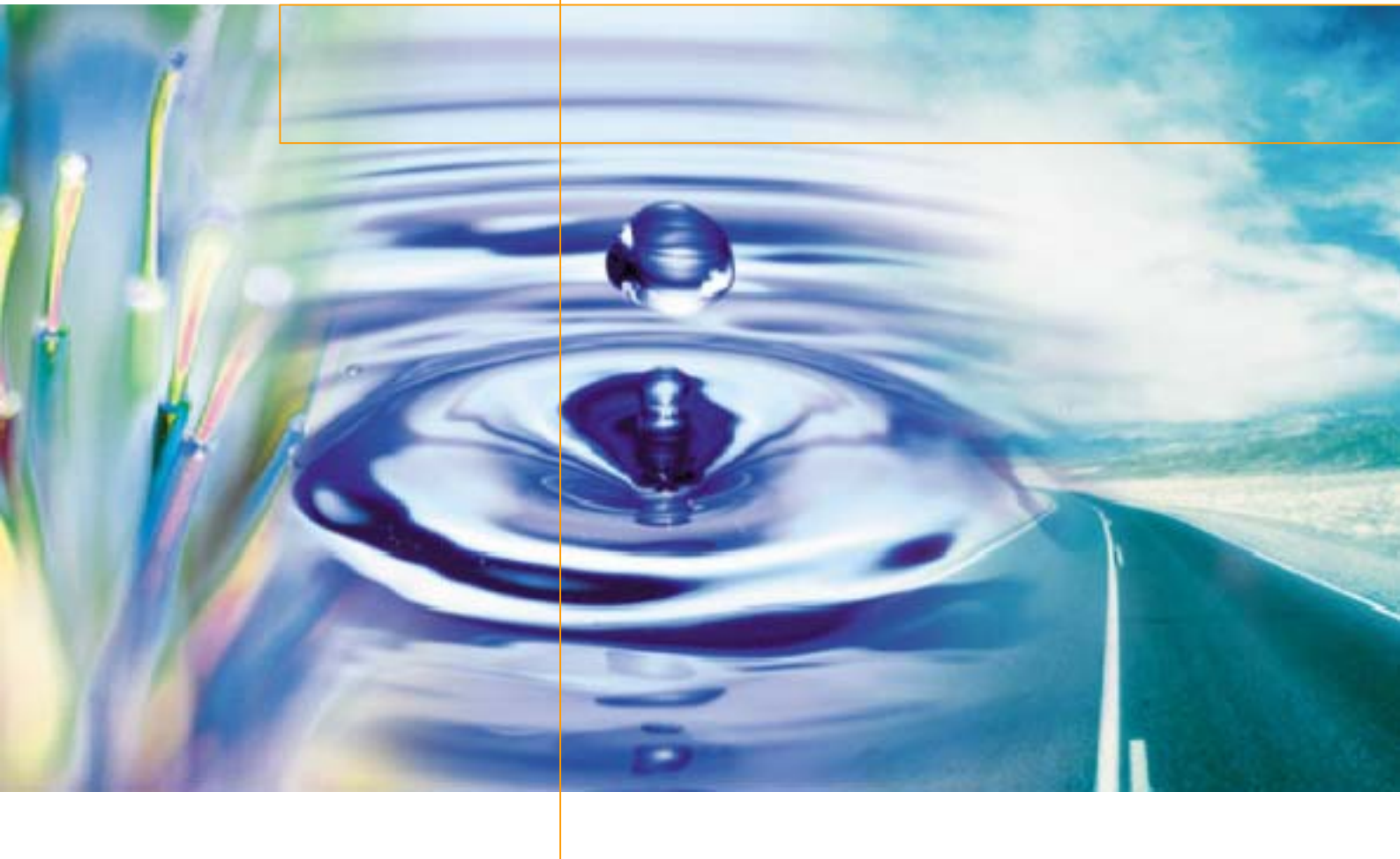


**Working Paper No. 10**  
**Private Participation in Infrastructure**



**Infrastructure Regulation**

**An introduction to fundamental  
concepts and key issues**



Deutsche Gesellschaft für  
Technische Zusammenarbeit (GTZ) GmbH

The increased co-operation of the private and the public sector in the provision of infrastructure is often referred to as Private Participation in Infrastructure (PPI). PPI carries the potential to create multiple development benefits as it enhances the transfer of management skills, technical know-how and capital as well as it improves the provision of services to the poor and increases the operational efficiency of utilities. In this series of discussion papers on Private Sector Participation in Infrastructure we intend to publish contributions that deal with PPI in the water, energy and transport sector. We would thereby like to establish a forum for discussion that enhances the exchange of points of view and experiences regarding the practical implementation of PPI projects in development co-operation. The discussion papers present the personal opinion of the authors and do not necessarily reflect the position of the institutions they represent.

GTZ is implementing a number of regulatory projects worldwide – mainly in the water sector. Given the increasing interest in infrastructure regulation and the need for information on the subject, the objective of this manual is to give a brief overview of the fundamental concepts of regulation. It is written at a high level to serve as an introductory reading to practitioners and other interested parties with less experience in the subject.

#### **Impressum**

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# **Infrastructure Regulation**

**An introduction to fundamental concepts  
and key issues**

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# 1 Introduction

## *Shift to private sector delivery of public services*

In most countries, infrastructure industries have traditionally been monopolies, owned and operated by the public sector. Since the late 1980s, however, there has been a shift to both private management (private sector participation) and private ownership (privatisation) of these industries as well as the competitive provision of services within parts or all of these sectors (liberalisation). This trend towards liberalisation and private sector participation (or privatisation) has been prominent in both developed and developing countries.

## *Increasing focus on regulatory framework*

However, there is often a concern that countries lack the capacity to adequately deal with a range of new issues that arise from increased commercialisation, competition and private sector participation. In addition, it is feared that the needs of low-income groups or communities in rural areas are not sufficiently addressed.

Furthermore, after a decade of promoting private sector participation in infrastructure services in developing countries (and some high profile failures), governments and donor agencies increasingly recognise the importance of regulatory frameworks to ensuring the success of these reforms.<sup>1</sup>

Experience shows that a regulatory framework, if properly designed and implemented, can address these concerns while ensuring financial viability of private, and public, service providers.

## *Objectives of manual*

Given the increasing interest in infrastructure regulation and the need for information on the subject, the objective of this manual is to give a brief overview of the fundamental concepts of regulation. It is written at a high level to serve as an introductory reading to practitioners and other interested parties with less experience in the subject.

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<sup>1</sup> According to a recent OECD study the economy-wide gains from regulatory reform in five sectors (electricity, roads, airlines, telecommunications and distribution) in eight developed countries (France, Germany, Japan, Netherlands, Spain, Sweden, United Kingdom and United States) are estimated to range from 0.9% of GDP to 5.6%. OECD (1997) The OECD report on regulatory reform, Paris. A synthesis of the report can be found on <http://www.oecd.org/pdf/M00007000/M00007872.pdf>.

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*Content*

Rather than being sector specific, the manual sets out basic principles and concepts for regulation that are common to all infrastructure sectors. It covers the following key issues/questions:

- What is regulation?
- What are the activities of regulation?
- Why regulate infrastructure?
- What are the different forms of infrastructure regulation?
- Who regulates?
- What legal instruments are there for regulation?
- How should regulation respond to different management and ownership models?
- How to regulate?

## 2 Basic concepts for understanding regulation

### 2.1 Fundamentals

#### 2.1.1 What is regulation?

*Range of definitions* Regulation is a term or concept that can be applied across a range of government activity. At its broadest, regulation can be defined as all forms of law or legislation enacted by government. However, for the purposes of this manual, it is more useful to think of regulation as the rules governments or public authorities apply to market-based activities. That is, in the case of infrastructure, to influence consumers and suppliers (including public suppliers) of infrastructure services through either restraining or facilitating certain forms of behaviour.

