

International business, International Organizations and Wealth of nations
EBHA, 11th Annual conference
Geneva, 13-15 September 2007

Anne Dalmasso

Lecturer in contemporary history
University Pierre Mendès France, Genoble 2
Researcher at LAHRHA

(*Laboratoire de Recherche Historique Rhône Alpes* –
Historical Research Laboratory Rhone Alps),
CNRS UMR 5190

Provisional draft

International Organisations, Enterprises and Large Dams From the 1950s to today

Dam construction is a very ancient phenomenon. However, the birth of modern hydraulics¹ is no older than the first third of the 19th century while the rise of “large-scale hydraulics” is a phenomenon characteristic of the second of the 20th century. In the aftermath of the Second World War technical, economic, and political conditions all came together to favour large scale investment programmes in numerous fields including hydraulics and hydroelectricity. Exploitation of resources – already well under way in Europe and North America – became more intense in other continents, especially from the 1960s in the so-called developing countries. These had enormous potentials to be exploited, considered by contemporary development theory as a key for modernisation and prerequisite for economic take-off. Priority was given to very large projects – of which the design, finance, and construction were most often beyond the means of the states concerned. So the completion of large-scale hydraulic and hydroelectric development projects, based on “large dams”, was one of the fields most favoured by aid policy – whether bilateral or multilateral – which organised a large part of the economic and commercial relations between developed and developing countries. This technical and financial aid was accompanied by the allocation of these markets to western companies, whether this quid-pro-quo was an explicit part of “tied programmes” or not, in so far as only they mastered the required technology.

This model, characteristic of the period from the 1950s to the 1970s, was called into question from the 1980s for many reasons. On the one hand privatisation and the opening of the electricity markets to competition, in developed countries and certain developing countries, modified both the economic and financial motivation of the parties in question and the criteria for estimating the large hydroelectric dams’ profitability. On the other the dams themselves came in for criticism: their productivity was doubted and their negative environmental and social impact denounced. Besides, the development policies which had justified this kind of development and the international institutions promoting it – the World Bank most of all –

¹ Understood as the development of new techniques and the scientific formalisation of knowledge in the field of hydraulics followed by that of hydroelectricity.

were called into question virulently. This also concerned, more discreetly, private enterprises involved in large dam construction, accused of taking advantage of the circumstances peculiar to these markets to impose unsuitable but lucrative technical solutions, using methods ranging from lobbying to corruption.

This moment of discredit, between the middle of the 1980s and the beginning of the following century, occasioned a great deal of expert analysis and a certain number of recommendations and guides to good behaviour. After a distinct drop in big dam projects, and the abandonment of a few, investment recovered – especially in Asia.

The large-scale hydraulics sector has thus gone through two phases of internationalisation: the first in the context of particular north-south relations dominated in part by aid criteria and with the international financial Institutions – the World Bank included – strongly involved, the second being contemporary “globalisation”. We shall attempt to outline some of the elements of the adaptations adopted by the enterprises active in these markets by showing, at each stage, how public and private sector rationales adjusted to each other.

1. Large dams and development, 1950-70

Nature of markets and participants

Strictly speaking the notion of “large dams” or “large hydroelectricity” depends on technical criteria². It is also strongly correlated with the size of this infrastructure’s direct and indirect impact, whether considered positive or negative. The notions “large dams” and “large hydroelectricity” are only partially synonymous. Dams have four main functions, far from incompatible: energy production (hydroelectricity), irrigation, supply of drinking water, and flood control. We shall focus particularly on hydroelectric dams and, in terms of markets, on new installations.³

The enterprises involved in these markets are very diverse. To simplify they can be divided into engineering companies - auditing and consulting in the study and calls to tender drafting phase of the project – followed by construction and civil engineering enterprises responsible for the actual construction, hydraulic and electrical material enterprises for completing the works. Financing institutions, banks, international financial institutions, and guaranty institutions are also involved, and finally and naturally, the concessionaire energy distribution companies, public or increasingly private sector; and in varied forms, the public authorities - politics always has its say given the size of the works, their impacts and costs. Large dams mobilise a large number of participants in complicated markets of great size, which entails, most of the time, marrying public planning or development objectives with the private profitability objectives of the contractor enterprises.

