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**Restructuring infrastructure
in transition economies**

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1. Introduction

The provision of telecommunications, electricity and transport in centrally planned economies was distinguished from that in market economies in at least three ways. First, some services, such as electric power and rail freight transport, were abundantly supplied to enterprises as part of a strategy of directed growth. With the focus on expanding material inputs, certain infrastructure services were abundantly supplied to industry with little regard for their costs of production, including their environmental impacts. Second, with an ideological bias in favour of material production and a neglect of services, there was relatively little investment in telecommunications, despite its potential for raising productivity and output. Third, vital infrastructure services, such as electricity and urban transportation were provided to households for free or for a nominal charge as part of an approach to income allocation in which basic consumer goods and services were supplied at prices well below costs.

The provision of telecommunications, electricity and transport services in the transition economies must now adapt to recognise costs, to meet new market demands, and to address concerns for the environment. Tariff levels and structures must adjust to reflect the costs of production and the fiscal constraints of governments and to guide new investment decisions throughout the economy. The levels of service provision must also adapt. In some infrastructure sectors, such as railways and electric power, market adjustment involves lower service levels, albeit of greater reliability and higher environmental standards. Other sectors, such as telecommunications and road transportation, must respond to expanding demands. Achieving higher environmental and safety standards is also an important part of restructuring infrastructure. Under central planning, some infrastructure sectors played a central role in the process of environmental degradation, both through their own production and in their encouragement of wasteful use of resources, particularly electricity.

¹ This paper draws extensively from chapters 3 to 5 of the *Transition Report 1996: Infrastructure and Savings*, a product of the Office of the Chief Economist at EBRD. The views expressed in the paper are not necessarily those of the EBRD. Comments and information from Egbert Jöhrens, Christof Rühl, and Paul Seabright are gratefully acknowledged. An earlier version of the paper was presented at the international conference "Competition in Network Industries: Telecommunications, Energy and Transportation in Europe and Russia" organised by the European Institute for International Economic Relations and held in Potsdam on 21-23 November 1996.

The restructuring of infrastructure is thus a major challenge in the transition to a market economy. Meeting this challenge is particularly difficult, however, because the policies on which governments typically rely to induce enterprise restructuring -- hard budget constraints, privatisation and product market competition -- can be problematic when applied to infrastructure. For example, hardening budget constraints can require the liberalisation of tariff levels and structures to allow the elimination of production subsidies, but the impact on income distribution can create strong political opposition. Effective privatisation requires complementary measures to introduce either product market competition or effective regulation, but there is little experience in the transition economies with regulatory instruments and institutions.

The purpose of this paper is thus to characterise the infrastructure restructuring challenge in the transition economies and to examine carefully the government policies that can promote effectively this restructuring. The remainder of the paper is organised as follows. Section 2 assesses the prevailing imbalances in markets for infrastructure services in terms of inherited supply capacities (i.e., the capital stock put in place under central planning), changing patterns of demand for infrastructure services, and tariff levels and structures compared with market economies. Section 3 examines the pressures and incentives for a commercial approach to infrastructure and the potential it creates for its restructuring, including increased investment and access to private finance and greater operational efficiency. Section 4 considers the role of government in supporting a more commercial approach to infrastructure, a role that involves establishing boundaries between competition and regulation in infrastructure and providing effective regulation where competition is not possible. Section 5 contains a summary and some conclusions.

2. Challenges in restructuring infrastructure

This section characterises the restructuring challenges in telecommunications, energy and transport in the transition economies. It compares measures of both the level of service provision and the level and structure of tariffs to appropriate benchmarks from market economies. The section also examines environmental and safety issues.

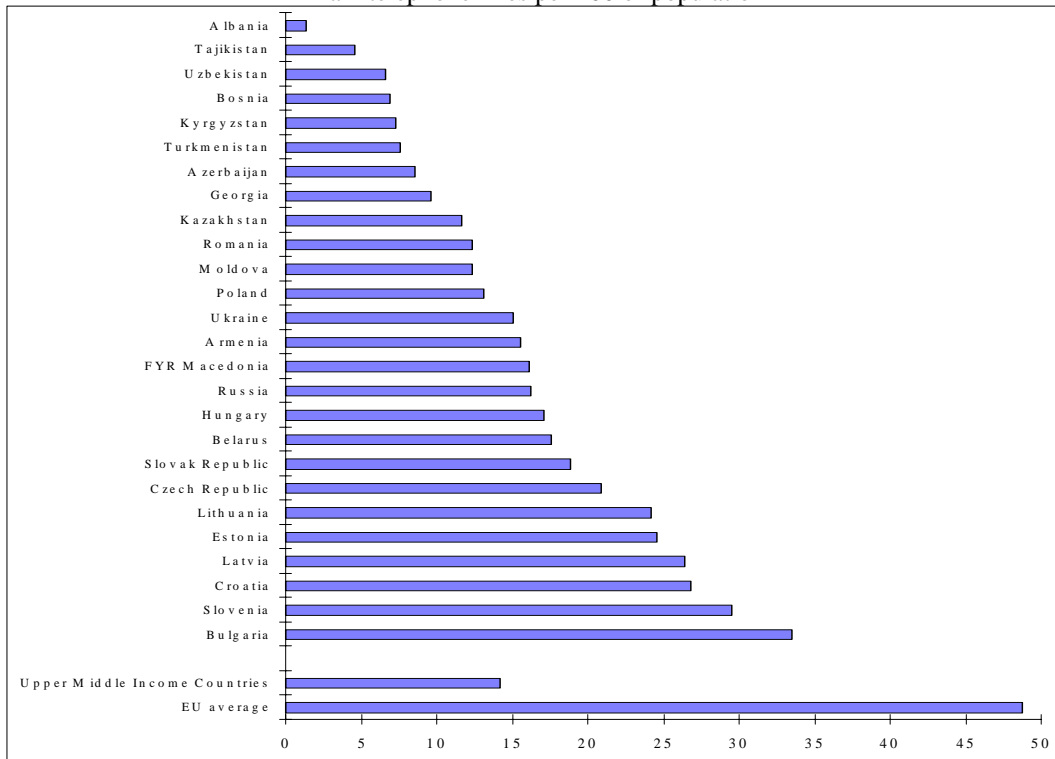
2.1 Telecommunications

Supply networks. With a bias towards material production and a neglect of services, central planning placed a low priority on provision of public telecommunications services.¹ Hierarchical network structures reflected concerns for security and bureaucratic control of the economy, with relatively limited access to telecommunications by both enterprises and households. Much of the technology was antiquated (analogue rather than digital) and unreliable.

The size of a country's telephone network is typically measured by the number of telephone lines relative to the size of the population, the so-called network penetration rate. Figure 1 shows that the network penetration rates in transition economies are on average similar to

those in upper middle-income developing countries with comparable per capita income levels. However, the rates are only between one-quarter and one-half of those in the European Union. The low penetration levels persist despite a belated effort under central planning to place a higher priority on telecommunications services as awareness of their importance to enterprise productivity increased.

Figure 1
Telecommunications network penetration rates, 1994
Main telephone lines per 100 of population



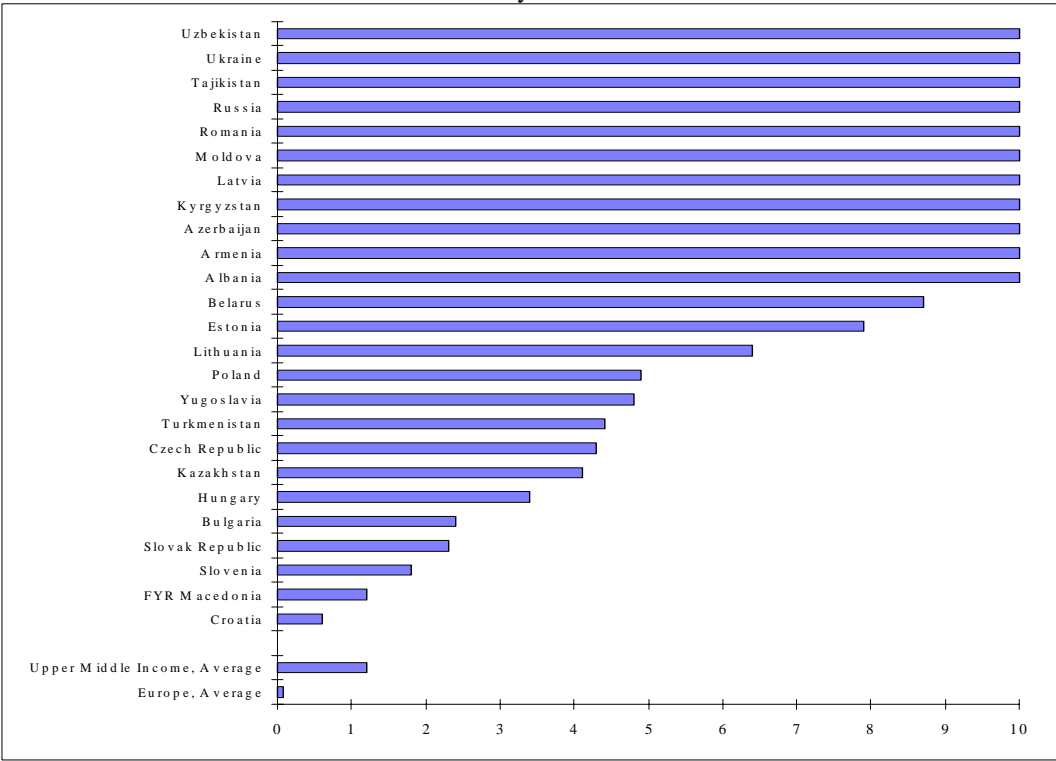
Source: International Telecommunications Union.

In terms of quality, inherited telephone networks are burdened with a high percentage of outmoded equipment and high fault rates. The information on faults per number of main lines, a standard measure of service quality, is incomplete for the region. For those countries where data are available, the average is 45 faults per 100 main lines in 1994, compared with an average rate of 34 for upper-income developing countries and 13 for those in the EU. The recorded fault rates in the region, however, range widely, from 10 (Latvia) to 95 (Romania).

Unmet demands. While some countries have invested significantly in network expansion in recent years, particularly those taking a commercial approach to the sector, there are long waiting lists for services in much of the region. There is also a definite willingness to pay for services, particularly by business users, despite tariff structures being designed to cross-subsidise household users from the income from business users.

Official waiting lists show that between 1 and 8 per cent of the population of transition countries are on a waiting list for network access, but the demand for telephone connections is in all likelihood considerably higher. The average expected waiting time for services is three years, compared with an average of one year in upper middle-income developing countries and less than one month in the EU (see Figure 2). With such long waiting times in transition economies, there may well be a significant number of discouraged potential subscribers who have not yet joined the queue for services.

Figure 2
Average waiting times for connection to telecommunications services, 1994
In years



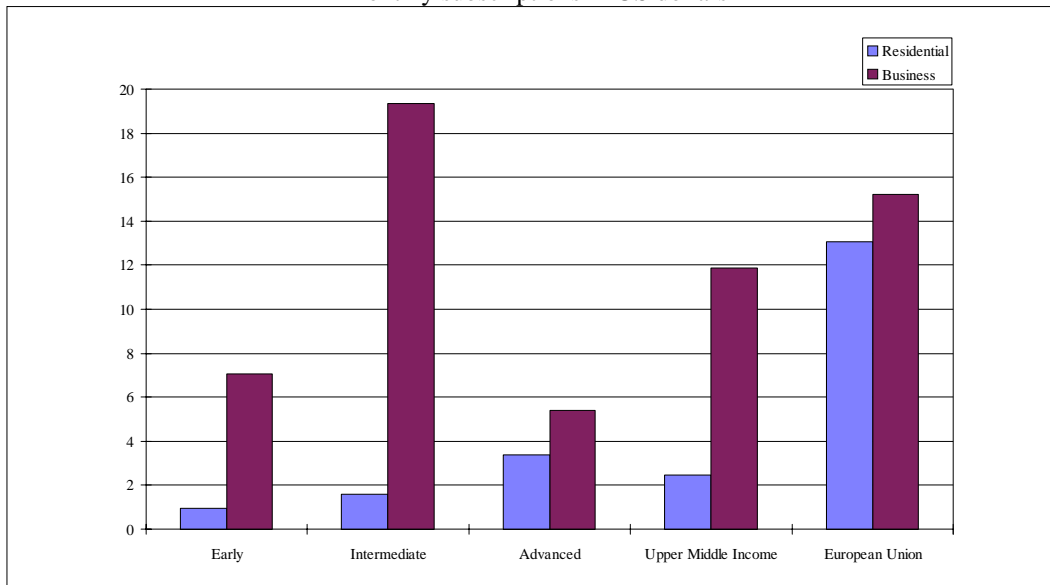
Source: International Telecommunications Union.

Development of cellular networks in transition economies provides one example of customers' willingness to pay for quick access to reliable services. This willingness is particularly true of business and high-income households. In some countries, the cellular network penetration rates have reached west European levels, despite the fact that charges for cellular services are substantially above those for fixed services and those for cellular services in the EU. Surveys of business users in the region confirm this willingness to pay for quick access to reliable services.²

Tariffs. The tariff structure under central planning consisted of subsidised but limited services for households (local calls were largely un-metered and free) while high charges were levied on enterprises for long-distance and international services. However, this tariff structure does not reflect the cost of services, for which the distance of a telephone call is not the dominant factor. The major component of service cost is connection to the network itself.

