

High Cost Environmental Issues: Power, Water and Waste Infrastructure

Premises for discussion:

- Regulatory stability and transparency is a critical component of any strategy designed to promote private participation in providing infrastructure services with large environmental costs
- Environmental priorities and pressures will evolve over the next 20-30 years, so that contracts and regulatory arrangement must be sufficiently flexible to respond without jeopardizing their goals and economic basis

Challenge for participants:

Promote a dialogue between regulators and investors/operators to stimulate a better understanding and implementation of good practice in such areas as the environmental targets in contracts, links between economic and environmental regulation, and the monitoring of contract performance.

Setting environmental goals and regulations for the providers of infrastructure services is a key strategic decision.

The agencies responsible for regulating infrastructure services and setting environmental standards must attempt to reconcile widely divergent expectations and priorities. Current business and residential customers want reliable services at the lowest cost, so long as they are not worried about future access. Those without services—including potential investors—may be less worried about cost but are more concerned about ensuring access on reasonable terms in the near future. Governments wish to promote investment to ensure that poor services do not hinder future growth, but they may also be under pressure to promote stricter environmental standards. Investors must be confident that they will be able to obtain a reasonable return on long term investments, which implies a regulatory framework that takes account of their circumstances and concerns.

The importance of these issues is most obvious when new contracts are being negotiated—under BOT or similar arrangements—or when existing services are being privatized. Still, both operators and regulators find themselves having to adjust to new concerns and priorities on regular basis as a result of changes in mar-

ket conditions, local and national legislation, and international pressures. Thus, contracts and regulations should never be seen as something static, defining a fixed set of rules for a period of 15 or 25 years. It is better to view them as defining a baseline for future investments and performance, which provides the starting point for a regular sequence of adjustments (renegotiations) in response to changing external conditions.

This perspective has many implications for the design of new projects, the implementation of privatization programs, and the management of existing services. The most important will be highlighted here in order to emphasize the strategic nature of the consequences of alternative approaches to environmental concerns.

- environmental regulations should allow flexibility in the choice of technology, fuel type, nature and performance of emission controls, etc;
- regulators should focus, as far as possible, on observable measures of performance and environmental conditions—i.e. ambient environmental quality rather than pollution loads, or emission standards rather than technology standards;
- both regulators and operators should plan for progressive improvements in efficiency and environmental performance;

- investors and operators should allow scope for future adjustments in designing plants and operating practices, even when this involves some penalty on current costs; and
- most infrastructure services are capital-intensive which means that regulations and decisions made now cast a long shadow into the future, so arbitrary or ill-conceived policies or behavior can have huge costs even when they appear to be relatively painless at the time.

The core theme developed in the rest of this note is the critical but delicate task of maintaining a balance between the need for flexibility in contracts and regulations with the requirement for predictability and certainty (at some level) as a condition for mobilizing the finance for large infrastructure projects. This theme will be explored both in the context of different phases of the relationship between the private and public sectors and with references to the strategic issues highlighted above.

Well-conceived environmental regulations and targets improve privatization outcomes

Serious, long-term, investors in public utilities being privatized are very concerned about the environmental conditions and obligations of the companies that they are buying. Their reasons are many, ranging from a concern that they are viewed as having “deep pockets” with large resources to tackle problems that could not otherwise be addressed to the recognition that environmental management is a core element of businesses such as water and sanitation or waste management.

Government agencies responsible for managing the privatization of utilities are often surprised by the degree of emphasis that potential bidders place on understanding and quantifying both current environmental liabilities and the future regulatory climate. The more thought that is given to these issues during the process, the better—in general—will be the outcome, both in terms of the terms obtained for the utility and in future performance.

Privatization of water and sanitation services—by selling state-owned companies or granting concessions—provides the clearest example, because the whole business from water treatment to the disposal of wastewater or sewage sludge is “environmental” in the

broad sense. Almost without exception, the primary motive for privatization is the lack of resources to finance the expansion of services, often for sewer networks or sewage treatment. Thus, the development of targets for the standard and coverage of service is a critical step in such cases—see Box 1.

There are two common mistakes. First, governments—especially environmental agencies—are prone to believe that a privatized company can quickly remedy the deficiencies and past lack of investment in environmental protection of the utility. This prompts them to set demanding, often unrealistic, goals for sewer coverage or wastewater treatment. Yet, the capacity and willingness of the population to pay for such services has not changed, so that the financial viability of the privatization depends upon combining improvements in operating efficiency with expanding those services for which customers can and will pay. Investments in sewage collection and, even more, sewage treatment should have a lower priority than water supply.

