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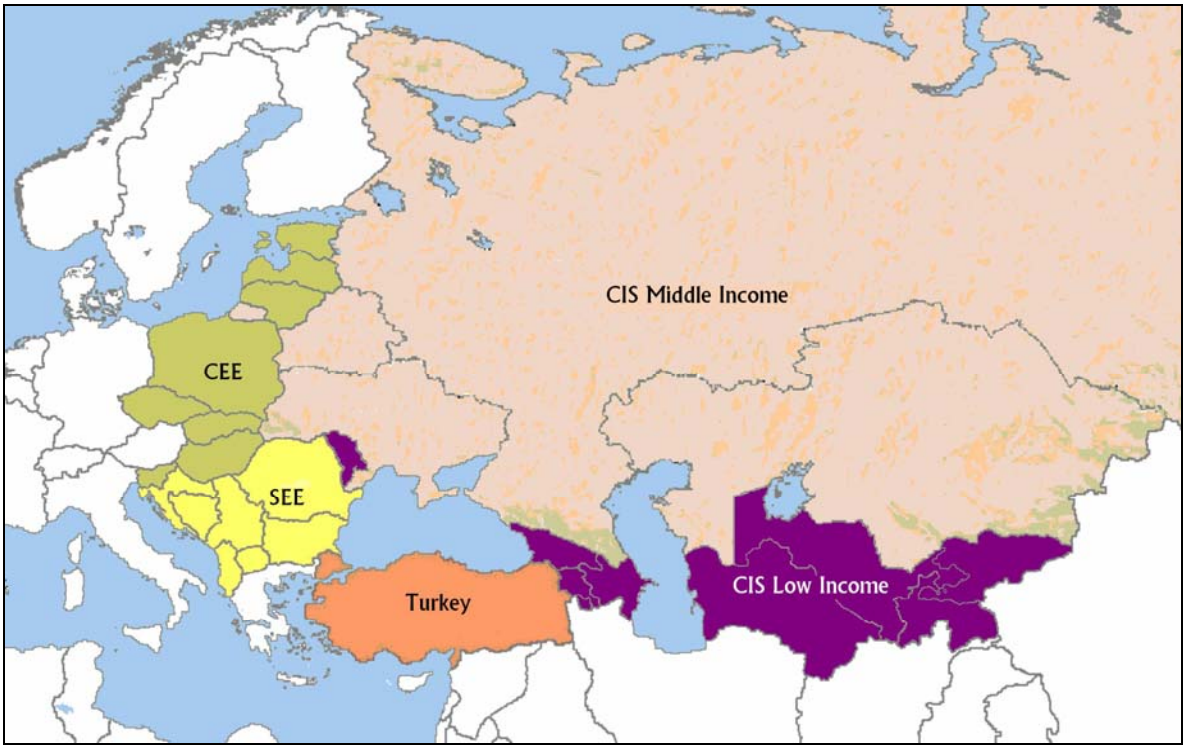
INFRASTRUCTURE IN EUROPE AND CENTRAL ASIA REGION APPROACHES TO SUSTAINABLE SERVICES



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Abbreviations

AIC	Average incremental cost
BOO / BOT	Build Operate and Own / Build Operate and Transfer
CARs	Central Asian Republics
CEE	Central and Eastern Europe
CHP	Combined Heat and Power Plant
CIS	Commonwealth of Independent States
CMEA	Council of Mutual Economic Assistance
DH	District Heating
EBRD	European Bank for Reconstruction and Development
ECA	Europe and Central Asia
EU	European Union
FDI	Foreign Direct Investment
FSU	Former Soviet Union
GDP	Gross Domestic Product
GWh	Million kWh
HBS	Household Budget Survey
HOB	Heat Only Boilers
IAS	International Accounting Standards
IFRS	International Financial Reporting Standards
IFIs	International Financing Institutions
kWh	Kilo Watt Hour
LRMC	Long run marginal cost
LSMS	Living Standards Measurement Survey
mcm	1000 cubic meters
OECD	Organization for Economic Cooperation and Development
PPP	Public Private Partnerships
QFD	Quasi-Fiscal deficit
SEE	South Eastern Europe
TWh	Terra Watt Hour or Billion kWh
UCTE	Union for the Coordination of Transmission of Electricity
WTO	World Trade Organization

Note: In this report, Dollar and Cent denote US dollar and US cent.
In some of the figures, this document uses the two letter ISO code to identify the countries.

Foreword

This report presents an overview of the key developments in the energy and infrastructure sector of the countries in Europe and Central Asia region. It attempts to identify the critical factors for success in the provision of services of acceptable quality and reliability on a sustainable basis. It is being released as a departmental publication both in print and electronic versions for use as a reference material by the World Bank staff and others interested in the region.

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Executive summary

This study reviews the status and performance of the physical infrastructure in the transition economies of the Europe and Central Asia (ECA) region during the last 12 to 15 years and attempts to identify the challenges to be overcome to ensure sustainable provision of reliable infrastructural services at acceptable levels of quality. It basically deals with the transition economies consisting of 15 countries which were part of the former Soviet Union and 12 Eastern European states which were formerly part of the CEMA arrangements with the Soviet Union and refers to the data and experience of Turkey to provide a comparative perspective. As the region, with a population of 475 million, is vast and diverse encompassing 28 countries and over 10 time zones, the analysis is in terms of four subgroups of countries: (a) eight Central and East European (CEE) states - which have recently joined the European Union (EU); (b) seven South East European (SEE) states, which hope to accede to EU in the near future; (c) four large middle income states of the Commonwealth of Independent States (CIS-middle income); and (d) eight smaller low income states of the CIS (CIS-low income)

Chapter 2 discusses what is unique to this region distinguishing it from other parts of the world.

- These are economies transiting from Soviet style central planning to market systems following the collapse of the Soviet Union and CEMA arrangements. They experienced dramatic declines in output and incomes during almost the whole of the 1990s and are recovering since at differing rates. The depth and duration of economic decline was much smaller and recovery much faster in respect of CEE and SEE states than in CIS states. The transition economies as a whole reached the 1990 level of GDP in 2004.
- In respect of key infrastructure sub-sectors like electricity, water, district heat and natural gas (where available), facilities were constructed to provide universal access, and supplies were ensured on the basis of per capita consumption norms substantially higher than in OECD countries, at prices which bore no relation to the true cost of supply. Reliable supply at little or no cost was considered by the population as an “entitlement”. Artificially low administered energy prices induced a high degree of inefficiency of energy use and promoted output with high energy intensities.
- When the outputs and incomes contracted in the 1990s, the demand for electricity, gas, rail transport and other infrastructural services declined steeply rendering the existing stock of infrastructure excessive. Nonpayment for infrastructural services became severe and the cash strapped government budgets could no longer finance routinely the cash deficits of the utilities. The utilities accumulated wage arrears, tax arrears and arrears to their suppliers, and often generators of electricity and heat, and distributors of gas had to curtail or discontinue service for want of cash to buy fuel. There were no funds for maintenance and the assets were allowed to deteriorate. The reliability and quality of service greatly dropped, as the poorly maintained assets could not meet even the greatly reduced demand.
- While most other regions of the world have to invest considerably to expand systems and increase access, the challenge in the ECA region had been to find resources to rehabilitate, operate and maintain existing assets to ensure reliable service at acceptable quality.
- The dimensions of many infrastructural facilities, especially in former Soviet Union, tended to be large as they were designed to meet the demand of large sub-regions covering several constituent republics, rather than the demand of each republic. When these republics became independent states, they had to rely on trade with neighbors to balance their demand and supply, a need which conflicted with their objectives of national self-sufficiency.

Chapter 3 discusses the quality of infrastructural services from the perspectives of the households and businessmen over the last several years, relying on the Household Budget Surveys and Business Environment and Enterprise Performance Surveys. These surveys indicate that the quality deteriorated

through the 1990s leading to the sentiment that a service connection does not always mean service provision. The deterioration was more severe in semi urban areas and rural areas. More than 60% of the business respondents considered infrastructural services to be an obstacle to their businesses in the 1999 survey. The surveys in 2002 and 2005 indicated notable improvements. By 2005, electricity was not considered an obstacle by 68% of the respondents. The corresponding percentages for transport and telecommunications in 2005 were 68% and 72% respectively. While improvement during 1999-2005 is laudable, the services have still a long way to go to achieve industry standards of quality and reliability. The frequency and duration of power outages and water supply disruptions are still excessive in many countries of low income CIS and SEE sub-regions and even in some CEE states. Transportation is still considered a bottleneck by a significant percentage of businessmen. Regulatory uncertainty is the proverbial *bête noire*. Nearly 75% of the respondents considered it a constraint to their businesses. Unless the reform agenda is pursued and the quality of service is fully restored to industry standards, infrastructure would prove a significant constraint to economic recovery and growth, especially in low income CIS and in many SEE countries.

Chapter 4 discusses the financial sustainability of the services. In power, gas and water sectors, payment indiscipline, high levels of technical and commercial losses and tariffs inadequate to cover costs are the three key elements for correction to ensure financial viability. Quasi-fiscal deficit or implicit subsidy expressed as a percentage of the GDP is an excellent tool to measure the extent of qualitative and quantitative improvements in this regard across countries and over time. It encompasses the difference between the actual and normative levels in respect of the three key elements. Payment discipline has improved and commercial loss levels have come down in most countries of the region, the exceptions being some of the CIS (low income) countries. Tariffs have reached, in a majority of the countries, short term viability level of collected revenues being able to cover all cash costs and finance some urgently needed rehabilitation. The quasi-fiscal deficits in electricity (4.2%), gas (1.7%) and water (1%) sectors together have come down to the level of about 7% of the GDP by 2003. As in the case of most aspects, here too, the performance is best in CEE (where quasi-fiscal deficits are close to zero) followed by CIS (middle income), SEE and CIS (low income) country groups. The move towards the next step of achieving tariff levels adequate to cover all costs including all O&M (operation and maintenance) costs, debt service and contributions to rehabilitation and expansion costs, and further improving on billing and collection efficiencies, and sustaining such efforts is a challenge, the difficulty of which would also vary across the sub-regions more or less in the same order as above. It is likely to be specially challenging in some of the low income countries in Central Asia, where international assistance may be crucial in managing the large tariff increases needed, while protecting the poorest segments of the population. Achieving financial sustainability in the heating sector would be more challenging in CIS (low income) and some SEE states on account of the present low tariff-base, technological conditions, and the need to stabilize the finances of the municipal governments which own the systems.

In the rail transport, short term viability has been reached by 2003 in the region as a whole if we take into account the inevitable state subsidies for passenger traffic. Such subsidies are higher than 0.5% of GDP in Croatia, Romania, Serbia and Slovakia, and are between 0 to 0.5% in other countries. Railways in Russia, Romania, Poland, Lithuania, Latvia, Georgia and Azerbaijan have short term viability even without taking into account the government subsidies. Further improvement of financial viability would depend on eliminating unprofitable routes, downsizing labor strength, hiving off non-core businesses and rationalizing passenger subsidies in a transparent manner. Road sector financial viabilities are difficult to measure and establish on similar lines.

Chapter 5 explores the questions whether the people can afford the level of infrastructural services and whether the transition economies can afford the investments needed to provide reliable services at acceptable quality levels. The affordability ratios (ratio of expenses on infrastructure to total expenses of households) at 3% to 4% for electricity, 2% for heat, and 1% to 2% for water for *all households*, and

those at 6% for electricity, 3% for heat and 2% for water *for households in the bottom income decile* in 2003 are well within the acceptable limits of 20 to 25% for all services together. Immediate increase of tariffs to cost recovery levels does not seem to result in the violation of these limits in most countries except in the case of Tajikistan, Albania, Bulgaria and Serbia, where graduated increases would be needed. Even tariffs needed for long term viability seem to be capable of being achieved by 2007 or 2010 without exceeding the 20% to 25% affordability limit through the use of graduated tariff increases in the medium term. All the transition economies are registering notable economic growth, and the percentage of the poor in the population had dropped from 21% in 1998 to 12.8% in 2003. Overall, with appropriate social protection mechanisms, the tariff adjustments needed for financial viability appear achievable in the medium term. The resulting social protection costs should be manageable in CEE, CIS (middle income) and most SEE countries. Some of the low income CIS countries may need international support to manage the social protection burdens. Though non-earmarked cash transfer is the ideal mechanism, short to medium term solutions may have to encompass earmarked cash transfers, targeted subsidies, lifeline rates or a combination of some or all these mechanisms.

During 2005-2010, the ECA region may have to invest nearly 7% of the GDP annually to rehabilitate, operate and maintain the infrastructural services at a level and quality needed to sustain the targeted economic growth. Given the new economic dynamism and improved macroeconomic conditions experienced by the region driven by oil and gas prices and exports and associated trade, investments of this level would appear feasible with the adoption of appropriate policies. Accession to EC had been a powerful motivation for adherence to such policies by the CEE states (which have already joined EC) and many of the SEE states which aspire for such accession. Care would be needed to transfer the investment responsibilities to commercial and private finance in all potentially financially viable sectors. The government finances would then be applied to other sectors such as roads, rural services, passenger rail traffic as well as social protection costs.

Chapter 6 discusses the crucial role trade will play in the growth of these economies and how the infrastructure provision and operation should be geared for this. Given the uneven distribution of energy and water resources across the region, the size and location of the large infrastructural facilities, the modest demands in the newly independent states of the FSU, and the existence of transmission systems, trade in energy is both an inevitable consequence and a necessity. The large multi-purpose hydroelectric reservoirs serving more than one state have to be operated in a manner to maximize the benefit for the entire basin through appropriate trade arrangements. While national energy security is a legitimate concern, costs are sought to be moderated through cost effective trading arrangements. Basic sector restructuring in energy (needed to facilitate such trade on a commercial basis) has taken place in most countries in the region, though the trade itself takes place in SEE and CIS only among state-owned entities authorized to carry out such trade. The challenge in the energy sector in SEE and CIS is to promote liberalized energy trade as is being done in EU accession countries. SEE has already commenced this process through the Athens Memorandum of 2002. Electricity trading arrangements among the Central Asian Republics and among the states surrounding the Black Sea are being revitalized, promoted or studied. Large electricity projects which commenced during Soviet days and had been languishing for want of funds for completion in Central Asia could be economically completed as projects for export of power to Russia, Iran, China, Afghanistan and Pakistan, provided appropriate institutional arrangements are made. Russia, Iran and private investors have shown interest in financing some of these export projects. Russia has emerged as major supplier of energy to EU. Kazakhstan, Turkmenistan and Azerbaijan may soon be able to follow suit and play significant roles. Many of the transition economies are in the transit route of these exports and the power and gas systems in these countries do need substantial investment to keep the system integrity. Russia appears to have understood the implications of this and has been active in acquiring and investing in these assets. EU also needs to look into this aspect and promote investments in such systems to reduce risks to crucial supply routes.

In the road and rail transport sector, goods from the countries in the region pass through several borders before they reach the export destination. Apart from maintaining the road and rail assets in good condition, a great deal of streamlining and harmonizing of the border crossing and customs formalities has to be done. Focus on such trade and transit facilitation would appear to yield significant increases in trade gains.

