

Falling Water

Rising Power

RICHARD TAYLOR says that sustainable hydropower, although not a panacea, is infinitely renewable, improves energy security and reduces poverty — yet has still to realise its full potential

H ydropower produces almost a fifth of the world's electricity and supplies 92 per cent of electricity derived from renewable sources, yet only a third of the world's potential resources have so far been developed. This is particularly surprising as there is great scope for it in countries where the need for electric power is greatest.

Sustainable hydropower is a renewable, safe, clean, and reliable source of energy. It already supplies energy to 161 countries, and its development is most advanced in some of the richest and most environmentally aware nations.

It can become one of the international community's key tools in the struggle to raise the living standards of the poorest. No society has ever successfully tackled poverty without addressing water and energy security and the supply of affordable and reliable water and electricity can make a major contribution to meeting the Millennium Development Goals.

Infinitely renewable

Based on the simplest of principles, hydropower uses gravity to produce electrical power. As water is released through the turbines, generating power, the force is, in essence, free and infinitely renewable. Water is not consumed in the process. It passes through the power plant unchanged and can be returned to the natural river course and/or used for irrigation, water supply, and fisheries — and to help improve navigation.

It enables power to be stored effectively in freshwater reservoirs, allowing it to be released to meet sudden peaks in demand or loss in supply from other sources. This makes it the natural renewable partner for other technologies — such as wind, wave, tidal or solar energy — which do not themselves provide a continuous supply.

Energy security

It also improves energy security. As long as seasonal water flows are stored sensibly, hydro generation is entirely predictable. It is immune to fuel price fluctuations, and already offsets the need to burn 4.4 million barrels of oil equivalent worldwide each day. In a mixed energy system, hydropower's flexibility also enables fossil-fuel plants to operate in a steady state at their highest efficiency, further reducing emissions.

Recent events have brought power generation and its impact on our lives into sharp focus, and greatly increased the recognition of how energy policies affect our planet's well-being. Despite best efforts to manage it, global demand for electricity is expected to double in the coming decades.

Fossil fuels are causing economic and political conflict. And, alarmingly, there are increasing differences of opinion around the world between those that have abundant domestic sources of them and those that do not. But we must, of course, acknowledge that these fuels are





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an integral part of contemporary life — and make the best use of them during our transition to a cleaner energy future.

Clearly there is a need to make the best use of all technologies, including hydropower whose capacity could be tripled by judicious investment. At present, its usage varies hugely. Europe makes use of three-quarters of its hydropower potential, Asia less than a quarter. And in Africa, only 7 per cent of the hydropower potential has been exploited although tens of millions of people live without electricity.

Yet — while communities that have already developed hydropower enjoy cheap and reliable power — the costs of implementing new projects are onerous. High planning and construction costs create a financing challenge — though the subsequent running costs come in at just a tiny fraction of them. Innovative, longer-term financing and cleaner-energy credit will be required to transcend the financial barriers and exploit the economic and sustainable benefits of hydropower in the developing world. This is an ambition worth achieving, and the hydro sector is seeking to work with all stakeholders to find appropriate solutions.

Sustainable practices

The International Hydropower Association's biennial Blue Planet Prize recognises excellence in sustainable practices at hydropower facilities. One of this year's winners, the Andhikhola Hydel and Rural Electrification Project in Nepal, won for excellence in socio-economic benefits and capacity building.

Described as 'inspirational' by the inspection team, it delivers reliable water and electricity to 100,000 local people in rural Nepal, making electricity affordable for the first time to 22,000 low income families. It has also enabled local cooperatives to establish irrigation systems, which have stabilised food security in the region.

Voluntary standards

Blue Planet Prize nominations are evaluated in accordance with the Association's Sustainability Guidelines and Compliance Protocol — recently acknowledged by the Organization for Economic Cooperation and Development — which are designed to promote greater consideration of environmental, social and economic aspects in assessing the sustainability of new projects and managing existing schemes. The hydropower sector continues to make progress with these voluntary standards in planning, constructing and managing schemes with sensitivity to local communities and the environment. The future challenge is to ensure that all actors in the sector realise their full potential to help meet the world's growing needs and to lift communities out of poverty, by delivering sustainable water and energy security.

Environmental goals

In the words of Stéphane Dion, Canada's Minister of the Environment and President of the United Nations Climate Change Conference in Montreal in December 2005: "There is no doubt that hydropower can play a significant role in meeting many environmental goals, including climate change. In our increasingly carbon-constrained world, renewable energy forms, such as hydropower, have the potential to meet the sustainability criteria demanded of our times." ■

Richard Taylor is Executive Director of the International Hydropower Association.