#### 2.1.2 What are the activities of regulation?

*Three main activities: setting regulatory rules, monitoring behaviour and enforcing rules* A regulatory regime can be thought of as the institutional framework within which regulatory activities take place. To be effective, a regulatory regime should include institutions or actors able to undertake three activities:

- setting the regulatory rules or standards which are needed to influence the behaviour of market participants;
- monitoring the behaviour of market participants; and
- enforcing the regulatory rules when these have been breached.

#### 2.1.3 Why regulate infrastructure?

*Regulation deals with aspects of market failure* The main rationale for regulation is to deal with so-called 'market-failure' where competition is either not feasible or does not produce results that are perceived to be compatible with the public interest. In infrastructure industries market failure may take on a number of forms:

- Natural monopolies* First, infrastructure industries generally have substantial natural monopoly components that are largely derived from their network elements. Where natural monopolies are present, competition will not be possible. Consequently, regulation will be required to protect customers from:
- private monopolists seeking to levy prices significantly above costs to earn greater profits; or
  - public monopolies that allow costs to rise above efficient levels or offer services of inferior quality.
- Information failures* Second, in some infrastructure sectors there are substantial information failures whereby customers are unable to assess the quality of the service they are buying (e.g. drinking water quality, safety of transport vehicles). Regulation may be an appropriate response to these information failures.
- Externalities* Third, important externalities are present in a number of infrastructure sectors, which may necessitate regulatory intervention (e.g. environmental costs associated with: greenhouse gas emissions in electricity generation; sewerage disposal in sanitation; and pollution in the transport sector).<sup>2</sup>
- Social concerns* Finally, many infrastructure services may be considered 'essential' to life, and therefore regulation may be enacted so as to guarantee access to these services.

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<sup>2</sup> Externalities occur when a cost or benefit that is borne by society is not reflected in the market price for a product.

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## 2.2 What are the different forms of infrastructure regulation?

*Economic, social and other regulation*

There is a wide range of forms of regulation to deal with market failure.<sup>3</sup> For infrastructure industries there are generally considered to be three categories of regulation:

- economic regulation, which primarily addresses the problems of natural monopoly power in infrastructure;
- social regulation, which addresses problems of market access and affordability; and
- other regulation, which would include regulation that is common to all industries (not just infrastructure) as well as regulatory issues that may be specific to an infrastructure sector (e.g. health, safety, environmental).

This manual is primarily concerned with these first two categories of regulation.

### 2.2.1 Economic regulation

*Regulation of structure and regulation of conduct*

Economic regulation has two major components. First, regulation of industry structure, which seeks to promote competition by setting rules regarding both market entry and the shape of corporate entities operating in the market. Second, regulation of market conduct, which regulates outcomes in monopoly markets (primarily, price and quality) and may also involve the regulation of key production inputs (e.g. investment).

Regulation of industry structure is generally preferable to regulation of market conduct as competition will maximise the choices available to customers and provides greater freedom for companies to innovate and offer new products.

*Regulation of structure - introducing competition*

Competition in infrastructure services can be introduced in the following ways:

- reducing the strong market position of an incumbent operator and facilitating market entry for new service providers;
- isolating a monopoly network (through vertical unbundling) and promoting competition upstream and downstream from the network (through horizontal unbundling or new entry); and/or
- promoting the construction of new networks where this would not be wasteful, and in certain cases, facilitating their

<sup>3</sup> Baldwin, R., Cave, M. (1999) Understanding Regulation, Oxford University Press, pp. 9-17.

interconnection with existing networks.

Where open competition (or competition *in* the market) is not possible, competition may be introduced through comparative (or yardstick) competition and/or competition *for* the market whereby service providers compete for the right to provide a monopoly service.

*Combination of instruments used in different sectors*

Market structure regulation may require both industry unbundling and the lifting of restrictions on market entry. It is also likely to be combined with an element of competition regulation in order to prohibit or constrain any mergers that would reverse the impact of initial unbundling.

The isolation of monopoly networks from other service providing activity has been seen in the electricity, telecommunications, gas and railway sectors. The promotion of new networks and interconnection primarily occurs in the telecommunications sector, while competition for the right to provide monopoly services is the most commonly used instrument for waste collection, urban transport and water.

*Comparative competition*

Where market competition/regulation of structure is not feasible or desirable a regulator may rely more on the benefits of so-called comparative competition. Under comparative competition, regional monopolies do not directly compete with each other for customers, but key benchmarks (or yardsticks) may be used to provide comparative information on efficiency levels. This information can then be used as an input into the tariff setting process.

Comparative competition is, however, data intensive (which may make it difficult to implement in developing countries) and may be vulnerable to problems arising from making comparisons between firms operating under different conditions. Comparative competition has tended to be used most extensively in the water, electricity and transport sectors.

*Objectives of conduct regulation*

Conduct regulation involves the regulation of market outcomes, primarily price and quality, where there is a monopoly service provider. This involves balancing the interests of consumers and operators/investors. For consumers, effective regulation will *inter alia*:

- protect the short and long-term interests of existing and potential customers of utilities in terms of charges (both the level and structure) and quality of services; and
- penalise poor performance.

For service providers and investors, effective regulation will *inter alia*:

- provide sufficient freedom to manage their operations, to finance their functions/activities and to allow them to earn a reasonable return (e.g. profit) on their investment;
- protect investment and profits from arbitrary decisions from government (or regulators); and
- provide incentives for utilities to generate efficiencies and improve services.

There is potentially tension between these two sets of objectives. Ultimately, however, the two sets of goals are related in that consumers will not receive improved services and prices unless the utility is willing to invest.

*Price regulation is a critical regulatory activity*

A critical area of regulation is that of price regulation. Setting tariffs (or prices) for monopoly infrastructure operators involves a number of considerations:

- tariffs should be sufficient to ensure that the operator is financially viable i.e. revenues should cover operating costs and capital costs, including a reasonable profit;
- the tariff setting mechanism should include incentives for efficient operation; and
- tariffs need to be socially acceptable.

There may, however, be tensions between these objectives as well. For example, financial viability considerations may conflict with social objectives.

*Quality regulation*

Any form of price regulation will create incentives for regulated infrastructure service providers to over or under provide service quality. For example, under price cap regulation there is an incentive for private operators to under supply product quality in order to increase profits. As a result, regulation of the prices of a monopoly service provider will generally require an accompanying system of quality regulation.

Mechanisms for regulating product quality, where consumers do not have a choice of product, include:

- direct compensation to customers for under-performance against agreed standards;
- adjusting the regulated price to reflect greater or lesser quality; and
- minimum quality standards with fines for under-performance.

*Regulating inputs?*

In certain cases, effective regulation may also require the regulation of inputs (e.g. investment levels) and activities (e.g. maintenance activity). There is often a tendency for regulation to gradually increase its scope to encompass such activities. In some cases this may be justified given the long lived nature of assets and the need to ensure that services to future generations of customers are not unduly negatively affected by the behaviour of today's utilities.

However, in other cases, the extension of regulation into these areas represents an unjustified level of control over the internal management of the regulated utilities. This can be a particularly difficult balance to get right in developing and transition countries with a long history of state-led intervention in the economy.

## 2.2.2 Social regulation

### *Effect of infrastructure reform on poor consumers*

As noted above, social regulation in the infrastructure sector may be required to address problems of access to, and affordability of, infrastructure services for poor households. Infrastructure reforms that are aimed at providing improved services for consumers can sometimes appear to have the opposite effect on low income households. This is because reforms are often associated with tariff increases and lower tolerance of non-payment and illegal connections.