Evolution of the markets since 1945: growth and internationalisation

² For the International Commission of Large Dams (ICOLD), a large dam is 15 metres or more high or 5 to 15 metres high with a reservoir superior to 3 million m³ in volume. For UNIPEDE (*Union internationale des producteurs d’électricité* – International Union of Electricity Producers), large-scale hydroelectricity means power stations of more than 10 000KW.

³ The hydroelectricity markets are made up of three large parts, new large and small hydroelectricity sites, and renovation sites. The latter are developing but still limited.

The industrialisation of occidental countries was accompanied – throughout the 19th and 20th centuries – by a very important phase of dam construction. The number of large dams is estimated to have been about a hundred in 1800, about a thousand in 1900, and 5000 towards 1950, essentially - but not exclusively - in the industrial nations. About 40,000 are said to exist today, with a different distribution: 2/3 in emerging or developing countries built after 1950 and particularly after 1970⁴. About half are used exclusively or mainly for irrigation and water supply, especially in Africa and the Middle East, the others for electricity production. Dams produce about 20% of world electricity and 7% of total energy.

During the 1950s growth in production capacity came from the large construction programmes in Europe and North America. Thereafter further growth prospects faced a dilemma: in developed countries with substantial financial resources the important hydroelectric sites were already largely exploited, those remaining being subject to increasingly difficult economic and, above all, environmental and social conditions. On the other hand, considerable potential resources existed in developing countries but their exploitation presupposed the development of financial plans prior to any construction, particularly with the important international institutions.

For the enterprises specialising in the hydraulics and hydroelectricity markets exporting to these particular markets became vital from the end of the 1950s, especially for the European firms whose home markets were exhausted more quickly than in North America. In the plant field firms were still numerous at this period. Most of the large European construction groups had a department or subsidiary active in these sectors and some independent firms were able to develop in this niche. The Swiss firms⁵ - Brown Boveri, Charmilles, Vevey, and Escher Wyss – German – Voith, and Swedish - Asea – were particularly active. In France the main mechanical and electro-mechanical construction groups had a hydraulics department working under foreign licence. One enterprise, Neyrpic⁶, for specific historical reasons, developed independently until the 1960s with a particularly dynamic export policy. Today it is a division of Alstom PH, the world's leading supplier of hydroelectric material. Its history lets one follow the conditions of the switch to exporting during the 1950s and 1960s.

Elements of enterprise adaptation (1)

Neyrpic (Alstom PH) was one of the European firms specialising in hydraulic material which switched their activities to export markets from a very early date. As early as 1947, even when the equipment programme of the national firm, EDF, guaranteed it an unprecedented level of business, the company's management anticipated the programme's termination. The company prospected in countries likely fill the gap, in zones where it already had business relations before the war – the Iberian peninsula, North Africa, Belgian Congo, Argentina, Indochina – and in new zones in Latin and North America, the Middle East and some countries in Asia, especially India. This research confirmed the size of the potential markets, most especially in developing countries, but also their problems.

⁴ It seems half were in China and 35,000 date from after 1945.

⁵ Serge Paquier, *Histoire de l'électricité en Suisse, la dynamique d'un petit pays européen, 1875-1939* (History of Electricity in Switzerland – the dynamic of a small European country), Geneva, 1998

⁶ DALMASSO (Anne) Robert (Eric), "Recherche et innovation dans l'industrie hydraulique: Neyrpic-Sogreah des années 1930 aux années 1960" (Research and Innovation in the Hydraulics Industry: Neyrpic-Sogreah from the 1930s to 1960s, seminar *Entre l'atelier et le laboratoire, recherche et innovation dans l'industrie électrique du milieu du XIX^{ème} century à nos jours* (Between the Workshop and the Laboratory, Research and Innovation in the Electric Industry from the mid-19th Century to Today), fondation EDF Nef des Sciences, Mulhouse 8 and 9 December 2005, to be published.