While detailed data on long-distance and international tariffs are not available, average monthly subscription charges for households and businesses provide some indication of tariff levels and structures. Figure 3 shows average monthly subscription charges for both household and business consumers for countries in the region grouped by their stages of transition.³ A comparison across these stages reveals how tariff levels and structures have evolved during the transition. As a rule, those countries at more advanced stages of transition have adjusted tariff structures to allow for more balanced charges between households and businesses and have raised the overall level of tariffs. An exception is the very high tariffs levied on business users in countries at intermediate stages of transition. Nevertheless, tariff levels in countries at advanced stages of transition remain below the average for household and business users in both upper middle-income developing countries and those in the EU.

Figure 3
Average telecommunications tariffs by countries' stages of transition, 1994
Monthly subscriptions in US dollars



Source: International Telecommunications Union. EBRD Transition Report (1996)

1 Average of countries for which data are available.

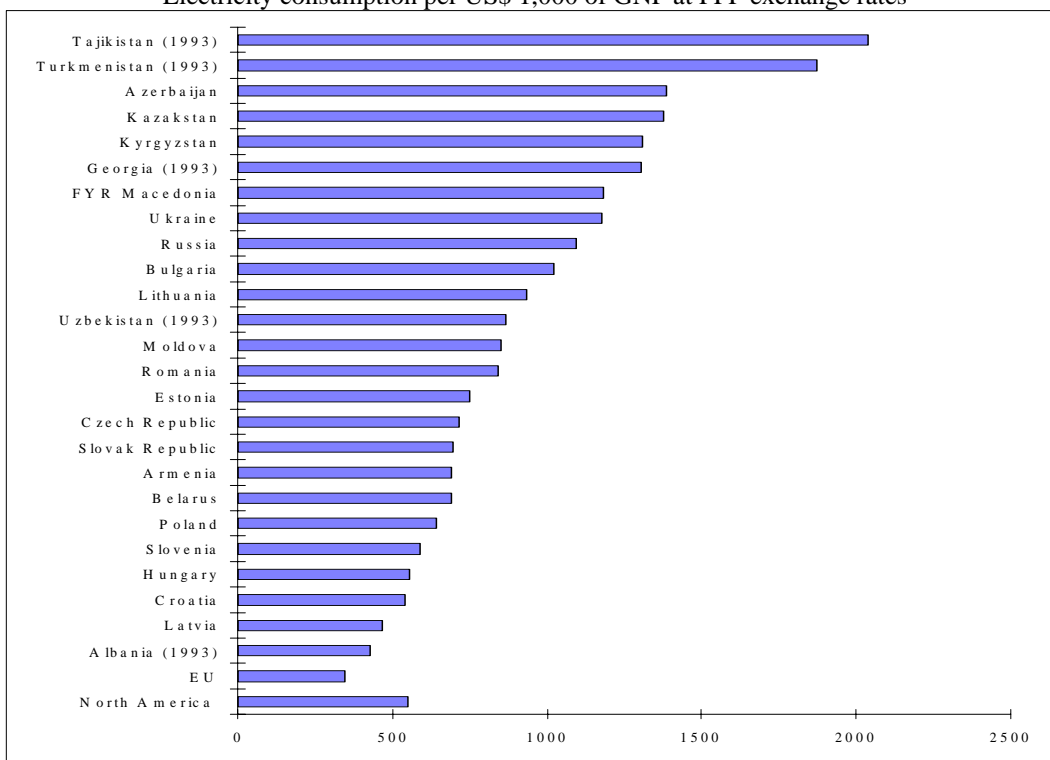
2.2 Electric power

Generation and supply networks. The installed generation capacities in the countries of eastern Europe, the Baltics and the CIS were designed to meet electric energy requirements prior to the

transition. Since demand has declined in most transition economies since 1989, the installed capacity now exceeds present requirements in the region as a whole and in most individual countries. However, many thermal plants in transition economies are comparatively old and often not well maintained. In addition, the coal and lignite used in these plants are often below the quality for which the boilers of existing power plants were designed. As a result, the effective capacity of power plants is often below their design levels.

In 1994 the electricity intensity of output, as measured by the consumption of electric energy per unit of GNP at purchasing-power-parity (PPP) exchange rates, was twice as high in eastern Europe and the Baltics as in the EU (see Figure 4). The electricity intensity in the CIS was even greater, exceeding that in northern America by a factor of two.⁴ The electricity intensity in northern America is about 50 per cent greater than that in the EU, reflecting differences in costs of primary energy (including transport costs) and in energy taxation.

Figure 4
Electricity intensity of output, 1994
Electricity consumption per US\$ 1,000 of GNP at PPP exchange rates



Sources: International Energy Agency and World Bank.

In the EU, industry typically accounts for between one-third and one-half of total electricity demand, with households and small-scale commercial users each accounting for about half of the remainder. In transition economies, particularly in the CIS, industry's share of electricity consumption was typically higher at the beginning of transition. In 1990, for instance, industry

accounted for 60 per cent of electric energy demand in Russia⁵ and 65 per cent of the demand in Ukraine,⁶ reflecting the priority attached to abundant supply of power for material production. Much of the high energy intensity of the transition economies can be attributed, therefore, to industry. However, variations in electricity intensity among the transition economies are significant. These differences reflect in part endowments of primary energy resources and in installed capacity for nuclear power generation.

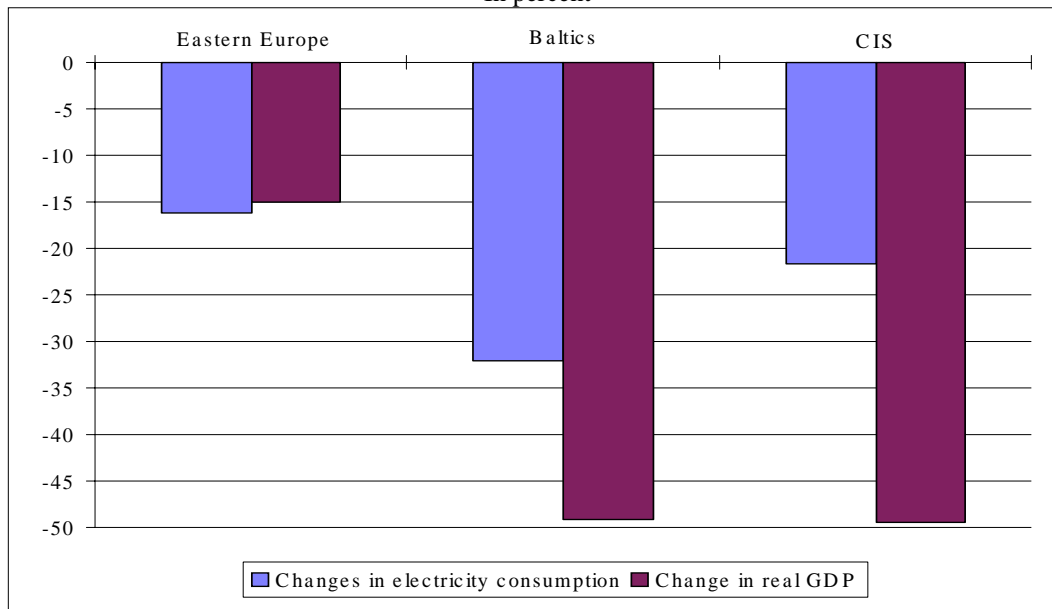
While central planning encouraged wasteful consumption of electricity, the electric power systems in the region are also inefficient in the sense that they use larger amounts of primary energy per kilowatt hours (kWh) of electric energy output than do the power supply systems in industrialised market economies. The overall thermal efficiency of coal- or lignite-fired power stations in the transition economies is usually below 30 per cent and in many cases only in the 20 to 25 per cent range. This compares with thermal efficiencies of about 35 per cent for modern coal-fired plants in the EU and up to 50 per cent for gas-fired combined cycle plants. Furthermore, technical transmission and distribution losses in power supply systems of transition economies are often in the order of 10 per cent of net generation and sometimes as high as 15-20 per cent, whereas in western Europe they are usually between 4 and 9 per cent.

Changing demands. Since 1989, electricity consumption has fallen by over 30 per cent in the Baltics, and by 22 per cent and 16 per cent in the CIS and eastern Europe respectively (see figure 5). The fall in energy consumption matches the decline in real GDP in eastern Europe. However, in the Baltics and CIS, recorded GDP has fallen by much more than electricity consumption. This may reflect in part the difficulties of measuring output in the former Soviet Union where statistical coverage of the new private sector is often weak.

While industrial consumption of electric energy has declined substantially in the region, households in transition economies consumed more electric energy in 1994 than in 1989, despite the fall in disposable incomes over the period. The reasons for the increase in residential electricity consumption include the improved access of households to electrical appliances and in some cases a switch from coal and oil to electricity for heating – for example, in cases where primary energy prices have increased relative to effective electricity tariffs.

Tariffs. Electricity tariffs should be set at a level which aims to ensure the financial viability of power utilities and to encourage efficient use. In most advanced industrialised countries, power utilities are typically financially profitable, although questions are raised as to whether electricity tariffs fully reflect costs, including those associated with pollution and decommissioning of nuclear power plants. In the EU, electricity tariffs average 7 US cents per kWh for large industrial users and 15 US cents per kWh for households. These tariff rates include indirect taxes. The comparable tariffs in northern America are 4 US cents per kWh and 7 US cents per kWh respectively.

Figure 5
Change in electricity consumption, 1989-94
In percent



Source: International Agency and EBRD

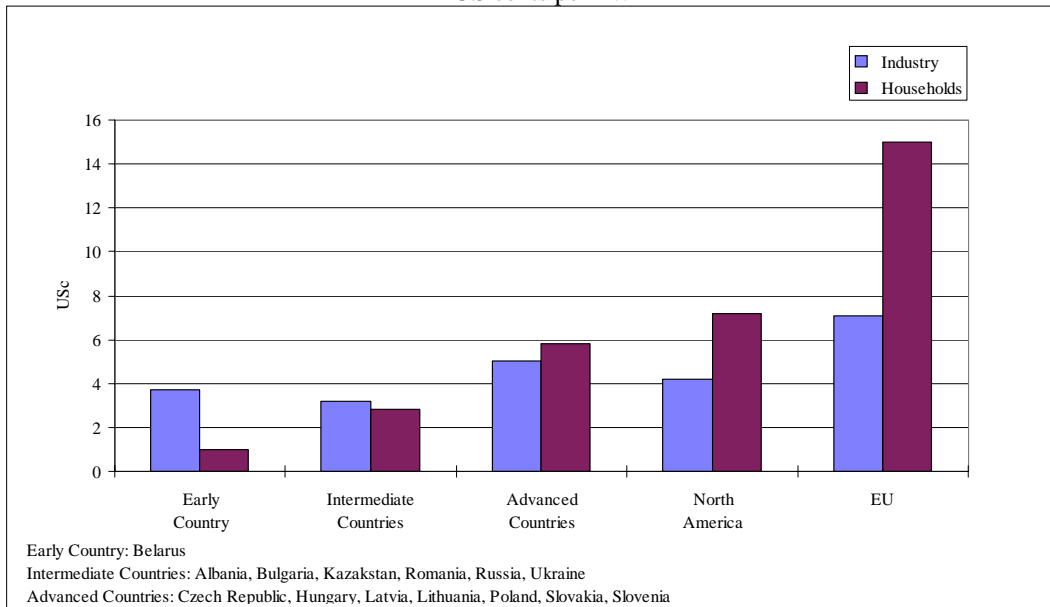
In the transition economies, the level and structure of electricity tariffs tends to vary with progress in transition. Those countries at early and intermediate stages of transition (primarily CIS countries) still have tariff structures which are inverted, in the sense that charges to industrial users are above those for households. In addition, their tariff levels are low in relation to both those in the EU and the United States (see Figure 6). Those countries at advanced stages of transition (primarily in eastern Europe and the Baltics) have begun to re-balance their tariff structures between households and enterprises and to raise their levels.

Not all electricity consumption in the region, however, is actually billed and paid for on time. Moreover, non-cash payments in the form of barter transactions or give-and-take fuel contracts account in some countries for a large proportion of billed electricity resulting in low levels of cash receipts. "Non-technical" losses, largely theft by way of illegal connections and corruption of meter readers, are common in several countries. Some utilities have difficulty issuing bills on time for metered consumption, and often customers are unwilling or unable to pay for their consumption once bills are received. Mechanisms for enforcing payments are also weak, with an unwillingness to disconnect users for non-payment. As a result, arrears to power utilities account for a significant share of total payment arrears in many transition economies. The discrepancy between effective electricity tariffs in the region and those in industrialised market economies is, therefore, likely to be even greater than is indicated in the above chart.

As a result of low effective tariffs, the demand for electric energy is higher in transition economies than it would be if tariffs reflected costs.⁷ Not only is this situation inconsistent

with the goal of improving demand-side efficiency, the low tariff levels are also an obstacle to mobilising private finance for electricity investments (see section 3). While increased tariffs and improved collection would initially represent additional expenditure for enterprises and households, these steps would make measures aimed at energy efficiency more attractive, easing the longer-term impact on real incomes.

Figure 6
Electricity tariffs by countries' stages of transition, 1994
In US cents per kWh



Sources: International Energy Agency.

