Guidelines for Attracting Developers of Hydropower Independent Power Projects

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Introduction

Developing countries have become increasingly interested in attracting private entities to bid on construction and operation of hydro-based independent power projects (IPPs). The output from such power generation facilities is committed, under long-term supply contracts, to the developing country’s power utilities.

In general, IPP developers are attracted to countries that have sound legal and business frameworks, that need new power, and that have power sectors open to foreign private investment and capable of paying for power purchases from private projects. Another factor that may predispose IPP developers to work in a developing country is the presence there of other successful IPPs, which reduces the perceived risk of entering a country and hence enhances the ability to raise financing.

Distinctive Requirements of Hydro IPPs

Agreements to develop hydropower IPPs have important differences from those for thermal projects, however. Project financing is the distinctive issue for hydro IPPs because construction costs for hydropower projects are subject to greater uncertainty and account for a larger proportion of total project costs than for thermal power projects (about 80 percent versus 50 percent, respectively). Private hydropower developers are thus likely to look at several other factors quite carefully:

- availability of site-specific information such as surveys of hydro potential;
- ease of securing water rights, land rights, and transmission rights of way;
- the need to arrange for connecting the IPP to the transmission grid;
- the cost-effectiveness of hydropower relative to alternatives.

Need for Hydropower Guidelines

Unfortunately, existing guidelines for IPP contracts focus largely on thermal projects, and the process of attracting bidders to hydro and thermal projects differs significantly. Pakistan has developed separate guidelines for hydropower IPPs, and other developing countries would be well-advised to do likewise.

This note explores several principal points relevant to developing such guidelines. Given the paucity of experience with hydropower IPPs in
developing countries, the note draws largely on views expressed by private developers. It focuses its recommendations on the following topics, which are central to developing appropriate guidelines for hydropower IPPs: the need for site-specific information and options for site configuration, the structure of the power purchase price, the bidding process; and the handling of geological risk.

Provide Site-Specific Information and Options

Make Relevant Site Data Accessible

Hydropower developers need to perceive that governments and their power utilities are well organized and know what they want. Governments and utilities can foster this perception by making a broad range of information about potential hydro sites easily accessible, particularly the following:

- hydrology records and hydrological analysis (preferably over at least 10 years);
- topographic data at the 1:5,000 scale for a dam site, and 1:50,000 scale for a reservoir area;
- a geological survey of the site, or at least a survey of the geology of the area;
- records of any seismic activity in the region;
- basic environmental and social data of the region, including the river basin, and about the people who would genuinely gain or lose by the project;
- information on any required new access and transmission routes, and the state of survey and cadastral records;
- local availability of construction materials.

Offer Developers Multiple Sites to Help Mitigate Cost and Schedule Risk

A key objective of governments for attracting private development of their hydro potential is to pass on the substantial construction cost and schedule risks to developers who are better able to handle them. To this end, it is helpful to give developers a choice by offering more sites than needed. This was done in Nepal, where three years ago, 100 small-to-medium sites (up to 100 MW) were outlined: currently, hydropower IPPs are being negotiated for four of these sites.

Allow Developers to Elaborate the Details of Site Configuration and Project Design

In promoting hydro sites, governments should use outline design concepts to the prefeasibility study level—including economic, environmental, and social aspects—and leave the detailed design to the developers, who often have more experience with such projects and in any case will prefer to be involved in design choices that affect their risk. Developers may choose different configurations from those proposed by governments and engineering consultants, because developers are working from different commercial, economic, and environmental assumptions. In particular, developers are more likely to configure their projects using conservative assumptions about firm power capacity, river flow, hydraulic head, and reservoir storage that lead to the choice of lower installed capacities and larger reservoirs than those suggested by standard power system planning approaches. The best way to persuade developers to consider configurations with more generating capacity and smaller reservoirs is by proposing an appropriate structure for the power purchase price in the bidding documents.
Minimize Implementation Risks

Developers prefer to exert some control over the execution of environmental and social mitigation measures in order to manage implementation risks. They are often ready, therefore, to cover at least some of the costs of these measures in their project financing plans. They are likely to shun sites that would involve them in controversial environmental and social issues or to configure projects to minimize them, because such issues pose serious business risks.

