

# Commercial aspects of hydropower development: A changing scene

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Over the last two decades hydropower has hovered uneasily between the public and private sectors. Indeed, some of us would say that it has moved from the public to the private sector - and then partway back again. In many countries it has evolved from a public service to a market culture, supplying a tradable commodity: electricity. In consequence the framework surrounding the development and ownership of hydro projects has changed so that commercial aspects have become more prominent - and certainly more complex. Lying behind these changes there are a number of factors:

- i) The unbundling of the old vertically integrated state-owned power utilities;
- ii) The public sector seeking to divest itself of responsibility for financing power projects;
- iii) The private sector finding it difficult to assume some of the risks associated with large hydro projects.

These changes have been accompanied by the emergence of new institutional structures and a whole raft of new players, in particular private power developers, investors, and lenders who collectively form the independent power producers (IPPs) which we now see in many parts of the world. The main responsibility of any IPP is to its shareholders; its only role is to sell power to the system and it has no downstream obligations beyond this. The efficiency and security of the system is the responsibility of the System Operator, who in turn sells power to the Distribution Companies. Overlooking all of this is the Regulator, whose job is to act as an umpire, monitoring the often conflicting interests of the various parties concerned.

While there are no doubt many advantages in the competitive tension created by the unbundling of the old power utilities, it certainly creates a complicated commercial environment. This is especially evident when it comes to the hydropower where the long-term, capital intensive nature of the projects, with their high construction risks and multiple stakeholders, makes it difficult to package them neatly within contractual framework of a free market.

The most obvious consequence of these structural changes has been to devolve accountability downwards. Under the IPP scenario individual projects have to be commercial viable in their own right under all reasonably foreseeable scenarios, whereas in the past they were justified by their contribution to the overall performance of the portfolio of generating assets owned by the utility. Under today's structure the key issue is the financial viability of the individual project, in contrast to the past when it was the economic viability of the entire power system. This means that cost, revenue, and risk are all ring-fenced in the one project which has to be judged on a stand-alone basis.

## **Brief historical overview**

With the perspective of over twenty years, one has to concede some disappointment at the relatively slow inflow of private financing into the hydro sector. Whereas the IPP concept has generally worked for thermal power stations, it has proved to be more difficult to apply to hydro other than for small run-of-river projects. The larger and more complex hydro schemes are not easily adapted to the model.

This is not though lack of trying. In the early days of privatisation many companies took up the challenge, and while some succeeded too many lost a lot of money for reasons that were often outside their direct control. The situation varied greatly from country to country, but despite some notable exceptions like Nam Theun 2 and Bujagali (both of which took years to reach financial closure) the success rate has in general been low. One of the most disturbing consequences of this is that, as far as large projects are concerned, there is now not as much interest from prospective developers as the market needs.

As time has passed perceptions have change. Governments no longer imagine that private hydro is an easy option where they can simply award a concession and leave it all - including all of the risks - in the

lap of the private developer. There is a growing realisation that the State has a major role to play in the preparation of any large private hydro project, and that this will often include bearing some of the risks and raising part of the finance.

Having shied away from hydro throughout the 1990's, the multilateral development banks (MDBs) are now back with a vengeance, but in a somewhat changed role as "facilitators" of private financing rather than being the main funding vehicle. That at least is the theory, but in practice the reality is that they are increasingly being called upon to fill the gap between the economic and financial viability of projects with public money to keep the lights burning and prevent other, possibly less environmentally and economically desirable thermal project, being built simply because thermal can be financed relatively easily by the private sector..

Then there is the issue of cost. Hydro is expensive in the early years while the capital cost is being amortised; but ridiculously cheap thereafter. Notwithstanding this, it is very difficult to convince a government that is already under pressure from high domestic power tariffs that it would be a good idea to forego the less expensive thermal option in the interests of having cheap, renewable hydro energy in the long-term. A number of prospective hydro projects have failed on cost, and in many cases this is at least partially attributable to the procurement and risks-sharing arrangements adopted for construction. In recent years we have seen a softening of this position, and a move away from the fixed-price contract, as financiers and developers become better informed and the various parties work more collaboratively to improve the competitiveness of hydro energy. We shall look at these points later.

The average hydro project involves a large number of commercial decisions which will start being taken at an early stage. This paper will focus on two inter-related areas where a workable commercial model is still evolving. These are:

- i) Structuring of projects.
- ii) Construction arrangements.