### *Common situation of low income consumers*

In reality, however, poor households are generally:

- less likely to access the service in question and therefore reliant on expensive alternatives;<sup>4</sup> or
- if accessing the service, they are less likely to be able to substitute poor quality infrastructure services with alternative services of superior quality.<sup>5</sup>

### *Pro-poor regulatory mechanism*

There are a range of regulatory mechanisms that can take into account the specific needs of poor households. As a group, these measures have been referred to as 'pro-poor' regulatory mechanisms. These measures include:

- pro-poor tariff structures, such as lifeline block tariffs;
- universal service obligations to ensure access to services by poor households;
- encouraging small scale service providers that are willing to offer services in poorer areas;
- facilitating the provision of lower quality solutions that entail lower costs (and prices) for poor households;
- ensuring payment flexibility, particularly for larger up-front costs, such as connection fees;
- subsidies provided directly to poor households to assist with the purchase of infrastructure services; and
- subsidies payable to infrastructure companies based on extending services to poor households.

<sup>4</sup> This is particularly the case in relation to water services. In relation to other services, such as heating, the alternative service may not be more expensive, but may have detrimental impacts in terms of health or the environment.

<sup>5</sup> This is typically the case with public transport in urban areas as well as for poor households connected to under performing utility services, such as district heating.

*Benefits of considering social protection policies in the design of pro-poor regulatory frameworks*

A major problem in the design of pro-poor mechanisms in developing countries is the lack of a reliable system for identifying poor households. Without such an identification mechanism the use of pro-poor tools, such as output-based subsidies, is inherently more difficult. In these countries, policy-makers are generally required to rely on less accurate targeting mechanisms, which may result in non-poor households receiving subsidies and poor households missing out on assistance.

*Considering social issues in sector reforms*

Finally, an important challenge for infrastructure reform is to consider social issues in the beginning of a restructuring project. This enables appropriate mechanisms to be set up from the beginning that reflect the needs of the poor and offsets the need for future social interventions which may unnecessarily disrupt regulatory processes and decision making and adversely affect investment incentives.

### 2.2.3 Other types of regulation

*Environmental, health and safety regulation*

Infrastructure services, just like other industries, are subject to a range of regulations including labour regulations, tax regulations and so on. Similarly, environmental, health, and safety regulation are areas that are not limited to regulation of infrastructure services, but they are often critical areas of regulation in relation to infrastructure services.

The objective of health, safety and environmental regulation is to protect individual consumers (or society as a whole) from certain risks associated with market failures such as environmental pollution, service quality and health and safety risks associated with the production or use of a specific infrastructure services.

*Balance cost and benefits of regulation*

It is important to note, that regulation of health, safety and environmental risks will not reduce these risks to zero. The basic issue is one of balance between the benefits of limiting risk and the cost that they impose.

## 2.3 Who regulates?

*Regulation can be undertaken by a variety of institutions*

A key question for any regulatory regime is the nature of the public authorities responsible for its administration. Many observers associate infrastructure regulation with independent regulatory agencies. However, there are a range of public authorities as well as other bodies that are involved in an effective regulatory regime.

*Issues for consideration in the design of an effective regulatory regime*

Some of the key issues in considering the question of who should regulate are the following.

- What should be the relationship between regulation, policy, ownership, and operation?
- How can the independence of the regulatory agency be ensured?
- Should regulation be carried out at the national, regional or local level?
- Should a regulatory agency be responsible for more than one infrastructure sector?
- Should regulation be carried out by a government agency or is there scope for self-regulation?

### 2.3.1 Regulation, policy making, ownership and operation

*Separation of policy making, regulation and operation*

There are four distinct roles in the provision of infrastructure services. These are:

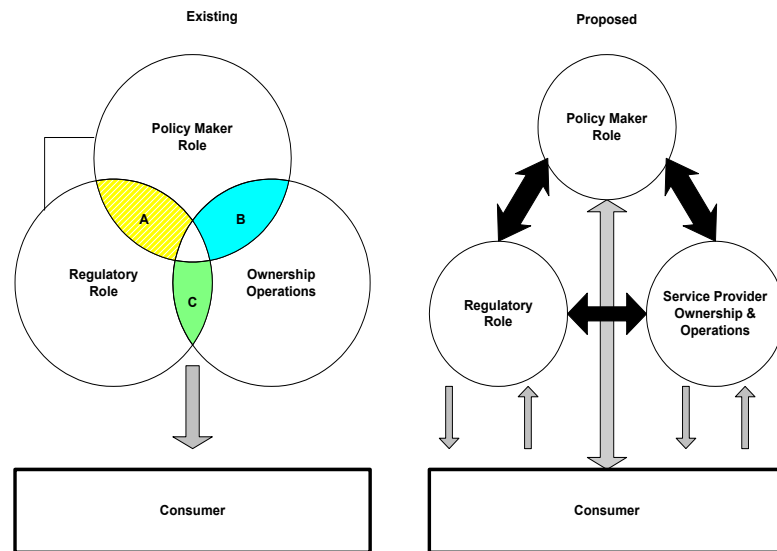
- *policy*: government decisions regarding the framework for the infrastructure sector, including issues such as private sector participation, liberalisation, the nature of the regulatory regime and institutions, and social assistance;
- *regulation*: developing, monitoring and enforcing rules that influence the behaviour of suppliers and consumers of infrastructure services;
- *ownership*: carrier of equity risk of infrastructure operations, oversight of infrastructure managers; and
- *operation*: management of day to day service delivery.

*Confusion between different roles in practice*

In a traditional public sector model for infrastructure services prior to any reform, there is likely to be a great deal of overlap and confusion between these various roles. The utility operator may also have regulatory responsibilities, or regulation may be conducted by the same authority responsible for policy making.

Many infrastructure reforms, however, are aimed at separating these roles so that individual institutions have a clear objective on which to focus and can be more easily held accountable for their performance. For example, corporatisation of public utilities separates ownership responsibilities from operational responsibilities, while privatisation separates ownership responsibilities from policy-making. The figure below tries to depict these relationships schematically.

Figure 1: Division of policy making, regulatory and operational roles



NB For the sake of clarity, we have combined the role of owner and operator in this diagram

*Regulatory agencies should be independent of operators*

A basic starting point is that regulatory authorities should be independent from the industries that they regulate. Without this independence, operators may be able to influence regulatory policies to their own advantage, and to the disadvantage of new entrants or competitors.

Where infrastructure operators remain in public ownership, this is a strong argument for placing these two activities in separate institutions. Hence, the creation of regulatory units operationally separate within ministries responsible for policy-making and ownership oversight. In some countries, the policy making ministry has been separated from the ministry responsible for acting as owner (or shareholder) in the public utilities (e.g. New Zealand, some states in Australia).

*Regulatory agencies should be independent from governments*

Regulatory decisions, particularly in relation to tariffs, may be subject to political pressure from politicians seeking to avoid unpopular tariff increases. An independent regulatory agency may be established as a way of insulating these decisions from the political process. This can allow tariff decisions to be made in the long-term interests of consumers, and ensure that if private operators are involved, they will have confidence in their capacity to earn sufficient revenue to cover their costs and undertake new investment.

*Independent agencies may not be the appropriate solution*

Independent regulatory agencies may not, however, always be the appropriate solution. At the local level, in particular, the costs and benefits of an agency compared to other ways of insulating regulatory decisions from political interference (such as contracts) need to be carefully examined. In addition, there are compromises that provide for different levels of independence.

*What is the relationship of the regulatory agency with the government?*

There are two broad options for the legal and institutional set up of a regulatory agency:

- first, a regulatory agency that operates fully independent of government, or
- second, a government ministry or department under the direction of a government minister.

There are a number of other possible compromises that provide for greater independence than is usually the case in a ministry or a local government agency but are not fully independent. These include:

- A regulatory unit within a ministry or the local government to co-ordinate regulatory matters (e.g. licensing private operators, performance monitoring and reporting). To enhance its independence from industry interests, this can be established within a ministry other than the sector ministry (e.g. Ministry of Finance).
- A separate regulatory authority, but with some or all of its powers limited to making recommendations to the minister. Alternatively, the regulatory authority could be allowed to make decisions subject to approval of the ministry or the parliament.
- A quasi-public regulatory body authorised by law to make regulatory decisions applicable to their industry or membership or to administer rules made by ministries or public bodies.<sup>6</sup>

These options allow governments to continue to be involved in some form in regulatory decisions.