Second, there are widespread misperceptions about the capacity of privatized utilities to raise and service additional debt. Much will depend upon the development of local capital markets. One of the lessons of the East Asia crisis concerns the vulnerability of infrastructure projects which rely upon external financing. Customers may understand the link between exchange rates and electricity prices because the prices of most fuels are set in world markets, but the same case cannot be made for water and sanitation services. If local capital markets have limited capacity and heavy dependence on foreign financing is ruled out, the main source of finance will be internal cash flow from depreciation and profits.

The implications of these two observations are clear and very important for the manner in which water utilities are privatized. Environmental goals must be linked to the capacity of the privatized company to generate cash from existing and new services. In turn, this means that, wherever possible, water and sewage services should not be separated, unless there is clear evidence that customers are willing to pay realistic prices for sewage services. The examples of Malaysia, Thailand, and China suggest that this is rarely the case in East Asia. Even then, on both economic and environmental grounds it is questionable whether such a separation makes sense, because the

Box 1. Phasing environmental improvements in privatizing water utilities

A number of South-East Asian countries as well as Brazil are trying to learn lessons from the example of Argentina in privatizing their water and sanitation services. In the Buenos Aires privatization it is widely recognized that two significant misjudgments were made. The first was the reliance upon connection fees to finance the expansion of services, especially for low income customers. Such customers have been unwilling to pay fees that were as high as \$1,000 per connection for water or sewage, especially where connection to networks was compulsory for public health or environmental reasons. The second was that the contract required the concessionaire to invest a very large sum in sewage treatment which would yield small environmental benefits, because sewage and effluent was being discharged into the River Plate with a huge dilution factor. Both factors have been the source of continuing disputes between the concessionaire and its regulators, greatly complicating the first major revision of tariffs.

The issue of connection fees is not just one of how the expansion of services should be financed. It touches on the priority that should be given to different services and the rate at which networks should be developed. Many studies confirm that households are willing to spend significant sums on ensuring reliable water supplies, but they are not willing to pay much for the removal of sewage—

except from their immediate neighbourhood—or for its treatment. Technical specialists may advocate a parallel expansion of water and sewer networks, but this is rarely feasible in financial terms. Thus, service targets must be based on realistic assumption about ability to pay, connection rates for different services, and levels of water demand, which are often greatly overstated because of losses and inefficiencies in existing networks.

Agreeing on sewage treatment targets may be very difficult because of the different interest groups involved. Environmental advocates wish to avoid the “mistakes” made in Western countries—no more “great stinks” because rivers are treated as open sewers—while economists point to the apparently low benefits from sewage treatment. As always, the choice is a political one, but it should be one informed by careful technical analysis. In Rio de Janeiro, a beautiful city built around a heavily polluted bay, the privatization of the water company was preceded by some detailed studies of alternative strategies for developing sewer networks and sewage treatment. The conclusion was to focus the limited resources on simple sewage treatment. Over 20 years some facilities will be upgraded in the segments of the bay where the impact would be greatest on those indicators of water quality of most interest to the general public—largely affecting whether water can be used for bathing.

generation of wastewater is so closely linked to water consumption.

Moving beyond the water sector, the examples in the background material show that careful attention to environmental goals and costs is critical whenever companies are being privatized in sectors that can have large environmental impacts—not just utilities but also mining, metallurgy, chemicals, and refining. Sometimes the primary concern focuses on the damage caused by past activities—see Box 2—but more often it is the environmental standards that will apply to future operations.

The usual practice is to require that the new owners should ensure that plants operate in accordance with emissions standards that reflect good practice around the world. Few investors will object to this in principle, and governments may wish to avoid those who do. As usual, however, the devil lies in the details. What really matters is the time allowed for coming into compliance with such requirements and whether the regulator attempts to specify standards for particular operations

in considerable detail. It is on such matters that careful and extensive consultation and negotiation is required either before or during the process of privatization.

There is an understandable tendency to leave key issues to be settled after the privatization has been completed, especially when time is short or crucial information is lacking. While this may be unavoidable, it will usually lead to a less satisfactory outcome. Comparing bids based on different assumptions about environmental obligations is difficult at best. Negotiations after a privatization deal has been completed are easily soured by suspicions of bad faith while the baseline assumptions at the time of the deal may be unclear or subject to dispute.

Who should be responsible for setting environmental goals for individual projects?