1 Average of countries for which data are available.

With low and inverted tariffs and weak collection efforts, reflecting in part past use of electricity as a mechanism for distributing benefits and resources under central planning, it is important to recognise that untargeted subsidisation of electricity can be a regressive measure. This adverse effect arises to the extent that higher-income households consume more electricity than do lower-income households, not only on a per capita basis but also as a proportion of income.⁸ A more progressive measure would be the provision of a basic or life-line service for households at subsidised tariffs rates to help ease the impact of cost-reflective tariffs on those who are unable to afford them. One way to fund such a subsidy would be to charge progressively higher tariffs for those who consume greater amounts of electricity.

Environment. At the start of transition, the power sector contributed substantially to the poor air quality in a number of countries in the region. In 1990, sulphur dioxide emissions from power plants exceeded EU levels on a per capita basis by a factor of nine in Bulgaria, seven in Estonia and six in the area of what is now the Czech Republic (see Table 1). In these three countries local coal, or oil shale in the case of Estonia, is the primary energy source for power

generation, and power generation accounts for the bulk of total sulphur dioxide emissions from all sources.

It is difficult to assess the change in air quality in the transition due to a lack of consistent emission data, particularly of sulphur dioxide, since 1990. Indications are, however, that any improvements to date are limited primarily to the effects of reduced thermal power generation. Strict environmental standards have so far tended to be enforced only for new power plant investments. However, where stricter environmental legislation applies also to existing plants, it is likely to be the driving force behind major power sector investments over the coming years, as for example in the Czech Republic and Poland.

Table 1
Emissions of sulphur dioxide in selected countries, 1990

	SO ₂ from power plants		Power plants as per cent of total SO ₂ emissions
	1,000 tonnes	kg/capita	
Bulgaria	1,453	173	72
Czech Rep.	1,163	113	62
Estonia	217	141	79
Hungary	430	42	48
Lithuania	105	28	47
Poland	1,589	41	49
Romania	903	40	69
Slovak Rep.	243	46	45
Ukraine ¹	1,690	33	65
European Union	8,600	23	50

Sources: EU Commission and International Energy Agency (1996). EBRD Transition Report (1996)

¹ Includes emissions from fuel refining and processing.

2.3 Transportation

Road and rail networks. Transport networks in the region tend to have relatively well-developed railways, but only limited road systems. The intensive use of railways under central planning reflected the emphasis on primary and heavy industries, which created transport requirements for bulk commodities. Moreover, industrial production and location decisions gave inadequate weight to transport costs, establishing overly centralised and vertically integrated production facilities and thereby generating an artificially high transport requirement. The capacity and cost advantages of railways over long distances and for bulk cargoes meant that this transport mode was well suited to the freight requirements of central planning. In most countries in the region, railways also provided a high share of passenger transport, not only for long-distance traffic but also for commuter and regional travel. Alternatives were in short supply. Low car ownership, limited bus services and poor roads all added to rail use.

The densities of transport networks are typically measured in relation to a country's population or to its land area. Figure 7 provides the densities of railways and roads in the region in relation to population. Two broad features stand out. First, the rail densities are high compared with those in the EU and United States. For example, the Russian rail network density in relation to population is about 50 per cent greater than that in the United States; although, if the densities were calculated in relation to land area, they would be broadly similar. Many countries in eastern Europe and the Baltics also have relatively high rail densities, and their land sizes are roughly comparable to those in the EU. Second, the road densities in relation to population of most countries in the region are substantially less than those in the EU and the United States.

The quality of the transport networks reflects a number of factors, including their initial design. For example, in the Baltics the major trunk roads run east to west rather than north to south. The trunk roads in the former Soviet Union were also designed for lower vehicle weights than in the EU, although this is consistent with the traffic tasks which they had to perform in the past. With respect to railways, design standards are less exacting than those in the EU. However, most rail lines have adequate speeds and are of a sufficient standard for the majority of rail freight services currently provided. Partly as a result of the greater use of rail for bulk freight, passenger speeds are generally lower than on main lines in the EU, offering less competition to emerging road coach and medium-distance airline services.

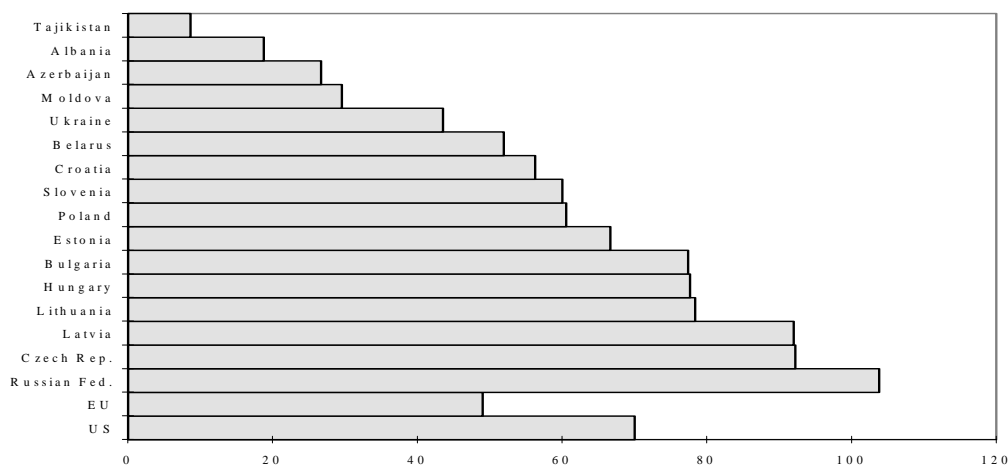
Another important dimension to the quality of infrastructure is maintenance and renewal. Here, piecemeal evidence points to considerable neglect. In Russia, the extent of rail track subject to speed restrictions, for example, has doubled since 1988 to stand at 20 per cent of the network,⁹ while about 25 per cent of tracks in eastern Europe are estimated to be in unsatisfactory technical condition.¹⁰ The latter often serve as major trunk routes for new trading patterns. However, many secondary and branch rail lines with low traffic were probably maintained to excessively high economic standards in the past. With respect to trunk roads, an estimated 38 per cent of the system in Russia requires upgrading or reconstruction, and an additional 25 per cent is in need of resurfacing.¹¹

Changing demands. High volumes of freight transport in relation to output characterise transport activities inherited from central planning, with the sector being heavily dominated by rail. In 1988 freight intensity of output in the former Soviet Union (measured in terms of tonne-kilometres of domestic freight per dollar of GDP at purchasing power parity exchange rates) was nearly five times that in the United States.¹² Freight intensity in east European countries were similar to those in the United States, but well above those in the EU. The freight intensity of EU output is about one-third of that in the United States.

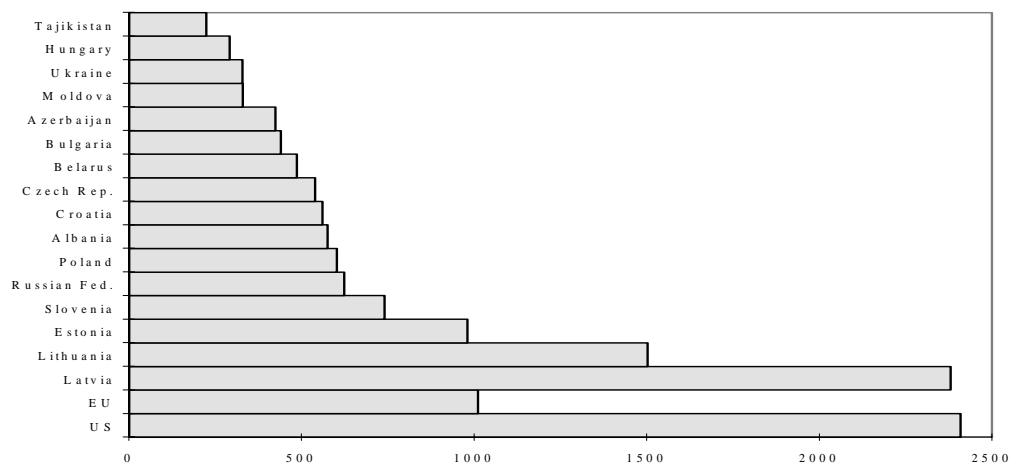
In the transition the demand for transport services has changed dramatically. There has been a sharp reduction in overall freight volumes, especially on the railways. Between 1989 and 1994 rail freight volumes declined about 50 per cent in eastern Europe, the Baltics and the CIS (see Figure 8). This decline is greater than the fall in real output in these economies, particularly in eastern Europe, pointing to a reduction in the freight intensity of output. However, the trends

in road haulage in the region are more diverse. In eastern Europe road haulage fell by 5 per cent from 1989 to 1994, indicating that the proportion of freight carried by road transport has increased. However, in the Baltics road haulage has declined by more than rail. Only very limited data on road haulage in the CIS are available, and these figures point to substantial declines in the initial years of transition.¹³

Figure 7
Rail network densities 1993
Kilometres of rails per 100,000 of population

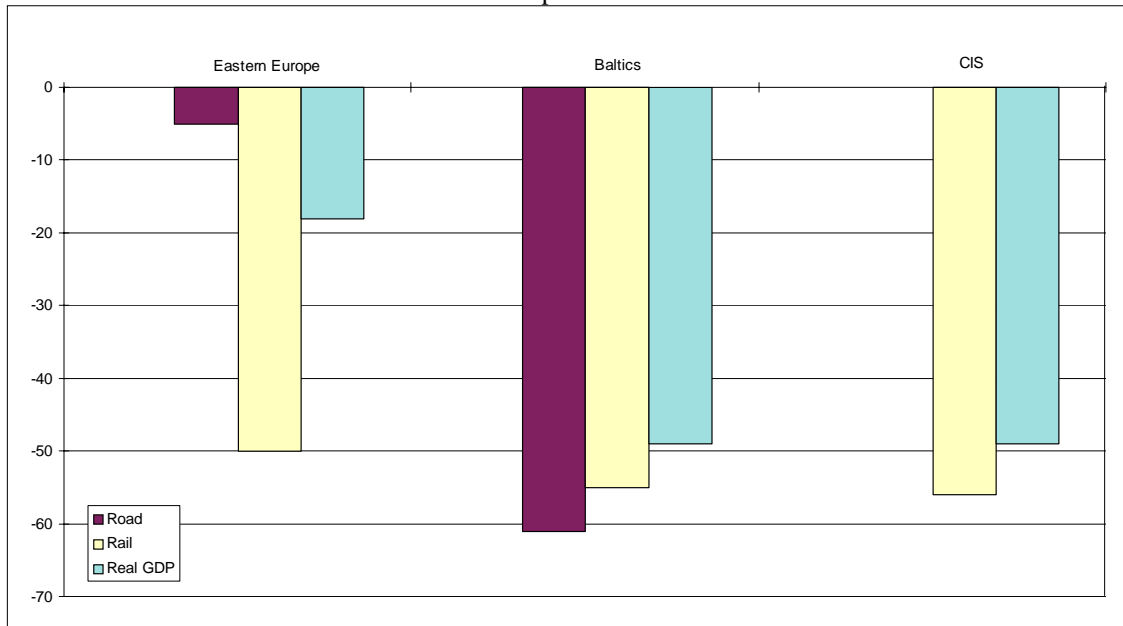


Road network densities, 1993
Kilometres of roads per 100,000 of population



Source: International Road Transport Union (1996).

Figure 8
Change in freight transport: 1989 vs. 1994
In per cent



Sources: World Bank Railway Database, ECMT (1996a) and EBRD.

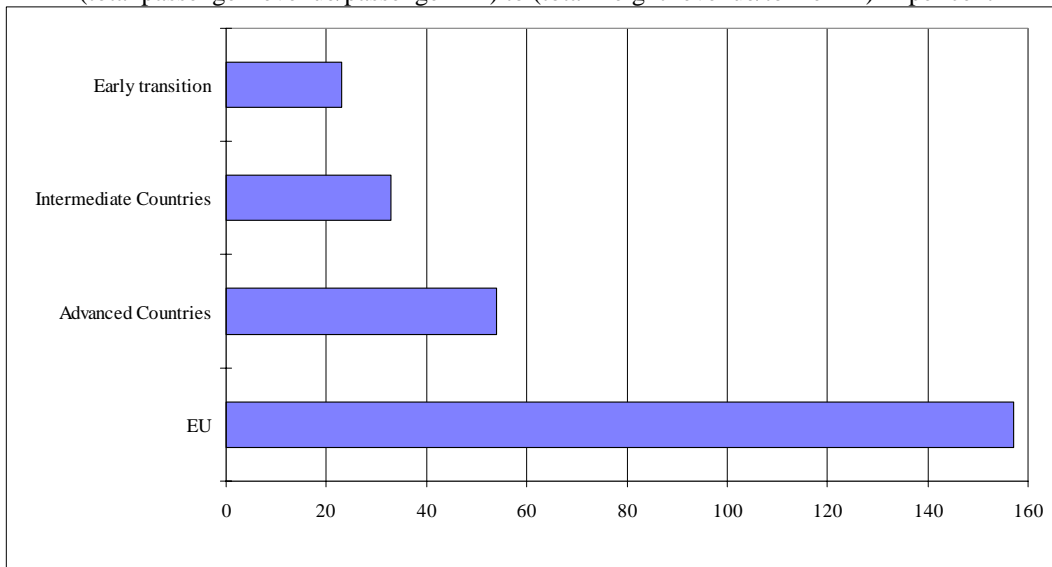
Even if railways successfully restructure, road transport can be expected to carry an increasing share of total freight traffic for three main reasons. First, the shift in composition of output away from lower-value bulk commodities towards higher valued products and the location of new production facilities which takes account of transport costs will lead to a fall in the transport intensity of output. Second, with the shift towards higher-value products, road will become more competitive for freight transport in terms of cost and service compared with rail. Third, the road haulage sector will be operating in the private sector and will tend to be more responsive to customer demands. This outlook presents an infrastructure challenge both for road infrastructure providers and competing rail networks.