To maintain regular contacts with these new markets, the enterprise set up commercial agencies, often jointly with complementary French firms - Alstom, Schneider, Société générale d'entreprise.... It signed representation agreements with local companies or created small branches in the most promising countries, in Latin America especially. In less than a decade Neyrpic implanted itself in this way in some fifty countries taking care, nevertheless, to limit its investments to the most promising markets. These modest structures could later work as a basis for construction workshops, in liaison with local firms, as in Brazil and Argentina.

Maintaining a commercial network close to clients is only, however, one element in developing markets of which a substantial part were won through calls to tender governed by the large international financial institutions (IFI), chiefly - and especially in Africa - the World Bank. Large dams had a special place in the toolbox used by institutions dedicated to development aid. They were after the heart of the period's developmental ideas: belief in technology as a tool for modernisation, in large-scale infrastructure as an instrument for development, and in concentrating investments in order to create growth centres. More generally, under-development was seen as a form of backwardness caused by a lack of technological knowledge and financial resources; so large dams seemed an excellent way to fill both gaps at once while triggering the modernisation chain reaction expected from development aid policies.

The global role of the World Bank and the other IFIs in direct financing of large dams is not as great as their place in the debates of the 1990s would lead one to believe (around 3 %, according to the Bank itself), the main part coming from state finance or parapublic institutions, financed by loans in which, in fact, some IFIs played a part. On the other hand, the role of the Bank in financing studies, setting up calls to tender, not to mention site monitoring was important. Its role was as much to stipulate and organise as to finance. For an enterprise such as Neyrpic (Alstom PH) adaptation to the new practices came rapidly. In 1955 it separated, at the World Bank's request, its construction from its engineering business, turned into subsidiaries to satisfy the two types of calls to tender. Just as significantly, in 1954 Bernard Chadenet, a Neyrpic engineer close to management, entered the International Bank for Reconstruction and Development at Washington for a four-year assignment. He returned to Neyrpic from 1958 to 1964 becoming Managing Director before returning to the World Bank where he finished his career as vice-president.

Learning about new markets and their protagonists was fruitful in terms of business: at the beginning of the 1960s Neyrpic made half its turnover through exports and sold 2/3 of its turbines abroad. The enterprise considered itself to be the leading world exporter, and stated it had won 20% of the world market after the war. These estimates are difficult to verify; penetration into the great overseas markets was, however, real. On the other hand the financial results did not come up to scratch: the enterprise did not make enough profits; competition in the international markets pushed prices down while no compensation was possible on the home market - dominated by a single client, EDF - and open anyway to competition from foreign firms. The evolution of financing methods also paid its toll. The market for hydraulics machines is special as orders are often very specific and completion times long (3 to 5 years on average). Detailed studies are necessary in advance, of which the costs cannot always be recouped in the contracts. Before the war the enterprise could ask foreign clients for half the payment in advance, the other half being paid as needed into the workshops which lightened the load on the treasury. From 1945 the international market imposed new rules, clearly

unfavourable to suppliers. The final settlement of orders could take place up to several years after delivery; a client would naturally pay instalments but insist on very high guarantees. The terms of payment granted to clients became a decisive element in winning orders, sometimes even more than technical or price considerations. Enterprises had to have a well-stocked treasury and, above all, a financial network to support them. The public export aid agencies in France, the Coface (*Compagnie Française d'Assurances pour le Commerce Extérieur* – French Insurance Company for Foreign Trade) played an essential risk insurance role from market research to contract completion. As a sign of the importance of relations with this institution the deputy manager of Neyrpic, Henri Dagallier, became its director – complaining regularly all the while of the mediocrity of the French State's financial mechanisms compared to its foreign competitors.