### **Structuring of Projects**

Although it is completely illogical to compare a 200 MW gas-fired plant with a 200 MW hydro plant using short-term financial criteria alone, this is effectively what a prospective private developer does. He is not interested in the fact that the hydro plant will have an indefinite shelf-life while the gas-fired plant will last for only twenty years; nor in the ancillary benefits that hydro will bring unless they create revenue (which they generally will not); nor in the fact that in the longer term hydro will produce extremely cheap, clean energy. But he is naturally very interested to learn that hydro will take two years longer to construct, and that during the construction phase the risks will be significantly higher.

Given these facts it is not surprising that it is much easier to find investors wishing to develop a thermal plant. A government faced with the need for more capacity may find itself being propelled towards the thermal option because it can be financed under a BOOT concession, despite the fact that an alternative hydro plant, which it cannot finance as easily, may be better the economic (i.e. national) perspective. The only way to overcome this problem is to inject public money into the hydro project to bring its financial viability to an acceptable level, using the wider "public good" benefits as justification.

Public funding may simply involve stepping in where the private sector fears to tread because the returns are not commensurate with the risks, in which case the money may be on commercial terms. However it is increasingly being recognised that for many hydro projects it is not only a matter of the availability of funding but also of its cost, in which case concessionary (i.e. soft) public money will be needed to bring an otherwise sound project to financial viability. Faced with this situation the MDBs are acting in their traditional role as financier of last resort, by feeding in sufficient concessionary money to act as a catalyst for the private sector to step forward.

The injection of public funds in this manner is effectively a subsidy to a private company, and it obviously raises certain transparency issues. The most obvious way of overcoming these concerns is to involve the public sector directly in the project, either as the owner and financier of a discrete element of the works (e.g. transmission line, access roads, or even the dam itself) or as a shareholder in the Project Company. This is the move towards Public-Private Partnerships (PPPs).

Most notionally "private" projects are actually being financed by a mix of public and private funds under some form of PPP arrangement. But even with large public participation such projects still

operating under the commercial disciplines of a private company. In this respect the distinction between Public and Private is becoming increasingly blurred.

There is no set format for a PPP, but people tend to think of them as any project where the State has an element of ownership. Apart from assisting in improving the financial viability of projects, PPPs tend to be more politically acceptable than a wholly privately-owned company where the exploitation of national resources is involved. However they raise many complex issues, and this has given rise to another relative newcomer known as the Transaction Advisor who guides the Host Government through the strategy of procuring the Private Partner, and then negotiating with him on the complex and often inter-related technical, financial and legal issues. A key part of these negotiations will be the risk sharing arrangements between the public and private sectors: in essence, how much risk does the public sector have to assume to keep the private sector on board at a sensible price?

The structuring of a hydro project as a PPP has to be formulated on a case-by-case basis. The most common arrangement is for a public sector holding in the Project Company, in which case the Government will find itself with diverging interests, acting both in its sovereign capacity and as a shareholder. The important thing is to ensure that the reasons for establishing the PPP are clear; that the rights and obligations of the parties are enshrined in enforceable contracts; and that adequate checks and balances are in place to keep all parties focussed on a common end.

### **Construction arrangements**

The second area where there are signs of change is in the procurement and form of the construction contracts. This is an important issue because the cost and duration of construction is a dominant factor in determining the tariff. Closely linked with this is the fact that amongst the many risks that a hydro project faces, construction risks are the most common and potentially the most serious in terms of their impact on the overall viability of the project.

This is an issue that the host government cannot simply ignore and leave to its partners, because in many circumstances the cost of construction will be treated as a pass-through cost when it comes to determining the tariff and the government take on the project. In simplistic terms, the headroom for the developer's profit and government royalties is the difference between the construction cost and the revenue created by the scheme; high construction costs adversely impact tariffs and reduce the scope for government royalties.

The problem is that it is very difficult to decide in advance what the construction cost for a large hydro project should be and, to a large extent, it will be determined by the procurement and contract terms. Although it might appear obvious that the developer and the government have a common interest in keeping costs low, this is not always the case.

Most readers will be aware that in recent years the traditional, multiple-contract approach to construction has given way to EPC/Turnkey arrangements where a single contractor carries the full responsibility for the design and delivery of the working project to a predefined price and schedule. The latter approach has emerged as a result of private developers looking for ways of reducing risk in a situation where the commercial viability of the project has to be protected under all situations. That is fine, but in practice where major hydro is concerned the EPC approach also has a number of serious drawbacks, which can be summarised as a) reduced flexibility to respond to site conditions during construction, and b) significantly increased prices.