Changes in the scale and nature of demand for passenger travel also drive infrastructure needs. There has been a sharp increase in automobile registrations in the region, albeit from low levels. Personal mobility, measured by annual kilometres travelled per capita, was significantly lower in the centrally planned economies than in the EU. In eastern Europe and the Baltics the number of registered vehicles is now between 20 and 30 per cent above its pre-transition levels. Limited data from the CIS point to increases in registered vehicles ranging from 15 to 30 per cent.¹⁴ As living standards increase, it can be expected that car ownership will increase sharply. In urban areas in particular this will create environmental pressures and tend to have a damaging effect on surface-based public transport unless policies are pursued to protect it.

Cost-reflective tariffs and prices. Historically, most railway systems in the region had higher rates of operating cost recovery than their counterpart public railways in the EU, mainly due to the much higher freight traffic intensities arising out of centrally planned production. Despite recent traffic reductions, rail freight still returns a margin above operating costs in many countries in the region, but there is increasing difficulty in earning sufficient revenue to fund renewal of infrastructure. This shortfall is partly due to higher costs, but also to governments requiring, or encouraging, freight services to support passenger services in an effort to cushion the impact of falling household incomes while not impacting on the government budget. The result is a significantly inverted structure of railway tariffs.

In the EU, passengers' fares are about 55 per cent higher than freight rates. In the advanced transition economies, this tariff structure is inverted, with passengers' fares about 55 per cent below those for freight in 1993.¹⁵ The inversion in tariffs is even greater for those countries at intermediate and early stages of transition (see Figure 9). These cross-subsidies threaten to overprice freight and prompt its shift to road transport, thereby reducing the resources needed for railway renewal and improvement. An alternative approach can be found in EU transportation policies, which prescribe that loss-making services should be operated under contractual arrangements, including financial compensation from the relevant authorities (municipalities for urban services, regional governments for rural services, and central governments for intercity services).

Figure 9
Ratio of average passenger fares to average freight rates,
by countries' stages of transition, 1993
(total passenger revenue/passenger km) to (total freight revenue/tonne-km) in per cent



Source: World Bank Railway Database.

1 Averages for countries for which data are available.

Safety and the environment. While there are safety challenges for all modes of transport in the region, the largest existing and potential problem, in terms of people at risk, relates to road use. The number of annual deaths in the transition economies due to traffic-related accidents compares unfavourably with that in the EU. In eastern Europe the number of deaths relative to the number of registered vehicles exceeded that in the EU by a factor of three in 1994.¹⁶ A similar difference exists for the number of traffic-related deaths in relation to distances travelled. Fatality rates on Russian roads are between four and five times higher than those in western Europe and the United States.¹⁷ With the increased registration of passenger cars and the projected expansion in road haulage, there is a need to improve safety in the design of both vehicles and roads as well as improve drivers' awareness of road safety.

The rapid growth in the size and use of vehicles, the average age of vehicles, and the vehicle technology in use have focused attention on the environmental impact from road transport. Air pollution from motor vehicles is now a growing concern in some cities, such as Warsaw, Budapest and Prague. Authorities in a number of east European countries have set emission standards for new vehicles that comply with EU standards, but the main problem remains control of emissions from vehicles already in use, which form the majority of vehicle ownership. Engine retrofitting and the development of well-targeted vehicle inspection and maintenance programmes are cost-effective ways to address this problem.

2.4 Summary

The evidence presented in this section shows that infrastructure capacities in transition economies diverge widely from market demands and concern for the environment and safety. As a result, infrastructure must be substantially restructured, requiring new investment, more effective management and greater efficiency. Tariff levels and structures also continue to be heavily influenced by the use of infrastructure as way of distributing income and resources under central planning, which encourages inefficient use of services, distorts investment decisions throughout the economies and impairs the financial viability of infrastructure enterprises.

3. Tariff Reform and Restructuring through Commercial infrastructure

The public provision of infrastructure services has been widespread in all economies. This approach is commonly followed because of the natural monopoly aspects associated with infrastructure and because unregulated private provision can lead to monopoly pricing or failure to benefit from economies of scale. In addition, infrastructure services are often regarded as strategic in that they are essential to a well functioning economy, and they can have significant impacts on the environment. Thus, governments have recognised a responsibility for infrastructure and, in many cases, it was assumed that this responsibility implied public ownership and provision.

It is increasingly recognised, however, that these considerations do not automatically imply that public ownership and provision are the right answer. There is a great deal that can be done through private participation in infrastructure, particularly where there is scope for competition among, or effective regulation of, service providers. Where private participation is not considered possible, governments are taking an increasingly commercial approach to publicly provided services. Here, commercial infrastructure refers to both private participation in infrastructure (new entry and privatisation) and the commercialisation of state-owned utilities.

Commercial infrastructure can help overcome the legacies from central planning in infrastructure in at least two ways. The first is to provide some insulation from arbitrary political influence. The sheltering of infrastructure from excessive political intervention can be instrumental in achieving and sustaining tariffs which reflect the costs of production and the fiscal constraints of governments. Such tariffs also help to unlock access to private finance for needed infrastructure investments, as many governments have sharply cut back public investment due to the fiscal strains associated with transition. The second is to promote restructuring by selecting the most capable service providers and strengthening their incentives. The selection of managers for infrastructure enterprises under central planning was influenced not only by the distorted priorities of the old system, but also by the way in which bureaucracies operate.

3.1 Political influence, tariff reform and access to finance

Evidence of the distorted tariff levels and structures and of ineffective tariff collection presented in the preceding section reveals an important aspect of an uncommercial approach to infrastructure in the region. It is not easy for governments to overturn the legacy of using infrastructure distributing benefits to households and allocating resources to enterprises. A new approach involves upsetting customers with higher tariffs and more determined collection.

Initial steps towards mitigating political pressures can involve the commercialisation of infrastructure enterprises. Commercialisation refers to reforms in the oversight of, and incentives within, state-owned enterprises. These changes include legal incorporation and exposure of state enterprises to commercial laws and bankruptcy; selection of an agent with clear responsibility and accountability for representing the state as owner; transparent procedures for selecting enterprise managers; and managerial incentive and performance measures. However, even with such reforms, the government still retains considerable discretionary control over the state-owned infrastructure enterprises.

A further instrument for reducing political pressures is to introduce private participation, thereby adding a clear and consistent voice for cost recovery and efficiency in tariffs.¹⁸ Moreover, even though government may retain a regulatory role in setting infrastructure tariffs, a private service provider would be relatively insulated from political influence compared to a state enterprise. This insulation arises from the fact that in order to attract private investment in infrastructure assets, governments must first put in place institutions to protect private rights, including credible regulation (see section 4 below). Private ownership

then serves to insulate the infrastructure enterprises from political influence beyond the contractual terms of the regulations. It is the respect of private property and contracts that serves to insulate private, albeit publicly regulated, infrastructure enterprises from arbitrary political influence.

A more commercial approach to infrastructure, founded upon the principles of tariff levels and structures which reflect the costs of production and the fiscal constraints of governments and of financial autonomy for infrastructure enterprises, can also help to unlock access to new sources investment finance. Infrastructure enterprises which are financially viable can often attract private finance. Recent innovations in international capital markets have helped to foster the recent world-wide expansion in the private financing of infrastructure, particularly the rapid development since the late 1980s of project finance. Expanding access to private finance is particularly important in the transition economies because of the severe fiscal strains associated with the transition.

When faced with extreme fiscal pressures, governments often defer capital expenditures, and those in transition economies have proved no exception. However, some caution is required in interpreting trends in government capital expenditures. Under central planning, the government budget provided much of the funding for investment in both infrastructure and in fixed assets by enterprises. Nevertheless, even allowing the inevitable shift of some investment spending away from government to enterprises, public investment in the region continue to fall even in the most recent years and is at quite low levels. In most countries in the region, public investment in 1995 amounted to less than 3 per cent of GDP.

3.2 Commercialisation, private participation and restructuring

Government policies typically used to promote enterprise restructuring in the transition economies include: the strengthening of objectives and incentives within enterprises; the introduction market selection of producers through privatisation and market entry and exit; and the intensification of product market competition to reduce organisational slack. With respect to infrastructure enterprises, their commercialisation aims primarily at introducing market-oriented performance goals and strong incentive structures and, in some cases, market selection of managers. Private participation infrastructure, either through selective new entry into market niches or through privatisation of dominant services providers, tends to introduce a stronger mechanism for market selection. Competition in the provision of infrastructure services is closely bound up with the issues of effective regulation, and this is the focus of section 4.

Commercialisation. Governments in many transition economies have used a number of instruments to promote commercial qualities in their infrastructure enterprises, and these measures have been extensively surveyed in a recent study.¹⁹ The most fundamental step is corporatisation, the legal separation of public utilities from government through incorporation. This change serves to establish clear boundaries between a public utility and government, thereby separating ownership from management of the enterprises. In transition economies

these two roles were often blurred under the structures inherited from the old regime, preventing the establishment of clear responsibilities and systems for accountability for both managers and those within government who performed an ownership role. Corporatisation can also involve subjecting state enterprises to the disciplines of commercial law and bankruptcy, although this is not always the case in transition economies.

With separation of ownership from management in state enterprises, governments must select an agent to represent it as the owner of these enterprises. This responsibility can reside with particular government ministries, or a separate agency can be established to perform the task. In transition economies, leaving the ownership role with the branch ministries that formerly operated infrastructure enterprises runs the risk of leaving unchanged long-established relationships between ministries and the state enterprises which they formerly operated. Several transition economies – including Hungary, Poland and Russia – have established a separate government agency or ministry to represent the state as the owner of enterprises. However, branch ministries in the transition economies have often maintained considerable influence over the state enterprises that they formerly operated.

Improving the management of infrastructure enterprises typically requires selection of capable managers and introduction of managerial incentive contracts based on performance measures. Under central planning, the selection of enterprise managers was neither competitive nor transparent, and a number of governments in the region have recently begun to adopt more open procedures. However, incumbent managers in some cases have been able to use their inside knowledge and personal connections to maintain their positions. Where selection of managers is made on the basis of fair competition, available evidence suggests that significant gains in performance can be realised.²⁰ Until recently, performance evaluation and incentives were largely absent in transition economies. Their effective implementation requires the development of quantitative and qualitative measures of managerial performance and setting of targets that are sufficiently demanding. There is not yet a sufficient track record to gauge their effectiveness in the region.

Available evidence from developing countries on performance-related contracts for public-sector managers, however, reveals that they are often ineffective. A comprehensive survey of government enterprises in developing countries found that implementation of reforms based on performance contracts with public-sector managers had little impact on enterprise performance, including profitability, labour productivity and total factor productivity.²¹ Factors behind these disappointing results are the inability of governments to overcome the information advantage of inside managers in negotiating performance contracts, the weakness of rewards and the absence of penalties for poor performance, and the frequent breach of contract terms by governments, including the regulation of infrastructure tariffs according to fair and consistent rules. This latter finding is particularly significant for infrastructure in transition economies, where attainment of socially efficient tariff structures is a priority.

Selective private entry. Selective private entry into infrastructure can take the form either of new operators serving market niches where competitive provision is possible or of concessions

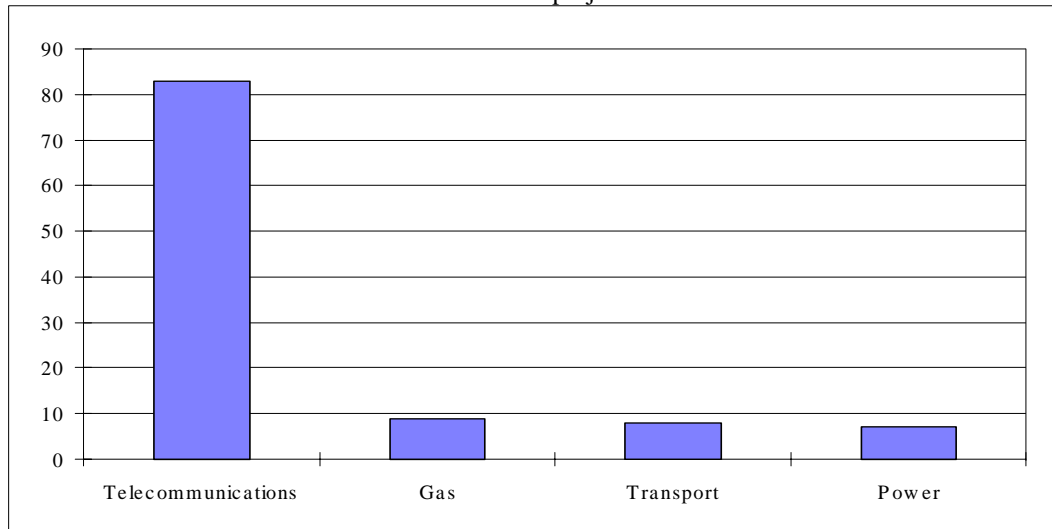
to operate public infrastructure assets. The latter approach allows for competition for the right to serve a market where competition in that market is not possible. There are several advantages to expanding private participation in infrastructure in these ways. While these approaches usually require supportive measures to reduce the scope of public utility monopolies, they typically do not require the creation of regulatory institutions or the break-up of dominant utilities; yet they allow for increased competition. The regulatory conditions that are required are usually written into the licence agreements or concession contracts. The use of contracts and the courts, at least as a transitory arrangement, allows for more rapid implementation compared with comprehensive regulatory reform.