Just as serious, the enterprise suffered from a growing gap between the size of the foreign markets and the weakness of its financial position. At the beginning of the 1960s, the unit orders from the big markets for turbines reached approximately FF 40 to 60 M, that is sums representing between a quarter and a half of company turnover, and equivalent to its capital which then amounted to FF 61 M. The guarantees demanded grew in proportion and lost all relation with the financial size of the company. The integration with a larger group became indispensable for reasons of security and economy, thanks notably to sharing risks, to lower general costs, and a better-adapted financial base. In 1967 the enterprise was absorbed by Alstom, its majority shareholder, a firm which itself became part of the *Compagnie Générale d'électricité* group in 1969. This concentration, on a national base, occurred in the other constructor countries, and corresponded to the general evolution of the industry in the 1960s.

Hydraulics continued to rise in the 1970s with the construction of very large dams: in Latin America - Tucurui, Itaipu - in Africa – Inga – and in North America - Grand Coulee, La Grande.... The IFIs, followed by governments, imposed the use of international consortiums, bringing together the large national groups, to equalise the technical and financial risks which grew with the size of the projects. Cost analysis methods began to be formalised, as did, in some cases, inquiries as to the dams' social and environmental effects. The Asian Development Bank was one of the first to do so, in the 1970s. New markets opened up to engineering enterprises: the Sogréah, Neyrpic's engineering subsidiary, evolved in this way from technical expertise to territorial development consulting, integrating social and environmental dimensions into its impact studies. Along side the engineers, economists, sociologists and anthropologists were mobilised to meet this new demand. Just as important, contracts came more and more with the requirement to collaborate with local engineering or construction companies, and to transfer technology and skills. From the 1960s certain equipment enterprises chose to manufacture a part of their orders on the spot (government pressure, transport problems, currency repatriation etc.). This led western enterprises to develop subsidiaries and invest in local construction companies, which in turn developed their own means of production and needs for orders. The question of sharing work between parent company and local workshops became more and more crucial – long before “delocalisation” became an issue.

These harbingers of an evolution in the approach to large dam building sites were still slight until the middle of the 1980s. The collapse of the hydraulics markets, parallel to that of other large infrastructure sites in developing countries, was a definite rupture.

2. Globalisation and the developmental model called into question: consequences and adaptations.

The hydraulics and hydroelectricity markets suffered a strong contraction in demand, in middle of the 1980s, as did all the large infrastructure markets. Several elements explain this crisis and the start of a decade of turbulence: a financing crisis, loss of confidence in dams' legitimacy and efficacy, and the change of the energy markets from a sector with strong public regulation to one governed by the laws of the market. How did the enterprises and financial institutions adapt themselves to this new environment?

Crisis in financing

After very high growth rates in the 1960s and 1970s, the progress in hydroelectric production capacity slowed down in the 1980s – even in Latin America and Asia, the most dynamic zones. The debt crisis, and the structural adjustment policies it entailed, led to a definite reduction in public financial capacities in third-world countries. The fall in the price of oil and the maturation of new technologies (gas turbines) degraded the relative profitability of hydraulics projects. Besides, the increase in criticism against the priority given to large-scale infrastructure, large dams especially, in development aid policies induced hesitations among the international organisations.

The temporary market contraction struck all companies in the sector – both European and North American - hard. More important because longer lasting, the rules governing large dam markets began to change. The progressive liberalisation of the electricity markets during the 1990s opened the way to private finance, growing strongly in the 1990s: in the third-world private investment in the electricity sector, very weak at the start of the 1990s, reached a peak of 43 billion dollars in 1997. At the same time finance by multilateral organisations had fallen from 8 to 3 billion dollars⁷. Private capital seems to have come at just the right point to take over from an exhausted parapublic system, strongly criticised for its inefficiency and opacity. But from the end of the 1990s the level of private investment fell back sharply to the extent of about 10 billion a year – a consequence of the financial crises of 1997/98, but also of unsatisfactory investment performance. So private investment did not replace public finance. This co-existence is not new; the share of development banks in financing dams since the 1950s is estimated at 15%, including 3% from the World Bank. But the period did witness a new form of diversification in finance sources, in the context of competition between different energies and a growing requirement for profitability.