Nobody can give precise figures for what is sometimes referred to as the "EPC Premium" but many people will concede that it adds 20 - 30% to the base cost of a project, for the following reasons:

- i) It is difficult to persuade contractors to bid on a turnkey basis for a large hydro project due to the cost and time involved. So competition is very limited.
- ii) It is equally difficult to persuade contractors to bid on a fixed-price basis, particularly where there are underground works involved. Or they assume a worst case scenario.
- iii) Similarly attempts to impose punitive liquidated damages (for late-commissioning, etc) can be counter-productive if the contractor feels he has no control over certain possible events.
- iv) The main contractor will employ sub-contractors whose prices will already include their own contingencies, but he will naturally add another contingency to cover his own exposure in managing and coordinating the separate sub-contracts.

Of course the multiple contract option is not without its additional costs, but it is easier to procure in a competitive manner and the owner has more control in directing the works (for example, he can improve the schedule by awarding Advanced Contracts). And there is less of a tendency to layer contingencies to cover adverse events that might not occur.

There are proponents for both sides, but the main supporters of the EPC approach are the bankers who believe that by tying down a single contractor to a “price-sure, time sure” contract they eliminate risk. However experience shows that this approach has not always afforded the level of protection anticipated, and there is some anecdotal evidence to suggest that EPC contracts end up in Arbitration or Courts more often than traditional contracts did in the past. A common source of dispute is the level of support for underground works which is defined by the Engineer under the traditional contract, while under the EPC it is defined by the Contractor or his designer.

There have been some developments on this aspect with the emergence of hybrid forms of EPC contract with provisions for repricing certain elements of the work, typically relating to design changes in response to geological conditions revealed as work proceeds. The Owner’s Engineer obviously has to be involved in approving (albeit without diluting the contractor’s liability for the design) the changes. And he has to agree any extension of time this might be added to the scheduled commissioning date, bearing in mind that delay is likely to be more costly to the owner than the actual modification to the original design.

Finally this brings me to the subject of contractual disputes. Arbitration or Litigation is expensive forms of dispute resolution which generally occur long after the event, when it is far too late to correct matters on the ground. Later in this session we are going to hear about Dispute Boards which are becoming more widely used. They are convened at the outset of a project with the object of providing timely and impartial judgement on disputes as they arise, so that the necessary corrective action can be taken immediately and the overall cost to the project is reduced.

## **Conclusions**

So where does this leave us? I think that we are seeing something of a boomerang effect, in the sense that the industry is coming part-way back from the changes in direction that took place in the 1990’s. To summarise the main points made above:

- a) We are seeing a gradual erosion of the original EPC concept, with mechanisms for price adjustments (usually for geological reasons) and with provision for the Owner to have a greater say in the ongoing design.
- b) Dispute resolution appears to be moving towards the concept of an independent tribunal monitoring the project from the beginning, and therefore being in a position to make rapid judgements without delaying construction.
- c) In the structuring of projects the move is away from total private ownership towards some form of PPP where the public sector engages more fully in the risks and rewards of exploiting its natural resources.
- d) On the financing of projects we are likely to see a much greater dependence on public support in one form or another – loans, equity, guarantees – than was generally envisaged only a few years ago.

If one looks closely at these trends one might observe that the modified EPC concept is getting much nearer the traditional construction arrangement; the Dispute Panel looks like a reincarnation of the Independent Engineer; and in the past the public sector has always assumed many of the risks and provided much of the financing. A cynic might say that having turned the full circle, the wheel has turned a half circle back again!

We may be converging with the past, but the one big change that will never be reversed is that hydropower is now a commercial commodity. The financing and ownership situation has changed beyond recognition and, whether we like it or not, future projects will be surrounded by a more complex set of commercial agreements than was ever the case in the past when public utilities simply developed projects on a nod from the government and the strength of their balance sheets.

## **The Author**

**Chris Head** is a consultant specializing in the Contractual, Commercial, and Regulatory aspect of hydro-power development and water resources management. He has advised governments, developers, investors, and lenders on projects in many countries. Chris is the author of *Financing of Private Hydropower Projects* (published in 2000), *Financing of Water Infrastructure* (2006), and of a number of other publications covering the contractual and commercial aspects of private hydropower. He was acted as an independent consultant since 2001, and was previously a Director of an international firm of Consulting Engineers. He has more than 30 years experience of the planning and development of water resources and power projects.