Scope for competition in the market is created by limiting the extent of the monopoly granted to integrated utilities to those parts that are truly natural monopolies and by allowing competition elsewhere (common examples of the latter are cellular telephony and independent power generation). While those services that are provided competitively do not necessarily require price regulation, they are usually delivered to consumers through existing infrastructure networks; and determining the terms and conditions for accessing these networks can be a difficult issue to resolve. Two basic requirements are that competing service providers have access to the networks on equivalent terms and that consumers are free to choose among competitors.

Competition for the market is created through bidding for concessions to operate infrastructure assets for a fixed period. This bidding can help to reveal information about the potential efficiency of alternative private contractors and operators. However, this approach to competition can encounter at least three types of problems. First, the terms of concession are limited to those events that can be reasonably foreseen, and unexpected circumstances can lead to the renegotiation of the concession. Second, the private concession holder may not have an incentive to maintain infrastructure assets, particularly near the end of the concession period. Third, some types of concessions (e.g., operating concessions or leases) do not obligate the concession holder to make investments, thereby limiting some of the benefits from private participation.

In transition economies, selective private entry into infrastructure has been most prevalent in the telecommunications sector (see Figure 10). These projects have focused on cellular telephony, specialised networks for data transmission and other business services, and, to a lesser extent, long-distance and international services. These infrastructure services are relatively scarce short supply and their production technology allows competitive provision. In power there are relatively fewer projects involving selective private entry, in part because existing capacity in many of the countries was already large. In the transport sector, there are have small number of airport and port projects.

Figure 10
 Selective private entry in infrastructure sectors
 Number of projects¹



Sources: EBRD and World Bank Private Infrastructure Database

1 Projects with awarded contracts or in operation.

Privatisation. Privatisation of infrastructure enterprises can extend the benefits from private participation beyond selective areas of infrastructure to include much of the sector. However, successful privatisation can require two types of institutional change, which may take considerable time to implement. First, infrastructure enterprises themselves may require restructuring to create scope for competition or to enhance their commercial viability. Second, where monopolies are being privatised, effective regulatory institutions must be developed. Private investors must be assured that the approach to setting infrastructure tariffs is transparent and that the institutions responsible for regulation are robust enough to balance fairly the inevitable pressures from governments, consumers and producers.

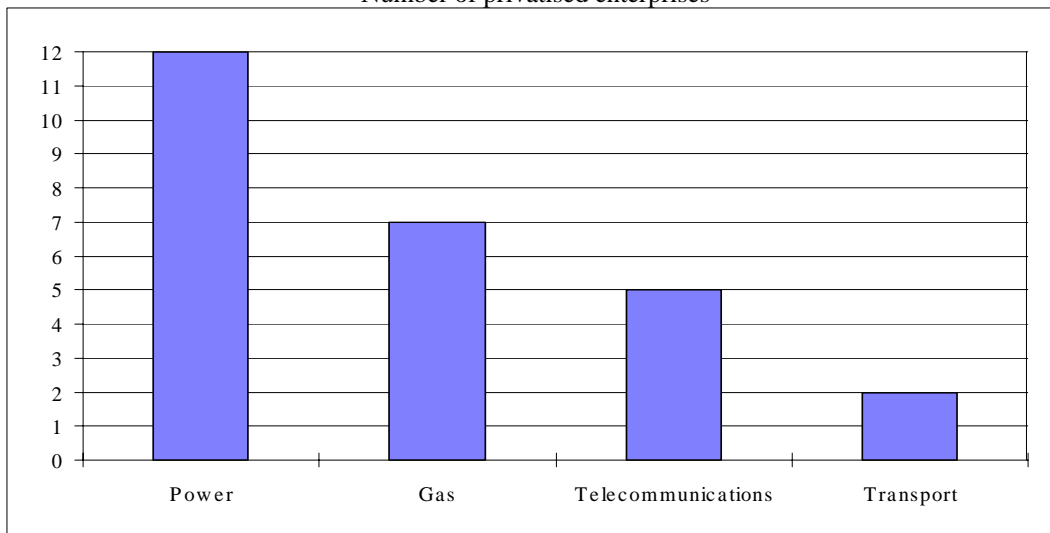
Some attempts to sell dominant infrastructure enterprises in Hungary and Russia to strategic investors have failed in part because investors lacked confidence in nascent regulatory arrangements. In Kazakhstan, sales in electricity have been quickly achieved, but at low prices. Building the necessary regulatory institutions takes time and there can be beneficial interchanges between potential private investors and government over their design.²²

One form of infrastructure privatisation which has also proceeded quickly is privatisation through vouchers in the Czech Republic and Russia. These countries have distributed minority stakes in major telephone, electric power and gas utilities as part of their mass privatisation programmes. In the Czech Republic, however, this initial distribution has been followed by the cash sale of additional shares in the dominant telephone provider to strategic investors.

The complete privatisation of infrastructure enterprises through vouchers could well compromise potential benefits from private participation, however. Due to resulting weaknesses in corporate governance, it may fail to deliver deep restructuring, investment and access to private finance. Voucher privatisation of infrastructure enterprises in the absence of effective regulation also risks creating a constituency in favour of monopoly provision and may require the government to compensate shareholders for interference with property rights acquired through voucher schemes.

The cash privatisation of infrastructure enterprises, including sales of minority stakes, in transition economies has been most prevalent in the power, telecommunications and gas sectors (see Figure 11). Hungary, Kazakstan and Poland have privatised major electricity or gas enterprises, with Hungary separating electricity generators, transmission grid and regional distributors prior to their cash sale. Given the apparently adequate capacity in the electric power sector, privatisation is likely to be the more prevalent form of private participation compared to selective private entry (e.g., in the form of independent power producers). Estonia, Hungary, Kazakstan and Latvia have sold at least minority stakes in dominant telecommunications enterprises to strategic investors. The Czech Republic has also sold a minority stake in its dominant telecommunications operator to a group of strategic investors, following the partial voucher privatisation.

Figure 11
Cash privatisations in infrastructure sectors
Number of privatised enterprises



Sources: EBRD and World Bank Private Infrastructure Database

Total cash investments by strategic investors in major infrastructure privatisations in the region amount to US\$ 6 billion. This represents 20 per cent of cumulative foreign direct investment in transition economies from 1990 to 1995.

3.3 Private participation and progress in transition

Like other forms of private investment, private participation in infrastructure requires a supportive environment. The relevant features of this environment go beyond issues of competition and effective regulation. In transition economies, the development of this environment is measured in part by indicators of progress in transition. Investors in privatisations of infrastructure enterprises, as well as those in infrastructure projects involving selective private entry, will typically require a sound legal framework for private transactions and share ownership, access to finance and material inputs, a stable macroeconomic environment, and a credible regulatory framework and reliable tax regime which will allow an assessment and limitation of risks and a market return on the investment. Satisfaction of these requirements requires progress in transition.

The EBRD's transition indicators embody many of the key factors determining the extent to which an effective environment for the private sector has been established.²³ In the early stages of transition, when major structural reforms have yet to be undertaken, or even in the intermediate stages when many of the consequences of reforms have yet to become apparent, commercial risks are often high. Relative prices can remain volatile and the creditworthiness of business suppliers and customers can be difficult to ascertain. Those countries at more advanced stages of transition tend to have a much more stable environment for investment, as well as greater progress in macroeconomic stabilisation.²⁴ In fact, survey evidence shows that foreign investors' perceptions of investment risks tend to decline with progress in transition.²⁵

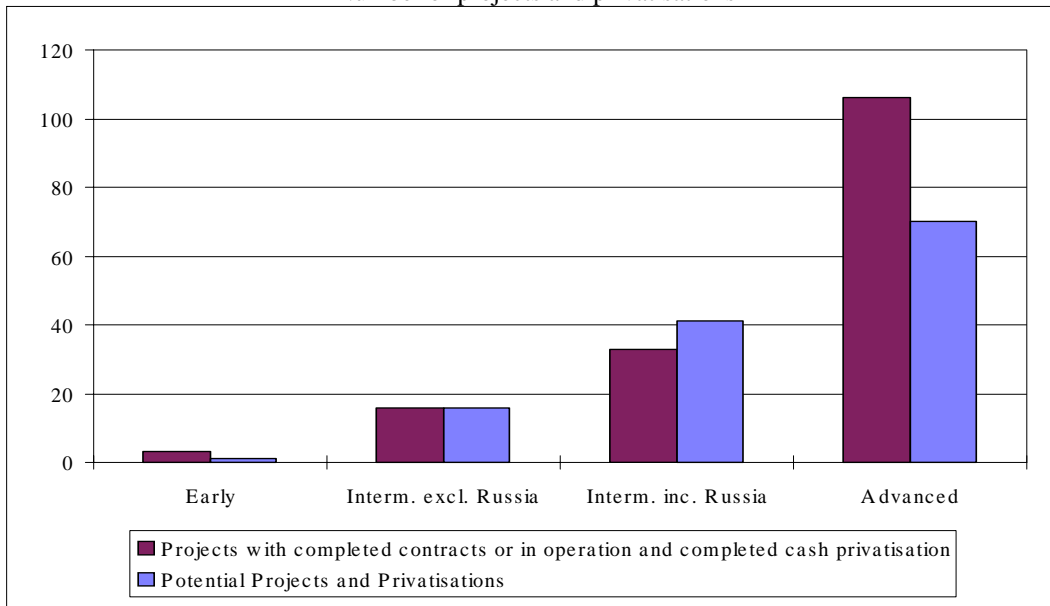
In transition economies, private participation in infrastructure exhibits a strongly positive relationship with progress in transition (see Figure 12). This correlation holds for both cash privatisation of infrastructure enterprises and for selective private entry. The positive correlation exists for potential projects as well as those that are already operational, reinforcing the point that progress in transition contributes to and facilitates private participation in infrastructure. The strength of the relationship also highlights the particular importance of a stable environment for private investment to infrastructure where many investments are large and irreversible.

3.4 Summary

The priorities in infrastructure in the transition economies are threefold. The first is to move toward tariff levels and structures that reflect the costs of production and the fiscal constraints of governments, that encourage more efficient use of these services and that guide appropriately investment decisions throughout the economy. Second, expanding access to private finance through financial autonomy of infrastructure enterprises is a priority due to the severe fiscal constraints and sharp cut back in public investment associated with transition. The third is to promote restructuring by strengthening incentives for infrastructure enterprise managers and by allowing increased market selection of service providers. A more commercial approach to infrastructure, particularly greater private participation, is a key instrument for

achieving these objectives. However, considerable progress in transition appears necessary for increased private participation in infrastructure.

Figure 12
Private participation in infrastructure by countries' stages of transition
Number of projects and privatisations



Source: EBRD and World Bank Private Infrastructure Database

4. Competition and Regulation

A important complementary policy to commercial infrastructure is the introduction of effective regulation or competitive provision of infrastructure services. Effective regulation or competition provision can enhance the effectiveness of a more commercial approach to infrastructure and these policies in their own right can add a further impetus to the restructuring of infrastructure.

A fundamental task in the regulation of infrastructure is to determine the boundaries between regulation and competition. In the past, infrastructure used to be considered a natural monopoly but it is now seen as a sector where competition can play a significant role.²⁶ This development owes something to changing technologies. More importantly, though, it is possible to restructure the industries concerned so that there is at least functional separation and even separation of ownership between activities, according to their potential for allowing competition.

The introduction of competition where possible is desirable because it avoids the high costs imposed by regulation. These costs arise because regulation requires considerable economic

and sectoral expertise, which is scarce, and because of the uncertainty that state intervention brings to private investors whose confidence in the future is critical to providing the capital requirements of transition.²⁷ Competition in infrastructure can also promote better operational and financial performance by service providers via competitive pricing combined with the threat of bankruptcy for loss-making firms or *via* competitive market entry and exit. Finally, competition can reveal information about the comparative performance of firms operating in the same sector which can be used to improve incentives within both public and private firms.

The scope of competition and that of necessary regulation, however, depend on the state of technology and the provision of alternative services, both of which are constantly changing. This difficulty in foreseeing the potential problems for a system of regulation points to the need for flexibility in responding to unforeseen developments. But flexibility also has a cost. Investors need reassurance that the profitability of their investments will not be compromised by future regulatory decisions that might lower prices or increase standards to court political popularity, exploiting the fact that capital investments, once “sunk”, cannot move elsewhere. Typically, investment in infrastructure is extremely capital intensive, has a long lead time and subsequent operating life, and once made cannot change either its function or its location. The “sunk” nature of investment in infrastructure makes it particularly vulnerable to fears about adverse regulatory decisions in the future.