The hydroelectric industry faced new and much more competitive criteria and constraints. This did not concern all countries: about half developing countries had adopted more or less complete liberalisation of their electric sector at the beginning of the 1990s. And it did not concern all dam projects either, but enough to modify the way the sector worked deeply. As an American consultant summed up in 1996, “*Electric power is moving from public procurement, with which the hydro industry feels comfortable, to a commercial business, where the hydro industry is uncomfortable*”(in English in original)⁸.

⁷ John E. Besant-Jones, *Reforming Power Markets in Developing Countries: What Have We Learned?* Energy and mining sector board discussion paper n°19, The World Bank group, September 2006.

⁸Anthony Churchill, senior advisor with the Washington Energy Group in *Large Dams: Learning from the Past, Looking at the Future*. Workshop Proceedings. IUCN, Gland, Switzerland and Cambridge, July 1997, UK and the World Bank Group, Washington, DC. p.123

Certain studies now distinguish several types of dams, according to their purpose and the ways they are financed:

- “Development dams” still largely financed by multilateral organisations, e.g.: Nam Theun in Laos, or Bujugali Falls in Uganda, continuing past developmentalist policies.
- “National interest dams” whose financing is based on national public or private funds: the Three Gorges in China, or Tucurui in Brazil, characteristic of the major Asian and Latin American countries.
- “Commercial dams” financed by private loans: Ralco in Chili, or Birecik in Turkey, the most “innovative” in financial terms but the least common.

These distinctions – useful as they may be - simplify a much more complex situation. New protagonists have stepped forward or grown in importance: private commercial banks along side development banks, private local distribution companies along side public firms, occidental electricity production and distribution firms internationalising their business, not forgetting the export aid agencies (Export Credit Agencies, ECA). Less often, material construction firms have committed themselves to finance projects in exchange for winning orders. This was the case most notably for the dam of Birecik in Turkey completed by a consortium of about ten contracting companies. In most cases, however, one finds crossed financing in very varied doses.

Far from disappearing the role of the international financial institutions has been modified. Hydroelectric installations can only become profitable in the long term, with long term low or zero return financing, which in many cases only parapublic institutions can bear. So financing by multilateral organisations remains necessary in the poorest countries whose markets are too small to ensure sufficient return on investment. But by improving projects’ financial balance they can also make it easier to call upon private capital in the context of crossed financing. So the role of the multilateral banks evolved during the 1990s. It became less that of a direct financial backer, even if this function persisted, than that of a facilitator who legitimates projects and makes them more secure thereby making them more attractive for private investors. The support of the multilateral institutions, the World Bank especially, for large dams was violently criticised during the 1980s and 1990s – a source of another form of uncertainty for economic participants in the sector.

The large dam controversy

These structural modifications of the markets take place in a new ideological context: the large hydraulic infrastructures faced a crisis of legitimacy which also sprang up in the middle of the 1980s. What is known as the “large dam controversy” became an international issue focused on the international financial institutions – most especially the World Bank. This controversy was one of the greatest operations mobilising protest against the international organisations and their development policies, and, in turn, the occidental enterprises denounced as these policies’ beneficiaries. Combining environmentalist and political attacks against “the liberal order”, the large dam controversy has established itself as one of the questions of the burgeoning issue of “sustainable development”. It also bears witness to a world conscience concerning environmental problems. The size of this international mobilisation and its recognition by the World Bank under the presidency of James Wolfensohn during the 1990s forced the various protagonists - enterprises included – to show where they stood and even to modify their policies.