Induce Efficiency through the Pricing Structure

The structure of the power purchase price is the key to reconciling the developer’s cash flow needs for debt service with providing an incentive for the developer to produce power according to the purchaser’s requirements. The pricing structure should place the risks to the developer’s financial returns from hydrological uncertainty on the developer without restricting its access to commercial loans for the project (the utility also carries a financial risk from hydrological uncertainty from its supply obligations).

Use a Two-Part Pricing Structure

A price that consists of just a single energy rate is unlikely to meet these requirements, except for run-of-river plants that have little scope for regulating power output. A two-part price structure—consisting of separate payments for capacity availability and energy supplied—encourages developers to configure projects with sufficient storage and generation capacity to meet the purchaser’s needs most economically. Capacity availability payments encourage the developer to have capacity available when required by the utility, and should provide the cash flow for debt servicing. The energy payments encourage the developer to generate energy efficiently, and should provide the revenues that earn the return to its equity in the project.

Incorporate Premium Rates

A two-part pricing structure can also include higher rates for times when project output displaces the most expensive of the utility’s power sources, such as thermal plants for meeting daily peak loads and for supplementing hydropower during seasons of low river flows.

Establish Clear Bidding and Negotiation Processes

Clearly formulated bidding and negotiation processes can help in all power projects, but greater detail is required for hydropower projects, because of the critical importance of site features, which strongly influence the economic potential of a hydropower project. The right to develop a good hydro site is valuable in a way that does not usually apply to thermal power projects. In the bidding and negotiation stage, hydropower policy guidelines should be applied to the evaluation of specific development proposals through:

- a preliminary licensing process, allocating temporary licenses that reserve the right to develop specific sites to experienced and creditworthy developers, according to a fair and transparent prequalification process;
- negotiations for a power purchase agreement and project implementation plan;
- preparation of an environmental impact assessment and a mitigation plan.

Energy Note No. 9 continues on next page
Handle Geological Risk

Geological uncertainty can introduce construction and financial risks; handling this risk is therefore critical for the development of private hydropower projects. If this risk is not mitigated in some way, the developer may either apply unduly high cost contingencies to cover the risk or simply be unwilling to bid to a power purchase price that is fixed before the project is built.

Facilitate Geological Investigations

Developers’ perception of geological risk will be influenced by the known geology and by past experience with underground construction in the region. However, if, as recommended, developers are allowed to choose their own project configurations, it is not advisable for governments or purchasing utilities to carry out major geological investigations (such as drilling boreholes), since their information would not necessarily apply to the chosen configuration and hence could fail to reduce the developers’ perception of the geological risk.

Explore Methods of Sharing Risk

One way to mitigate the geological risk perceived by the developer is to arrange for some sharing of the risk between the power purchaser and the developer. Three methods for sharing geological risk are possible:

- incorporating as a contingency in the energy purchase price the costs of dealing with geological conditions; however, since there is no logical relationship between this cost item and the quantity of power sold, this is an inefficient approach economically;
- the power purchaser could underwrite prudently incurred construction costs over a defined level that arise from geological conditions; however, this is risky for the purchaser because the constructor effectively controls much of the information needed to ascertain whether such costs were incurred prudently;
- a target price contract could be agreed whereby both developer and purchaser benefit when incurred costs are lower than the target level, but share costs that exceed the target level. This target price could emerge from a competitive bidding process. The shares do not have to be equal; for instance, a particularly risk averse purchaser might be willing to accept less than 50 percent of the share of any cost saving in exchange for being liable for less than 50 percent of any cost overrun.

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