Chapter 7 discusses the experience in the region in participation of the private sector in infrastructure provision, the key lessons learnt and the outlook for the future. During 1990-2004, investments in the infrastructure projects with private participation amounted to $139 billion covering 550 projects. About 70% of the investments were in telecommunications, followed by energy (23%) and transport (4%). Bulk of the investments involved divestiture (51%), followed by green field investments (43%), concessions (4%) and management contracts (2%). Privatization receipts at $42 billion amounted to about 5% of the GDP. With the decline in the interest of the traditional western investors, the role of regional investors is becoming more significant. Similarly, the focus on the so-called strategic investors is shifting to investors who specialize in acquiring poorly performing assets and turning them around into profitable ones.

Chapter 8 discusses the critical factors of success in the sector reform. Sustained financial viability of the sector entities is the key central objective. This may be achieved in several ways: public provision, private provision, regulated monopolies, competitive entities or a combination of all or some of these. Whatever be the route, the key critical factors of success are: a clear recognition of the problems, consistent ownership of the program to overcome them, transparency in all transactions to enable meaningful accountability, and governance adequate to ensure effective sector management and oversight to ensure that the sector agencies provide services to the consumers at acceptable levels of quality and reliability. These encompass concepts of respect for property rights, prevention of theft, enforcement of contracts, and regulation – all of which need to be enabled by the state. They also include improved corporate governance and public enterprise reform. Irrespective of the route chosen—public provision or private provision—the states which focused on these critical factors achieved a measure of success even in the face of turbulent times, while those states which did not focus on these aspects could make little headway.

1. Transition and infrastructure in ECA

Scope of the study

This study reviews the status and performance of the physical infrastructure[1] in the transition economies of the Europe and Central Asia (ECA) region during the last 12 to 15 years and attempts to identify the challenges to ensure the sustainability of adequate infrastructural services at acceptable levels of quality and reliability. Given the ubiquitous role of governments in ensuring optimal and sustainable provision of infrastructural services to their economies, it highlights the experiences relating to the issues of the relative roles of the governments, the private sector and the international financial institutions, and the overriding importance of good governance in general.

Unlike in the case of other regions of the world, access to most infrastructure facilities is not a problem in the ECA region: nearly 100% of the population has access to electricity and water. The key problem here is one of *making functional once again* the existing massive stock of infrastructural assets to provide infrastructural services to the population and the economy at acceptable levels and quality, rather than one of massive capacity addition to the stock of infrastructure to increase access to the population. In fact, in many countries and in several sub-sectors the problem is also one of excessive idle capacity in relation to the shrunken demand and the income levels of the population, and of coping with over-dimensioning of the physical assets.

The ECA region of the World Bank Group (WBG) comprises 28 countries. Fifteen of them were part of the former Soviet Union (FSU). Twelve of them are East European states - formerly part of the CMEA arrangements with the Soviet Union. Together, these 27 countries are often referred to as the transition countries. The last is Turkey, which does not belong to either of the two groups. It is, however, a candidate for future accession to the European Union (EU). Unless specifically mentioned otherwise, the discussions in this study are essentially about the FSU and East European states, and data and experiences relating to Turkey are mentioned in passing to provide a comparative perspective.

With a population of about 475 million, the ECA region is vast, covering more than 10 time zones and stretching from Poland and Czech Republic in the west to the Bearing straits in the east and from the arctic regions in the north to the Pamir Mountains of Tajikistan in the south. Its diversity is such that generalizations and meaningful discussion of issues is possible not so much in terms of the region as a whole, as in terms of country groups. Discussions in this study are thus generally in terms of the grouping of countries given in Box 1.1.

The transition process

Though all these countries, except Turkey, shared the common history of facing major economic collapse in the context of the dissolution of the Soviet Union and the discontinuation of CMEA/COMECON arrangements in 1989-1990, they differed significantly in the duration and depth of gross domestic product (GDP) decline and in the rate and extent of economic recovery. Their responses to the challenges varied widely across the dimensions of policy, governance and consumer behavior resulting in remarkably different outcomes during the last 15 years.

[1] The term “physical infrastructure” is to be understood as distinct from social infrastructure such as education and public health. Also, the study is essentially written mostly from the perspective of the networked sub-sectors such as electricity, water supply, and railways, and to a lesser extent of natural gas and district heat. It refers to other physical infrastructure sub-sectors such as roads and sanitation to a very limited extent, generally in the context of discussion of certain common issues.

Box 1.1: Country Groups

A. Central and Eastern Europe (CEE): (8 countries) (all new EU members and often referred to as EU 8)
Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovak Republic, and Slovenia

B. South East Europe (SEE): (7 countries)
Bulgaria, Romania, (2 candidates ready for accession to EU), Albania, Bosnia-Herzegovina, Croatia, FYR Macedonia, and Serbia-Montenegro (5 candidates for possible EU accession at a later date)

C. Commonwealth of Independent States (CIS) (low income): (8 countries)
Armenia, Azerbaijan, Georgia, Moldova, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan

D. CIS (middle income): (4 countries)
Belarus, Kazakhstan, Russia, and Ukraine

E. Turkey: (a Candidate for EU accession at a future date)

Note: The WBG classifies countries with a per capita GDP lower than $965 as low income countries and those with per capita GDP between $965 and $5685 as middle income countries.

The region is undergoing a unique process of transition, the understanding of which is necessary to comprehend fully the developments in its energy and infrastructure sectors and the challenges faced by them. The transition process, which commenced in 1990 and is still ongoing, comprises three closely related and intertwined elements, namely,

- A political transition from highly centralized and controlled single party political system to more decentralized, multiparty democratic forms of government. In some countries, this was accompanied by internal conflicts and political disintegration;
- An institutional transition from the framework of central planning to the institutions of a market economy as well as a fiscal decentralization from the national to sub-national and local governments to empower the latter to discharge their public responsibilities better; and
- An economic transition involving the disintegration of the highly integrated economic space of the FSU and CMEA arrangements, resulting in the disruption of trade, financial and labor market relationships.

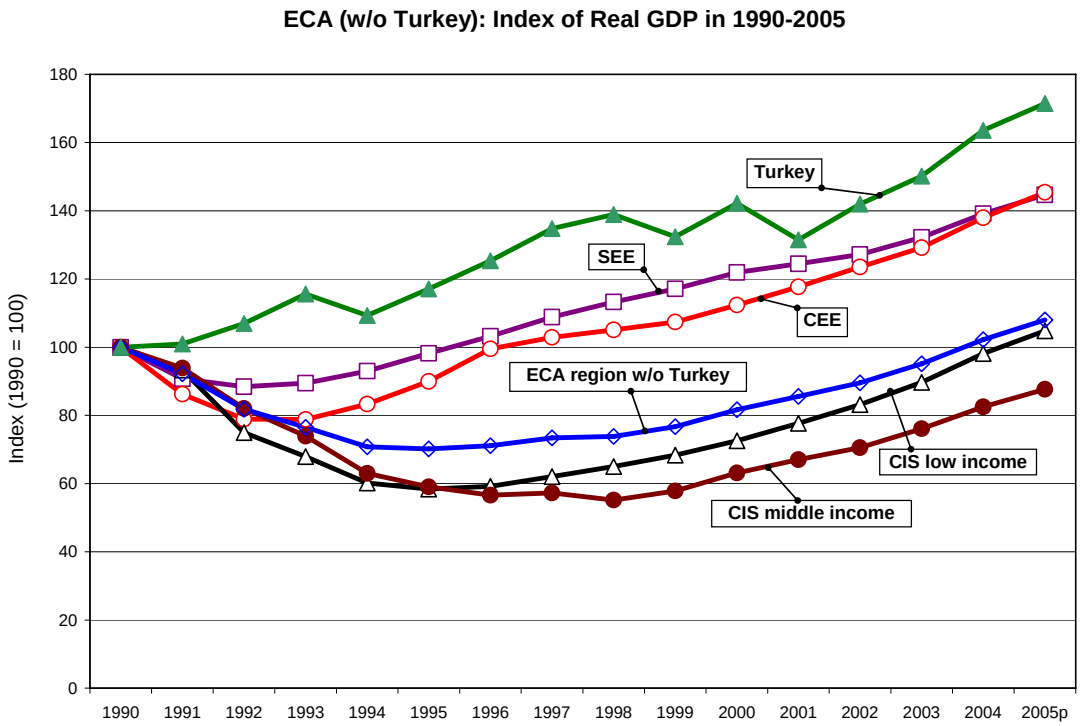
The transition involved two stages. In the first stage, the economic turmoil was characterized by a steep decline in output and incomes, high unemployment and runaway inflation, as well as the disintegration of exiting political, institutional and economic relations. At this stage, countries aimed at stabilizing their economies and arresting further deterioration. This was followed by a second stage characterized by economic recovery, involving rebuilding, reform and integration with the world economy.

Map 1.1: Map of the ECA Region

CEE	SEE	CIS (MI)	CIS (LI)
01 Czech Republic	09 Bulgaria	18 Belarus	16 Armenia
02 Estonia	10 Croatia	20 Kazakhstan	17 Azerbaijan
03 Hungary	11 Romania	23 Russia	19 Georgia
04 Latvia	12 Albania	26 Ukraine	21 Kyrgyz Republic
05 Lithuania	13 Bosnia-Herzegovina		22 Moldova
06 Poland	14 FYR Macedonia		24 Tajikistan
07 Slovak Republic	15 Serbia-Montenegro		25 Turkmenistan
08 Slovenia			27 Uzbekistan

Source: EBRD Transition Report 2004

For the region as a whole, the first stage lasted about 6 years from 1990 and resulted in the loss of about a third of its measured GDP. This was followed by stagnation for about 3 years and disruption to recovery caused by the Russian currency crisis in 1998. Steady economic growth resumed from 1999, spurred significantly by rising prices and exports of oil and gas. The vigorous growth continued through 2004 and is expected to continue for the rest of the decade making it the most economically dynamic region in the world.



Source: ECA Regional Economics Database, World Bank

The depth and duration of recession in the first stage and their impact varied across country groups. In the 15 countries of CEE and SEE, the recession lasted only for 2 or 3 years and the GDP contraction was only about 15%., though the three to four digit inflation rates could be brought down to a single digit rate only by 1997/1998. In the 12 countries of CIS, the recession lasted for 6 to 7 years and GDP losses were about 44%. The duration was much longer in Russia (8 years) and in Ukraine and Moldova (9 years). The GDP losses were much more severe in Georgia (78%), Tajikistan (68%), and Moldova (65%). The three and four digit inflation rates experienced in CIS countries could be brought down to a single digit only by 2002. While Azerbaijan and Georgia could bring their inflation rates down to 4% and 7% by 1997, Belarus, Moldova, Russia, Tajikistan and Uzbekistan had inflation rates in the band of 10% to 28% even as late as in 2003.

Social impacts of the steep economic decline were dramatic.

- The percentage of the poor (with incomes lower than one dollar a day) in the population increased from 1.5 in 1990 to 5.1 in 1998. In Russia and Tajikistan poverty rates reached 30% and 70% respectively.
- Inequality increased substantially. In countries such as Armenia, Russia, Tajikistan and Ukraine, inequality as measured by Gini co-efficient nearly doubled.
- Living standards dropped steeply in most countries. In Russia, male life expectancy fell to 57 years, well below those in low income developing countries.
- Spending on social services and safety nets and their quality dropped dramatically. Per capita public expenditure on health and education was less than $20 in low income CIS countries and less than $100 in Russia compared to about $350 in CEE countries and a multiple thereof in Western Europe.

The transition was more difficult and much slower in CIS than in CEE and SEE for the reasons:

- It had a longer history of tight political control. Its need for new political and sovereign institutions was greater. Many of the countries had a high potential for internal conflicts;
- It had relied on a more rigid form of central planning and had no history with a market system.
- Its economy was much more tightly integrated in FSU and was thus more negatively affected by the spatial break down of the Soviet economy.
- Low income CIS countries were especially hard hit, as they lost their subsidies from the Soviet Union and suffered from the disruption of the essential links of trade, transport, energy and water which existed before the dissolution of the Soviet Union. They also faced the loss of critical human resources as a result of the repatriation of Russian nationals.

In contrast, the economic links of CEE and SEE to the Soviet System were less close; their central planning was less rigid; and they had a more recent history with the market system and were exposed to Western trade and capital. The prospect of EU accession was a powerful influence in ensuring political consensus on the needed reforms. In addition, earlier and more systematic reforms (covering stabilization, price liberalization, privatization, property rights, legal and judicial reforms, financial sector reform and public administrative reforms) as well as the more favorable initial conditions are believed to have helped the CEE and SEE states to recover faster. The growth in the last few years of even countries lagging behind in systematic reform have been explained to some extent by the surging commodity prices such as oil and gas.

A key element of the reform process is the establishment of a healthy investment climate for domestic and foreign investors. The CEE countries, and to a lesser extent the SEE countries, managed to establish a better investment climate and a more disciplined and supportive environment for enterprises and were thus able to attract a greater share of the foreign direct investment (FDI) flow into the region and permit the creation of a rapidly increasing number of productive firms and small and medium enterprises. The CIS tended to lag behind in these areas with a correspondingly low share of the FDI flows (see Table 1.1).

Table 1.1: Cumulative net FDI Inflows into the Transition Economies 1989-2004

Country Group	Cumulative Net Inflow ($ million)	Cumulative Net Inflow Per Capita ($)
CEE	163,074	2,235
SEE	42,018	821
CIS	56,876	203
All Transition Economies	261,969	647

Source: EBRD Transition Report 2005

The prospect of accession to EU had been had been a powerful coordinating influence for reform in the CEE countries. It is also playing a similar role in the SEE countries and even in some of the CIS countries which aspire for such EU accession in the near future. For other CIS countries, the potential for expanded trade relations not only with EU but also with big and solvent neighbors to the East and the South (China, Iran, Turkey and South Asia) would serve a similar purpose.

Infrastructure restoration and the transition

In the transition economies, there is a strong positive correlation between the rate of economic recovery and growth and the rate of restoration of the infrastructure sectors to provide services at an acceptable level and quality. While the causal relationship between the two is not easy to discern, there is clearly a cyclic synergy among two at least till the economy matures. In economies that have recovered fast or are growing fast, the task of restoration of services becomes some what less difficult and more rapid. In countries where infrastructure reforms lag behind and services are inadequate or unreliable, growth is

seriously constrained. Business environment surveys carried out jointly by the World Bank and EBRD in 1999 highlighted shortfalls in the provision of key infrastructure services (such as reliable electricity supply) as a major constraint for economic development in the region. Subsequent surveys in 2002 and 2005 show a gradual easing of this constraint. It is therefore not surprising that developments in the transition process and those in the region's infrastructure sectors run parallel

At the time of the collapse of the Soviet Union, the region had a stock of infrastructural facilities, constructed to meet the perceived demands of the era of central planning and Soviet/ Soviet satellite style economy. Even without the sharp economic decline of the 1990s, the facilities (especially in the electricity, water and district heat sub-sectors) were arguably over-dimensioned and barely affordable. The economic collapse which ensued exacerbated this problem.