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<sup>6</sup> Such bodies vary widely in form and function. They include self-regulatory bodies, industry boards and commissions, tripartite bodies comprised of business, labour and government representatives and 'watch-dogs' bodies of consumer, community or environmental groups.

*Defining the appropriate level of independence*

The appropriate level of institutional independence will depend on a range of factors including the nature of the industry, the nature of any PSP contract and the nature of any other alternative legal instruments used to implement the regulatory regime.

Governments have often chosen to establish independent agencies where privatisation has taken place and where the industry involves high levels of specific investments (and potentially large sunk costs). This has particularly been the case in telecommunications and electricity. The purpose has been to establish a regulatory framework that is more predictable and where political interference may be restrained.

In solid waste collection and some urban transport activities, contracts with private operators are more likely to be on a shorter term basis, involve lower levels of sunk costs, and suffer less from contract incompleteness.<sup>7</sup> As a result, in these sectors it has often been decided to establish monitoring units within local government rather than full independent regulatory agencies.

Requirements for regulation in these sectors are similar to telecommunications and electricity, however, if there is significant long term investment involved operating under uncertainty (e.g. rail track and related infrastructure).

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<sup>7</sup> Contract incompleteness arises when a set of circumstances arises that were not foreseen in the original contract and cannot be resolved by reference to the contract.

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## 2.3.2 Institutional design of independent regulatory agencies

<i>Regulatory independence</i>	If the government wishes to establish an independent regulatory agency, there are a number of factors that help to ensure the independence of a regulatory agency.
<i>Selecting, appointing members of the board</i>	<p>First, the process for selecting and appointing members of the regulatory agency as well as their dismissal is an indication of the credibility and the independence of the agency. For independent agencies potential requirements to help ensure selection is fair include:</p> <ul style="list-style-type: none"> <li>• members being selected based on their skills and qualifications;</li> <li>• selection is subject to the ratification of the legislature as well as government;</li> <li>• the regulator or board members are selected from a list prepared by an independent selection committee that is nominated by persons other than those in Government;</li> <li>• regulators are appointed for fixed term periods;</li> <li>• clear rules exist for the removal of the head and/or members of the board of the commission.</li> </ul>
<i>Funding</i>	Second, a regulatory agency should have an independent source of funding that is beyond the influence of Government. The most common way is to levy annual fees on the regulated companies, an alternative is a tariff surcharge. However, the general requirement should be that fund raising is transparent and proportional to the costs incurred.
<i>Staffing</i>	Third, the staff appointed to a regulatory agency must be sufficient in number and of the appropriate calibre to ensure that the head of the agency/the board has the support required to independently reach conclusions and take decisions. As a result, salaries should be attractive and competitive. This may often require the release of the regulatory agency from civil service employment conditions.
<i>Legislative changes</i>	Fourth, the ability of the Government to influence the behaviour of the regulator through legislative changes or the threat of legislative changes should be minimised. This is discussed further below in Section 2.4.
<i>Single regulator</i>	In relation to decision making structures there are two broad options: to provide for an individual person or alternatively, for a commission of, for example, three or five members.

In the UK,<sup>8</sup> as well as other countries such as Germany (for the competition commission) the regulatory authority was traditionally vested in an individual Director-General or President. The rationale for this model is that it:

- provides for faster decision making, increased accountability for decisions, and greater predictability; and
- is less resource intensive, both in human and financial terms.

*Multi-member regulatory commission*

Most countries in Europe, however, including France, Italy and the Netherlands and in developing countries have opted for multi-member sector regulators. Multi-member commissions may have the advantage of:

- being less vulnerable to individual preoccupations (regulation is depersonalised) or improper influences;
- providing for greater stability and continuity across changes in governments and decision makers; and
- showing capacity to reflect multiple perspectives.

### 2.3.3 National, regional and local regulation

*Regulation on the sub-national, national, supranational, regional and global level*

In nearly all countries there are at least two levels of government - national and local - and in some, there is a third level of government at the regional level. In undertaking infrastructure reform an important issue is the level of government at which responsibility for infrastructure regulation should be located. The establishment of regional economic groupings (such as the EU) and international agreements regarding trade (such as GATS) is also leading governments to consider whether infrastructure regulation might be carried out at a supranational level.<sup>9</sup>

<sup>8</sup> It is worth noting that in the UK, the balance of opinion would appear to be shifting from individual decision makers in favour of multi-member commissions or boards.

<sup>9</sup> An interesting and one of the first examples of a regional regulatory agency is the Eastern Caribbean Telecommunications Authority (ECTEL) established in 2002 by governments of five Eastern Caribbean states. ECTEL has enforcement powers in each of the five jurisdictions.

*Local regulation* Advantages of regulating at a local or regional level include a greater ability to adapt or adjust regulatory decisions so as to reflect local conditions, priorities and preferences. Regulation at the regional or local level may also allow 'regulatory competition', whereby different regions effectively compete to provide the most effective regulatory regime.<sup>10</sup>

Municipal level regulation, however, may be constrained through a lack of resources and/or expertise. In particular, independent regulatory agencies are unlikely to be viable at the municipal level, except for the largest of cities.

*National regulation* Regulation at the national level is most appropriate for services or operators that are national in their scope of operations. National regulatory authorities are also more likely to be able to have the scale to ensure that they attract and retain appropriate expertise.

A final decision in relation to the location of regulatory authority needs to take into account these factors as well as broader policies towards decentralisation and local government.

*Combining benefits* There are a number of ways of seeking to gain the benefits of both national and local regulation. These include, for example, national regulatory authorities establishing regional offices. Another alternative is for regulatory responsibilities in a sector to be divided between the national and regional (or local) levels. Examples of this latter approach are found in electricity regulation in Belgium<sup>11</sup> and Australia.

*Sector specific requirements* In general, telecommunications is most likely to be regulated at the national level, electricity is likely to be regulated at the national or regional level, while water, solid waste and urban transport are most likely to be regulated at the municipal level. However, there are many exceptions to this general pattern.

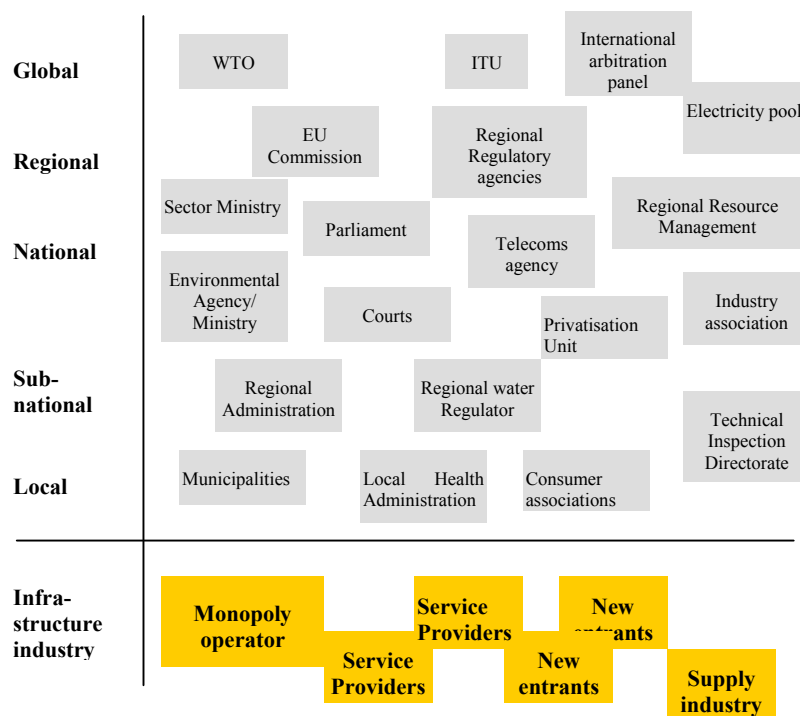
The following figure gives examples for the diversity of different regulatory bodies at different tiers of government.

