WEIR-ED AND WONDERFUL

It's a case of back to the future for the carbon-cutting mill towns of the Northwest, which have huge potential for a modern version of waterpower.

Words Jason Teasdale

Steve Welsh of Water Power Enterprises

The Northwest's latest hydro-electricity project, now about to generate its first sparks of energy, is a scheme both weir-ed and wonderful.

The town of New Mills in Derbyshire is the test site for a technology that could revolutionise the way the North's former mill towns get their power; not from some distant fossil fuel or nuclear plant, but from the rivers at their heart.

Last spring an Archimedean screw eight metres long and two and a half metres wide arrived in New Mills to be winched into place among the ruins of Torr Mill – specifically, alongside its weir. It will transport some of the River Goyt's flow across the drop in water level, turning the screw as it would a turbine and generating 70kw of power in the process.

The Torrs Hydro New Mills scheme could provide a template for post-industrial sites across the region and bring back into use weirs built by long-gone mill owners who needed power for their spinning machines. Water Power Enterprises (h2oPE) manages the project and aims to operate 25 such schemes across the region by 2015, enough to power 5,000 homes.

This summer saw the chiefs of Britain's energy industry warn a Commons committee that household bills could rise by 40 per cent. Around the same time, prime minister Gordon Brown announced moves to speed-up connection of renewable energy projects to the national grid – a cause of huge delays in proposed developments.

h2oPE managing director Steve Welsh said hydro schemes are well placed to benefit: "Water contains much more energy than wind – the amount of time a wind power scheme operates at full capacity is just twenty-five per cent, for hydro schemes that figure is forty-five per cent. And hydro schemes last around forty years whereas wind turbines operate for only around twenty-five years. For a £250,000 one-off cost you can power seventy homes for twenty-five years."

In absolute terms the returns aren't huge, but there is a strong case for using energy from a local resource – up to seven per cent of the electricity generated at a power station is lost in its transmission.

A report for the Northwest Regional Development Agency describes small scale hydro power as "a potentially large opportunity for the region" due to its climate and topography: any hydroelectrical scheme's output, whether it be wheel, turbine or screw, depends on the water's drop-height and its volume per second. The wet, hilly Northwest is ideal.

> The North's former mill towns could get their power not from some distant fossil fuel or nuclear plant, but from the rivers at their heart.

The government hopes to get ten per cent of the UK's electricity from renewable sources by 2010 and fifteen per cent by 2020. It currently stands at just two per cent.

Its main mechanism for doing this is the Renewable Obligation Certificate (ROC). It works like this – power suppliers must source an increasing proportion of electricity from renewables and, if they can't produce it themselves, they must buy ROCs from those who do. Not doing so means potential fines.

Small scale hydro projects (defined by the Environment Agency as those with less than five megawatts of generating capacity) should play a significant part in meeting these targets, but there are fewer than you might think.

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Installation of the Archimedean Screw at Torr Mill Wier

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Despite the apparent suitability of our region, data from 2006 recorded just 16 active hydro projects here. Meanwhile the Environment Agency, which grants the necessary water abstraction papers, has issued around 37 such licenses across the Northwest, though not all may have been used. A recent report for Cheshire and Warrington Economic Alliance found just two active projects in the county and noted that even the potential in this slopeless landscape isn't being met. More encouragingly, the report identified 14 planned schemes for the county.

Its author, Manchester University postgraduate student Evelyn Bateman, said development cash is the main obstacle and usually only stretches to a feasibility study: "Funding is needed to push these schemes forward, but where you can get it is difficult to say – there is no clear guidance."

One of the most interesting aspects of the Torrs Hydro New Mills scheme is the way it was funded. Part of the £250,000 cost was met by a £135,000 grant and a £61,000 loan, but the rest was raised through a share offer taken up by around 200, mainly local, people. A maximum of 7.5 per cent of the scheme's profits can be paid back to shareholders, while the rest will be poured into a community fund that should generate an annual social dividend of around £6,000 and be used, for example, to fund energy saving grants.

Richard Body, a director of Torrs Hydro New Mills, said: "When income is low it will not be the community which suffers, it will be the shareholders! And I strongly support the idea that the money we generate could be put into feasibility studies and funding for another hydro scheme in the same area. A lot of people are already asking if we plan to do this again.

"The only opposition we have ever had was from one person who felt it was so small an amount of electricity that it was not worth losing the view. But I think that, while the view has changed, it has been enhanced. We are really just putting back an updated form of the technology that was here."