Under the central planning regime, price of the services was not a key determinant of demand and cost recovery was not a central concern. Provision of what everyone needed and what the economy (focused on heavy industries and military production complexes) called for (in the plan perspective) was the key objective. Also the choice of technology and designs were based on price levels of raw materials and energy (coal, oil and gas) substantially out of line with internationally traded prices, as well as an indifference to environmental concerns.[2] This favored a regime of low prices, high tolerance of technical losses, inefficient energy conversion choices. Under a philosophy of "to every one according to his needs and from everyone according to his ability" the pricing of the services was such that payment for the services was not a problem. It also favored very high levels of consumption (for example energy and water).[3] All the facilities were owned and operated by public enterprises under the supervision of the government ministries and were routinely subsidized (especially in the FSU) from the state budget. There was thus a legacy of widespread expectation that the people are entitled to these services, which should be provided at little or no cost.

In the context of the dissolution of the Soviet Union and the CMEA/COMECON arrangements, the prices of commodities and fuels tended to rise sharply to traded levels and the marginal cost of the supply of the services rose. This was happening when GDP contracted sharply, fiscal deficits became unmanageable, inflation raged to three or four digit rates and people's income drastically diminished. At the same time there was a sharp decline in industrial production and the demand for energy, transport and other services dropped dramatically. The infrastructure supply entities could not collect the dues from the cash-strapped consumers and government budgets could no longer provide unlimited support as before. The governments could not, in fact, pay even for their own consumption. The service providers therefore accumulated wage arrears, tax arrears and arrears in payment to suppliers and were forced to defer not only fresh capital investment, but also the normal maintenance necessary to keep the services flowing. Ongoing construction of new facilities was suspended indefinitely, and the existing facilities were allowed to deteriorate. Widespread theft of supply facilities became common in certain countries. Thus the adequacy and quality of infrastructure services declined sharply throughout the region, and in several cases, the services were discontinued altogether. For example in countries like Armenia, Kyrgyz Republic and Tajikistan, district heating facilities which functioned in all cities earlier, were no longer operational in most cities except in the capital and one or two of the larger cities and that too serving a substantially reduced customer base.

In CEE states, where the recession was short and relatively shallow and where economic reforms were introduced earlier and more systematically, the deterioration in infrastructure facilities and services was

[2] The ECA region generates more than 20% of the world's carbon emissions, while procuring only less than 3% of the global GDP

[3] The energy intensity of growth in CEE and SEE was four times, and that in CIS was 13 times of the average energy intensity in the OECD countries.

relatively limited. In these countries the critical elements of the reform process in the infrastructure sectors were the introduction of sufficient financial discipline to assure ongoing financial viability and the associated application of adequate governance procedures to support the introduction of the necessary disciplinary measures. Even in these countries, however, challenges remain to ensure that infrastructure services are brought up to levels comparable to the rest of the European Union.

Elsewhere, the challenges are rather more significant. The EU accession countries and other countries in South Eastern Europe have recognized the importance of implementing a financially sustainable model for the provision of infrastructure services, although, in doing so, several countries also face a key challenge regarding the affordability of these services. Several of the CIS countries have also taken critical steps towards assuring future financial sustainability of their infrastructure sectors. Interestingly, two of the poorer CIS countries, Armenia and Moldova have been in the vanguard in this effort. Other CIS countries, however, have been slower to recognize the importance of financial viability and, in some cases, have yet to take any significant action. As a consequence, they face a continuing deterioration in the quality of infrastructure services and an increasingly daunting challenge in attempting to restore services as and when the deterioration reaches the point where governments will feel compelled to respond.

This study, therefore, focuses on the following topics with the objective of informing the broader dialogue on the challenges to the infrastructure sectors in the context of the ongoing transition process in the region:

i. The scope, legacy and the impact of transition;
ii. Quality of Services and Consumers' Perspectives;
iii. The financial viability of the provision of infrastructure services;
iv. The affordability of infrastructure services both from consumers' point of view and from the Governments' point of view;
v. The realignment of infrastructure services needed to support a more regional economy and regional trade;
vi. The role of the private sector; and
vii. Critical success factors for essential reform of the infrastructure sectors.

2. Infrastructure scope, legacy and impact of transition

Access at the beginning of transition

At the time of the break down of the Soviet Union, the countries in the region inherited a legacy of extensive infrastructure facilities designed to meet the perceived demand outlook under the central planning parameters of the Soviet Union and the Soviet Satellite economies; and access to services was widespread.

- Nearly 100% of the population had access to electricity, water supply and sanitation. Compared to the developing countries in other regions and in relation to their income levels, such an extensive access was considered remarkable (see table 2.1).

Table 2.1: Percentage of Households with Access to Electricity and Sanitation in 2000

Region	Per Capita GDP (Current $)	Electricity			Improved Water supply		Improved Sanitation	
		Urban	Rural	Total	Urban	Rural	Urban	Rural
East Asia	888	99	81	87	93	67	73	35
Europe & Central Asia	1,998	100	97	99	95	82	97	81
Latin America	3,888	98	52	87	94	66	86	52
Middle East & North Africa	2,304	99	79	90	95	77	93	70
South Asia	441	68	30	41	94	80	67	22
Sub-Sahara Africa	496	51	8	23	83	44	73	43
World	5,216	91	57	73	--	--	--	--
All Developing Countries		--	--	--	92	69	77	35

Source: For electricity IEA 2002; World Bank 2003. Figures for ECA from the WBG Household survey data. For water supply and sanitation Water Supply and Sanitation Sector Board paper of January 2004 on WBG Program (World Bank Water Sector Board website).

- Natural gas supply networks covered both urban and rural areas extensively in areas where gas transmission trunk pipelines passed through. In the region, about 75% of the households in the capital areas, 60% in other urban areas and close to 40% in the rural areas had access to gas supply networks.
- Most urban areas had district heating facilities. IEA estimates that about 75% of the households in the region have access to district heating. A study covering 19 countries in the region estimates that about 60% of the households in the capital cities, 35% in the other urban areas and about 10% in rural areas had district heating service connections.[4]
- Telephone connections were available to about 80% of households in capital areas, 60% of the households in other urban areas and about 35% of the households in rural areas.
- Rail networks were extensive with total route length exceeding 208,000 km[5] and network density varying from 2.1 km/sq.km in Latvia to 120.2 km/sq.km in Czech Republic. Rail network covered enormous distances (such as in Russia ,Ukraine and Kazakhstan) and were built primarily for the long distance haulage of raw materials, intermediate and finished goods of the heavy industries. Nonetheless its passenger traffic density is considerable. In Russia, which has the largest network in the region, the traffic density measured as passenger traffic units per route kilometer is five times more than the EU average.

[4] See Ellen Hamilton and others, *Dimensions of Urban Poverty in ECA*, World Bank, March 2004. The low percentage in rural areas is not surprising as the low housing density in such areas is not conducive to the district heating option.

[5] Of this, the largest share was in Russia (41%) followed by Ukraine (11%) and Kazakhstan (6.5%)

- While road networks were not designed with a particular focus on transportation of goods (especially in the CIS countries) most communities had access to an all weather road. In the region about 89% of the roads were paved. In Russia for example, out of the 900,000 km of road network only about 16% of the roads serving about 10% of the population was not paved. Percentage of paved roads in total road network length varied from a low of 30% in Ukraine to 80% in Bulgaria, Croatia, Moldova and Serbia. Based on data relating to 15 countries in the region including Russia, road density expressed as road length in kilometer per square kilometer of the area was in the range of 0.04 to 0.61, the exception being Hungary with a ratio of 1.85. Worldwide the above ratio varied from 0.01 to 4.9 with a median value of 0.20. Based on data relating to five CIS countries, Albania and Bulgaria, the percentage of rural population with access to an all weather road within a distance of 2 km varied from 31% in Albania to 74% in Tajikistan.[6]

Infrastructure legacy

Such an extensive stock of infrastructural assets did not prove an unmixed blessing to the newly independent states, especially during the first stage of transition. When GDP contracted by 15% in CEE and SEE, and by 44% in the CIS, the supply capacities in the region became quickly excessive in relation to the greatly reduced demand. The problem of excess capacity was much more acute in Russia, Ukraine, Georgia, Moldova and Tajikistan, where the GDP contraction was greater or the duration of the recession much longer than the average. The facilities designed in the central planning era during the Soviet regime became also unsuitable for the developments towards the market economy.

- Most of the thermal power and heat generation assets had already exhausted their useful life of 25 to 30 years and were in a state of disrepair requiring extensive rehabilitation to keep them going. Power and heat generation technologies and equipment with low levels of efficiency of energy conversion chosen in the context of plentiful supply of fuels at artificially low administered prices, quickly became white elephants in the context of the fuel prices rising rapidly to regionally or internationally traded levels. In the Soviet days, the power transmission and distribution system was designed to meet a large share of total consumption at high voltage levels by industrial complexes and a relatively modest share at low voltage level by the population. During the recession not only did the total electricity demand decline, but its composition radically changed with a steep decline in the share of the high voltage demand by industries and a large rise in the share of the low voltage demand by the households, the emerging service sector and small enterprises. The transmission and distribution systems, (especially the latter) called for extensive reconfiguration and reinforcement, to avoid excessive technical losses. Though most consumers were metered, the quality of meters was poor. Tajikistan for example used three digit meters where the household average annual consumption was higher than 4,800 kWh.
- The efficiency of the Combined Heat and Power (CHP) plants in the region was only 70% to 75% compared 80% to 90% in Western Europe. The design of the generally over-dimensioned district heat systems was also based on the inefficient constant flow regime, lack of system controls and insufficient insulation of pipes resulting in high levels of heat losses which were three times as much as in Western Europe. Annual make up volume of the circulating water was 6 to 10 times of the volumes encountered in the west.[7] System metering and consumer metering even at the level of substations and buildings were practically non-existent and unreliable. Consumers could only be charged on the basis of norms for the volume of space heated or the number of persons occupying the heated buildings. Worse still the consumer had no way of adjusting the level of his consumption based on the price of heat and his ability to afford it. It has been estimated that an investment of $25

[6] The data here is from the WB Infrastructure Data Base and from World Bank/Infrastructure and Energy-Transport Website.
[7] Meyer, A and Mostert 2000

billion would be needed in the course of the next five to seven years to improve the energy efficiency of the district heating systems by 20% in eleven transition economies.[8]

- The gas distribution systems also did not provide a significant percentage of consumers with meters and bills were made on the basis of consumption norms relating to the size of the dwelling and the number of persons occupying it. In addition, in certain Central Asian Countries, even the import/export meters for gas were non existent resulting in the need for a great deal of complex calculations to determine the volume of gas imported or consumed. The billing norms for gas and heat almost always tended to be substantially lower than the actual level of consumption and were often subject to abuse.
- Overall power, water supply and waste disposal facilities had been designed without adequate environmental safeguards. To conform to the environmental standards considered necessary under the EU program, significant investments would be needed.
- Water supply systems adopted consumption norms three times as high as in OECD countries; pipe lines and related facilities were oversized ; and water was often piped over long distances. The pumping equipment used was also energy inefficient; and household and commercial connections were without meters. Further, the quality of equipment and materials used was low. Water transmission pipes for example tended to corrode heavily, as they lacked corrosion protection.
- The railway networks were designed to link the republics to Russia. Thus the rail network in Central Asia extended to Russia in the north-south direction, but left underdeveloped the links among the Central Asian Republics and their neighbors such as China, Iran and Afghanistan, thus causing the region to lag behind in trade.
- The freight transport was essentially by rail. Road networks in Russia and CIS were not designed to handle heavy freight traffic. They were designed with a maximum width of 10 meters and a tight radius to minimize construction costs and were suitable for maximum axle loads of six to eight tons per axle. This proved inadequate for the operation of much larger trucks of European dimensions with axle loads of 11 to 16 tons on double axles.[9] Such large trucks came to be used when modal shift in freight transport occurred during transition.
- Telecommunication technologies for the civilian use were outdated and inefficient.

Dimensions to suit sub-regions rather than republics

Often infrastructural facilities tended to be of large dimensions, as they were designed, especially in the Soviet Union, to meet the demand in large sub-regions covering several constituent republics, rather than the demand in each republic. Thus for example the Toktogul reservoir in Kyrgyz Republic was designed to operate providing water for irrigation in Uzbekistan and south Kazakhstan during summer and feed the electricity produced into the Central Asian Power Grid[10] covering Kygyz Republic, Tajikistan, Uzbekistan and South Kazakhstan with a central load dispatch center located in Tashkent. During winter, when water was stored in the reservoir, the power needs of Kyrgyz Republic were met by mostly by the supply of electricity from the regional grid or gas and coal from Uzbekistan and Kazakhstan. Gas pipelines network was thus designed to allow the flow of gas from Uzbekistan and Turkmenistan to South Kazakhstan, Kyrgyz Republic and Tajikistan. Oil refineries were located in the oil rich republics of Kazakhstan, Uzbekistan and Turkmenistan with facility to transport refined oil products to Tajikistan and Kyrgyz Republic. Similarly rail network enabled the transport of coal from the mine heads in Kazakhstan and Uzbekistan. These arrangements which worked smoothly when they were all a part of the Soviet Union, became difficult to maintain when they all became independent republics each with its own

[8] These are Russia, Ukraine, Romania, Poland, Czech Republic, Hungary, Lithuania, Estonia, Bulgaria, Croatia and Slovenia. (Gochenour, C, 2001)

[9] Ben Eijbergen and others, *Russia: The Transport Sector*, World Bank Policy Note August 2004

[10] This was one of the 11 such power grids each covering several constituent republics of the former Soviet Union. Trans-Caucasian grid covering Armenia, Azerbaijan and Georgia is another example of the national power systems of the newly independent countries becoming unbalanced upon the dissolution of FSU.

national energy self sufficiency objective. What was previously a matter of national allocation of resources became a matter of international agreements and trade exacerbating: (a) summer water shortage for irrigation and winter flooding problems of the downstream countries; and (b) summer power export problem and winter power and fuel shortage problems of the upstream countries.

Similarly the location of large nuclear power plants in a small republic like Lithuania was based on the demand of several adjoining republics. It became over-dimensioned for the small economy when it became independent and had to rely on exports to Belarus, which had great difficulty in making timely payments for the imports.[11] The location of a 2,500 MW thermal power station in the Transnistria region of Moldova is another example of this type of approach to plant sizing.

An associated consequence of the large dimension of the infrastructure and related facilities in the region was the development of the so-called company towns in relatively remote places, built around large coal mines, oil and gas facilities, major power plants and railway workshop and production facilities. These towns were mostly populated by the workers in these production units and their dependents. The agencies operating the production facilities were also responsible for providing the town with all urban services such as housing, education, public health, medical and recreation facilities, as well as utility services. Significant costs of such social responsibilities were thus associated with these production facilities.[12]

Changed political and economic environment

Upon the collapse of the Soviet Union and the CMEA/COMECON arrangements, the political and economic environment under which the infrastructural services were provided underwent a sea change.