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<sup>10</sup> The underlying assumption of this approach is that regulatory competition would force governments to compete to provide effective regulation to satisfy citizens' preferences and attract new business and investment in their region. In doing so, regulators will be led to experiment in the search of the best regime resulting in innovative and tailored regulatory approaches. For the concept of government competition see Tiebout, C. (1956) A Pure Theory of Local Expenditures, 64 J Pol Econ, p. 416-424. It was argued, however, that there may also be 'destructive competition' by which competing regulators pay more attention to attract investment thus making concessions to social policy objectives. For a discussion of the benefits and risks of regulatory competition see Baldwin, R. and Cave, M. (1999), p.182.

<sup>11</sup> The Belgian electricity sector has a national regulator as well as regulators for each of the three regions (Flanders, Wallonia, Brussels). The national regulator's responsibilities include tariff setting, while the regional regulators are responsible *inter alia* for decisions regarding the pace of sector liberalisation.

Figure 2: Examples of different regulatory bodies



### 2.3.4 Multi-sector regulatory agencies

*Should there be a cross sectoral regulator?*

Where a regulatory agency is established, it may be given responsibility for more than one infrastructure sector. Multi-sector regulatory agencies have been established, for example, in Lithuania, Latvia, Jamaica, Guyana and Armenia. They are also common at the state-level in both the United States and Australia. The establishment of a multi-sector regulatory agency responsible for telecoms, energy and railways is also currently being considered in Germany.<sup>12</sup>

<sup>12</sup> An alternative proposal, that is currently being discussed, is to devolve regulation for the electricity sector to the Federal Cartel Office.

*Benefits of a multi-sector agency*

Potential benefits of a multi-sector regulatory agency include:

- improved capacity to deal with issues that cross narrowly defined industry boundaries;<sup>13</sup>
- efficiency gains through resource sharing;
- consistency of approach to similar regulatory issues across sectors (e.g. regulatory treatment of the cost of capital);
- sharing experiences in relation to cross cutting issues; and
- limited vulnerability to 'regulatory capture' by a single industry.

*Limits of cross-co-ordination*

Given these potential benefits, a surprisingly small number of multi-sector regulatory agencies have been established worldwide.

The sequencing of infrastructure reform in many countries, however, has often seen the establishment of a regulatory agency in the telecoms sector prior to other infrastructure sectors. It can often be easier to create a new agency for other sectors then to alter the scope of authority for the existing agency.

The transformation of a telecoms regulator into a multi-sector regulatory agency may be opposed by both staff within the agency, that feel that their authority or position will be undermined, or by the regulated industry, which may feel that it is somehow being downgraded. The subsequent merger of regulatory authorities into a single authority may, however, be undertaken at a later stage once multiple regulatory agencies have been established.

Multi-sector approaches are also often unpopular with sectoral ministries as this approach may be seen as diluting their influence.

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<sup>13</sup> This is particularly required in relation to the energy sector, where there are likely to be issues that impact on electricity, gas and district heating sectors. It has also been seen in the communications sector with the development of regulatory agencies to deal with telecommunications and broadcasting.

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### 2.3.5 Self-regulation

#### *Forms of self-regulation*

An alternative regulatory option to the arrangements discussed above is the instrument of self-regulation. Self-regulation occurs when a group of firms or individuals exerts control over its members and their behaviour.<sup>14</sup>

In infrastructure services, self regulation occurs in several ways. For example, a community based water association may set its own tariffs for services that it charges from the member of its community. The risk of overcharging or under provision of services is reduced, given that the management of the water association is appointed and accountable to its members.

A self regulatory association may either act in private interest of its members and/or, government policy tasks are delegated to an industry association. In addition, self regulation could either act in an informal, voluntary manner or may be legally binding and enforceable by courts.

#### *Constraining self-regulatory powers*

If the government wishes to limited the power of the self-regulatory organisation, the scope of self regulatory power may be constrained in a number of ways:

- statutory rules of the association;
- periodic oversight by a governmental agency;
- systems in which ministers approve or draft rules;
- procedures of enforcement of self-regulatory rules through public law; and
- participation of members and accountability to an external body.

#### *Nature of regulatory regime*

Self regulation may achieve substantial benefits if there are sufficient incentives for the participants of a regulatory regime to achieve the desired outputs. In doing so, it may help to reduce the cost of external regulation, facilitate access to information and provide intrinsic incentives to achieve efficiencies.

There is a risk, however, that members may not be able to reach an acceptable decision, or the decision may benefit the members of the self-regulatory regime only but have negative impacts on other groups of society.

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<sup>14</sup> Baldwin, R. Cave, M. (1999), Understanding Regulation, Oxford University Press p.125

### Textbox 1: Self-regulation in Germany

In Germany, the electricity industry has been granted the right to self-regulate the general rules for network access. A general access agreement was negotiated between the Association of Electricity producers (VDEW), the Association of the German Industry (BDI) and the Association of the Industrial Energy Sector (VIK). This framework agreement sets the general conditions but does not set any price levels. These are subject to negotiations between the network operator and the third party requesting access. Only if self-regulation fails the Ministry of Economics has a reserved option to legislate for access, and move to a system of regulated third party access. However, the Government has now decided to devolve these functions to an independent regulatory agency i.e. the Federal Cartel Office or the industry regulator for telecommunications, with effect from June 2004.

## 2.4 What legal instruments are there for regulation?

### *A range of legal instruments for regulation*

The implementation of a regulatory regime for an infrastructure sector is likely to require a range of legal instruments, such as primary legislation, secondary legislation (e.g. regulatory decision making, rules, decrees), licenses as well as contracts between public and private entities as well as between private entities. The choice of legal instrument will often stem from a country's legal norms and traditions as well as its institutional endowment. However, this choice can also have an important influence on the credibility of the regulatory regime in the eyes of private investors or operators.

### *Primary legislation*

Primary legislation is generally used to set out the broad framework for a regulatory regime, with secondary legislation used for more detailed decisions. The advantage of primary legislation is that it is, generally, relatively difficult to change. Therefore, embedding regulatory provisions within primary legislation will carry a relatively high degree of credibility.<sup>15</sup> On the other hand, this can mean that it is difficult to implement new decisions in response to changing circumstances.

<sup>15</sup> To some extent, this will depend on the nature of political institutions within a country. Changes to primary legislation are generally more difficult in countries that divide authority between the executive and legislature, have a bicameral legislature (with different election arrangements for the upper and lower houses) or numerous political parties represented in the government and legislature.

<i>Secondary legislation</i>	Secondary legislation, on the whole, is more flexible (i.e. easy to change) but, as a result, may carry less certainty for private operators. A government agency, for example, may be empowered to take regulatory decisions that are legally binding. This should fall within a clearly defined mandate that is set out in a law or the regulator's statutes. In most cases, regulatory decision making by an agency independent from government involves a certain level of discretionary decision making power.
<i>Licensing</i>	Under a licensing regime, the licensed infrastructure operator must apply for and fulfil all the conditions of a licence in order to be able to provide the services authorised by the license. The issuing authority may amend a licence periodically, allowing further obligations to be placed on the company. License amendments may require the agreement of the licensee, or may only allow unilateral changes to the license under certain limited circumstances. These characteristics will determine the flexibility and credibility of a licensing regime.
<i>Contracts</i>	Contracts between public authorities and private operators may also form an important part of a regulatory regime. Concession contracts, in particular, are likely to have important components dealing with tariff setting. Regulation 'by contract' is particularly prevalent in the water, solid waste and transport sectors but has also been used in telecommunications and electricity sectors. An important feature of a contract based regulatory regime is that changes to the regulatory regime agreed in the contract require the consent of both parties.