Given the need for both flexibility and credibility, the most challenging task for regulation is not of deciding what to do at any given moment but of deciding who should have the powers to decide what should be done. Infrastructure regulation is in an important sense a task of constitution making rather than merely policy making. This distinction is particularly important in transition economies where there have been major changes in political regimes and there has not been time to develop the regulatory institutions and predictability that investors require.

This section of the chapter examines the main issues concerning regulation and competition in infrastructure. It is organised by infrastructure sector, with telecommunications followed by electric power and transport.

4.1 Telecommunications

Challenges. The evidence in section 2 indicates that the overwhelming priority in telecommunications is investment in new capacity and improvement of the quality of existing capacity. Given fiscal constraints, the bulk of this investment must come from the private sector, and much of the private finance of infrastructure in the transition economies has so far flowed into this sector. There is ample evidence that the willingness of users to pay for new telecommunications capacity will continue to exceed the costs of providing this capacity for the foreseeable future. However, there is at present a significant imbalance between the low tariffs for local calls and the high tariffs for trunk and international calls, which may bias new investment towards long-distance traffic at the expense of local networks.

The challenge for regulation in this sector centres, therefore, on investment. Most importantly, a framework must be established in which investors are confident that they will recoup the costs of the sizeable investments required, together with enough of a reward to compensate for the risks involved. In facing this challenge, a number of crucial policy issues for the sector need to be resolved. First, in which parts of the sector is competition desirable? Second, what is the appropriate pace of market liberalisation? Third, where there remains a degree of monopoly power, what is the appropriate regulatory structure?

Scope for competition. In market economies there has been increasing competition in many parts of the telecommunications sector. The manufacture of equipment is a potentially competitive activity like any other, and in the transition economies this activity has long been separated from the telecommunications operators. The provision of enhanced services and cellular telephony to the final customer can be undertaken by rival operators, provided access can be assured on appropriate terms to the physical transmission network. Competition in cellular telephony has already been introduced in 11 transition economies (see Table 2). Although the fixed network has long been considered a natural monopoly, even this structure is changing, for a number of reasons. First, local radio links (which are not subject to significant scale economies) may soon be sufficiently low-priced to replace fixed links. Second, the falling cost of fibre-optic transmission, as well as the fact that telecommunications services can be bundled with other services, such as cable television or electricity distribution, means that the cost disadvantages of duplicating parts of the main network may be small compared to the overall value of the services provided and to the potential benefits from competition.

In the transition economies, competition in the core telecommunications services (local, domestic long-distance and international services) remains limited. In the great majority of countries, there is still a monopoly telecommunications operator, usually a government enterprise that is both owned and regulated by a government department or ministry. Partial privatisation of the state operator has taken place in five countries (the Czech Republic, Estonia, Kazakhstan, Latvia and the Russian Federation) and majority private ownership has been achieved in only one (Hungary). However, this privatisation has only in some cases been accompanied by general liberalisation, although this is sometimes promised for the future. The move towards liberalisation is most extensive in local services, where in Poland, Hungary, Kyrgyzstan, the Russian Federation and Ukraine local authorities have legally opened local networks to competition. Poland, the Russian Federation and Ukraine have also legally opened long-distance telephony to competition, but only Ukraine has allowed private entry in long-distance and international services through an operating concession.

Table 2
Telecommunications sector

Services legally open to private entry (number of private entrants)	
Cellular telephony:	Albania (1), Belarus (1), Bulgaria (2), Croatia (2), Czech Republic (3), Estonia (3), FYR Macedonia (1), Hungary (3), Kazakstan (1), Latvia (2), Lithuania (3), Poland (3), Romania (1), Russian Federation (9), Slovak Republic (1), Slovenia (2), Ukraine (2) and Uzbekistan (1)
International long- distance services:	Ukraine (1)
Domestic long- distance services:	Poland, Russian Federation and Ukraine (1)
Local services:	Hungary (16), ¹ Kyrgyzstan, Poland (14), Russian Federation and Ukraine
Privatisation of dominant operator (share of private ownership)	
	Czech Republic (49 per cent), Estonia (49 per cent), Hungary (67 per cent), Kazakstan (49 per cent), Latvia (49 per cent) and Russian Federation (49 per cent)
Regulatory institutions	
Separate telecoms department within ministry:	Czech Republic ² and Slovak Republic ³
Separate telecoms authority:	Hungary and Latvia (for tariffs) ⁴
Anti-monopoly office:	Poland ⁵

Sources: EBRD and World Bank. EBRD Transition Report (1996)

- 1 Of the 54 local telephone companies, concessions to operate 16 of these companies have been awarded to consortia that do not include the dominant Hungarian telephone operator, MATAV.
- 2 Ministry of Communications retains authority for licensing new service providers. Authority for resolving disputes over the terms of inter-connection with the fixed network remains unclear.
- 3 Telecommunications office within the Ministry of Transportation, Posts and Telecommunications is responsible for monitoring service quality, while the Ministry itself is the licensing authority. The Ministry of Finance sets tariffs.
- 4 Telecommunications office within the Ministry of Economy proposes tariffs and issues licences for private networks and services, but final decision on tariffs rests with the Ministry of Finance.
- 5 The Telecommunications Law established an independent Tariff Council to set tariffs, while the Ministry of Transport and Communications is responsible for overall telecommunications policy, radio frequency management, mobile licensing and relations with international telecommunications organisations.

Pace of liberalisation. While it is undoubtedly easier to introduce competition in areas of new technology, such as cellular telephony, where there are fewer entrenched interests at stake, in the rest of the sector difficult questions arise about the appropriate pace at which competition should be introduced. There are at least two reasons why phased competition is desirable. It allows both for an initial period of monopoly profit as an incentive to investors and for a period of learning and adaptation to new conditions. In Hungary, for example, under the terms of the sale of the 30 per cent stake in MATAV (the state operator) to a Deutsche Telekom/Ameritech consortium in 1993, MATAV will enjoy a monopoly position for eight years. Similarly, in Estonia the partially privatised operator, Esti Telefon, was given an eight-year exclusive right to provide long-distance services. By contrast, the partial privatisation of the Latvian operator Lattelekom in January 1994 involved a monopoly right for a period of 20 years (subject to some limited rights of competition in enhanced services and the establishment

of private networks). The comparison with Estonia and Hungary suggests that such a lengthy period may be an unnecessarily long time to wait for the benefits of liberalisation. With only a distant prospect of competition, there may be limited incentive to invest now in new capacity and service improvements.

International evidence on the value of phased competition for fixed-link telephony is difficult to assess conclusively, but it seems most appropriate where the requirement for network investments is high, as in most transition economies. However, even where phased competition in the market is appropriate, it is desirable to ensure that there is competition for the market – for example, through the award of licences by competitive tender. The main difficulty with phased competition, however, lies in ensuring that the timetable for liberalisation is credible. Granting monopoly or duopoly rights creates interest groups with a powerful incentive to resist further liberalisation.

Effective regulation. For those activities that remain monopolies, the structure of regulation is of great importance. Only in Hungary, Latvia and Poland has there been the establishment of independent regulatory powers. In the great majority of transition economies, regulation of prices is still carried out by a government ministry, sometimes the same ministry that continues to have responsibility for ownership and management of the sector's assets. The fact that such a ministry is also subject to considerable political pressure has contributed to maintaining tariffs for local services below cost-recovery levels. In the Russian Federation the effectiveness of regulation is further hampered by the fragmented organisation of the telecommunications system and its control.²⁸

In Poland responsibility for price regulation is in the hands of the Anti-Monopoly Office (AMO). This approach has avoided, to some extent, the difficulties seen elsewhere of excessive protection of state-owned firms. Indeed, the AMO has ruled against the state-owned operator on several occasions. However, in its implementation a number of issues emerge. First, the Ministry of Communications issues permits for new service providers, but remains the owner of the dominant operator. Second, the legal framework for the terms of access to the fixed network remains unclear. Third, despite the AMO's efforts, the tariff structure still discourages investors from entering the market for local services, where licensing is more liberal.

There are also more general issues raised by relying on AMOs to regulate telecommunications tariffs. While it is beneficial to have regulation carried out separately from a Ministry of Communications, assigning the responsibility to a general competition authority tends to confuse the tasks of creating competition and regulating prices in its absence. Many transition economies need to establish the principle that competition policy is not merely price control in disguise, and allowing competition authorities to retain price control powers makes establishment of that principle more difficult. Also, there is no good argument for the pooling of expertise, since the nature of the training and skill required to regulate telecommunications is very different from that of more general anti-trust policy.

In Hungary some attempt has been made to overcome regulatory uncertainty by making use of the provisions of contract law. The concession granted to MATAV in 1993 offers an eight-year monopoly in the supply of long-distance and international services, and in 29 of the country's 54 local districts. This monopoly is conditional on performance targets with respect to the rate of growth of installed exchange lines. It is also conditional on a price-cap formula that allows retail prices to rise by 7.5 per cent per annum in real terms, and this is reviewed every four years (by the Minister for Transport, Telecommunications and Water Management). Although the terms of this review are clearly potentially politically charged, the fact that it must take place only after four years represents a constructive attempt to use the greater certainty of the contract law to mitigate the vagaries of regulatory politics in the interests of creating greater certainty for investment. In some transition economies contract law is as uncertain as regulatory politics, but the solution seems well-adapted to the Hungarian circumstances.

4.2 Electric Power

Challenges. The immediate challenge is to provide electricity tariffs that reflect costs and to enforce payment by electricity users. These measures would lead to a long-term decline in the electricity intensity of the transition economies from the current high levels documented in section 2. It would be wrong to conclude, however, that the region's power generation capacity is likely to meet power needs adequately in the medium term, particularly where there is a strong recovery in economic output. This is so because much of the current capacity is in very poor condition due to years of inadequate maintenance and many generating units will have to be closed, and many more upgraded fitted with pollution control mechanisms. Moreover, there is significant scope for improved efficiency in the management of existing assets in the sector. In many aspects, the need to encourage investment in existing and new assets in the sector raises similar issues electricity as in telecommunications.

Tariff reform is thus necessary to ensure that adequate incentives are in place for investments that use the most appropriate form of energy and that encourage investment in existing and new assets. Users of electricity must make current investment decisions in the knowledge that they will face tariffs reflecting the true costs of electricity production to the economy, particularly since the prices of tradable forms of energy (oil and gas) have reached international levels in much of the region. Tariff reform is also necessary to raise the returns and reduce the risks to investing in the electric power sector itself, given that tariffs in this sector have been historically low. Furthermore, credible environmental regulation of electricity needs to be in place, and tariffs must reflect the costs of regulated environmental standards.

There is also significant potential to restructure the electric power sector so as to allow greater competition. Electricity generation (which is potentially competitive) can be separated from high-voltage transmission (which is a natural monopoly). This in turn can be separated from local distribution, where there are elements of natural monopoly alongside the potential for limited competition.

Tariff reform. Firms are the electricity users that have the greatest medium-term potential for investment in energy-saving techniques, and the establishment of cost-reflective tariffs for them is therefore urgent. However, in most countries the discrepancy between prices and costs is greatest for households, with their low average income limiting the scope for closing this gap quickly. Some progress has been made in raising tariffs in recent years (usually because of fiscal pressures), although there remains a considerable way to go, particularly in the countries at early and intermediate stages of transition.²⁹ Households are responsible for much of the peak energy demand (which is supplied from generation units with the highest marginal costs and often with the most polluting plant). It is uncertain how sensitive household demand is to prices, but there may be substantial efficiency gains to be made from better management of demand from households. Given the legacy of low tariffs in transition economies, as well as the potential importance of electricity in household budgets, the challenge is to find ways of structuring tariffs so that they are perceived as fair as well as efficient.

The perceptions of fairness are important, particularly given the poor payments record of both households and enterprises and widespread theft in some countries. Raising household electricity tariffs to cover costs fully would have a significant impact on the real incomes of households (unlike with telecommunications charges). While there is evidence that this impact is not regressive on average, some poor households would be severely affected. It is important, therefore, to ensure that other tax-and-benefit policies are implemented to minimise the impact on poor households.

Factors other than the overall income distribution may also affect the perceived legitimacy of electricity charges, and therefore the willingness of customers to pay. If large and well-connected state-owned enterprises fail to pay their bills and are not cut off (as has happened in a number of countries, including the Russian Federation and Ukraine), there will be severe resentment if smaller enterprises or households are penalised for non-payment. This suggests that policies to improve payment need to be introduced broadly and systematically so that burdens are perceived as being fairly shared.

As emphasised in section 3, privatisation in the electricity supply industry can play an instrument role in establishing credible economic tariffs.³⁰ Hungary provides a good example of such a process at work, in that the government's efforts to privatise electricity distribution companies in 1992-93 failed to meet its expectations of sales values because investors lacked confidence in the future regulation of tariffs. These problems were addressed by establishing a more credible tariff policy, including the separate energy regulatory authority, and eight electricity companies successfully privatised in early 1996. In contrast, the inclusion of 30 per cent of the main vertically integrated company in the Czech voucher privatisation scheme and of 49 per cent of the Russian companies in similar schemes has involved no such pressure for improved regulation.