- Armed internal conflicts in countries such as Armenia, Azerbaijan, Georgia , Moldova, Kyrgyz Republic and in certain provinces of Russia such as Chechnya in the CIS and full scale ethnic wars in the Balkans and armed conflicts in Albania in SEE resulted in a great deal of damage and destruction of infrastructural facilities and also created operational problems. Georgia and Moldova, for example, could not control their key electricity generation assets located in rebel areas, nor could they hope to collect the payment dues from the consumers from such areas.
- The newly independent states moved away from the previous regional operational regimes for the provision of services and adopted national self sufficiency approaches, even though such approaches proved economically disadvantageous. Costs and availability could now be managed, only through trading and cooperation agreements among the new nations and this proved difficult.
- The government owned enterprises and agencies providing services were not organized as financially sustainable entities and were dependent on state budgets for much of their operational and investment resources. In the context of rapid collapse of the economy and the vastly increased fiscal deficit problems, government budgets could no longer provide support to these enterprises, as before. This led to a sharp reduction of public investment in the infrastructure.
- Nor could the agencies look to the consumers for resources. In an environment of raging inflation, steeply falling production, rapidly rising fiscal deficits and sharp drop in household incomes, consumers (whether they were production enterprises, government departments or agencies or households) could not pay the bills. Non-payment problem became intense and proved intractable for a length of period.
- Administered prices for services determined under the earlier regime were no longer relevant, as the prices of fuels and other traded materials rapidly tended to rise and match the border prices. Greatly reduced demand, rising prices of inputs and severe non-payments as well as hyper inflation tended to push up service costs and most services providers became insolvent. The infrastructure entities accumulated wage arrears, tax arrears and arrears to their suppliers. Often thermal power stations and

[11] This nuclear plant is scheduled to be shut down under a program agreed with EU on safety and age considerations.
[12] Similar company towns also existed around major state owned industrial complexes (or Kombinats).

district heating facilities and gas networks had to be shut down, as they could not pay for the imported fuels. Thus actual level of the services could not meet even the greatly reduced demand and a downward spiral ensued. Service quality and reliability plummeted.

- Cash strapped service enterprises had to abandon or suspend all their new investment projects and could not find resources even to carry out the normal maintenance resulting in a further reduction of operable assets.
- Nor could these cash strapped entities provide the support needed for the company towns resulting in an adverse impact on spending for health and education. Municipalities were created for them or they were attached to other municipal towns. In either case they all suffered for want of resources during the prolonged recession. In respect of company towns surrounding uneconomic coal mines closed down, there were large scale migrations of people to the towns of other economic mines or to the normal urban areas increasing pressures for services in those areas.

Impact of transition on infrastructure across the region

The extent of impact of the new environment varied across the region. Broadly in line with the macroeconomic changes, the impact was modest and adjustment/recovery was earlier in the CEE. The decline in economic activity was short lived and the adverse impact of under-investment in maintaining facilities was also relatively limited. Investments are required to bring the quality of infrastructure services up to the standards prevalent in the rest of the EU, but this is projected to be manageable and affordable over time.

In the power sector, for example, Hungary and Poland, faced decline in electricity sales by 16% and 12% during 1990-1993, but the deterioration in the quality of supply was arrested and adjustments to meet the changing pattern of demand made relatively quickly. The demand reached the 1990 levels by 2000/2001. In the case of Lithuania sales dropped nearly 50% reflecting the changed production structure of the economy and stabilized at that level with gradual improvements in the quality of supply. Since 2000 demand is also rising slowly.

In the SEE states, as a whole, gross electricity demand dropped from about 150 TWh to 145 TWh during 1991-1994 on account of the economic downturn and the war, but grew thereafter at an average rate of 1% per year till 2001 to reach the level of 163 TWh. The share of the industrial consumers went down from 55% to 47% while that of residential consumers went up from 32% to 39% during this period. Electricity generation at 167 TWh in 1991 could comfortably meet the demand, while generation of 165 TWh in 2001 was inadequate to meet the demand, due to the export of power to countries outside the region. The tight supply situation is attributable, in part, to the dependence on hydroelectric power to the extent of 24% to 35% and fluctuations in hydrology. It is also attributable slower pace of reforms needed to moderate demand through cost recovery prices and ensuring financial viability of supply entities to secure finance for rehabilitation of the generation facilities.

- Within the region performance varied. Albania and Montenegro faced major problems while Romania and Bulgaria fared as well as the CEE states, as they were spared from wars and conflicts.
- In Albania, demand for electricity dropped by 21% during 1989-92 due to the fall in industrial production arising from the discontinuation of CMEA. However it increased dramatically at the rate of 10.4% per year through 2000 and beyond. The incremental demand came from households, who were getting free household appliances from abroad from their friends and relatives in large quantities.[13] Inability of the government to control theft of power and enforce payment discipline greatly accelerated such growth in demand. With reduced hydroelectric generation caused by weather

[13] A high level of rural to urban migration may have also contributed to the increase in household consumption.

changes and inability to import on account of financial constraints, extensive load shedding became the routine.

- Bulgaria's electricity generation dropped from 49.2 TWh in 1988 to 35.6 TWh in 1992 as a result of the economic decline and the sudden drop in the industrial demand, but bounced back to 42.8 TWh by 1996 and maintained generation at about that level thereafter. It was able to restore and maintain acceptable service standards and also maintain an electricity export level of 5 TWh to 8TWh (or about 20% of its generation), through a vigorous implementation of reforms in the areas of payment discipline, price adjustments and enterprise reform and finally through privatization of distribution assets and part of the generation assets in the last two years. Romania also achieved similar results with a slightly longer time lag. The prospect of EU accession in the immediate future had been a powerful incentive for reform in these two countries. Integration of UCTE 2 (to which the SEE countries belong) with UCTE 1 (to which most of the west European states belong) had also been a major incentive for reform and realignment of the power sector.
- In the other Balkan states such as Bosnia-Herzegovina and Serbia-Montenegro the problems of transition were compounded by internal conflicts and ethnic wars causing extensive damage to the infrastructure facilities. Since the restoration of peace, they are attempting to restore the facilities and services to an acceptable standard.

The adverse impact of the first stage of transition was most pronounced and lasted longest in the CIS countries. Available generation capacities contracted and could not meet even the greatly reduced demand. Supply quality dropped dramatically; supply interruptions increased in frequency and duration, caused by severe shortage of liquidity in the system arising from the phenomenon of nonpayment and payment through barter, offsets and promissory notes.

- Russia had the largest power system in the CIS with a total installed generation capacity of 216 GW (70% Thermal power plants, 20% hydropower plants and 10% nuclear power plants). However on account of the age and lack of maintenance of the generation assets, the available capacity decreased by about 17 to 20% during the 1990s. Many large thermal units among the available ones could not operate for want of funds to pay for the fuel. During 1990-1998 generation and consumption of electricity dropped by about 24% and 30%. Both the demand and supply have grown since 1999 in line with the notable GDP growth of the country. The investments needed to rehabilitate the generation plants in Russia had been estimated by International Energy Agency (IEA) to be of the order of $21 billion through the year 2030. The consumption at the level of 618 TWh in 2002 is forecast to grow at the rate of 1.3% per year through 2030, the rate being slightly faster during the next 5 to 10 years. While the supply position is reasonable now (except perhaps in the far eastern and southern parts on account of transmission restrictions) and is likely to be so till about 2015 on account of the current overcapacity, investments may be needed for incremental demands thereafter. For the period up to 2010 IEA estimates generation investments of about a $1.0 billion per year, while annual investments in transmission and distribution is estimated at $1.0 billion and $ 3.4 billion respectively. [14]
- Ukraine which had the second largest power system with an installed capacity of 55 GW (68% Thermal, 9% hydro and 23% nuclear) faced even greater asset deterioration. Only 78% of its capacity was available and generation and consumption during 1990-1999 dropped by 47% and 45%. Here too, both demand and supply have grown since 2000 in line with GDP growth. Investment needs for the next five years have been estimated at $1.5 billion per year (20% for thermal plants rehab, 20% for distribution, 33% for rehabilitation of nuclear units, and 27% for transmission and dispatch).
- In Kazakhstan which had an installed capacity of 18.3 GW (89% Thermal and 11% hydro) the available capacity contracted by about 24% and electricity generation declined during 1992-1999

[14] The data here is drawn from *World Energy Outlook*, International Energy Agency (2004)

by about 43% and gross domestic supply including net imports declined by about 44%. Supply condition deteriorated to well below acceptable levels during 1900-1996. Driven by oil exports, the economy has registered remarkable growth in GDP since 1999; and electricity generation has increased by about 48% by 2004. Supply conditions have notably improved.

- The problem was even more acute in the low income CIS countries like Georgia, Moldova, Armenia, Azerbaijan, Tajikistan, Uzbekistan and Kyrgyz Republic. In these countries power supply could not be provided for more than few hours even in the capital cities and the quality of supply was extremely poor during the early years of the recession. Gas supply was greatly curtailed for want of money to pay for imported gas. District heating systems were too dilapidated in the rural areas and even in urban areas service coverage was greatly reduced on account of the inability to pay for the fuel. The available power generation capacities decreased by about 30% in these countries (except in Georgia where the decrease was about 70%) largely because of the deterioration caused by lack maintenance of the thermal power plants and the lack of cash to pay for the fuel. Even the hydro facilities had gone into disrepair on account of armed conflicts in Georgia. Such regional conflicts affected Armenia greatly by disrupting the supply of fuels from the other republics. By adopting the needed reforms the deterioration had been arrested and 24 hour supply restored in Armenia, Azerbaijan, and Moldova. Tajikistan and Kyrgyz Republic continue to have supply shortages in winter season on account of their inability to fund the rehabilitation of their thermal plants and inability to pay for the import of fuel. Uzbekistan has provided extensive natural gas access to most households and has been able to raise its gas and electricity tariffs substantially in the recent past, but still has difficulties of meeting the peak demand in the electricity sector on account of the need to rehabilitate its extensive thermal generation assets. Georgian power system is still deeply distressed (financially and otherwise) and is unable to provide reliable supply, despite a range of reform initiatives undertaken.
- The four Central Asian Republics (Kazakhstan, Kyrgyz Republic, Tajikistan and Uzbekistan) together had at the end of 2002 a total installed power generating capacity of 38 GW of which only a capacity of 25GW was available. They had a total generation of 134.6 TWh and a small net export to outside systems of 150 GWh. Their domestic demand was expected to grow at a very modest annual rate of 0.31% during 2005-2010. Their investment needs during this period to rehabilitate distribution systems and some transmission assets and thermal generation units are estimated at $3.4 billion. This would enable them to export by 2010 about 25TWh of electricity to outside systems.

The *district heating sub-sector* was perhaps least equipped (in terms of technical design, organizational arrangements, structure of pricing and cost recovery policies) to withstand the upheavals caused by the transition. Heat production in the region declined dramatically during 1990-1994. Despite some moderate increases in heat generation in certain countries since then, production levels in 2002 were considerably behind the levels in 1990.

Table 2.2: Heat Production in 2002 as a percentage of 1990 Production Level

Country	Poland	Hungary	Lithuania	Latvia	Estonia	Russia	Ukraine	Moldova	Kazakhstan
Percentage	47	84	45	39	29	67	42	23	58

Source: IEA 2004

The demand reduction was attributable to a sharp fall in the industrial heat demand and serious supply disruptions. The industrial demand is unlikely rebound in most economies (except perhaps Russia and Ukraine) on account of the structural shift from the heavy to light industries. Industrial consumers thus would no longer be able to cross subsidize as before the residential consumption. The near collapse of the district heating systems in many of the countries (caused by much of the same reasons as those in the power sector) created the greatest discomfort in the region, a great part of which experiences severe

winter weather and where heating is a basic human need during the long winter seasons. In many low income CIS countries such as Georgia, Moldova, Armenia, Tajikistan, and Kyrgyz Republic most of the district heating facilities in the rural areas and secondary towns have deteriorated to such a state that they have to be discarded. Even in the capital cities, the systems need extensive rehabilitation and serve a greatly reduced customer base. In countries and areas where gas supply networks were accessible, consumers switched to gas for heating. In other places consumers switched to electricity to space heating; this caused serious problems in countries like Tajikistan, Kyrgyz Republic, and Georgia, where power supply (which is mostly from hydroelectric sources) diminishes greatly during winter. In such countries consumers in most rural areas resort to the use of dirty fuels (coal and biomass), which impacts negatively on their health and environment.

In the case of *water supply and sanitation sector*, the quality of water dropped in relation to high quality standards nominally in force. The operation of waste water treatment plants ceased in many places. Maintenance and rehabilitation work was postponed over several years accelerating the process of asset deterioration. In several countries hours of system operation were reduced in the context of cash constraints. National surveys indicate that less than 65% of households in capital cities and less than 50% of the households in secondary cities and rural areas reported 24 hour access to water services. The average continuity of water supply is 17 hours and the average number of breaks is 2 per km a year. This compares very unfavorably with international standards (table 2.3). Less than 24 hour water supply is far more than consumer inconvenience. During supply interruptions, the pressure in the distribution pipe lines falls and allows intrusion of liquids in the soil around the pipe breaks or loose joints and results in contaminated water supply when the supply resumes. Furthermore, pressure swings reduce the service life of everything from pipes to meters. Over time pipe breaks and service continuity display a high negative correlation.

Table 2.3: Hours of Supply and Pipe Breaks in Water Supply (2003)

Country	Hours of Supply per day	Number of pipe breaks/km/year
Albania	6.0	-
Armenia	8.0	1.7
Azerbaijan	8.0	0.9
Belarus	24.0	-
Bulgaria	24.0	-
Georgia	19.0	2.6
Kazakhstan	23.5	1.3
Kyrgyz Republic	22.0	0.9
FYR Macedonia	24.0	-
Moldova	11.5	7.5
Russia	23.8	0.8
Tajikistan	13.1	1.7
Turkmenistan	15.0 to 20.0	-
Ukraine	19.0	2.3

Source: WB ECA Infrastructure Data Base; Note: Data for Armenia and Russia relate to 2002. Non-availability of data is indicated by -

Reduced maintenance and reduced hours of supply led to increased leakage of water and equipment failures, both high by the standards of OECD countries (table 2.4). When these problems became significant, water pressure in the pipes fell and end of the pipe consumers began to lose service. However, forecasts of catastrophic system failure, so common in the late 1990s, have rarely come to pass because utility engineers have proven quite resourceful in keeping basic systems functioning. That said, rural water users have often found their network supply entirely gone and have had to shift to other supply

sources. And the consumers now receiving intermittent supply, suffering low pressure, being forced to carry water to the top floors of apartment buildings have experienced a severe deterioration in their living standards.

Table2.4: Water sector losses in selected ECA countries in 2003

Country	Unaccounted-for water (% of water produced)	Country	Unaccounted-for water (% of water produced)
Albania	>50	Georgia	43
Armenia	72	Kazakhstan	36
Azerbaijan	8	Kyrgyz Republic	56
Belarus	25	Moldova	45
Bulgaria	55	Poland	41
Czech Republic	20	Romania	40
Estonia	51	Russian Federation	24
Latvia	20	Serbia	50–80
Lithuania	22	Tajikistan	15
		Ukraine	31

Source: World Bank ECA Infrastructure Database.