## **2.5 Regulating different models of public and private service provision**

<i>Different models of service provision</i>	Different models of public and private service provision have different incentives for operators in terms of efficiency, prices, service quality and investment. As a result, the focus and nature of the regulatory regime will be influenced by choices regarding public or private ownership and management. This section looks at the different requirements on regulation of these different ownership and management models.
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*Privatised companies*

Privatised companies may be expected to have the strongest incentives to maximise profits. In a competitive market, this works to the advantage of consumers through encouraging efficiency and product innovation. However, in a non-competitive market an unregulated privatised company may be expected to maximise profits by increasing prices and/or lowering service quality.

Regulating a privatised company in a non-competitive market will be most successful where the the goals or instruments of the regulatory regime align the company's profit maximisation objective with the public interest. An example of this is price cap regulation, where a private operator can increase profits by reducing costs.

In a semi-competitive market, a privatised company (if unregulated) may be expected to engage in activities that would limit competition (e.g. anti-competitive mergers). Regulation will need to control these activities.

*Public private partnerships*

The incentives facing the managers of a public-private partnership will, in large part, depend on the governance arrangements for the PPP and the role taken by the public shareholder.<sup>16</sup> If the public shareholder acts in the same way as a private shareholder, the PPP may be expected to face the same incentive structure as a privatised operator and should be regulated on the same basis.<sup>17</sup>

A PPP may be structured so as to provide the public shareholder with a greater say over certain issues of particular public interest, such as prices or investment. If this is the case, it is preferable to have the public shareholders area of influence clearly defined within PPP's corporate governance arrangements rather than relying on informal 'influence', which is likely to lack transparency.

Such an arrangement may reduce the need to implement external regulatory arrangements. However, in a PPP a government may face a conflict of interest between its roles as shareholder, policy maker and regulator.

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<sup>16</sup> For the purposes of this paper, we have defined a public-private partnership as an infrastructure operator in which there are both public and private shareholdings.

<sup>17</sup> This is most often the case when a PPP emerges as a transition to full private ownership. It may also be the case where the local company law restrains the actions of the public shareholders through various provisions aimed at protecting the rights of minority shareholders.

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*Franchise arrangements*

Under a franchise arrangement, a private operator is granted the right, generally through a competitive bidding process, to operate an infrastructure service for a fixed period. At the end of this period, the assets revert to government control and the franchise may be re-let. Franchising agreements are used throughout the infrastructure sector, but are particularly common in water, urban transport and solid waste collection

*An alternative to regulation?*

Franchising has been seen as a way of addressing the problems of monopoly and regulation<sup>18</sup> because, in theory, a competitive bidding process should result in the same level of prices that would be achieved in a competitive market.<sup>19</sup> In practice, however, this is not always achieved for some of the following reasons.

- The competitive bidding process may be undermined if there are too few firms bidding for a contract, or if one of the firms has a significant informational advantage as a result of being the incumbent contractor.
- Information problems may mean that the competitive bidding process is based on incomplete information. This may subsequently require contract renegotiation in which the private operator may engage in bargaining from a position of strength as the government is unlikely to wish to terminate the contract.
- Similar problems may arise from contract incompleteness whereby a set of circumstances arise that were not envisaged in the original contract and require a negotiated resolution between the two parties. This is particularly likely in long-term contracts in the water sector.

*Regulation by contract*

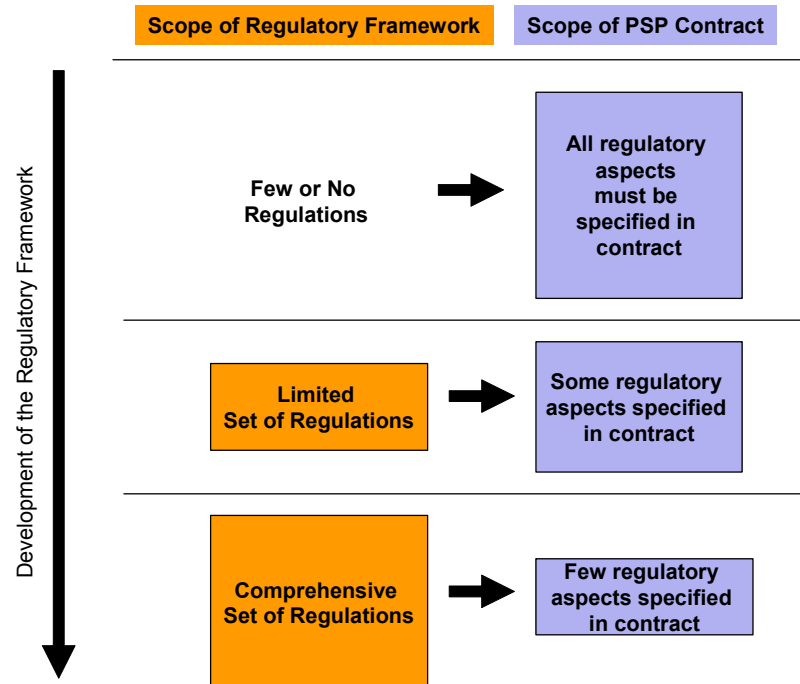
Despite these problems, the key feature of franchise contracts is that a certain element of the regulatory framework will be contained within the contract (leading to the phrase 'regulation by contract'.)

These problems mean that some form of adjudication between the government and the private operator may be necessary to deal with informational or contract incompleteness problems over the term of a franchise contract. This role may be undertaken by an independent regulatory agency or other bodies (e.g. arbitration bodies, courts, expert panels and so on). The following table shows the link between the scope of contracts and the scope of a regulatory framework.

<sup>18</sup> Franchising is sometimes described as an alternative to regulation (See e.g. Kay and Vickers, 1990).

<sup>19</sup> Demsetz, H. (1968): Why regulate utilities, 11 Journal of Law and Economics, p55.

Figure 3: Scope of contract and regulatory framework development



*Regulatory issues in relation to different contract types*

The informational and contractual incompleteness problems outlined above are common to all franchise contracts. However, there are also specific regulatory issues that arise in relation to different types of franchise contract as a result of the different incentive structures associated with different contract types. There are three basic forms of franchise contract:

- management contract;
- lease; and
- concession.

*Features of management, lease and concession contracts*

Under a concession, the franchisee takes responsibility for all aspects of the service, including investment. A typical concession contract will last for at least 20-25 years. Under affermage (or lease) contracts, which typically last for 10-15 years, the franchisee is responsible for operating the assets and ongoing maintenance, while the government retains responsibility for long term financing. Management contracts are generally let for shorter periods of time (e.g. 4-7 years). The government retains responsibility for funding the utility's operations, and the franchisee is paid a fixed fee (agreed in advance) for the operating the assets on the government's behalf.

*Addressing different level of incentives*

A concession is generally considered to provide the strongest incentives for efficient operation, while management contracts are generally considered to provide the weakest incentives for efficiency. This is because a management contractor does not have a direct financial interest in the profitability of the service it is operating.

Apart from the information problems outlined above, the major regulatory issue associated with concession contracts can be to do with investment incentives over the life of the contract. Towards the end of the contract, a concessionaire may only have limited incentives to invest if the assets are to revert to government control, and the operator will not be able to earn a sufficient return on its investment.

In relation to management contracts, the major regulatory issues are associated with finding ways of addressing the weaker incentives inherent in these contracts. This has resulted in a performance-based remuneration element being introduced into many management contracts. In these cases, the management contractor is rewarded not only with a fixed fee but also with a variable fee which is based on the contractor's performance against a number of pre-agreed performance indicators.