The controversy - in its international dimensions – was born from the encounter between local protest movements, in the countries effected by major hydraulics works where this protest can be expressed – mainly India and Brazil – and European and North American movements criticising the global system. Some are generalists while others specialise in the issue of water management, including the very active NGO *International River Network* (IRN). “The junction between the two movements is active in the fields of the defence of the environment, the protection of aboriginal cultures, and the criticism of heavy technology and the financial system of Bretton Woods.”⁹ Large dams are attacked on all the fronts: their technical efficacy, their economic efficiency, their social and environmental impacts and, their lack of respect for elementary human rights. Globally, the “anti-dams” denounce an ideological conception favourable to dams which systematically underestimates costs and negative impacts, especially related to population displacement¹⁰. Contradicting the developmentalist line the IRN affirms that “dams only benefit a minority and aggravate poverty”. Their environmental impacts are denounced in two ways: on the one hand by demonstrating the multiple negative effects on river flow-rates, bio-diversity, soil quality etc. on the other, by confuting the presentation of hydroelectricity as a renewable source of energy with evidence of the CO2 produced by the great tropical reservoirs.

The respective shares of the financial problems and of these criticisms in the evolution of the big international banks’ policies during the 1990s is difficult to establish. That there was an evolution is obvious, symbolised by the decision of the World Bank, in 1993, to retire from the Sardar Sarovar dam project on the Narmada in India. More astonishing, whereas most often in controversies of this type the opposed cases are expressed in parallel without ever coming face to face for lack of a common “arena”, in this particular case the arena was built and agreed upon by the different parties.

As the main target of the “anti-dams” the World Bank reacted by launching in 1996 an internal inquiry on the impact of the dams financed by the institution since the 1950s¹¹. It concluded 90% of the dams had met the objectives fixed at the time of their construction, but that only 25% satisfied the stricter standards developed in the 1990s totally, 50% partially and 25% not at all. To complete these appraisals and work on the development of large dam project acceptability standards, a conference was organised by the World Bank and the World Conservation Union (IUCN) at Gland in Switzerland in 1997. It was to “appraise the state of knowledge on the subject of large dams and to appreciate if, and in what way, they can contribute to sustainable development”¹². It recommended the creation of an international study commission representing the various parties concerned, the World Commission on Dams, created in 1998.

Unlike many of its peers this commission worked well. Bringing together very different participants of divergent opinions¹³, it achieved legitimacy due to this very diversity, the wide-ranging nature of its studies¹⁴, and the real effort to take all points of view into

⁹ Jean-Luc Racine « Le débat sur la Narmada : l’Inde face au dilemme des grands dams » *Hérodote*,

¹⁰ Estimates of the number of people displaced since the 1950s range from 80 to 100 millions.

¹¹ *Effectiveness of Environmental Assessments and National Environmental Action Plans : a Process Study*, World Bank, Operations Evaluation Department, Washington DC, 1996

¹² *Large dams, learning from the past, looking at the future*, op. cit.

¹³ The commission, directed by Kader Asmal, South African minister for water and forest management, brought together representatives of NGOs, groups of people harmed by dams, multilateral and governmental agencies, enterprises and research institutions.

¹⁴ *Dams and Development: A New Framework for Decision-making, The report of the World Commission on Dams*, Earthscan Publications Ltd, 2000. The report was accompanied by some hundred thematic studies. Its work could be found until recently on its site, now closed.

account¹⁵. Indeed it perfectly fulfilled its mission, giving its report in 2000 before dissolving as planned. This report was an event for the circles concerned and had a favourable reception on publication. Its balanced conclusions¹⁶ affirmed both the positive role of dams and the reality of negative impacts ignored for too long. It proposed a list of recommendations aimed at modifying the ways energy choices were evaluated by including the social and environmental consequences, and at respecting the rights of the populations concerned.

As was to be expected the “anti-dams” saw it as a vindication of their denunciations, the “pro-dams” as an encouragement to continue building, once they had incorporated the recommendations into their policies.