Effective price regulation. As with telecommunications, an important task is to separate regulation from the state's responsibilities of owning and managing assets in the electricity sector. There has been a variety of approaches adopted by transition economies, as Table 3

indicates. In some countries, prices are regulated by a branch of government that is separate from the energy ministries, although in such circumstances it is important to ensure that issues of the environment and safety are not neglected. In Hungary and the Russian Federation a separate regulatory authority for energy as a whole has been established. It is too early to tell how effectively these agencies will be able to function, since it is unclear whether they will be able to operate with real autonomy. For example, the Federal Energy Commission in the Russian Federation is the successor to an earlier body that was widely criticised for having few powers and no real independence, since it was composed mainly of industry representatives. It has now been restructured to have consumer representation and has been granted enhanced powers to gather information, but the effectiveness of these changes has yet to be tested.

Table 3
Electricity sector

Comprehensive unbundling (number of enterprises)	
Generation:	Armenia (5), Hungary (8), Poland (35), Slovenia (6), Ukraine (6)
Distribution:	Armenia (53), Belarus (6), Czech Republic (8), Hungary (6), Poland (33), Russian Federation (72), Slovak Republic (3), Ukraine (27)
Independent power generators (number of projects)	
	Hungary (3), Czech Republic (1)
Privatisations¹ (number of privatised enterprises)	
Integrated utilities: ²	Czech Republic (1), ³ Kazakstan (1), ⁴ Russian Federation (1) ⁵
Generators:	Hungary (3), Kazakstan (1), Poland (1)
Distributors:	Czech Republic (8), ⁶ Hungary (6), Russian Federation (27) ⁷
Regulatory institutions	
Separate department within ministry:	Armenia, ⁸ Belarus, Bulgaria, ⁹ Georgia, Lithuania, ¹⁰ Ukraine ¹¹
Separate energy authority:	Hungary, Russian Federation
Anti-monopoly office:	Kazakstan, Kyrgyzstan

Sources: EBRD and World Bank. EBRD Transition Report (1996)

- 1 Including partial divestiture.
- 2 Including regional integrated utilities.
- 3 CEZ (Czech Power Company) (high-voltage transmission and some generation) partially privatised using vouchers.
- 4 Regional integrated utility, Almaty.
- 5 RAO EES Rossii (Russian Joint Stock Company for Electric Power and Electrification) (high-voltage transmission and some generation) partially privatised using vouchers and through direct sales to insiders.
- 6 Partially privatised using vouchers.
- 7 Partially privatised to insiders, with the remaining shares owned by the integrated utility, RAO EES Rossii (high-voltage transmission and some generation).
- 8 State Committee on Prices deals with tariff issues; an independent regulatory authority is to be established.
- 9 Committee on Energy, which reports to Council of Ministers.
- 10 Establishing an Independent Regulatory Agency. As an interim step the government has established an Energy Pricing Council, which submits proposals to the Cabinet.
- 11 An independent regulatory authority is to be created as part of the 1995 reorganisation of the Ministry of Power.

The energy sector could be regulated as a whole rather than through separate regulators for electricity, gas and other energy forms. The case for an integrated approach may be strongest in those parts of the former Soviet Union where natural gas is in plentiful supply but where international trade in gas is limited by security concerns in importing countries and the inadequacy of pipeline facilities. The choice of techniques and the location of plant in electricity generation should be made on the basis of coherent long-term decisions about the

prices not only of electricity but also of different kinds of fuel. Again, this task could be made easier by an integrated approach to regulation for the sector as a whole. However, a single regulatory agency could be particularly vulnerable to capture by special interests, especially in resource-rich countries.

The environment and nuclear safety. Environmental regulation by an energy ministry which continues to own the assets of the industry or to be closely identified with the industry's interests is certainly undesirable. Such regulation is expensive and will tend to be resisted within the industry itself. The alternatives are regulation by either a general environmental agency or by which ever agency is charged with regulating other aspects of electricity. The advantage of the former is that it enables an integrated and coherent approach to overall environmental regulation. It also ensures that the political difficulties faced by the industry in raising tariffs do not provide an incentive for lax enforcement of environmental standards.

The regulation of nuclear safety poses particularly difficult problems, since it is often the most dangerous plants that provide cheap, base-load power and which the national authorities are most reluctant to shut down. Since nuclear safety has significant cross-border implications, the effectiveness of this regulation is an entirely proper matter for international concern and negotiation.

Scope for competition. There has been significant restructuring in the electricity sector even without privatisation, with considerable separation of distribution companies both from each other and from the grid, and some separation of generation as well (see Table 3). In some countries, such as the Russian Federation, this restructuring involves basically the creation of regional monopolies (distribution, regional transmission and generation are vertically integrated, and the national grid provides the means for trade between these monopolies; the grid also has large shareholdings in the regional companies). Since the distribution companies may be able to pass on their costs of generation to the customer, the presence of the grid provides no real incentive to generate electricity efficiently.

Elsewhere, there is potentially a more competitive structure in which generation, transmission and distribution are fully separated in order to break up both generation and distribution into separate operating companies. Armenia has five generating companies, Hungary eight, Poland 35 and Ukraine six. It can be argued that at least the larger countries (the Czech Republic, Hungary, Poland, Romania, the Russian Federation and Ukraine) should eventually be able to privatise a sufficient number of separate generation companies to ensure reasonable competition (a minimum of five companies is a reasonable rule of thumb).³¹ However, the short-term prospect for competition in the market for power generation is limited by the lack of financial viability of the sector with current tariff levels and structures.

In the meantime, the unbundling of the electricity sector provides scope for competition in the right to supply the market through bidding for long-term contracts, provided access by private suppliers to the grid can be ensured on non-discriminatory terms.³² This approach relies on long-term "take-or-pay" contracts with independent power producers, which ensure vigorous

competition for contracts, but which provide weaker incentives for efficiency improvements after contracts have been signed. Although distribution cannot be a competitive activity, except for supply of retail services to certain large customers, separation of distribution companies from each other at least provides for accounting transparency and consequently makes it easier for price regulation to be based on comparative cost or “benchmark” information.

4.3 Transport

Challenges. In transport, considerations of overall system capacity are less significant than the geographical and functional mismatch between the components and quality of transport infrastructure and likely future demand. As trade patterns in transition economies reorient towards existing market economies, there is a need for new and expanded westward links, by road, rail, sea and air. Rail use (relative to GDP) is still very high in comparison with industrialised market economies, but has declined sharply in the transition. The changing market share in favour of road transport reflects the more diversified composition of production in the transition. In addition, transport networks are often in poor condition and not as effectively managed as they could be. Major investments are required in maintenance and in upgrading the quality of existing infrastructure in line with market demands, and more effective management is required.

To find the right balance between competition and regulation in the transport sector, it is necessary to examine the scope for competition, the type of regulation needed and the role that governments should play.

The scope for competition in transport depends largely on the specific characteristics of individual modes of transport and on the existence of alternative modes which can provide competitive services in the same markets. The distinction between competition within the market and competition for the market is particularly important in this sector. Competition in the market can take place between firms in the same mode of transport – intra-modal competition – or between firms in different modes (road or rail, for example) competing in the market for the same service, namely transport between two points. Competition for the market takes place when different firms compete for the right to provide a service for a given period of time (urban bus franchise) or to build and operate infrastructure under a concession agreement (toll motorway concession). Transport modes differ regarding the potential scope for each type of competition, and the extent of institutional and financial restructuring that first needs to be undertaken.

Government strategic planning and regulation have important roles in transport infrastructure investment. These roles reflect the influence of transportation on many aspects of economic activity and social life and its impact on land use and the environment. These considerations mean that uncoordinated and unregulated private investment cannot be expected to respond adequately to the needs of the economy and society as a whole.

Competition within the market. Competition within the market is usually more feasible and desirable for the supply of transport services than that of transport infrastructure. Certain services, such as road haulage, inter-city coach services and air transport, can be opened up fairly fully to competition, and experience in market economies provides valuable lessons. In transition economies there has been extensive privatisation and liberalisation of road haulage, often as part of a process of divesting of services by large vertically integrated enterprises. Hungary and Poland, for example, liberalised and privatised their road haulage services from existing local public enterprises and own-account fleets. Because of the large number of these privatised service enterprises, as well as the lack of significant economies of scale in such activities, this has resulted in *de facto* liberalisation of haulage markets. However, obstacles to entry remain significant in some countries. These include difficulties in obtaining operating licences, or preferential contracting policies by state authorities. There has been less progress in liberalisation of inter-city bus transport.

Although deregulation of road haulage, inter-city bus services and air transport in market economies has not been free of problems, existing evidence strongly suggests that general restrictions on entry into these markets serve no useful purpose, and that the amount of institutional restructuring required prior to open competition is minimal.³³

Introducing competition among train-operating companies is more complex. It can require a large amount of enterprise restructuring, regulatory frameworks for gaining fair access to tracks, mechanisms for allocating capacity, and new contractual frameworks between infrastructure owners and operators to ensure safe and reliable services. There are basically three ways in which railways can be restructured, and each creates different potentials for competition. The first is to put the railway infrastructure under the direct management responsibility of the main passenger or freight operator which uses it and to charge other operators which might also use it for access. The second is to establish infrastructure as a separate internal business within an integrated railway and then to create an internal market with the freight and passenger division. The third approach is to establish the infrastructure business as a separate corporation, so that commercial relationships with the freight and passenger operating companies are formalised in legal contracts.

Each of these approaches aims at creating scope for competition by unbundling vertically integrated railways, and each has advantages and disadvantages which vary with the particular circumstances of the railway. EU directives require the second approach, and they may be strengthened in due course to require the third. However, EU countries, with the exception of Great Britain, have not embraced the notion of competition among railway operators.

Most countries in transition have recognised the need to adapt their railways to the market economy. Some are in the planning stages of reform, and a few have begun the process of vertical unbundling. The latter countries include Bulgaria, the Czech Republic, Hungary, Poland, Romania, the Russian Federation, and Slovenia (see Table 4). In comparison with railway restructuring in western Europe and other industrialised countries, the envisaged pace of change is very rapid, given the extensive use of railways under central planning and the

sharp decline in demands for their services in the transition. These plans must recognise the impact of strong competition from other modes of transport, but there remains the need to continually re-appraise productivity targets, equipment utilisation and unit cost levels.

Table 4
Transport sector

Functional separation of state railways:¹	Bulgaria, Czech Republic, Hungary, Poland, Romania, Russian Federation ² and Slovenia
Concessions for ports and airports: (number of projects)	Hungary (1), Kazakstan (1) and Turkmenistan (2)
Motorway concessions: (number of projects)	Hungary (2), Poland (bidding stage) and Romania (bidding stage)
Regulatory institutions: (separate motorways authority)	Hungary, Poland, Romania

Sources: EBRD and World Bank. EBRD Transition Report (1996)

1 The functional separation of railways involves establishing separate operating units within the state railway along functional lines, typically, freight haulage, passenger services and infrastructure (tracks, signalling, stations).

2 Commitment under the 1995 Statement of Modernisation Strategy and Commercialisation Principles for Russian Railways.

The fact that vertical unbundling of infrastructure and service operations can create scope for competition within the market applies to other modes of transport as well. For example, the joint operation and management of airport and airline services in transition economies is a practice inherited from the integrated structures of the past, and is a system which hampers competition. There are no financial or operating reasons to maintain airports and airline operations together. Moreover, there is ample scope for introducing competition in airline services and to a lesser extent in airport management. After the US experience with deregulation, the scope for introducing viable competition in the provision of commercial aviation services is no longer in doubt. Airports represent a case where ownership of infrastructure can be successfully separated from the running of airport services, such as runway maintenance or baggage handling, with the possible exception of air traffic control.

Competition for the market. Competition for the market can provide for private participation and efficiency gains in many areas of transport infrastructure provision and management, such as road and rail track maintenance, the construction and operation of toll motorways, airport terminals and port berths. Through competitive bidding for the right to provide and/or manage a given infrastructure facility or support service for a period of time, or to undertake a particular investment, it is possible to achieve significant cost reductions and service quality improvements. In the Russian Federation, for example, competitive bidding for road maintenance works was introduced in 1994, leading to increased competition in the selection of contractors and to a reduction in costs per unit of lane-kilometre of road upgrading work being contracted.³⁴ Likewise, open tendering for major road works is becoming common practice in Romania as part of the restructuring of the road sector, including the construction industry and the Ministry of Transport.

Concessions to build and operate parts of the transport infrastructure can also attract private participation and new investment into the sector. Toll motorway concessions have been granted in Hungary and are at the bidding stage in Poland and Romania (see Table 4). In principle, the use of tolls means that such concessions can involve 100 per cent private finance. However, traffic flows in most road corridors in the region are not yet sufficient to bear the full cost of upgrading to high-standard, dual-carriageways. Nevertheless, motorways typically have social rates of return well in excess of their private rates of return because of their contribution to reducing congestion and accidents and creating new land use opportunities, although in some circumstances they may impose significant environmental costs of their own. Where private rates of return are inadequate to make the project independently viable, this suggests that public-private partnerships, in which the state contributes a subsidy in recognition of the social benefits thereby created, may make an important contribution to mobilising investment finance in this sector.

Concessions for other elements of the transport infrastructure (airports and ports) can work in similar ways to those discussed for toll motorways. Four such concessions are in operation in the transition economies.

Regulation. The nature of necessary regulation depends very much on the nature of prevailing and potential competition. When inter-modal competition is strong and there are no artificial barriers to entry into the market, there appears to be little reason for price regulation. While the safety aspects of road and air transport usually need specialised regulatory expertise, evidence from market economies suggests that, provided the conditions for granting licences to operators are reasonably clear and non-discriminatory, and that an appropriate safety regime is properly enforced, regulation of the general process of competition in the provision of these services can be left to competition agencies.