*Public enterprises*

Nationalisation or public ownership of infrastructure services has historically been seen in many countries as the most appropriate way of dealing with the problems presented by monopoly industries. Public enterprises would not have the same profit incentives as private firms and would be able to focus on investment and service provision.

*Lack of incentives for efficiency*

The problem of public enterprise, however, is that the lack of a profit incentive has meant that there is little incentive to operate efficiently, and budget constraints have meant that public owners have been unwilling or unable to fund necessary investments. Public owners have also been able to keep prices below cost-recovery levels thus resulting in further service deterioration, while the enterprise has been seen as having an important role in generating employment.

*Corporatisation and regulation*

Public enterprise reform has focused on improving the incentives for public enterprises to act in the same way as private firms. This process often involves 'corporatisation' of the public entity, whereby it is transformed into a limited liability corporation 100 per cent owned by the government. The managers of the corporatised entity are charged with meeting commercial objectives, including profit making.

Where this is the case, there is a requirement for corporatised enterprises to be made subject to the same regulatory regimes that might apply to privatised companies. However, it may be necessary to adjust the regulatory regime to take into account the specific circumstances of the corporatised entity. For example, managers may not be motivated by increased profits if this does not translate into higher salaries or other performance rewards.

*Crucial issues for regulation of public enterprises*

Regulation of public enterprises should focus on the following areas:

- defining a basic agreement between public shareholders and the management of the public company;
  - agreeing on clear performance targets;
  - ensuring mechanisms for accountability (e.g. reporting requirements, monitoring systems, periodic parliamentary control, independent financial audits);
  - identifying appropriate regulatory incentives for public sector companies;
  - introducing managerial incentives for staff (performance based management systems); and
  - protecting company management against political interference through appropriate governance structures.
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## 2.6 How to regulate?

### *Preventing regulatory failure*

In theory, governments intervene to remedy 'market failure' as we discussed above. In practice, however, 'market failure' is often replaced by 'government failure' or 'regulatory failure'. As a result, there are a number of potential problems associated to regulation particularly in developing countries where governments often face specific challenges.

### *Sources of regulatory failure*

These include:

- shortages of required skills and expertise;
- information asymmetries between the regulated company and the regulator, and the regulator and the government;
- the regulatory agency may not be acting in the public interest due to regulator's personal or political interests;<sup>20</sup> and
- difficulties in defining the public interest in terms that are acceptable to all stakeholders.

### *Regulatory legitimacy*

Regulatory processes should be designed to overcome these issues. Moreover, processes should be established to help to achieve so-called regulatory legitimacy. The legitimacy of a regulatory regime refers to its acceptance by stakeholders, such as consumers and regulated businesses, as a source of authority that exercises its powers in a fashion they consider appropriate. A regulatory regime needs to be accepted as legitimate to ensure its effectiveness. Without this, the regulatory regime will be unable to achieve its goals without creating an ongoing sense of resentment.

### *Tests of regulatory legitimacy*

There are five key tests as to whether a regulatory agency has legitimacy:

- Does legislative authority support the regulatory regime?
- Is due process followed i.e. are procedures fair, accessible and open?
- Is the regulatory authority acting with sufficient expertise?
- Is the regulatory regime efficient?
- Is the regulatory authority accountable to democratic institutions?

These tests or criteria are now discussed in turn.

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<sup>20</sup> According to the proponents of the various private interest theories of regulation (economic theory of regulation, capture theory, various institutional theories), the supply of regulation by government will be influenced by powerful interest groups that may not be representative of the 'public interest'. Government's may exchange regulation for political support or regulatory agencies may come to identify its interests with those of the industry it regulates.

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<i>Political or legislative mandate</i>	The regulatory regime needs to act within its mandate and achieve the outcomes set for it in the legislation or resolution by which it is established. <sup>21</sup> There is likely to be a greater sense of legitimacy associated with a regulatory regime if it is operating consistently with the political or legislative mandate that it has received from the democratic institutions under which it operates. Stakeholder support for the regime is also likely to be greater if the regulatory regime is achieving the outcomes set for it in the legislation or resolution by which it is established.
<i>Fairness and Transparency</i>	Decisions arising out of processes that are considered by stakeholders to have been fair, transparent, and open to participation by stakeholders are likely to receive more support than would otherwise be the case. <sup>22</sup>
<i>Expertise</i>	The legitimacy of a regulatory regime is also likely to be influenced by the expertise (perceived or otherwise) of those persons responsible for making regulatory decisions. The importance of this criterion is likely to increase with increasing complexity. For example, in issues of food safety a regulatory regime that relies on expert scientific input into its decision making process is likely to have greater legitimacy.
<i>Efficiency</i>	The efficiency of the regulatory regime refers to the direct costs of operating the regime, including the cost of any regulatory authority or the staff carrying out regulatory functions as well as to the cost caused to the regulated industries (e.g. information requirements). If the regime is perceived to be expensive, then its acceptance by industry stakeholders is likely to be reduced. <sup>23</sup> Cost-benefit analyses have been increasingly introduced to provide more transparency regarding the cost and benefits of a regulatory rule (or even an institutional regulatory arrangement).
<i>Accountability</i>	The principle of accountability refers to the extent to which a regulatory authority is held responsible for its actions to democratic or other institutions, such as the courts. Appeals procedures and dispute resolution mechanism are an important element of accountability. <sup>24</sup>

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<sup>21</sup> Assessing the legitimacy of a regulatory regime against this criterion can, however, be difficult where the political or legislative mandate is insufficiently precise. In some cases the mandate is left vague intentionally so that the regulatory institutions may exercise its discretion in determining the appropriate trade-off between objectives. In other cases, however, conflicting objectives in the mandate of the regulatory institutions involved may lead to a lack of efficacy in the regulatory regime.

<sup>22</sup> This principles may be regarded as pointing to the importance of regulatory authorities using either formal or informal consultation processes prior to making important decisions as well as being predictability in the decision making process in terms of announcing the process, timing and factors that will be taken into account in making decisions, and providing the reasons once a decision has been made.

<sup>23</sup> In mature regulatory regimes the cost of the regulatory regime has also become a critical issue. As a result, regulators are increasingly subject to scrutiny.

<sup>24</sup> Utility regulators in the UK, for example, have been criticised for their alleged lack of accountability due to the large amount of discretion vested in each Director General (leading to a highly personalised style of regulation), the lack of openness in the procedural requirements surrounding regulatory action, and finally, the lack of a regular and adequate means of scrutinising the work of a regulator see, for example, McHarg, A. (1995).

**Textbox 2: Effective appeals and dispute resolution procedures**

Perhaps the most effective important mechanism for ensuring a regulators' accountability for its decisions is the presence of mechanism that allows operators to appeal the decisions of a regulatory agency to an independent external body. Appeals and dispute bodies may include courts or other government bodies (e.g. the competition commission) or, as is increasingly the case, arbitration and alternative dispute resolution (e.g. mediation, conciliation, and expert determination).

Effective dispute resolution procedures that achieve legitimacy in the eyes of key stakeholders will reflect the following considerations:

- providing a safeguard against regulatory decisions that are incorrect;
- restraining excessive appeals that could cause decision making processes to 'seize up' or impose excessive costs;
- minimising delays and costs by using different institutional forms for different types of disputes;
- taking stakeholders interests into account and balancing the interests of operators, consumers and the long term public interest; and
- ensuring that the dispute resolution body has the required level of skills and capacity about the industry to make an informed decision.

***Legitimacy-a few conclusions***

In summary, the legitimacy of a regulatory regime will be based on a general assessment of the factors considered above. It follows that improving the performance of a regulatory regime in relation to any one of these factors will be likely over the long term to increase the legitimacy of the regulatory regime.