Elements of enterprise adaptation (2)

From the enterprises’ point of view the rise in protests against large dams was worrying. The necessity affirmed to carry out complicated preparatory negotiations with local cultural groups, NGOs... to have the construction sites accepted is an additional cost and an element of uncertainty. Including social and environmental costs hitherto ignored or left to governments can make many projects uncompetitive – especially those causing population displacements.

The structural difficulty of making the long-term economic rationale of hydroelectric infrastructure compatible with the short-term rationale of financial investors was only reinforced. So the increase in social demands may well deter investors from this sector just when many countries are turning to the private sector to finance their energy infrastructure.

Just as sensitive a subject for firms – the criticisms directed at their own behaviour and performance: loss of control over costs¹⁷ and deadlines, real performances inferior to projection, corruption and indifference to the violent methods used in certain countries to eliminate opposition and displace populations. A World Bank inquiry on 80 dams carried out in the 1970s and 1980s showed that in nearly every case (76) projected budgets had been exceeded - by 50% or more in 30% of the cases. Generally, the ability of those concerned to estimate and control the costs and real benefits of hydroelectric developments is called into question, from the design by engineering companies, to completion by the construction and material enterprise, and including the financial institutions and contractor enterprises. Behind these difficulties in keeping costs and deadlines under control lurks the issue of corruption, openly discussed in the works of the world commission on dams.

As stated by the head of an NGO specialised in the struggle against corruption:

“Large dams are probably no more prone to corruption than other large investment projects, but also no less so.”(*in English in original*)¹⁸ Given the size of the sums involved, the complexity of the projects and the multiplicity of participants, the large hydroelectric sites offer numerous opportunities for pressure, sundry arrangements and back-scratching - long

¹⁵ Navroz K. Dubash, Mairi Dupar, Smitu Kothari, Tundu Lissu, “Multi-Stakeholder Processes: The Legacy of the World Commission on Dams”, *A Watershed in Global Governance?: An Independent Assessment of the World Commission on Dams*, July 2003

¹⁶ The commission’s 7 main recommendations to make large dams acceptable are: win the consent of the populations, evaluate all the alternatives, improve the performances of existing dams, preserve water courses and the nutritional resources they represent, recognise the rights of all parties concerned and share benefits equitably, impose regulation compliance, favour sharing water courses for peace and development.

¹⁷ The World Bank inquiry effected in 1996 on 80 dams completed in the 1970s and 1980s shows that in nearly every case (76) projected budgets were exceeded, by 50% or more in 30% of the cases.

¹⁸ Michael H. Wiehen (Transparency International, Germany), *Transparency and Corruption on Building Large Dams*, contributing paper to the World Commission on Dams, December 26, 1999, p.1

tolerated and even openly admitted, but denounced more and more clearly as corruption from the 1990s. The scandal of the Lesotho Highlands Water Project (LHWP), one of the largest African projects, highlighted the issue in August 1999 when the government accused the ten or so occidental companies working on the project of corruption. At the end of a series of trials several of the sector's most important firms were found guilty (the Canadian firm Acres, the German Lahmeyer, the Italian Impreglio, the French Spie Batignolle,...) and excluded by the World Bank, admittedly for limited periods, from the projects it finances.

The sector was in a difficult situation throughout the 1990s. The enterprises reacted on several levels. First of all a new wave of mergers, marked by the pure and simple withdrawal from the market by certain groups (e.g. Asea Brown Boveri, and a concentration into a small number of companies. At the end of this movement the equipment supply market was dominated by four groups: General Electric in North America, Andritz - an Austrian group which took over Vatech Hydro in 2006, which had itself progressively brought together the hydraulics divisions of the big Swiss firms (Charmilles, Vevey, Escher Wyss, Sulzer) - Voith Siemens Hydro in Germany, and Alstom Power Hydro in France, which claimed the title of leading world supplier. At the end of this restructuration these 4 international groups controlled about 70% of the market, along side Japanese firms (Mitsubishi), and above all Indian (BHEL) and Chinese (Harbin). The engineering sector, less specialised, remained much more fragmented.