Even in the presence of strong inter-modal competition, however, the relationship between modes of transport is complex and will require some co-ordination as well as competition. For example, the development of airports requires consideration of road and rail links; the scope for seaports to handle container traffic depends on the quality of rail links as well as on the presence of container terminals inland. For these reasons, decisions about the location of infrastructure investment requires regulatory supervision by local and/or national planning authorities. However, since these decisions usually have significant consequences for the profitability of existing service operators, such authorities can come under strong pressure to favour established operators against new entrants. A strong presumption in favour of competition and rights of new entrants is therefore appropriate.

When there is competition for the market, some amount of regulation is necessary to monitor compliance with the concession agreements signed between the public authorities and the private concessionaires. In addition, it is necessary to have an arbitration authority, which does not need to be a specialised one, to resolve disputes that may arise between the parties in cases of non-compliance. It is essential to ensure the independence of these regulatory bodies as well

as to limit their proliferation. In Hungary, Poland and Romania independent authorities have been established to oversee the toll motorway concession (see Table 4).

Government credibility and consistency is vital to encourage private participation in transport infrastructure investment. The cancellation of toll road projects after the private sector has committed significant resources to the projects has occurred in some countries in the region, and such reversals will undoubtedly make it difficult to attract investment in similar projects in future.

In some transport sub-sectors, government will continue to play an active role due to inherent obstacles to efficient resource allocation posed by the fact that prices faced by alternative competing modes do not reflect true social costs. This is the case in urban transport, where basic economic principles suggest that pricing may require government subsidies to operators to support public transport, which is needed to reduce urban congestion and pollution levels. The degree of subsidy required will also depend on the complementary policies adopted with respect to taxation of private transport. For example, if congestion pricing could be adopted for roads, private car transport would become significantly more expensive, and public transport could compete without the need for large subsidies. Although market economies have been slow to consider the adoption of congestion pricing for roads, this is no reason for transition economies not to learn from earlier experiences.

5. Summary and conclusions

Infrastructure in the transition economies requires substantial restructuring. Section 2 of this chapter characterises the restructuring requirements in the telecommunications, electric power and transport sectors in the region.

Telecommunication services in transition economies are scarce in supply and poor in quality. The network densities are low compared with those in the EU, the waiting times for access to services are long, and the frequency line faults is high. The structure of tariffs falls relatively heavily on businesses and more lightly on households, and the overall level of tariffs remains low in most countries. The need for investment in this sector to expand capacity and to improve service quality is substantial. Annual investment in telecommunications in upper-middle income developing countries, which have similar network densities to those in transition economies, averages about 4 per cent of GDP (compared with about 1 per cent in the EU).

The main legacies in the power sector are high electricity intensities of output, existing overcapacities of supply facilities (albeit needing maintenance and renewal), poor environmental performance and, in some countries, nuclear safety concerns. The inadequate level, structure and collection of tariffs hinder demand-side efficiency and make investments in existing and new assets in the electric power sector unattractive. Cash-strapped utility companies are often primarily concerned with the immediate need to purchase fuel to meet

demand and have insufficient funds to with which to improve operating and environmental performance and, in some cases, nuclear safety.

In the transport sector, there is a functional mismatch between the inherited components of the transport infrastructure and market demands. Given the shift in composition of output toward higher value-added products and the increased demand for personal transport, there is likely to be a shift towards greater reliance on road services. In fact, there has already been a sharp decline in demand for freight services, which in eastern Europe has fallen particularly heavily on the railways. However, the current structure of railway tariffs (and fuel taxes) runs the risk of encouraging an excessive substitution of road for rail-based services, and this should be realigned. Estimates of annual investment requirements in east European road and railway rehabilitation and development range between 2 and 3 per cent of east European GDP over the next decade.³⁵

In view of these major challenges, it is imperative to ask what government policies can bring about the necessary tariff reforms and restructuring of infrastructure. For enterprises in general, governments typically rely on hard budget constraints, privatisation and product market competition to induce restructuring. But each of these policies can become problematic when applied to an infrastructure sector. Sections 3 and 4 of this chapter seeks to identify ways in which these problems can be overcome.

A more commercial approach to infrastructure, including greater private participation, is an effective means for facilitating tariff reform and expanding access to private finance for investment, which have the effect of hardening the budget constraints of infrastructure enterprises. In particular, by creating a constituency for their attainment, private participation in infrastructure can promote the establishment of cost-reflective tariffs and financial autonomy of infrastructure enterprises.

Commercialisation of infrastructure enterprises, selective private entry and privatisation, moreover, are measures which aim to change the objectives of infrastructure service providers the constraints under which they operate, and the composition of service providers through market selection. While the experience with commercialisation of infrastructure remains limited in terms of duration, experience in developing countries suggests that greater private involvement may be required. Selective private entry in infrastructure has been most extensive in the telecommunications sector, where there is both insufficient capacity and scope for competitive service provision. In contrast, privatisation has most frequent in the power sector, where existing capacity is adequate but where tariff reform and improvements in operational performance are required.

Privatisation of existing infrastructure enterprises has proceeded more slowly than selective private entry. This form of private participation can require two types of institutional change: the restructuring of enterprises before their privatisation and the creation of effective regulatory institutions. Nevertheless, considerable progress in transition, as measured by the

EBRD's transition indicators, appears necessary for both selective private entry and privatisation.

Policies which are complementary to commercial infrastructure are the introduction of competition in service provisions where possible and of effective regulation where it is not.

Although the particular regulatory challenges vary across the sectors, two common themes emerge. First, competition for the right to supply the market is possible and important— in particular where competition in the market is either impossible or unlikely to be achieved in the short run. Competition in the market can be quickly achieved in some activities, as with cellular telephony and road haulage, although the scope for competitive provision in telecommunications extends well beyond cellular services. Electricity generation, airports, ports and toll motorways are services where competition for the market has the potential to increase efficiency and encourage private investment in infrastructure in transition economies and thus to promote its restructuring.

Second, independent yet accountable regulatory institutions are needed to oversee competition for the market, to guard against the abuse of monopoly power and to take into account the environmental impacts of infrastructure, such as pollution and urban congestion. There is no recent history with independent regulatory institutions in transition economies, and only limited progress has so far been achieved in the establishment of regulatory institutions that are separate from the government ministries which oversee infrastructure sectors. Given the time required to establish effective institutions, the initial steps towards their creation should not be delayed.

References

- ARMSTRONG, M. COWAN S. and VICKERS, J. (1994), *Regulatory Reform: Economic Analysis and the British Experience*, MIT Press, Cambridge, Mass.
- CAMPBELL, R. (1995), *Soviet and Post-Soviet Telecommunications: An Industry Under Reform*, Westview Press, Boulder Co.
- BACON, R. (1995), "Competitive Contracting for Privately Generated Power", *Private Sector*, No.3, pp.23-26.
- BOUSQUET, F. and QUEIROZ, C. (1996), "Road Management in Russia", *World Bank Internal Discussion Paper*, Europe and Central Asia Region, February.
- EBRD (1993a), *Railway Sector Survey of Russia, Belarus, Ukraine and Kazakstan*, January.
- EBRD (1993b), *Roads and Road Transport Study. Russia, Belarus, Ukraine and Kazakstan*, January.
- EBRD (1993c), *Transport Sector: Issues and Options*, March.
- EBRD (1996), *Transition Report*.
- ECMT (1996a), *Trends in the Transport Sector 1970-1994*, March.
- ECMT (1996b), *Trends in the Transport Sector in the ECMT Countries in Transition*, March.
- Foreign Investment Advisory Service (1996), "Infrastructure services in central and eastern Europe: The current situation", *World Bank Background Paper for Vienna Roundtable*.
- FREUND, C. and WALLICH, C.(1996), "The welfare effects of raising household energy prices in Poland", *The Energy Journal*, 17, pp.53-77.
- GASPARD, M. (1996), "Transport infrastructure financing in central and eastern Europe", *European Commission (DGVII) Working Paper*, April.
- International Energy Agency (OECD/IEA) (1995), *Energy Policies of the Russian Federation, 1995 Survey*, OECD, Paris.
- International Energy Agency (OECD/IEA) (1996), *Energy Policies of Ukraine, 1996 Survey*, OECD, Paris.
- International Telecommunications Union/OECD (1992), *Telecommunications Indicators of the Former Soviet Union*, ITU, Geneva.
- International Telecommunications Union/OECD (1994a), *Telecommunications Indicators for Economies in Transition*, ITU, Geneva.

- International Telecommunications Union (1994b), Demand for Business-oriented New Telecommunications Services in Central and Eastern European Countries ITU, Geneva.
- LANKES, H.P. and VENABLES, A. (1996), "Foreign direct investment in Eastern Europe and the former Soviet Union," EBRD Policy Studies to Promote Private Sector Development.
- McMILLAN, J. (1996), "Restructuring enterprises in central and eastern Europe," EBRD Policy Studies to Promote Private Sector Development.
- McGOWAN, F. and SEABRIGHT, P. (1989), "Deregulating European Airlines", Economic Policy, No.9, pp.283-344.
- MORRISON, S. and WINSTON, C. (1986), The Economic Effects of Airline Deregulation, The Brookings Institution, Washington, DC.
- NEWBERY, D. (1996), "Guidelines for Private Sector Involvement in the Electricity Supply Industry of Eastern Europe", EBRD Policy Studies to Promote Private Sector Development.
- PANNIER, D. (ed.) (1996), "Corporate governance of public enterprises in transitional economies," World Bank Technical Paper No.323.
- THOMPSON, D. and WHITFIELD, A. (1995), "Express Coaching: Privatisation, Incumbent Advantage and the Competitive Process", in Bishop et al. (1995).
- THOMPSON, L. and FRASER, J. (1996), "Command legacy will take time to overcome", Rail Business Report, Railway Gazette Yearbook 1996, pp.5-14.
- World Bank (1993), Transport Strategies for the Russian Federation. Studies of Economies in Transformation (Washington, DC: World Bank).
- World Bank (1994), World Development Report, Oxford University Press, Oxford.
- World Bank (1996a), World Development Report, Oxford University Press, Oxford.
- World Bank (1996b), Bureaucrats in Business: The Economics and Politics of Government Ownership, Oxford University Press, Oxford.

ENDNOTES

- ¹ See International Telecommunications Union/OECD (1992, 1994a) and Campbell (1995) for analyses of telecommunications in transition economies.
- ² See International Telecommunications Union (1994b).
- ³ See EBRD (1996), Chapter 2 for a discussion of measuring stages of transition and the classification of countries.
- ⁴ Northern America refers to Canada and the United States
- ⁵ See International Energy Agency (1995).
- ⁶ See International Energy Agency (1996).
- ⁷ The impact of the low tariffs on demand depends on the price elasticity of demand, which is smaller in the short term than in the long term, when power consumers can adjust the number and type of electrical appliances, production processes and even the location of electricity-intensive industries. Price elasticities within transition countries are difficult to estimate, as the price effects are particularly difficult to distinguish from structural changes in the demand pattern caused by other factors.
- ⁸ See Freund and Wallich (1996).
- ⁹ See EBRD (1993a).
- ¹⁰ See Foreign Investment Advisory Service (1996).
- ¹¹ See EBRD (1993b).
- ¹² See EBRD (1993c).
- ¹³ It is instructive to compare this experience with EU railways, which have faced decades of increasing competition from road haulage and of declining heavy industries. Rail freight transport measured in tonne-kilometres in the EU has declined by about 22 per cent over the last 25 years, while the railways' share of the freight market share has halved to about 15 per cent. The loss of rail freight traffic in eastern Europe, the Baltics and the CIS has had the effect, therefore, of compressing decades of gradual market-driven change in the EU into a few years. The organisation, management structures and operating methods of the railways in the region, however, are very similar to those in the EU 20 years ago. Railways in eastern Europe and the Baltics need to reform at a faster rate and more successfully than EU railways in order to secure an effective long-term role in freight transport.
- ¹⁴ Information provided by DRI/McGraw-Hill from their database.
- ¹⁵ See Thompson and Fraser (1996).
- ¹⁶ See ECMT (1996b).
- ¹⁷ See World Bank (1993).
- ¹⁸ See Willig (1994) and Newbury (1994)
- ¹⁹ See Pannier (1996).
- ²⁰ See McMillan (1996).
- ²¹ See World Bank (1996b), Chapter 2.
- ²² See EBRD (1996), Chapter 5.
- ²³ See EBRD (1996), Chapter 2.

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- ²⁴ World Bank (1996a), Chapter 2, argues that progress in transition is necessary for control of fiscal and quasi-fiscal deficits and macroeconomic stabilisation.
- ²⁵ See Lankes and Venables (1996).
- ²⁶ See World Bank, 1994.
- ²⁷ See EBRD (1996) Chapter 4.
- ²⁸ See Armstrong & Vickers (1996).
- ²⁹ See EBRD (1996) Chapter 3.
- ³⁰ As has been argued by Newbery (1996a).
- ³¹ See Newbery (1996a).
- ³² See Bacon (1995) and Besant-Jones (1996).
- ³³ See, for example, Morrison and Winston (1986), McGowan and Seabright (1989), and Thompson and Whitfield (1995).
- ³⁴ See Bousquet and Queiroz (1996).
- ³⁵ See Gaspard (1996). This EU initiative aims to facilitate integration on key European infrastructure networks.