Such deep-seated community support is invaluable in overcoming physical and legal barriers to development. Even with an encouraging feasibility report, such projects can whither when reality bites and enthusiasm fades, Bateman said: "There are many different factors to a micro hydro scheme; cost-benefit analysis, flow engineering, how funding might work – it is quite complicated."

To illustrate the point the Environment Agency publishes a 50-page booklet to assist its staff with hydropower proposals. Although the agency insists it will "take a positive view of reasonable and well designed proposals" the booklet covers potential pitfalls in planning, land ownership, environmental assessment, fisheries, flooding, conservation, recreation, angling and water resource and quality alterations. Little wonder so many projects flounder.

It's a familiar tale for Body. He said anyone planning such a scheme must anticipate reams of legal paperwork: "Everything has to be right; we did not want to get ten years down the line and find out that we never actually owned the scheme!

"It has meant a lot of work for the directors, more than we anticipated, but that is mainly because we wanted to be involved. We wanted local people to feel that the scheme belongs to them."

If those whose mill has long gone can do it, what of those still lucky enough to have a building in place?

The first records of a water wheel at Quarry Bank Mill near Wilmslow in Cheshire date back to 1784 – it was once the largest and most powerful in the country. Over the centuries it has been replaced several times and the machinery remains intact and is still used for demonstrations. But the National Trust, which runs the property, is keen on going further. Bob Hardiker, visitor services manager, said: "We intend to carry out a feasibility study into the potential for generating electricity from the waterwheel. We hope to have the results of the study within the next 12 months, leading to power generation within two years."

Elsewhere, Staveley Mill Yard in Cumbria, a thriving business park founded in 1995 by David Brockbank on the back of his family's declining cotton business, has been green for generations.

Cumbria's River Kent may be the best source of small scale hydropower in England.

The nearby River Kent has been providing power to the area's mills since the 1600s and is said to be among the most powerful in England – dropping from the greatest height over the shortest distance. No wonder that 30 mills once hugged its banks. Now only Staveley remains but, even in its present guise, it has use for the Kent's power – the second hand water turbine installed by Brockbank's father 50 years ago is still running today.

Brockbank shares his father's pragmatic view of the river: "You might as well use it since it's flowing past the door. We have been doing it for 300 years. It's common sense and that's why we have done it."

He isn't keen on the term 'green' but sees his role more in terms of shepherding a local resource: "We live in a beautiful part of the world, we have lived here all our lives and we respect and understand it."

Brockbank says the present turbine produces 25kw of power that can be exported to the grid: "But we now use all our own power because there is a bakery operating 24 hours a day on site. At night a hundred per cent of the energy we use is produced here, during the day time just ten per cent, so we have to import power."

Sadly it's not the only form of importation associated with such small scale projects. New Mills had to ship in its Archimedean screw from Germany, and a strong euro meant it cost £10,000 more than planned.

It's a shame so much innovation is taking place overseas, but specialist industries that grew up in this part of the world to service hydropower schemes do exist. Companies like Kendal-based Gilkes, which installed its first water turbine in 1856. The company has since worked in more than 80 countries and has offices in Texas and Japan.

Chris Brett, design engineer at neighbouring Inter Hydro Technology, which acted as design consultants for the Backbarrow Hydro Scheme on Cumbria's River Leven, confirmed the industry is enjoying a renaissance. "We are seeing an increase in work at the moment. There are a number of companies active in this field here in the UK and each will see at least 100 schemes each year from a feasibility point of view. Anywhere where there used to be a mill... could be brought back into service."

Brett puts the resurgence down to the green energy push, but added: "There is some resistance to wind turbines which were, until recently, seen as a panacea, while solar and photovoltaic energy will never do much here in the UK. So that leaves water and there is a lot of potential here in the Northwest. You won't find any massive schemes like Glendoe [a 100MW scheme now being built in Scotland] but the government is pushing for distributed energy rather than centrally produced, so there is an opportunity for schemes dotted around the Northwest to make their own contribution."

From August, New Mills will begin making its contribution. An agreement has just been signed to supply the town's Co-op supermarket, but Body says that even before the screw makes its first revolution it will be fulfilling a purpose. "I hoped that we would inspire others and kick start a debate over the use of weirs. You can argue that it is not a great deal of electricity, and that is true, but it is not just about clean energy – it is also an income that the community will be getting. There is a great deal of pride here in New Mills at this scheme."

Jason Teasdale has worked on regional newspapers including the Liverpool Post and the Liverpool Echo. He is the former environment correspondent at the Northwest Enquirer.