Although the figures in the table are derived from official sources, they highlight one of the management challenges that face both utility operators and their government overseers. The figures reported for Azerbaijan and Tajikistan rival best practice in OECD countries. World Bank teams working in the sector in both countries see evidence that performance cannot be nearly as good as the reported figures suggest. A pervasive lack of system metering makes the actual figures unknowable in either of those countries. By reporting excellent performance the utility operators leave government unable to understand the level of intervention needed and—if the utilities use the figures to guide interventions—managers unable to target their rehabilitation efforts accurately.

Levels of unaccounted-for water average 31 percent in CEE, 32 percent in the CIS, and 52 percent in SEE. Although some unaccounted-for water is unavoidable in any water distribution system, the accepted economic level is about 20 percent. The fact that unaccounted-for water is much higher in many ECA countries suggests both that systems may be in a state of disrepair and that there are fundamental problems with billing.

In the CIS countries the term *communal sector* refers collectively to hot and cold water supply, sewerage, district heating, gas and power supply at the municipal level. The Federal Agency for Construction and Housing and Communal Sector (CHCS Agency) in Russia estimates that communal assets in Russia are deteriorating at the rate of 2 to 3% a year. Between 1995 and 2003, the level of asset deterioration[15] has increased from 39.1% to 46.3%. It also estimates the investments needed for rehabilitating the communal assets to be of the order of $36 billion. These estimates may have an upward bias, but nonetheless indicative of the order of magnitude of rehabilitation investment needs in the urban areas.[16]

In the *railways sector*, which was mainly designed to meet the transport demands of the primary and heavy industries, the major impact was a sharp drop in the volume of freight caused by the decline in industrial production during 1990-1997. The impact was most adverse in systems which had a high percentage of passenger traffic density, since the ability of the reduced freight volumes to cross subsidize the passenger transport was greatly diminished and the traditional need for the budget support for

[15] By the term asset deterioration, CHCS agency means the percentage of the assets which have been fully depreciated under Russian Accounting Standards (i.e., useful life exhausted).
[16] World Bank, Infrastructure Financing Options for Russia, Background paper on Financing of municipal and communal services, 2005

passenger traffic became unsustainable or out-of-control. Thus the most financially distressed railway systems were in Albania, Croatia, Former Yugoslavian Republic of Macedonia and Turkey followed by Bulgaria, Czech Republic, Romania and Poland, which experienced serious financial distress difficulties.[17] This led to constraints on funding for maintenance and fresh investments. Increases in coal and oil trade, especially after 1997, reversed the declining freight traffic trend and large railway systems such as those in Russia, Kazakhstan, Uzbekistan, as well as smaller systems such as those in Latvia, Lithuania, Estonia, Azerbaijan and Georgia were able to manage the problem on account of low percentage share of passenger traffic and increasing freight and transit traffic.

Table 2.5: ECA railways: Traffic Task, Density and Traffic Mix, 2003

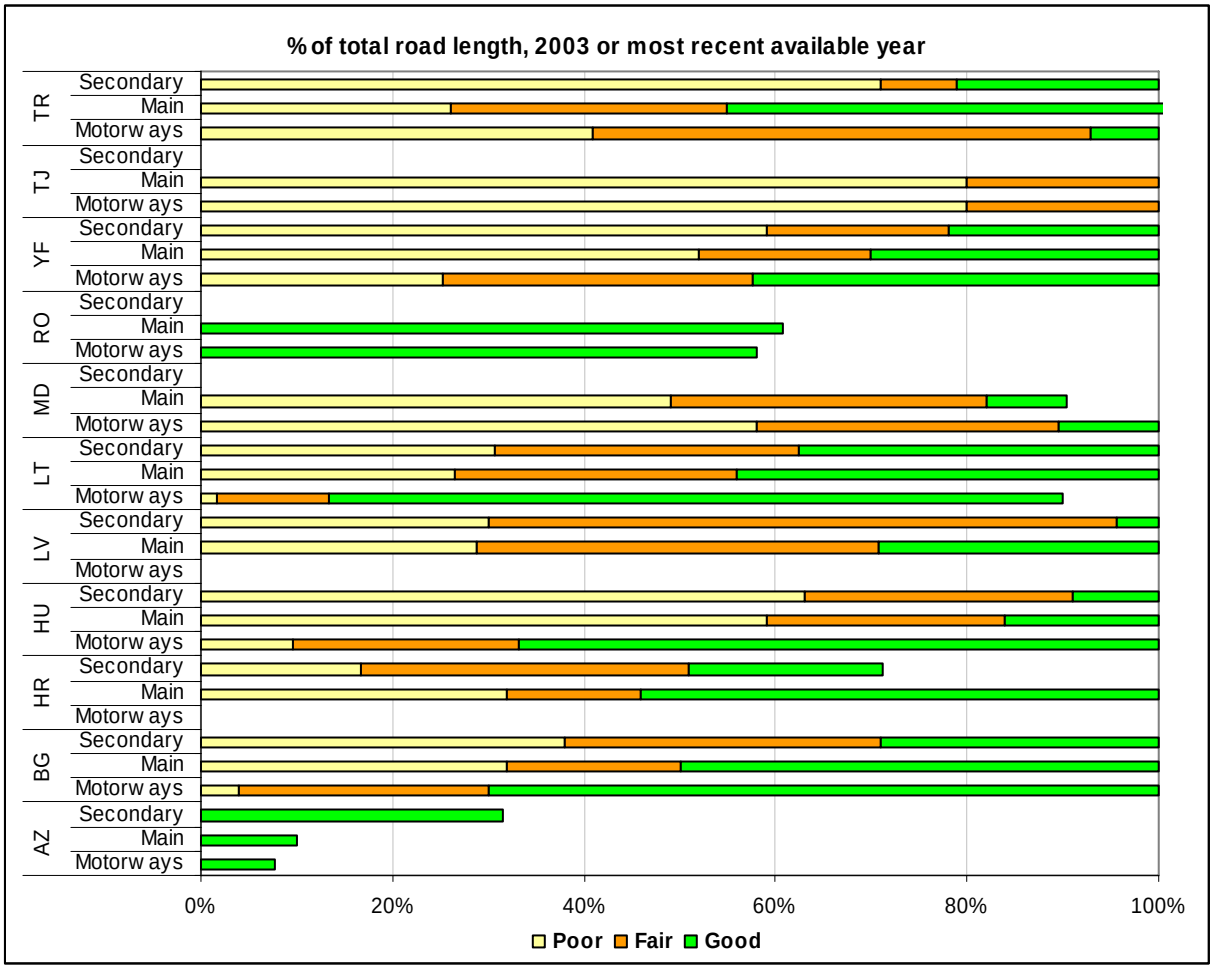
Country	Total trafic units (passenger-km +tonne-km) (millions)	Traffic density (traffic units/route-km) (thousands)	Traffic mix (proportion of Passengers) (%)
Albania	144	327	85
Armenia	500	703	10
Azerbaijan	7,564	3,565	8
Belarus	48,518	11,236	30
Bosnia and Herzegovina	361	350	14
Bulgaria	7,225	1,673	36
Croatia	3,401	1,247	35
Czech Republic	22,369	2,355	29
Estonia	9,874	8,270	2
Georgia	5,476	3,584	7
Hungary	18,283	2,366	58
Kazakhstan	143,537	10,557	7
Kyrgyz Republic	438	1,050	10
Latvia	15,764	6,944	5
Lithuania	10,265	5,856	5
Macedonia, FYR	432	618	23
Moldova	3,030	2,705	10
Poland	63,873	3,158	27
Romania	25,699	2,261	33
Russian Federation	1,663,100	19,442	9
Serbia and Montenegro	3,286	863	31
Slovak Republic	13,065	3,573	21
Tajikistan	1,126	1,824	4
Turkey	13,352	1,540	41
Turkmenistan	8,603	3,410	13
Ukraine	243,685	11,037	21
Uzbekistan	20,446	4,955	10

Source: Amos 2004

The impact of transition on *the road transport sector* was complex. Fiscal deficits in the first phase led to cuts in allocation for roads sector and road maintenance was the first casualty. The condition of roads in the region became worse and a major percentage of roads came to be classified as poor or fair (Figure 2.1 sourced from World Bank Infrastructure Data Base).

[17] Financial distress is evidenced in many ways including escalating accounting losses, chronic cash flow problems and debt crises, rapidly increasing need for budget support and deterioration of assets due to a lack of maintenance and investment.

Figure 2.1: Condition of the Roads in Select ECA countries



Even by 2000, outlays in road maintenance were well below requirements in many countries despite higher collections of road related revenues (table 2.6).

Table 2.6: Ratio of Actual to Required Road Maintenance Expenditures 1999-2000 (Amount in $ million)

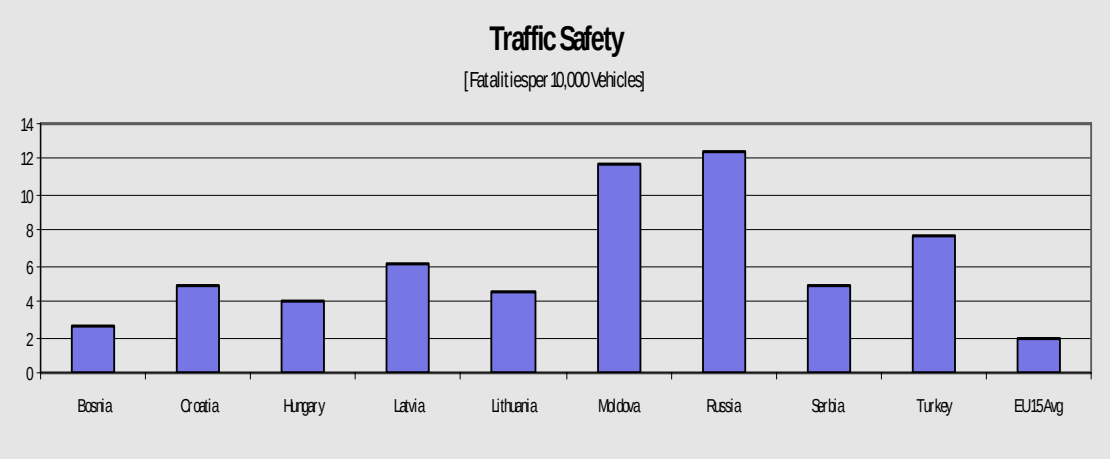
Country	Road User Revenue	Actual Maintenance expenditure	Required Maintenance expenditure	Actual/ Required Ratio (%)
Bulgaria	597	43	213	20
Romania	1,279	115	213	54
Czech Republic	1,939	165	533	31
Estonia	94	10	45	22
Hungary	342	153	341	45
Latvia	105	59	53	111
Lithuania	176	48	69	70
Poland	4,907	364	933	39
Slovakia	121	72	171	42
Slovenia	310	72	64	113

Source: Kenneth Clare, Cesar Quiroz and Lauri Ojala (Eds), Transport Sector Restructuring in Baltic States: Towards EU Accession, World Bank, March 2004

Conflicts in various parts of the region damaged road infrastructure and interrupted flow of trade. Creation of many new independent states meant far more border crossings than before and consequent delays. Transition also meant a shift away from the transport of heavy industrial goods to light industrial goods and farm produce. The transport intensity of the economy (the number of freight tons/km needed to produce a given value of GDP) tended to fall to less than half of its original value. As the transition progressed, the average size of consignment tended to decline, while the diversity of freight origin and destinations increased. These created much greater freight demand for road services than before. Since few of the new freight generators (typically the numerous new small and medium industries) had rail connections, greater coordination between road and rail services, and provision of multimodal transport and integrated logistic services became necessary to sustain trade. The design standards of the soviet regime for roads were no longer adequate for use of trucks with substantially higher axle loads. These larger trucks were causing more damage to the roads at a time when maintenance outlays were shrinking.

Road safety became a major concern. Russia is believed to have one of the highest fatality rates at 12 per 10,000 vehicles in the world (Figure 2.2).

Figure 2.2: Road Sector Fatalities per 10,000 Vehicles in the ECA region and EU



Source: World Bank, ECA Infrastructure Data Base

It compares with a rate of 2 per 10,000 vehicles in EU. Its ratio of one fatality for every eight persons seriously injured is also one of the highest in the world. The fatality rates (per 100,000 of the population) for some of the ECA countries are given below.

Table 2.7: Fatality Ratios in road Transport for Select Countries in ECA

Country	Fatality/100,000 population	Country	Fatality/100,000 population
Albania	8.06	Czech Republic	14.0
Bulgaria	11.7	Hungary	14.0
Croatia	14.0	Latvia	22.0
FYR Macedonia	8.69	Lithuania	19.0
Romania	10.7	Estonia	16.0
Serbia	10.2	Russia	21.8

Source: World Bank Transport website

Financial outlays needed to make up for the past deferred maintenance, to carry out the regular annual maintenance for the roads, and to expand the system to support a growth of 5% per year in Russia, have been estimated at 4.25% of GDP or $13 billion per year. This compares with $2 billion per year currently being spent.

3. Quality of services and users' perspective

In the context of the first phase of the transition (and to some extent even in the second phase), universal or near universal access or connection to infrastructure networks did not necessarily imply provision of reliable service of an acceptable quality. During the Soviet regime the infrastructural services were heavily subsidized, and the level of subsidies could not be sustained during transition. When such subsidies dwindled, the infrastructure entities could not maintain the reliability or the quality of service, especially in the context of low tariffs and high levels of nonpayment. Often due to lack of funds for maintenance and operation, parts of district heating networks have been abandoned and connections mean nothing in such cases. In other cases connections continue to remain but provision of service has become unreliable.

Inadequate and dysfunctional infrastructure has significant economic and social consequences.[18] Loss of production and lost opportunities for productivity increases, loss of competitiveness in export markets are obvious economic consequences. Intermittent power supplies with unacceptable voltage and frequency fluctuations cause serious damage to household appliances and industrial machinery. Lack of rural all weather roads may mean not only lack of opportunity to market the farm produce, but also inability of the rural folks to access health and educational facilities.

The impact of poor quality network services fall heavily on the apartment dwellers of the capital cities and secondary cities. Use of dirty fuels for cooking and heating in the absence of clean fuels has serious health and environmental consequences. Further, the analysis of the Household Budget Surveys (HBS) and Living Standards Measurement Surveys (LSMS) indicates that the impact is most adverse on the urban poor (the lowest income quintile among urban households).

These and the impact of poor electricity and heat services on hospitals and schools have often been the substance of protests in the region (especially in CIS) in the past, but there are clear signs that things are becoming better during the second phase of transition.