In response to the environmental and social criticisms against large dams there was intense activity producing reports and good conduct guides and other ethical charters, which more generally accompanied the rapid assimilation of the theme of sustainable development by economic protagonists and international institutions. The enterprises did not stay inactive but often limited themselves to very general undertakings. A recent report on about fifteen financial institutions, banks, and International Financial Institutions involved in dam construction sites shows that if almost all referred to an environmental policy, only a half had criteria specific to hydraulics. The constructors' environmental reports, in the same way, go no further than an appraisal of their own activity without considering the consequences of their construction sites. It is possible in this way to judge the discretion with which the major firms involved in the very controversial Three Gorges dam in China have commented on their participation in this project. On the other hand the enterprises seem to have paid greater attention to publicising their struggle against corruption, as all now have widely distributed ethical charters.

The increasing sensitivity to environmental issues is not purely negative for the enterprises. It also opens new markets to the engineering companies. Whether for evaluating and repairing "past errors", or for defining present-day conditions of acceptability, the consultants very quickly adapted themselves to satisfying this new type of demand.

This leaves the fundamental problems of profits and finance. Although some important sites - in Turkey and Chili - have been financed by private international funds, most are still substantially supported by public capital, national or international. So the firms have every reason to wish for new forms of private-public partnership, in which the enterprises agree to pay more attention to the social consequences of their activity, while governments permit the sector to be organised as a commercial activity ruled by the laws of the market. The renewal of open support by the World Bank for dam projects - even the most controversial, such as Nam Theun in Laos - seems to be a step in this direction. Having had an attitude quite open to the World Commission on Dams' recommendations the Bank has returned to a much more

traditional position favourable to large dams, in the context of a policy called “high risk/high reward”(in English in original), influenced by certain large countries wanting large dams and concerned at its temporary disengagement. This renewal of investments is the sign – for the promoters of dams – that the lessons of the phase of criticisms having been taken on board work on the sites can be restarted under good social and environmental conditions. The opponents of dams denounce on the contrary the instrumentalisation of a part of the conclusions from the work of the World Commission on Dams in the interests of a continuation of former practices¹⁹. Their doubts are shared by certain NGOs confronted with the reality of the effects of the rapid assimilation of “sustainable development” themes by the international organisations and major enterprises, as shown, besides, by their public relations.

Conclusion:

The prospects for the development of hydroelectricity are still good: According to certain specialists production could pass from 2000 TWh a year (in 1996) to 5000 by 2020²⁰. The conditions for the exploitation of these resources are, however, more and more complex, whether for economic, financial, or social reasons. Half the profitable projects are concentrated in 3 countries - China, India, and Brazil – which have both exploitable sites and large markets, but where social protest is more and more virulent. Contemporary globalisation, in its double aspect of internationalisation and liberalisation, has deeply modified the ways in which large-scale hydraulics markets work. Liberalisation of energy markets, financial globalisation, globalisation of protests... have increased both opportunities and risks. In this context the role of the international organisations and especially that of the World Bank is still important - included from the enterprises' point of view. It is still a potential element of security for the big infrastructure markets. Its role supporting economic security is an old one; it continues to facilitate the articulation between the short-term financial criteria demanded by the markets and the long-term economic limitations on profitability peculiar to this type of investment. Its role in reducing the risks of social protest is more recent. Its actions “moralising” the markets by the priority publicly given to the struggle against corruption, and its recent alertness to the social and environmental consequences of dams play a part in a reconquest of legitimacy for dams which is still very partial at best. This leaves the issue of the cost of large dams' social and environmental impacts and assuming responsibility for them. The international organisations could help share the burden so as to protect enterprises' interests without injuring the rights of the populations, but it remains an open question.

¹⁹ Peter Bosshard, *The world bank at 60: a case of institutional amnesia? a critical look at the implementation of the bank's infrastructure action plan*, International Rivers Network, April 2004

²⁰ Large dams, op. cit. p. 115