Private participation in providing some types of infrastructure services has focused on individual project developments which usually focus on large-scale pro-

Box 2. Dealing with past and future environmental liabilities

The issue of past environmental liabilities may be important in many privatizations. Few buyers are willing to take on an open-ended obligation for damage that may have been caused by the previous operations of a company. Equally, it may be expensive or impossible—in money or time—to carry out a detailed analysis of the scale of such liabilities and the likely cost of dealing with them. Thus, an alternative approach is often required. This may include the implementation of specific measures to deal with liabilities that are very large or whose solution is intimately linked with plans for the future of a plant. Other liabilities may be dealt with by setting a maximum cost to the buyer together with an explicit procedure and time frame for identifying and remedying them (where appropriate). The acceptance of such an arrangement will depend upon the credibility and willingness to negotiate of the seller. Thus, the clearer and more transparent is the

regulatory framework, the better will be the deal that can be obtained.

Future liabilities are a serious problem for private facilities responsible for the management and disposal of wastes, especially hazardous wastes. Any risk to the public from poor design or operations may only emerge after the concession has terminated or the facility has closed. In other cases, the cost of remediation has far exceeded the value of the company which is liable. Thus, governments may wish to ensure that private operators either post a large performance bond or offer some kind of long term insurance. Such financial instruments may be very expensive or impossible to underwrite, unless the government operates an effective regulatory regime which monitors the performance of the facilities covered and does not attempt to change standards and obligations with retrospective effect.

duction. The large number of IPP projects in the power sector, proposal for and investments in BOT and similar projects for water supply, sewage treatment, and waste disposal indicate the scale of such investments. However, the experience of such projects has highlighted some important issues that have not been adequately addressed to date—see, also, Box 3.

Two hypothetical but realistic examples will serve as illustrations :

A. The electricity authority in a province in Central China needs to obtain additional supplies of power and invites proposals for the development of a large IPP project. Coal for the power plant can be obtained from various sources but there are substantial differences in the sulfur and ash content as well as other characteristics of the different types of coal. Further, a number of locations are under consideration for the plant, including some in relatively unpolluted rural areas and others in heavily polluted urban areas. Potential developers enquire about the environmental standards that will apply to the project and are given copies of the relevant national and local regulations, but equally they discover that such regulations have not been applied uniformly to similar projects. Specifically, they become very concerned about whether they should include flue-gas desulfurization in the plant design and how they will be expected to handle the ash generated by the plant.

B. There is a need for a waste disposal facility to handle hazardous wastes generated in a large metropolitan area in South-East Asia. Proposals for the development of such a facility are invited and interested parties are told that a short-list of potential sites has been prepared. However, no detailed environmental assessments have been undertaken and it will be the responsible of the developer to select a final site and undertake the work required to obtain the necessary permits. As they start to draw up their proposals, the developers learn that local action groups opposed to the development of a waste facility have been set up near most of the potential sites.

In both cases the broad issue at stake is one of responsibility for strategic decisions of environmental policy that impinge upon the design and operation of such projects. The simple answer for the power developer is to assume that it will have to install a scrubber and to handle the ash itself, which would point towards siting the plant in a rural location. However, neither answer may make sense from a broader perspective of environmental management at a regional or national level. It may be much cheaper to control total emission of sulfur by using low-sulfur coal or by installing controls at other, more damaging, sources. Rather than spending money on managing large volumes of ash, it may be much more efficient to agree contracts for the supply of coal

Box 3. What kind of standards for power generation?

There has been a long-running debate over the nature of environmental standards that should be applied to power plants. The question of controls on sulfur dioxide is the most sensitive because these involve the heaviest costs. IPPs, especially their engineers and designers, tend to favor standards which specify or imply specific technical requirements, while the owners of multi-plant utilities and some regulators would prefer to focus on total emissions or indicators of environmental quality. The reasons for the differences are clear. IPPs do not want environmental standards to be a variable in a competitive bidding process, especially where there is uncertainty about how the standards may be interpreted or modified in future. Larger utilities and regional or national regulators, on the other hand, have an interest in minimizing the cost of achieving certain environmental goals, especially when pollution causes regional or global rather than local damage and where there are significant differences between the costs of control at different plants.

Reliance on general technology-based or very specific emission standards will always be more expensive in the long run than a regulatory framework that allows operators to take advantage of differences in costs, fuel characteristics, and locational features. In most cases the saving from allowing greater flexibility will be substantial, provided that fuel prices are appropriately reflect quality parameters. The question, then, is who should be respon-

sible for the overall level of emissions of the power sector? Clearly, this is much more easily resolved when there are limited number of large utilities rather than many independent operators.

In all cases, the effectiveness of the regulatory system is the critical consideration. There are various mechanisms for reconciling individual decisions with overall limits on emissions. Sulfur trading in the US is the best known example, but similar outcomes can be achieved by using a variety of planning or market arrangements. However, all of them depend on the existence of competent regulatory bodies which are capable of devising and implementing appropriate standards or incentives.