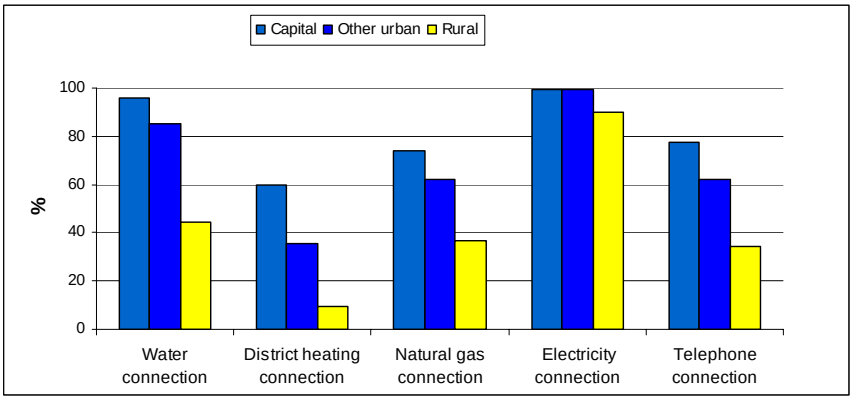
Perspective of the households

Some insight into the extent of such deterioration (and signs of recent partial recovery) is available through the Household Budget Surveys, Living Standards Measurement Surveys and a few other similar surveys periodically undertaken in the ECA countries. Based on an analysis of the surveys carried out during 1998-2002 for 20 of the countries, a set of findings emerged.[19]

Urban residents, who are concentrated spatially and who commonly reside in high rise apartment buildings are especially hard hit by the deterioration in infrastructure services such as water, power, sanitation, garbage collection and district heat, as (unlike their rural counterparts) they have fewer coping options. The standard claims of universal connections seem to hold well mostly only for electricity. In respect of other services such as water, district heat, natural gas and telephone appear to vary notably by location (capital cities, other urban areas and rural areas).

[18] Details are summarized in Komives, Foster, Halpern, Wodon (2005)
[19] This section draws from Ellen Hamilton and others, *Dimensions of Urban Poverty*, World Bank 2004

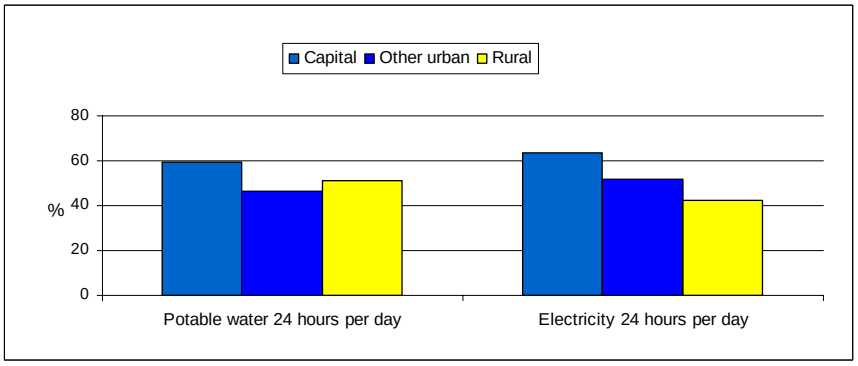
Figure 3.1: Access to infrastructure and energy services in ECA in the early 2000 by location
(% of households reporting access)



Note: Average among 20 ECA countries for water connection, 19 ECA countries for district heating and telephone connection, 15 ECA countries for natural gas, 10 ECA countries for electricity.

Furthermore, only 40% to 60% of the households report 24 hour water supply or power supply, as can be seen from the following figure.

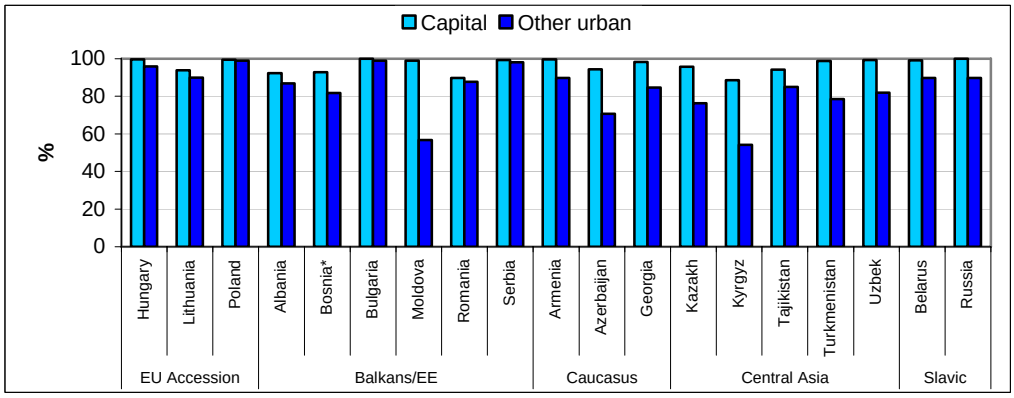
Figure 3.2: Reliability of infrastructure and energy services in ECA in early 2000
(% of households reporting access, receiving water or electricity 24 hours per day)



Note: Average among 8 ECA countries for potable water; 8 for electricity.

Water connection variations between the capital cities and other cities in several ECA countries are given in the next figure:

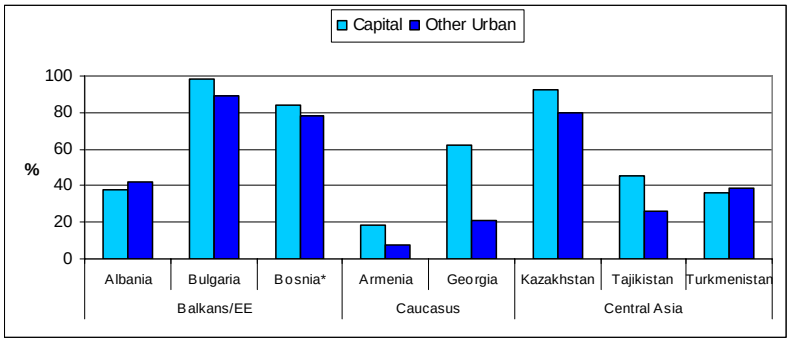
Figure 3.3: Water connection comparison in capital and other urban areas in ECA countries in early 2000



* Bosnia- urban & mixed settlements

The differences in reliability of supply between urban and other urban areas in a few ECA countries are indicated in the following figure.

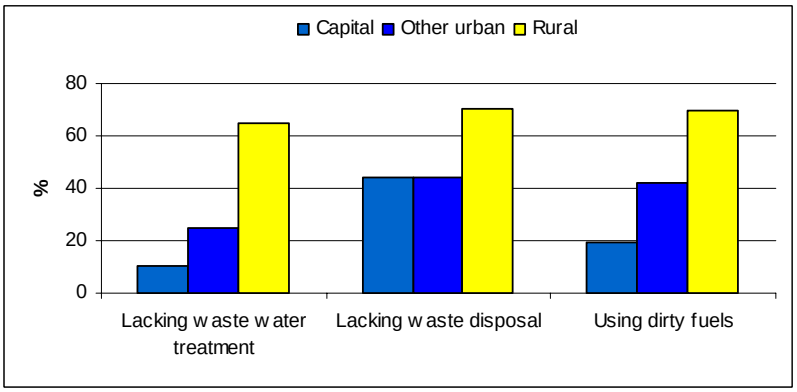
Figure 3.4: Water reliability (24 hours per day)



* Bosnia - urban & mixed settlements

Sanitation services are also not available to a large percentage of households in rural areas and other urban areas. Use of dirty fuels because of non-availability of power or gas or district heating is noted everywhere, but much more so in other urban areas and rural areas

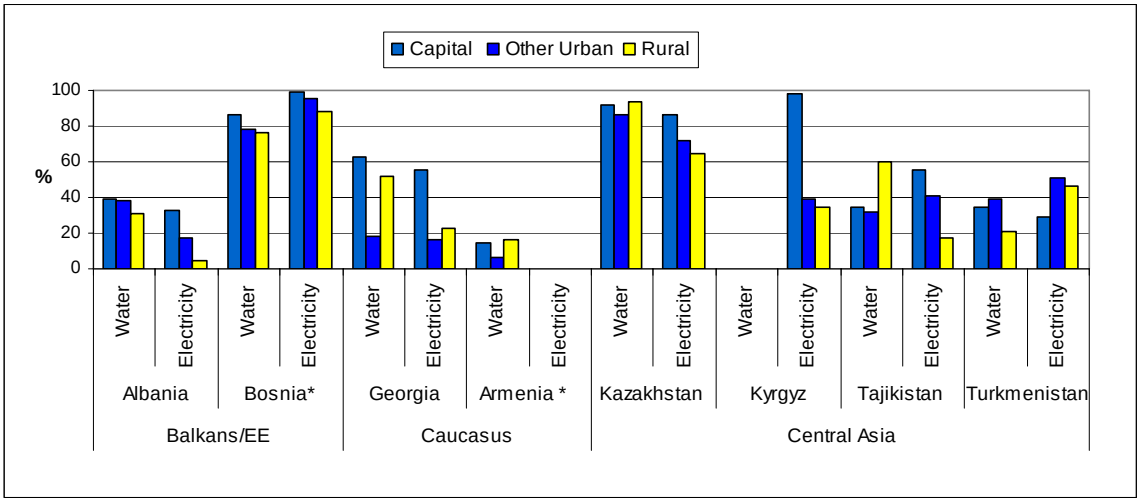
Figure 3.5: Incidence of poor Sanitation and Environmental conditions in early 2000
(% households)



Note: Average among 15 ECA countries for lack of inside toilet, 6 for lack of regular waste collection; 16 for dirty fuels.

Most people in capital and other cities are apartment dwellers and they generally have high rates of connection. But they also suffer most for lack of reliability of supply. The situation of apartment dwellers in several ECA states is captured in the next figure.

Figure 3.6: Central water and electricity 24 hours a day (early 2000)
(for apartment dwellers only)



* Bosnia urban, mixed, rural settlement.

* Armenia -electricity reliability not available.

* Kyrgyz water reliability not available

Perspective of the business community

The World Bank and EBRD have jointly conducted Business Environment and Enterprise Performance Surveys (BEEPS) in 1999, 2002 and 2005 covering most of the countries in the ECA region (including Turkey but excluding Turkmenistan). These surveys cover a wide range of businesses and in all covered 3000 enterprises in 20 countries in 1999, 6100 enterprises in 26 countries in 2002 and more than 9500 firms in 27 countries in 2005. Turkmenistan is the only country not covered by the survey. Some of the data available from these surveys present a picture of gradual improvement of the infrastructural services over time (see Annex for detailed tables).

In the 1999 survey a significant percentage of respondents considered the infrastructure services as "slightly bad, bad or very bad" (Table 3.1)

Table 3.1: Percentage of Respondents with negative Perception of Services (1999)

Region/Sub-region	Roads	Electricity	Water
ECA	59.0	22.8	29.2
CEE	56.6	10.7	15.1
SEE	57.2	21.9	32.5
CIS	62.5	31.3	36.2

Source: BEEPS 1999

A much larger percentage of respondents considered the road services to be bad, followed by water services and power services. Even in CEE the road services were perceived to be bad. The situation in CIS was clearly the worst, while the level of dissatisfaction was high in SEE too, perhaps indicating the results of regional conflicts.

However when infrastructural services as a whole was considered 39.5% of the respondents in the ECA region believed that they did not present a major, moderate or even a minor obstacle to their business. The percentage of such respondents was higher in CEE at 46.3% and lower in CIS (38.8%) and SEE (32.5%).

Scarcity and bribes go hand in hand. Another statistic indicates that a very significant percentage of respondents (76.3%) in the ECA region did not allocate more than 10% of the total bribes they paid for getting new connections to public services. This percentage was highest in CEE (85.7%) followed by CIS (77.6%) and SEE (62.9%).

That infrastructural services improved during 1999 to 2002 could be discerned from the following scores constructed by EBRD on the basis of the two surveys. Movement from higher to lower score represents improvement.

Table 3.2: Improvements in Infrastructure

Sub-Region	1999	2002
CEE	1.9	1.1
SEE	2.4	1.7
CIS	2.1	1.9

Source: Transition Report (2002), EBRD

Since 1.0 is best possible score, one may surmise that the services were becoming close to normal and reliable at least in CEE. It is also interesting to note that SEE was overtaking CIS, perhaps as a result of cessation of conflicts and resumption of reform.

There is another statistic reinforcing the above finding in 2002 survey. When respondents were asked, "on how many days in 2001, did you experience loss of power, surge of power and insufficient supply of water?" a very high percentage of respondents indicated 0 to 46 days. The results in terms of the sub-regions and sectors are given in the following table.

Table 3.3: Respondents with loss of Service for 0 to 46 days in 2001

Region/Sub Region	**Power**	**Water**
ECA	94.2%	95.3%
CEE	99.6%	99.9%
SEE	93.7%	95.5%
CIS	89.7%	91.1%

Source: BEEPS 2002

The gradual improvement in the infrastructural service provision in the region is evidenced by the findings under BEEPS survey of 2002 and 2005. Some of these findings are discussed below. For the region as a whole, the average number of days on which power outages or high surges of power were experienced by the respondents came down from 11 in 2002 to 9.8 in 2005 (table 3.4). The improvement in respect of rural areas is noteworthy.

Table 3.4: Average Number of days of Power Outages or Power Surges

Region / Sub-Region	2002 Survey			2005 Survey		
	Rural	Urban	National	Rural	Urban	National
Three Baltic Countries	2.5	2.6	2.6	2.4	1.1	1.5
CEE without Baltic Countries	3.4	1.9	2.3	1.4	1.0	1.1
SEE	11.5	11.1	11.2	20.1	23.8	22.8
CIS (Middle Income)	11.8	5.9	6.9	6.4	4.3	4.6
CIS (Low Income)	51.5	24.9	31.7	22.8	13.8	15.9
ECA	16.0	9.4	11.0	10.9	9.4	9.8
Turkey- Benchmark	3.4	2.5	2.7	5.5	3.8	4.1

Source: BEEPS 2002 and 2005- World Bank Staff Analysis
Note: Settlements with a population of less than 50,000 were classified as rural

While the reliability of supply has improved in all other sub-regions, it seems to have become remarkably worse in SEE. This is on account of the poor performance of Albania in which the power outage days increased from 47.5 days in 2001 to 194.2 days in 2004. All the other SEE states had improved their performance to a level better than that of CIS (middle income) countries. Notable poor performers in 2004 included Georgia (57 days), Tajikistan (37 days), and Azerbaijan (16 days). The rural areas in these countries suffered greatly. In the rural areas the outage days were 111 days in Georgia, 78 days in Azerbaijan and 42 days in Tajikistan. It is also important to note that Armenia and Moldova two of the small states in CIS low income group had in 2004 a remarkably low number of outage days (1.9 and 2.1 days respectively) – a level fairly close to that of the CEE countries.

The average number of days during which the respondents experienced insufficient or intermittent water supply also improved for the region as a whole from 9 fays in 2001 to 4 days in 2004 (table 3.5). As in the case of power, the improvement in respect of rural areas was remarkable. Once again the unfavorable average number of SEE was caused mostly by Albania (in which the number of days of poor quality service increased from 16 to 91) and partly by Bosnia (2.9 days to 7.7 days). The other states in SEE performed as well as CEE states. Other poor performers were Georgia (11 days) and Tajikistan (10 days). The countries in which the rural areas suffered most in 2004 included Albania (95 days), Azerbaijan (34 days), Bosnia (23 days), Georgia (22 days), Kyrgyz Republic (10.2 days), Tajikistan (12.7 days) and Russia (10.3 days).

