Completing the Job: Ideas for Advancing Hydro Development

By Bruno Trouille

Once a proposed hydro project is identified and accepted in principle by all parties involved, the work of implementation begins. Offering new and additional financing mechanisms and project implementation approaches will aid the completion of more new hydro projects.

Once a proposed hydroelectric project is well defined and acceptable in principle to the host government, the utility, the non-governmental (NGO) community, and potential lenders, implementation can begin. During this phase, several actions are critical to ensure successful completion.

These actions include:

- Selecting the development team
- Negotiating the final financing package
- Choosing the implementation program

Throughout project implementation, I recommend that the advisory team, selected during the development phase as outlined in Part 1 of this series, remains actively involved with the host government or utility. The team is needed to protect the interests of the government or utility and to expedite the transition to project implementation.

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Selecting the project development team

The first task of the government agency or utility responsible for project implementation is to select a project development team, hereafter also referred to as the project company. Ideally, this team is a consortium composed of a developer-operator (a utility or independent power producer) and other investors having a stake in the long-term benefits of the project. For example, these investors could be large industrial consumers, mining companies, or distribution companies that would benefit directly from the power produced by the project.

In most cases, it makes sense for the project development team to be selected through a competitive bidding process. The advisory team can assist the host government or utility in instigating this selection process, and in setting both technical and financial criteria used to evaluate the various proposals toward selecting the most attractive offer.

In some cases, this competitive process may not be feasible due to a number of perceived technical and financial risks associated with the project and country, or due to a government-to-government agreement that has targeted the construction of the project. In these cases, the advisory team would help the host government conduct direct negotiations.

In return for a 20- to 30-year concession for the proposed project, the project development team is asked by the host government or utility to pay an initial access fee and annual royalty payments. The royalty payments usually start once the project company re-pays all major debts to its lenders. The host government or utility tries to recover, through the access fee, all expenses incurred during the early development phase. One criterion a host government or utility can use in selecting a project development team is to the amount of access and royalty fees offered.

Negotiating the final financing and implementation package

If the recommendations offered in Part 1 of this series are followed, the technical, environmental, and legal issues surrounding the project will have been addressed during the early developmental phase. In addition, the advisory team will have already explored a range of financing options with interested international and local lenders. Consequently, at the project implementation phase, the project development team can focus on negotiating a final financing package.

I recommend that the host government or utility gives the project development team the flexibility to decide how it will construct the project — either by bidding separately for the civil works and procurement of electromechanical equipment, or by asking for an engineer-procure-construct (EPC)-type or design-build construction contract. Depending on the construction risks associated with a project, an EPC-type contract may be very expensive, whereas a risk-sharing

arrangement between the development team and the civil constructor may result in a lower overall cost.

Exploring alternative financing mechanisms

A key to the successful establishment of a final financing package is the availability of multiple financing mechanisms. Herein lies a challenge for hydro. For example, the box on page 16 shows existing World Bank and International Finance Corporation (IFC) funds accessible to hydro developers. Direct project financing also can be obtained from these two institutions and other multi-lateral development banks. However, a look at the total spent on hydro development from 1996 through 2000 — about US$4.2 billion (28 percent of which was spent by multi-lateral development banks) — illustrates the limited amount of hydro expenditures when compared to a total of US$20 billion to US$25 billion spent annually for thermal power development.

To aid construction of renewable energy projects, it is critical to make low-cost financing available. Ideally, multi-lateral and bilateral agencies need to double or triple the amount of funding currently available. In addition, they should establish funds in countries or regions where there is a large potential for hydropower and other renewable energy development. Areas that would especially benefit from such an approach include Brazil, Peru, China, the nations of southern Africa, the Mekong countries, and Russia.

The World Bank has established a few country or regional development funds specifically for renewable energy and energy efficiency projects. These funds provide grants and attractive loans (low interest rates and 20- to 30-year repayment periods), but are usually for small projects (less than 50 MW). Bilateral and multi-lateral financing agencies need to make such funds available for larger renewable energy projects that benefit the economic development of a country or region and, at the same time, offer an alternative to the development of thermal generation.

Further, these agencies should work closely with existing national development banks to greatly increase the amount of loans offered per project — up to 90 percent of the total required debt amount rather than the current limit of 30 to 50 percent. They also should strive to lower interest rates and to extend repayment periods from ten to 15 years to at least 20 years.

Such actions would lower the high tariffs usually required for a hydro project in the first ten years of operation. As illustrated in Figure 1, the original "blue" range of private hydro tariffs would shift toward the "yellow" range, making hydro more competitive with other electricity sources. Lower interest rates and longer repayment periods would bring hydro tariffs within the "green" range of average generation costs.

After the first 15 to 20 years of operation, the lower cost of hydro generation could benefit consumers by reducing their electricity costs. Alternatively, the host government could levy additional "royalty" charges (the orange band in Figure 1). These additional revenues could be used to create new country or regional development funds to further encourage investments in hydro and other renewable energy projects.

