any protected species on land will suffer no significant impact from building or operating the hydro scheme and that identified breeding or dwelling sites will be avoided when building access tracks, foundations, laying pipes, etc.

¹ the suggested upper limit of 100kW is illustrative and in most cases schemes of over 50kW will potentially have some impact on the environment which should be carefully considered, and the abstraction and any impoundment licensed. However, there will also be schemes of this capacity which will clearly have negligible environmental impact and are therefore suitable for the proposed registration approach. For example, a 200m high head scheme using water from a 6km² high rainfall catchment area abstracted from the top of a cliff close to the sea would require a design flow of only ~21% (Q_{70}) of mean flow to generate 750MWh/annum at a maximum power of 100kW. The turbine would require a 17.5cm diameter turgo runner and the penstock would have an external diameter of 250mm.

² this could be carried out by the landowner where able to demonstrate good knowledge of ecology (e.g. where environmental agencies or fisheries boards are already satisfied with the landowner's ecological credentials) or by a qualified ecologist and/or fishery expert.

Other

- 7 no heritage or otherwise controlled areas or buildings are affected or relevant consents are being obtained
- 8 all neighbouring property owners are notified and confirmed not opposed to scheme
- 9 whole scheme lies on own land or agreement is being formalised with affected parties
- 10 penstock (if any) is to be buried where feasible and otherwise secured safely
- 11 turbine house footprint will be < 30m² and walls sound insulated if within earshot of habitation or frequented nature location
- 12 where the scheme is to be grid connected, the DNO is being notified via the standard procedure appropriate for the power to be connected
- 13 electrical and safety regulations are being followed
- 14 there are no adverse impacts on the character of buildings or landscape.

ENDS