Table 3.5: Average Number of days of Insufficient or Intermittent Water Supply

Region / Sub-Region	2002 Survey			2005 Survey		
	Rural	Urban	National	Rural	Urban	National
Three Baltic Countries	1.3	1.1	1.2	0.7	0.3	0.4
CEE without Baltic Countries	0.7	0.6	0.6	0.4	0.2	0.3
SEE	9.6	5.2	6.4	11.1	9.4	9.9
CIS (Middle Income)	15.8	12.3	12.9	6.1	3.2	3.6
CIS (Low Income)	44.7	17.0	24.0	8.6	3.8	4.9
ECA	13.7	7.7	9.2	5.3	3.6	4.0
Turkey- Benchmark	0.6	1.0	0.9	1.0	0.5	0.6

Source: BEEPS 2002 and 2005- World Bank Staff Analysis
Note: Settlements with a population of less than 50,000 were classified as rural

The average number of days during which the respondents experienced outages of land line telephone services also declined for the region as a whole from 5.8days in 2001 to 1.7 days in 2004. The improvement was both in respect of urban and rural areas (table 3.6). The improvement in respect of the CIS (low income) group is remarkable, especially in Georgia, Kyrgyz Republic, Tajikistan and Uzbekistan.

Table 3.6: Average Number of Days of Telephone Service Outages

Region / Sub-Region	2002 Survey			2005 Survey		
	Rural	Urban	National	Rural	Urban	National
Three Baltic Countries	1.3	1.4	1.4	0.8	0.4	0.5
CEE without Baltic Countries	1.1	1.4	1.3	1.6	0.7	0.9
SEE	3.7	5.4	5.0	3.1	1.7	2.1
CIS (Middle Income)	13.2	3.4	5.0	3.0	2.2	2.3
CIS (Low Income)	23.5	13.6	16.1	3.5	1.8	2.2
ECA	7.9	5.0	5.8	2.4	1.5	1.7
Turkey- Benchmark	0.8	0.8	0.8	0.1	0.3	0.3

Source: BEEPS 2002 and 2005- World Bank Staff Analysis
Note: Settlements with a population of less than 50,000 were classified as rural

Despite improvements registered in respect of service quality, loss of sales (as a percentage of annual sales of 2004) attributed to infrastructure failures by the respondents in the 2005 survey appeared noteworthy at 10.1 % of annual sales for the region (table 3.7). Reflecting slower pace of recovery of service quality in low income CIS countries losses were highest there at 12.8%. Albania and Bosnia accounted for the high levels of losses in SEE, the other states of which had a substantially lower level of losses.

Table 3.7: Loss of Sales Attributable to Infrastructure Failures as a Percentage of Annual Sales of 2004

Region / Sub-Region	Power Services	Water Services	Telephone Services	Total for all three services
Three Baltic Countries	1.4	2.2	1.8	5.4
CEE without Baltic Countries	1.9	2.5	1.6	6.0
SEE	4.4	4.0	2.6	11.0
CIS (Middle Income)	2.6	2.7	1.9	7.2
CIS (Low Income)	6.1	4.7	2.0	12.8
ECA	4.1	3.9	2.1	10.1
Turkey- Benchmark	2.3	1.0	negligible	3.3

Source: BEEPS 2002 and 2005- World Bank Staff Analysis

Payment of bribes for electricity and water services has also come down during 2001-2004. The percentage of respondents who “never” or “seldom” made any such payment went up from 84% in 2001 to 88% in 2004 in the region.

Table 3.8: Percentage of Respondents who did not pay Bribe for Services

Region / Sub-Region	2002 Survey			2005 Survey		
	Never	Seldom	Total	Never	Seldom	Total
Three Baltic Countries	89	6	95	92	4	96
CEE without Baltic Countries	77	12	89	89	3	92
SEE	60	20	80	71	14	85
CIS (Middle Income)	70	14	84	77	12	89
CIS (Low Income)	65	16	81	66	15	81
ECA	69	15	84	76	12	88
Turkey- Benchmark	57	16	73	81	7	88

Source: BEEPS 2002 and 2005- World Bank Staff Analysis

Percentage of respondents who “frequently” or “usually” or “always” paid bribes to get connected or to maintain the services came down from 7% in 2002 to 5% in 2005.
The extent of bribery is consistent with the level of improvement of the services. It is highest in low income CIS countries in line with slow rate of recovery of the quality of services. Representing the tightness of supply conditions in the rural areas the extent of bribes in such areas was higher than in urban areas.

The surveys asked the respondents to classify power, phone and transport services as well as regulatory uncertainty into one of the four categories, namely (a) major obstacle, (b) minor obstacle, (c) moderate obstacle, or (d) no obstacle to the growth of business. The results, summarized in Table 3.9, clearly indicate an improving trend, with a larger percentage of respondents in 2004 classifying them as no obstacle to the growth of their businesses.

Table 3.9: Percentage of Respondents classifying services as "No Obstacle" to Business Growth

Region / Sub-Region	2002 Survey				2005 Survey			
	Power	Telecom	Transport	Regulatory uncertainty	Power	Telecom	Transport	Regulatory uncertainty
Three Baltic Countries	72	67	72	16	76	81	76	31
CEE without Baltic Countries	76	71	68	16	74	72	68	20
SEE	58	65	63	13	63	66	64	21
CIS (Middle Income)	76	75	73	15	77	79	76	27
CIS (Low Income)	54	68	66	21	57	71	65	30
ECA	65	68	67	16	68	72	68	25
Turkey-Benchmark	44	46	57	13	55	61	60	28

Source: BEEPS 2002 and 2005- World Bank Staff Analysis

The percentages are somewhat lower for Turkey, reflecting the rapidly growing demand for provision of additional services (perhaps involving capacity expansion), while in the rest of the region the higher percentages reflect the rapid stabilization of service quality to meet the slowly recovering demand for services. About 4% to 6% of the respondents considered power, phone or transport services as major obstacles to business growth and about 26% of the respondents considered regulatory uncertainty as a major obstacle. The results relating to regulation can be considered to be indicative of a certain amount of maturing of regulatory systems and processes as well as the increasing ability of businesses to cope with them.

Is infrastructure still a constraint to economic growth?

There is no doubt that the infrastructural services have improved during 1999-2005 and that many businesses do not find them to be an obstacle. However they still have a long way to go to become reliable and achieve an acceptable level of quality in many countries.

The number of days with power outages or power surges is still unacceptably high in Albania (194 days), Georgia (57 days), Tajikistan (37 days), Azerbaijan (16 days), Kyrgyz Republic (14 days), Uzbekistan (8 days) and Kazakhstan (7 days). The regional average of 10 days is also very high. Also the average duration of outage at 5.3 hours for the region is high compared to normal industry standards. The region as a whole attributes the percentage of total sales lost (of about 4.1%) to such outages. Understandably such losses were highest in Albania (11.2%), Georgia (10.7%), Azerbaijan (6.3%), and Tajikistan (8%). Further 32% of the respondents still found power supply presenting them a major, moderate or minor problem. This percentage was much higher in Albania (77%), Georgia (70%), Tajikistan (62%), Turkey (45%), Czech Republic (43%), Armenia (41%) and Uzbekistan (40%), FYR of Macedonia (40%), and Bosnia (39%). Nearly 24% of the respondents pay bribes to get new power connections and wait for 14 days for the connections to be made. Thus power sector in many countries has a long way to go to achieve normal industry standards and cease to be a constraint to economic growth.

The situation relating to water seems to be similar, while that of telephones somewhat better (see Annex). In respect of transport, 32% of the respondents in the region found it to be a major, moderate or a minor problem. This percentage was much higher in Armenia (52%), Bosnia (51%), Czech Republic (48%), Albania (47%) and Georgia (43%).

Regulatory uncertainty has proved a major constraint to business growth. For the region as a whole 75% of the respondents perceived it as a major, minor or moderate obstacle to their business. The percentages were much higher in Serbia-Montenegro (92%), Kyrgyz republic (91%), Moldova (90%), Poland (87%), Bosnia (86%), Czech Republic (85%), Georgia (83%), Russia (82%), Lithuania (81%) and Romania (81%).

As the demand in ECA is reviving, infrastructural services might become a major constraint to recovery and growth, unless the reform agenda (including regulatory reform) is pursued to improve their quality and reliability to industry standards.

4. Financial sustainability of infrastructure services

A. Utility services

To ensure financial sustainability of the provision of infrastructure services, the cost of services have to be recovered fully and in a timely manner. Ultimately these costs have to be met by the consumers or by the state, if the services are provided by public sector agencies. Under the Soviet rule, utility services such as those relating to power, heat, gas and water were provided by state enterprises attached to the government ministries. Under the socialistic approach services were provided to the households at tariffs substantially lower than the cost. Services at low prices were considered as supplement to the wages. This led to a widespread belief that households are entitled to these services at little or no cost. Even though the tariffs for non household consumers were substantially higher, they rarely equaled or exceeded the cost of supply. Thus the state enterprises depended heavily on budget support for their continued existence and provision of services. The culture of such state support was not conducive to sector operational efficiencies in terms of technical losses (water, electricity, heat or gas lost in the system for technical reasons), commercial losses (arising from unmetered supplies, inappropriate norms, unbilled supplies and theft), and timely collection of billed dues, despite the use of extensive norms prescribed by state planning agencies for these purposes.

In the context of the economic turmoil that followed the dissolution of the Soviet Union, the state budgets could no longer provide extensive budget support as before; in fact they could not even pay for the consumption by their own agencies and for consumer subsidies. This led to the three key dormant problems (namely, (a) high levels of nonpayment and poor collection, (b) excessive technical and commercial losses, and (c) tariffs below cost) assuming huge dimensions diluting the quality and reliability of services, curtailing substantially the volume and coverage and even threatening the survival of the enterprises providing services. Ensuring the financial sustainability of the entities providing the services thus called for overcoming of these three key problems.

Nonpayment for services

Overcoming the nonpayment problem and strengthening payment discipline were the key critical first steps for the financial recovery of the supply entities. What was needed essentially was a change in the mindset of the people and the politicians from the belief that everyone is entitled to these commercial services to the reality that they could be provided only to those to pay for them.

In the case of *power sector*, this involved three key elements: (a) amending the related laws to enable the services providers to recover dues from clients speedily and deny services to those who do not pay their bills; (b) making theft of services a cognizable criminal offence and providing for deterrent punishments and for speedy trials in such cases; (c) ensuring that government departments and agencies had adequate earmarked budget provisions to pay their service bills and subjecting them also to the discipline of disconnection for nonpayment. The willingness, ability and success of the governments in this regard varied across the region.

The success in the efforts to ensure payment discipline depended on the speed of restructuring of the bankrupt state owned industrial enterprises, taming the run away rates of inflation, resumption of economic growth raising household incomes, reducing budget deficits, and improving the liquidity/money supply in the economy. Improving collection efficiency depended on the enforcement of discipline on the part of the utility staff, and installation of efficient mechanisms for monitoring collections and internal controls. Above all, it depended on the political will of the federal, provincial and local governments to refrain from interfering with the utility's decision to disconnect supply to non-payers. It thus depended both on improved corporate and national governance. The nonpayment problem was largely overcome in

a relatively shorter period (by mid 1990s in most cases) in the CEE and SEE states which had a relatively more commercial framework, and a set of laws which did not unduly restrict the rights of service providers to recover dues. The economic stabilization and resumption of growth and improvement in the legal infrastructure helped in this greatly. The problem was most acute in the CIS, where the GDP decline lasted longer and growth resumed much later than in CEE states. In Russia, for example, the Civil Code (till 1998) made it impossible to disconnect physical persons. Even legal persons could be disconnected only with their consent. The prolonged recession in Russia, Ukraine and most other CIS countries, the stern measures needed to stabilize the economy and poor and unreliable quality of banking services also led to the payment of dues in kind through barter, promissory notes and by offsets leading to disappearance of cash and facilitating non-transparent transactions to the detriment of the supply entity.

Thus in countries like Georgia, Armenia and Azerbaijan collection rates fell to the 20 to 40% range during 1991-1994 with cash collections being even much lower. As late as 1996, power sector collections in Russia and Ukraine[20] were 70% and 86% of the bills and collections in cash as a percentage of total collections were as low as 16% and 20%. The situation in most other CIS countries was not any better. In Azerbaijan collection levels continued to fall till the end of the decade.

By the turn of the decade of 1990s, Russia overcame the problem in a spectacular manner. Driven by oil and gas exports the economy grew rapidly since 1999. The federal Parliament amended the constraining laws. RAO UES of Russia, the apex power company dramatically improved its corporate governance over its regional energos; by the year 2002, current collections covered nearly 100% of the current bills, and were almost entirely in cash. This performance had been maintained and improved despite increases in the price of electricity. By 2003 collection rates were in the 90% to 100% range in most countries in the region except Croatia (80%) and Serbia-Montenegro (85%) among the SEE states, Azerbaijan (36%), Georgia (47%), Kazakhstan (85%)[21], Kyrgyz Republic (69%), Tajikistan (84%), Turkmenistan (85%), and Uzbekistan (70%) among the CIS. The problem of payments through barter and offsets has largely been overcome in the region, but persists to a significant extent in the Central Asian Republics and Georgia. In Russia too, the use of promissory notes still seems to linger to a small extent.[22] Overall, it is reasonable to surmise that the major nonpayment problem induced by macroeconomic factors during the first phase of the transition had been overcome. However the culture of nonpayment induced by the length of recession, still lingers in some SEE and many CIS states; present collection efficiencies in the region may compare with those of similarly placed developing countries of the world. Overall, based on data relating to 20 countries, electricity sector collections levels were 76% in CIS, 93% in SEE and 98% in CEE compared to a near 100% collection level normal for a well run western utility.

Despite the progress reported in the collection of current bills, the power utilities in most CIS countries face a significant problem of past arrears, which in many countries could equal or exceed the current annual sales value. The debt overhang is thus a serious problem for the creditworthiness of the utilities, and also especially when the utilities are sought to be privatized or given on concession. In Ukraine for example the historical debts in the electricity sector is about $3.0 billion.

In the *natural gas sector*, developments were similar to those in the power sector. In fact nonpayment in the power sector led to the power generators using gas defaulting in their payments for gas. In Russia and many other CIS states, the gas supply companies threatened to take over the assets of the power companies and gas distribution systems against the debts owed to them. Most countries other than Russia,

[20] By 1999, the situation in Ukraine worsened to a total collection level of 80% and a cash collection level of 8%.
[21] Kazakhstan is believed to have achieved a near 100% collection rate in 2004 (Check with I. Dobozi for information source). Collections in Kyrgyz Republic improved to about 88% in 2004 of which 42% was in cash.
[22] The 2003 Audit Report for RAO UES indicates that 13% of its accounts receivable and 18% of its accounts payable were handled through non-cash settlement. Most of these could relate to the liquidation of very old arrears.

Turkmenistan, Uzbekistan and Azerbaijan depended on gas imports and many of them in the Central Asia and South Caucasus region faced rising costs of imported gas and poor collections from their customers. Often the import supplies were cut off for want of payment resulting in the poor reliability of the gas distribution systems. The situation appears to have improved substantially in the last 5 years. Collections are above 90% of the current bills in Armenia, Belarus, Bulgaria, Croatia, Kyrgyz Republic, Poland, Romania, Russia, Serbia, Tajikistan and Ukraine. Collection levels continue to be low in Georgia (25%), and Azerbaijan (53%) calling for corrective action. Payment through promissory notes (which trade at a discount in the secondary market) and offsets still persists in the gas sector in CIS. Gazprom of Russia reports in its Annual Report of 2004, that about 18% of its payables and 14% of its receivables were settled in that manner. However the associated costs are properly accounted for in the books and with the improvement in the economic climate and in the reliability of banking services, these percentages are expected to decline in the near future.