However, it should be noted that there are trade-offs between many of these factors. That is, it may not be possible to improve a regime's performance in one area without diminishing it in another. For example, increasing consultation and stakeholder participation in regulatory decision making would be likely to increase the perceived legitimacy of the regulatory regime. However, it would also be likely to increase the regime's cost of administration. As a result, this may diminish the benefits gained from increased participation.

### 3 Conclusions

This manual seeks to summarise the fundamental issues in infrastructure regulation by setting out the basic rationale for regulation, legal and institutional options for regulatory regimes and discussing the interface between regulatory framework development and different forms of private sector participation. Furthermore, it recaps the current discussion on regulatory processes by presenting ‘best principles’ of regulation.

There is common agreement amongst governments worldwide, practitioners and representatives from donor agencies regarding the significant need to adjust the regulatory framework to provide for effective and efficient infrastructure service delivery. For this reason, in the past decade, most developed countries as well as emerging markets have undertaken substantial regulatory reform. For developing countries, however, the reform process has been particularly challenging given the specific circumstances in an emerging market economy.

As we discuss below, there are a number of issues that will remain challenging in the future and as such, are crucial for the successful implementation of regulatory reform in developing countries.

#### **Capacity of regulatory agencies**

The capacity and skills of staff is an important factor for the success of a regulatory regime. Regulatory decisions are often complex and require a high level of experience, specific skills and personal integrity. In practice, experience shows that regulatory capacity constraints constitute one of the main sources of regulatory failure in newly established regulatory regimes. This is all the more relevant, where the regulatory authority is set up as an independent agency and therefore requires particularly strong capacities as well as ‘arms-length distance’ from governments as well as the regulated industry.

Significant challenges arise in relation to the regulation of local infrastructure services (e.g. water services, transport, solid waste) by municipal authorities given the institutional and administrative weaknesses of many local governments. Furthermore, in practice, the effective interaction and division of regulatory responsibility between municipal, regional and national level constitutes a major challenge.

#### **Protection of poor consumers**

Regulation needs to balance the interest of all consumers, including the poor. Therefore, regulation should contribute to reduce the following concerns: ensuring affordability of basic infrastructure services for low income consumers, providing access for those who are not connected and ensuring an appropriate quality of service to all consumers. Particular attention needs to be paid to:

- setting the appropriate level and structure of tariffs;
- designing and implementing effective access policies to facilitate access by unconnected households (e.g. including universal service obligations);

- ensuring a sufficient level of flexibility regarding alternative service providers while limiting health or safety risks; and
- developing alternative dispute resolution, appeal and consumer protection mechanisms to ensure that weaker groups are able to voice their interest.

While there is general agreement that these issues should be addressed, many countries have not clearly defined how social policies and decision making are integrated in the overall institutional structure of the sector and the regulatory decision making process.

Furthermore, it may be worth investigating the extent to which sector specific social support may be diminished or even replaced in favour of cross sectoral social protection programs. The chances of succeeding with a more comprehensive approach, however, depend on the overall administrative capacity of each individual country and the existence of an effective general social policy and safety net.

### **Regulation of market structure**

The reduction of market power of the former incumbent operator is an important regulatory challenge for potentially competitive market such as telecommunications, electricity and urban transport. The success in introducing competition will largely depend on political will to abolish exclusivity arrangements and open markets for competition.

### **Pricing and financial viability**

Pricing issues will always be a central challenge for both emerging as well as mature regulatory regimes. That also means that awareness for the 'economic good' character of infrastructure services has to be developed even for those sectors that have previously been provided at a subsidised price or at no price at all (e.g. water and solid waste).

It is also about attracting private investors while ensuring social acceptance (as discussed above) and administrative feasibility.

### **Fit of different regulatory instruments**

For many sectors 'regulation by contract' is the predominant regulatory form while at the same time the specific features of the industry call for a regulatory agency or other forms of regulatory institutions. For water services and district heating services in particular, but increasingly for other contract based service provision, there is a need to ensure consistency between different regulatory instruments. In many cases, responsibilities defined in the contract (or in contracts with several service providers) are contradictory with those of a regulatory authority as defined in the sector legislation. This may be a result of regulatory reforms being implemented separately from PSP transactions.

Some governments may not wish to include the private sector for political reasons or private provision of service is not feasible for economic reasons. While often ignored in the past, effective regulatory arrangements for publicly owned and managed enterprises (e.g. reporting requirements, incentives for efficiency, autonomy in managerial decisions, accountability) are critical for the satisfactory performance of such enterprises.

### **Coordination and planning activities**

Infrastructure policies need to be coordinated and priorities need to be set between different modes of supply within a sector (e.g. competition in urban transport between public and private transport, CHP plants in district heating), but also between different infrastructure sectors (e.g. electricity and district heating). In addition, infrastructure regulation is also always subject to broader policies influences (e.g. environmental legislation, municipal policies and decentralisation, land use). Regulation will need to take this broader perspective to be effective. This requires significant capacity for cross sector approaches and overall infrastructure planning.

### **Development of effective appeal and dispute resolution mechanisms**

Currently, important discussions are taking place in relation to the appropriate development of appeals and dispute resolution mechanisms given the weakness of judiciary regimes in many developing countries and the absence of alternative appeal bodies (e.g. a competition commission or an appeals tribunal). The design of appeals bodies and alternative dispute resolution mechanisms is likely to continue to be an important issue in the regulation of infrastructure services.

Furthermore, while it is the fundamental mandate of a regulatory agency to protect consumers monopolistic behaviour in the private sector, in most cases the mandate does not go as far as protecting individual consumers against poor performance. There is a major challenge to build up structures that are able defend the interests of individual consumers (including low income consumers as we discussed above) in a non-bureaucratic and easily accessible way.

## Annex: Bibliography

The bibliography provides some background references for further reading. The bibliography is structured in two parts:

- reading on basic concepts for understanding regulation (part A); and
- sector specific reading for telecommunications, district heating, electricity, water, waste and urban transport (part B).

### Part A: Basic concepts for understanding regulation

#### Fundamentals on regulation (section 2.1)

An introduction into the microeconomic theory of regulation are provided in Gravelle, Rees (1992), Laffont, J-J, Tirole, J. (1993). A theoretical background on regulation from a public finance perspective is provided in Musgrave (1998). The standards textbooks on regulation include Baldwin, Cave (1999), Newberry, (2000), Armstrong, Cowan, Vickers, (1994) which have a strong emphasis on the UK regulation including case studies in telecommunications, electricity and gas and water regulation. Helm, Jenkinson (1998) discuss the challenges regarding the introduction of competition in different network sectors. Viscusi, Vernon and Harrington (2000) present a textbook on regulation and antitrust with US perspective. Borrman, Finsinger (1999) and Knieps, Brunekraft (2000) are the German equivalent. A legal perspective on regulation is provided in Ogus (1994) and Prosser (1997) and (1999). Guasch, Spiller (1996) discuss regulation from a political economy perspective and provide a number of useful examples from experience in Latin America and the Caribbean (1999).

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## **Different Forms of regulation (section 2.2)**

### *Economic Regulation (section 2.2.1)*

An analysis of the economics of price regulation can be found in most publications listed under the bibliography for section 3.1 e.g. Laffont, J-J, Tirole, J. (1993), Baldwin, Cave (1999), Newberry, (2000), Armstrong, Cowan, Vickers, (1994) Viscusi, Vernon and Harrington (2000). In addition, there less theoretical discussion have been provided by, for example, Green (1997).

Helm, Jenkinson (1998) provide an overview on competition issues for electricity, telecoms, water in the UK. For an introduction in competition and regulation of competition Klein (1998) in the same edition. Laffont, J.-J, Tirole, J. (1994) provide an conceptual analysis on the access pricing including the efficient component pricing rule (ECPR), Estache, Valetti (1998) give an overview of characteristics, advantages and disadvantages of different access pricing mechanism.

Adler, Posner (2001) provide an overview on conceptual, legal and economic issues in relation to cost-benefit analysis.

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