The problem for private investors, especially in individual power plants, is that they rely upon a stable regulatory framework and want to be able to prepare business plans based on clear requirements. Thus, explicit pollution charges may be acceptable, provided that such charges are not changed at frequent intervals and the rules for adjusting them are transparent. In practice, the outcome will have to be some combination of emission standards and/or charges which are fixed for, say, 10 years plus greater flexibility in the future. Unfortunately, negotiating such agreements places heavy demands on regulators and is often seen as an unnecessary burden by developers, though it would almost certainly benefit both parties in the longer run.

which encourage investments in cleaning coal at the mine.

The choices facing an individual IPP may be limited, so that its discretion over environmental standards may be small. This is certainly not the case for the power sector as a whole, so that an appropriate agency or regulator should be charged with developing an overall strategy which can be then used to define the specific requirements and goals that will apply to each project or group of projects. At the same time, it is normal that such standards—applying both to new projects and to the operation of existing plants—will change over time. Thus, environmental regulations and IPP contracts must include provision for adjustments in environmental obligations subject to a reasonable period for compliance as well as compensation via appropriate price revisions.

Similarly, the case of waste disposal facility involves critical strategic choices, both about location and about the type of disposal—e.g. neutralization and encapsu-

lation prior to landfill versus incineration. Many operators may be reluctant to prepare a proposal unless the sponsor has undertaken detailed site surveys and has, at least provisionally, identified a preferred site and initiated the process of obtaining permits. On the other hand, offering a site subject to detailed environmental requirements may be counterproductive because it will limit the scope for bidders to propose alternative solutions which may offer economic or environmental benefits. Thus, a balance must be struck between certainty and flexibility, which will require careful consultation and preparation if the bidding process is to yield satisfactory proposals.

Environmental policies evolve, so contracts must incorporate provisions to enable the parties to respond

However carefully a privatization or project is prepared, it is in the nature of things that there will be pressures to alter the environmental provisions of the contract.

Where such revisions occur early in the life of the contract, this is usually a symptom of a failure to pay sufficient attention to the relevant issues during the preparatory process. But it would be an excessively optimistic regulator or operator who believes that any contract can survive unmodified for its whole life. In many cases, it is only being realistic to expect that major amendments may be sought after 10 years or even less.

Leaving aside mistakes in the original contract, the pressure for change may arise from two quite distinct sources. First, there may be legislative or other changes in the overall framework of environmental regulation which affect specific activities or projects. Examples would include new laws dealing with the abstraction of water from and the discharge of effluent to river basins, domestic regulations that implement international agreements dealing with air pollution, or new regulations concerning waste disposal which affect the disposal of wastes from power or sewage treatment plants. Second, there are changes in local environmental conditions and priorities which prompt government decisions and regulatory actions to address specific environmental concerns.

In the first case, it is likely that legislation and the formulation of regulations will be preceded by some period of consultation during which those concerned with specific projects and services will have an opportunity to make their views known and to explain the possible implications of the proposals. Transitional provisions will have to be included in the legislation and/or regulations, which may even go as far as exempting or “grandfathering” existing plants and operations. Thus, the need for contractual flexibility will focus on provisions for adjusting prices to compensate for changes in environmental obligations—see Box 4.

Changes in specific environmental requirements are a more complex matter, especially where these involve the regulations that apply to one or many private utilities that make up a sector. As an illustration, an interesting dialogue is currently under way in the UK concerning the future environmental performance of the privatized water companies. A regular price review is due to be completed within the next 18 months. The water companies have managed to reduce costs over the last few years by more than was expected, so that the water regulator (OFWAT) is proposing that some of the “excess” profits

should be clawed back by a significant reduction in average prices at the beginning of the next 5 year period. On the other side, the environmental regulator—supported by some of the water companies—has argued that the public would not benefit much from such a reduction and that the resources should instead be dedicated to implementing tighter environmental standards.

Why might the water companies support this position? Obviously, they are unhappy at the prospect of lower prices, which will have a big impact on their profits. Further, they may believe that both regulators may overestimate the cost of meeting stricter standards, giving them more scope for increasing profits in future years, and that, in any case, tighter standards imply larger investment which will push up future profits.

The point is that the incentives facing private operators need not imply that they will resist all proposals to modify environmental standards. On the other hand, this may be a gift horse that regulators would be well-advised to examine carefully, because it may imply that the provisions for revising prices or other contract terms in such circumstances are excessively generous. Thus, both parties must think very carefully at the time when contracts are drawn up about how they will work when environmental and other obligations have to be renegotiated.

