

SMALL HYDRO IN EUROPE: HOBBLED BY REGULATION

Campaigners for small hydro say that implementation of the EU Water Framework Directive is limiting the sector's growth. On the other hand, conservationists say that small hydro can be bad for river habitats. Mike Scott looks at the impact of this conflict on the sector.

The European Union is proud of its pioneering role in environmental legislation and its position as a leader in installed capacity of renewable energy. But when it comes to one of the oldest, cheapest and most efficient forms of clean energy production, hydroelectric, EU regulations are stopping the region from making the best use of its resources, according to some in the industry.

While the Renewable Energy Directive calls for renewable energy to meet 20% of Europe's energy demands by 2020, the Water

Framework Directive (WFD) is holding back the potential of the small hydro sector to help meet that target, says Lauha Fried of the European Small Hydro Association (ESHA). "The two directives are conflicting and there is very little co-ordination."

Currently, about 70% of the EU's renewable energy is generated by hydroelectric sources, and of this around 90% is from large-scale schemes (those greater than 50MW), says Lau Salli, a policy analyst at the International Hydropower Association (IHA).

While large hydro generates 550TWh per year from about 180GW of installed capacity, more than 21,000 small hydro installations generate 46TWh of electricity per year in the EU. Production is concentrated in Austria, Bulgaria, the Czech Republic, France, Germany, Italy, Poland, Romania, Spain and Sweden, while the EU's near neighbours Switzerland, Norway, Croatia and especially Turkey also have considerable SHP capacity.

Even though the WFD came into force in 2000, its effects are only starting to be felt now because member states had until 2009 to submit their River Basin Management Plans. These outline the environmental objectives for each water body and how to achieve them.

The implementation of the WFD, which is designed to improve the environmental status of water bodies, is limiting the hydro sector's future growth, says Fried. "The interpretation of the Directive at national level is having direct consequences on the approval of new projects and allocation of concessions and permissions. This is often due to a lack of knowledge at the local level of how the technology has evolved, mainly with regard to environmental performance."

The directive is making it harder to get permits for small hydro projects and is also imposing conditions that lead to a loss of energy production and an increase in costs, she says. In addition, investors are finding it more difficult to invest in the sector because different countries are transposing the directive into national law in different ways and because many are running behind schedule. According to the IHA, by late 2009, only 16 member states had published draft River Basin Management Plans. As a result, the industry is "surviving, rather than developing," she says.

The main environmental impact of hydropower generation is on the 'residual flow' of rivers - in other words, the amount of water that must flow in order to maintain the optimum condition of a water course, according to the IHA.

In some parts of Europe there has been considerable opposition to small hydro owing to its impact on residual flow. In Poland, for example, campaigners have been calling for a moratorium on new



An old form of fish ladder on the River Dart in Devon. As the name suggests, it was built to facilitate salmon going up river to spawn. Measures such as this can help mitigate the impact of small hydro schemes on river habitats.

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projects and withdrawal of existing permits, says the ESHA. In Slovenia, the introduction of a new decree on residual flow will cut production by 30%-60%, making many new projects unprofitable, while in France, a new river classification exercise will cut forecast production by 2020 from 7TWh to 2-3TWh.

The WFD and the renewables directive are not in conflict, says a spokesman for the EU's Environment Commissioner, Janez Potocnik, "but of course they interact so member states have to ensure they comply with both when they take their decisions."

Member states are free to choose whatever technologies they like to meet the targets laid down by the Renewables Directive, provided they comply with environmental laws, be they national or European, the spokesman added. "Any law can be seen as a constraint but since they are known in advance, renewables can still be developed in compliance with the law."

One of the aims of the WFD is to "prevent the deterioration of the status of water bodies" and, as new hydro plants are likely to cause deterioration through the building of dams and alteration of

watercourses, there is bound to be some friction.

"In this case, the Directive recognises that there may be overriding public interests or benefits that outweigh the benefits of achieving the objective of the WFD," says the Commission. "An exemption can therefore be granted provided that adequate justification is provided, no better environmental option is available and mitigation measures are put in place." Such measures include fish ladders, infra-red systems, eel-friendly turbines and low-head hydro technology developed in France that reduces noise and vibration.

Andritz Hydro, one of the biggest suppliers of equipment for hydro power plants in Europe, says the directive "will have an impact on our customers and could mean delays or cancellation of planned hydro power projects".

Despite the WFD, there is still a great deal of potential for hydro in Europe, particularly for smaller-scale projects. According to ESHA, there is undeveloped potential of 22.7TWh in the 27 EU countries, and about double that for large hydro.

Furthermore, much of the existing small hydro capacity is aging and could be producing much more power if fitted with high efficiency modern turbines. More than 55% of plants in the region are over 60 years old and 68% have been in operation for more than four decades. ESHA estimates that repowering existing sites could add about 30TWh per year.

The European Commission has said it recognises the potential of large hydro, particularly as it can bring other benefits. "Large-scale hydropower with storage reservoirs might still be an attractive option when seen in the context of all the synergies arising from the many uses of reservoirs (water supply,

flood defence, irrigation and recreation)." Large hydro's ability to meet peak demand and provide ancillary services should not be neglected, it added.

The ability to provide an instant reaction to fluctuations on the grid is likely to become increasingly valuable as the proportion of intermittent renewable capacity increases to meet the Renewable Energy Directive targets. Saili says there has been considerable growth in pumped storage hydro - there is about 40GW of installed capacity and another 3GW is under construction. However, using hydro as peak power creates environmental issues related to the periodic surges of water.

"All operators are anxious about the water framework directive, regardless of their scale and the facilities they have," says Saili. "Any new development has to prove that it is greener than green." While there is a lot of concern about the WFD, Saili points out that "those states where hydro forms part of the national interest and accounts for a large part of generating capacity are not going to implement the directive in the same way as states where hydro is in a minority."

Unfortunately the sector is seen as a mature industry and so struggles to attract funds for R&D that could make it still more efficient, reduce its environmental impact, and integrate it with areas such as irrigation, drinking water supply, wastewater treatment and flood control.

Despite the opportunities available, investors may prefer to look to other regions with greater potential and less complicated regulatory regimes, such as the Americas and Asia. Indeed, they may even choose to look at nearby Croatia and Turkey, which has huge potential hydro capacity, rather than attempt to negotiate the conflicting currents of EU policy. ■

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