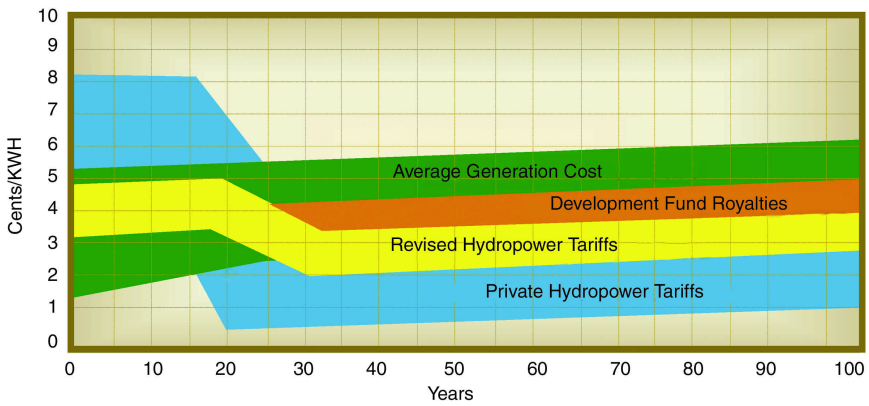
Furthermore, multi-lateral and bilateral agencies should be much more proactive in facilitating the availability of political and foreign exchange risks guarantees. These guarantees also should be structured in such a way that they can be used as insurance for unexpected cost overruns due to, for example, unforeseen geological risks and/or can provide financial assistance to the developer during periods of meager revenues due to temporary drought conditions.

Alternative implementation programs

Each hydro project, as well as each country interested in fostering the development of its hydro potential, has unique characteristics. Recognizing these characteristics, it may be prudent to consider adapting variations to the traditional mechanisms of developing greenfield power projects. In the following paragraphs, I offer several proposed alternatives that could aid the completion of more new hydro.

During the process of privatizing existing generating assets, it is sometimes possible to require a buyer of existing assets to invest in new hydro facilities. The purchase price of the existing assets would need to be negotiated to ensure that the resulting weighted average selling price of electricity from both the existing and new facilities would be competitive with the current utility tariff structure and cost of alternative generation. Such an arrangement was implemented in 1999

Figure 1



High tariffs for a hydro project in the first ten years of operation can be reduced if lending institutions will make country or regional development funds available to more hydro projects at lower interest rates and with longer repayment periods.

World Bank/IFC Funds for Renewable Energy Projects

The following funds are available specifically for renewable energy projects, such as hydroelectric power projects. These funds are in addition to funding on a project-by-project basis.

Energy Sector Management Assistance Program (ESMAP) — Established in 1983; jointly sponsored by the World Bank and the United Nations Development Programme (UNDP); allocates between $7 million and $8 million a year for technical assistance and micro energy projects, including hydro; from 1999 to 2003, hydro received 36 percent of total funds.

Global Environmental Facility (GEF) — Since its creation in 1991, allocated US$4.5 billion in grants to support more than 1,300 projects. On November 21, 2003, the GEF Council approved US$224 million for 19 new projects.

Power Development Fund — US$75.6 million credit to His Majesty's Government of Nepal in support of its efforts at expanding access to electricity and development of small and medium-sized hydro schemes; approved by World Bank in May 2003.

Prototype Carbon Fund (PCF) — Established July 1999 by executive directors of the World Bank; allocated US$180 million for buying carbon credits. As of September 15, 2003, the PCF had contracted US$31.8 million for emission reductions from hydro plants.

Renewable Energy and Energy Efficiency Fund (REEF) — Established in mid-1998; provided about US$200 million for financing various types of renewable energy projects less than 50 MW.

in Panama when private developer AES Corp. bought existing assets and committed to construction of the 122-MW Esti project. The project, on the Chiriqui River in Panama's Gualaca Region, began commercial operation in November 2003.

Another idea would be for the host government or utility to own the project, while the private sector would finance, construct, operate, and maintain the project throughout the period of the concession. The host government or utility would receive regular "lease" payments from the developer. The utility would dispatch the units and manage the reservoir to meet the wider requirements of its power system. The private sector would be required to deliver the completed project in full commercial operation by a specified date and to maintain its availability within specified performance limits.

Another possibility is for host governments to offer potential developers greater flexibility with regard to the length of the concession period. Large net revenues or positive cash flows occurring after 15 years of operation do not carry much present value when discounted at the expected rate of return on private equity. Most IPPs prefer positive cash flows and an acceptable rate of return as soon as the project begins operation. The prospects of large positive cash flows after 15 to 20 years of operation and a stable and low-cost supply of electricity might appeal to some developers (such as large industrial consumers, mining companies, or distribution companies), but not to others. As a result, it may be politically more attractive for some host governments to reduce the concession period to about 15 years. The initial concession period should still correspond at least to the repayment period of all major loans, and the private sector could remain involved through subsequent ten- to 15-year operations and maintenance (O&M) contracts. This arrangement could be attractive if the host government or utility does not have all the necessary skills to operate and maintain the project, or if O&M could be achieved more cost effectively through outsourcing.

Another advantage of this proposed scenario is that it better reflects the true pattern of hydro costs. The host government would have the opportunity to increase its royalty revenues during the O&M contract periods, because the cost for hydro operation would be limited to O&M costs, environmental and socio-economic mitigation costs, and refurbishment and upgrades. The need for the host government to participate in the upfront financing would be compensated by higher royalty revenues or benefits to the consumers in the next 50 to 100 years of operation.

Balancing public, private participation

To reconcile the long-term benefits of hydropower with the market constraints of private financing, we need to bring the pendulum between public and private participation toward a more balanced equilibrium. The private sector should be used for what it does best: to increase efficiency and reduce costs. The public sector (host governments and bilateral and multi-lateral agencies) and the NGO community have an important role to fill, and should be actively involved in the proper balance of thermal or hydro projects and the weighing of socioeconomic and environmental effects (such as global warming).

It is timely that one of the major results of the World Summit on Sustainable Development (WSSD) held in Johannesburg, South Africa, August 26- September 4, 2002, was to classify all hydro (large and small) as renewable. This declaration highlights the important role that hydro can play in the development of renewable energy. ▲

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Reference

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