From this perspective, the meaning of certainty and predictability in large infrastructure projects must be seen as a more complex concept than is often understood. Of course, it is essential that environmental (and other) obligations should be clearly defined when contracts are signed and investment commitments made. But, the need for flexibility as circumstances changes and policies evolve mean that it is equally important to define a clear set of “rules of the game” which will govern the intermittent re-negotiations that will occur through the life of the contract. Further, provisions for revising contract terms will work more smoothly if these are seen within the context of an ongoing dialogue between the operator(s) and their regulators, so that the overall framework should be one that allows for regular informal consultations as well as formal reviews or negotiations at less frequent intervals.

Challenge for participants: Promote a dialogue between regulators and investors/operators to stimulate a better understanding and implementation of good practice in

Box 4. How should environmental costs be reflected in prices?

Prices established at the time of the initial contract should normally take account of the environmental obligations of the operator, at least over the first 5 or 10 years. Changes to these obligations prior to the first price review tend to undermine the stability of the contract and should be avoided if at all possible. Both service targets and prices were adjusted in the third year of the Buenos Aires water concession, which gave rise to suspicion that the concessionaire had been able to take advantage of an inexperienced regulator. The importance of avoiding early contract revisions is a crucial element reinforcing the need for careful review and negotiation of environmental goals and other targets before the contract is finalized.

Changes in priorities and circumstances mean that the initial set of environmental obligations will be revised as the contract evolves. Nonetheless, it is still essential to define such obligations carefully when the contract is awarded, because they establish a clear baseline which can be used to assess the cost and other implications of proposed revisions. These revisions should normally be agreed for implementation over a time frame that is consistent with the regular process of price reviews. This ensures that future price reviews can include adjustments for the agreed changes in environmental standards, but only by reference to the increase or reduction in costs relative to the requirements in the original contract. Depending upon the structure of the industry and of ser-

vice contracts, such revisions may take the form of either (a) a uniform adjustment applied to all operators reflecting the average cost for an efficient operator, or (b) operator-specific adjustment factors applied when the changes vary by plant or location.

The UK system of RPI-X+K adjustment for the water prices, where K represented a special allowance for environmental obligations is rather unsatisfactory. It was necessary because there was no competitive process for the award of concessions and the market had limited information about future environmental costs when valuing the companies. Neither consideration should be relevant under a well-managed process for awarding a concession. Initial environmental targets should be reflected in the price paid for the concession, while later revisions should give rise to discrete price adjustments when the time of price reviews. However, this assumes that a proper mechanism for reviewing prices has been defined in the contract. In this respect, the Manila water contracts are equally unsatisfactory, because they lack specificity about the manner in which prices will be adjusted at the regular 5 year reviews (especially by comparison with the detailed provisions concerning annual and extraordinary price adjustments). It is almost certain that these contracts will give rise to serious disputes if the environmental authorities wish to revise the goals to be met by the concessionaires.

such areas as the environmental targets in contracts, links between economic and environmental regulation, and the monitoring of contract performance.

Participants will be fully aware of the difficulty of developing and interpreting contracts for infrastructure services which involve large environmental costs. The postponement of many projects as a result of the East Asia crisis combined with the need to re-negotiate many existing contracts emphasizes the nature and scale of the uncertainties which affect the role of private participation in these sectors. Yet, it is also clear that many countries will have to rely upon private investment and operators if they are to meet the long term growth in demand for power, water and sanitation, and waste services.

The temporary setback to private infrastructure investment caused by the crisis provides a good opportunity to learn lessons from past experience and to formulate new approaches that will be better able to

respond to changing circumstances in future. Both regulators and investors/operators will benefit by initiating a regular dialogue that could provide a framework for exchanging information and experience outside the constraints that must accompany discussions that touch on specific projects and contracts.

Among the questions that participants may wish to discuss are :

- Is there scope for developing best practice contracts or contract provisions relating to environmental obligations which might provide models that could be used as starting points for discussions relating to specific projects?
- Does experience in the Asia-Pacific region provide any clear guidance on the kind of contract flexibility that works or does not work in responding to changes in circumstances?
- How far can experience in dealing with environmental issues in the power sector, which is the most

developed in terms of private participation, be transferred to other infrastructure sectors?

- To what extent do or should the environmental guidelines adopted by international financial institutions or other financing agencies affect the environmental obligations incorporated in contracts?
- Are informal processes of consultation and negotiation the best channel for improving the definition of

the environmental requirements for new projects or should regulators be encouraged to establish more formal procedures?

- Similarly, for existing projects and privatized utilities, do participants believe that governments and environmental regulators should set up formal consultative mechanisms to be used when environmental policies and regulations are being updated?