In the *district heating sector* the problem proved somewhat more difficult because of the nature of heat as basic need during winter and because of the system designs which did not allow the disconnection of the defaulting heat consumer. During the first stage of transition collection levels and cash collection levels plunged even lower than those for power and gas. In the case of CEE states service quality was improved and payment discipline restored much faster (in most cases by mid 1990s) than in other parts of the region. Nonpayment is no longer considered a significant problem in these states. In Estonia, for example, nonpayment has been reduced to 4-5%. Polish regulations allowed district heating companies to deduct heating debts directly from the pay checks of customers in arrears. In Lithuania, the supply companies could prosecute those who do not pay their bills for 6 months and the courts were free to decide to expel them from the building. In SEE states also the problem of nonpayment for heat has become generally manageable, though lack of consistent data makes this assessment less robust.

It was in CIS the nonpayment problem for heat services was most acute. Russia, Belarus, Kazakhstan and Ukraine are the countries with very cold climates and the role of district heating in energy consumption is prominent. They have used several methods to improve collections including use of collection agents, lotteries open to customers who pay on time, amnesty for paying past bills without the penalties and publication of the names of the defaulting customers in the local press. Kazakhstan has also extensively privatized its district heating systems. Modernizing the system with installation of meters at the apartment building level helped a great deal.[23] More importantly, improved budget conditions enabled the release of funds for consumption by state agencies and the funds needed for consumer subsidies. Thus household collection rates have improved to 80-95% in Kazakhstan and to 90% in Russia, though public institutions continue to lag behind some what. Poor collections continue to cause problems in the Central Asian Republics, Georgia, Armenia, Moldova and Azerbaijan, where the consumer base has also greatly contracted.

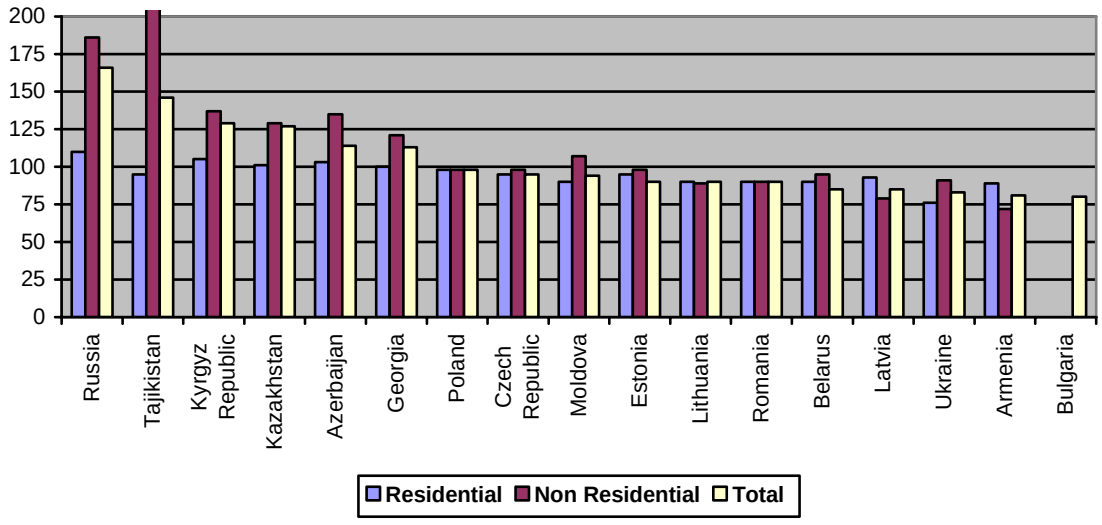
The *water sector* nonpayment problem is similar to the district heating sector in that water is considered a basic minimum human need and disconnection of supply to defaulters is not a practical solution in most cases. A recent survey of 18 countries in the region indicated that about 28% of the households in capital cities, 42% of the households in the other urban areas, and 50% of the households in rural areas did not pay for their electricity and water consumption.[24] The OECD database covering nine of these countries in

[23] In Kazakhstan, where the same entity handled both electricity and district heat distribution in the Almaty area, electricity supplies were denied to those who defaulted in heat payments. In another area the heat entity disconnected the entire building occupied mostly by nonpaying customers and provided electric heaters and free electricity to the paying customers there, till the defaulting customers settled the bills and heat supply was resumed to the building. Meanwhile a heated town hall was made available to the defaulting customers to spend the nights, if they wanted to.

[24] World Bank, *Dimensions of Urban Poverty in ECA*, March 2004.

CIS suggests that nonpayment in water sector could be as high as 60 to 70% of the billed services.[25] However a recent study covering 11 countries in CIS and 6 countries among CEE and SEE indicates that, based on national reporting, most countries appear to be collecting in 2002 more than 75% of their bills and that many appear to collect nearly 100%. The initially significant problem would appear to have been overcome with the resumption of growth and has ceased to be as unmanageable as it was in the early 1990s. Given the data limitations, and the relatively limited coverage of the countries in the region these results need to be treated with caution. Somewhat as in the case of district heating, water supply and sanitation services have been extensively municipalized and the numbers of water utilities are 54 and 51 even in small countries such as Albania and Moldova and run into hundreds in many countries, with Russia having more than 15,000 water utilities. Lack of consistency of data across so many utilities makes comparisons over time and across the countries particularly difficult. It is also possible that the treatment of unpaid subsidies from the federal, provincial and local governments in respect of a significant percentage of the population entitled to privileges of 50 to 100% tariff discounts had been treated differently in different sources of information, resulting in ambiguous findings. Maintenance of water prices at low levels generally within the affordability levels of the people may explain in many cases the improvement in collections. Wherever prices were raised (as in Odessa and Nikolayiv in Ukraine in 2002) collection ratios tended to drop, at least initially.

Figure 4.1: Collections in Water Sector as a Percentage of Bills (2002)



Technical and commercial losses

Excessive levels of total system losses characterize the power, water, gas and heat sectors of the region.[26] Part of the losses is technical depending on the design of the facilities, technologies chosen and the manner of operation of the facilities. These technical losses, on the whole tend to be higher (often more than twice) in this region compared to OECD levels, as designs in the centrally planned economies were optimized on the basis of artificially low administered prices of fuel, energy and materials, rather than on their market prices. Neither was environmental concern a constraint to the choice of designs and technologies. Corrective action for these will necessarily be in the long term as the assets are retired and

[25] Antonio Estache and Katharina Gassner, *Recent Economic Developments in Electricity and Water Sectors in ECA Countries*, World Bank, mimeo, July 2004.

[26] In this report Total system loss = [net generation in the country + imports-exports] – [Billed sales]. Both terms are expressed in quantities and not in money. In the literature it is also sometimes referred to as "the sum of undelivered energy and unbilled energy".

replaced by new ones. In the short to medium term, however, increases in technical losses in the power system could be corrected by rehabilitating and reinforcing the transmission and distribution system, rehabilitating the generating units and improving the manner of their dispatch[27] and adoption of regular and optimal maintenance of generating units and networks.

The remaining losses are "commercial" arising from two sources. The first is the use of norms of consumption by households in the absence of meters for measuring actual consumption. About 10 to 15% of the electricity, 20 to 25% of gas, and over 50 to 60% of water and almost the whole of heat are sold to the households in most of the countries in CIS without metering and on the basis of norms. The norms are based on the size of the residence, number of people living there, and whether the gas is used for cooking, heating or both. In fact, the actual consumption of the households is substantially higher than the norm. Controlled pilot studies carried out in Tajikistan, for example, have shown that the actual monthly household consumption to be 2.65 times the norm.[28] The solution to this problem is to undertake a program of proper metering of all consumers, and pending that, carry out pilot studies of the type mentioned above and update the norms periodically. In the case of electricity and gas, the cost effectiveness of installing meters for all consumers is considered unambiguous.[29] In the case of district heating systems installation of meters at the building level and the use of heat allocators at the apartment level is generally a cost effective solution. In the case of water services, though financial cost effectiveness of metering all residential consumers is not unambiguous on account of low water tariffs, metering all consumers and billing them on the basis of actual consumption may, on the whole, be the preferred option in the region on account of the need to moderate the excessive per capita consumption of water. In the context of rising prices (which is inevitable to pay for the rehabilitation and modernization of supply systems), proper metering and billing would enable consumers to adjust their consumption based on their affordability level. It would also allow the system managers to understand actual demand, help pinpoint illegal connections and identify the critical elements of network behavior.

In many countries, the second source is theft through bypassing or tampering with the meter, collusion with utility employees to obtain illegal connections, understatement of meter readings etc. Theft levels in excess of 20% of the total available electricity have been reported in countries such as Georgia and Kyrgyz Republic. Overall total losses (both technical losses and commercial losses) tended to rise during transition in most countries as a function of rising electricity prices, rise in the share of household incomes and consequent overloading of distribution systems, discipline of the utility staff and deteriorating governance systems. Action to control the rise in system losses (especially the commercial losses) became necessary to moderate the price increases needed to ensure financial viability of the utility sector.

In Hungary and Poland, electricity network loss levels were reasonable and relatively steady in the range of 10% to 12% and most of the losses were technical. In Lithuania, network losses tended to rise from 11% to 16.6% during 1989-1998 and have since come down to about 15.55 by 2000. In most of the CEE states, through improved governance the overall loss levels had been kept under reasonable control. The SEE states went through a period of increasing losses during transition. In Albania it went up from 13.6% to 58% during 1989-1997 and was still at 39% in 2003.[30] In Bulgaria total loss levels were reported at

[27] For example Russia, in the context of falling demand and excess generation capacity, tended to allocate the generation needs equally among all generation units, rather than dispatching the most efficient units. Generating units operating at partial loads have steeply falling efficiency.

[28] Raghuveer Sharma et ale, Tajik Energy Utilities Reform Review, World Bank, 2005.

[29] It is worth noting, however, that in Georgia and Kazakhstan, the practice of installing communal meters for small communities and apartment blocks and collecting dues from communal or building associations had been followed by some investors with some degree of success. These associations generally pay the bills fully and punctually and apportion the costs to individual households.

[30] This may have been caused, to some extent, by the unplanned periurban settlements.

around 28% during 1992-1997. However the government documents advertising privatization proposals of the six distribution companies indicated distribution level net work losses of 19% to 31% in 2002. Losses were highest in the area surrounding Sofia.[31] The problem was even more difficult in the CIS countries. In Armenia losses shot up to 65% in 1992, and were brought down to the range of 25% to 27% during 1996-2002. In Georgia losses remained at around 55% through much of the 1990s and may have come down only marginally despite major reform efforts. In Kyrgyz Republic losses increased from 11.7% in 1990 to about 33% in 2001 and are believed to be at 44% in 2003. In Kazakhstan, Ukraine and Moldova the losses range from 20 to 30%. Overall total losses in the electricity sector of SEE and CIS, presently in the range of 20 to 50%, need to be brought down to the CEE levels of 10 to 12% through improved governance to enable financial viability of utilities.

In the gas sector the data available are inconsistent. Nevertheless, losses in SEE and CIS gas systems are known to be much higher compared to the level of 1 to 1.5% of total losses normal for large commercially run gas utilities in the west, because of high leakages, lack of discipline and non-transparent transactions, in addition to lack of meters and use of inappropriate norms. High loss levels are reported in Georgia (28%), Armenia (19%) and Tajikistan (11%).

In the water sector also data problems exist. Based on data relating to 20 countries in the region water losses (or unaccounted- for- water) were at an average of 26% for CEE, 40% in CIS and 50% in SEE compared to a generally accepted economic loss level of 20%. The high level in the region is on account of the poor condition of the water supply systems and fundamental problems of billing.

Tariffs

The central element of the strategy to ensure financial viability of the utilities is to set and maintain tariffs levels to recover fully the supply costs. In the short term (while recovering from the economic collapse) tariffs have to cover the costs of all inputs (such as fuel or purchased power), cash operating and maintenance costs.[32] In the medium term they must also contribute the funds needed towards the capital cost of the urgently required rehabilitation of transmission and distribution (including meter installations), as well as carefully prioritized list of generating units to reduce cost of supply and improve quality of service. Over the longer term, the tariff levels should be such as to generate funds required to contribute to system expansion to meet incremental demands. Thus the principle followed is essentially one of long run marginal cost or its proxy long run average system incremental cost adopting discount rates equal to the opportunity cost in each country. Since most of the CIS countries have excess generating capacities and a modest demand growth forecast under which they will not catch up with their 1990 level of demand for at least another five to ten years, this translates mostly to capital expenditures on rehabilitation of generation, transmission and distribution, the last item taking a lion's share of the new investment. Because of this, tariff increases needed in this region are likely to be relatively lower than in other parts of the world which need substantial investments for system expansion to increase access.

[31] As a result of sector unbundling and better accounting of electricity flows from generation, transmission and distribution segments, the existence of a greater level of losses than before was revealed in most countries in the region..

[32] A substantial part of the utility assets in the region (in the CIS states as well as in Baltic States of Estonia, Latvia and Lithuania) are well past their normal economic life and fully depreciated. They were inherited from Soviet Union and revaluation of these assets in the context of massive inflation experienced during the transition was unpractical. Records relating to their historical cost of acquisition are not complete and apportionment of the historical costs of projects (such as multipurpose reservoirs) serving several purposes in several countries is beset with problems. Rate of return on assets approach is thus considered unpractical. Marginal cost approach in this region is thus both theoretically sound and practical.

Nevertheless, during most of the economic decline, numerous and significant tariff increases in local currency terms could not catch up with rising costs of the utilities on account of high rates of inflation, increasing levels of losses and nonpayment.[33] Most of the utilities were insolvent for a long duration and suffered from acute liquidity crisis and survived only through capital consumption. Once the economies stabilized and growth resumed tariff adjustments became meaningful, but always continued to be politically difficult.

The prevailing tariff structures in the early years of transition did not reflect the cost differential in the cost of supply to different classes of consumers. Thus residential consumers had the lowest tariffs though their supply costs were the highest in the system. They were cross subsidized by other consumers. Thus the two key objectives of tariff revisions were to raise the level of average revenues to cover at least the cash operating costs and minimum investments in distribution rehabilitation and to minimize the cross subsidy provided to the residential consumers by industrial and other categories of consumers.

Electricity tariff levels in most CEE and some SEE countries would appear to have reached the medium term viability level of covering operation and maintenance costs and contributing to the investment needs (consisting largely of rehabilitation and retrofits). The utilities in these countries are also able to access commercial sources of finance rather than solely depending on the sovereign source. They have also been able to attract foreign and domestic equity investors. The other SEE states with some exceptions (such as Albania) seem to be headed in this direction with some time lag caused by war damages to their infrastructure. The CIS states present a very different picture. In countries such as Kyrgyz Republic, Tajikistan, Uzbekistan and Azerbaijan tariff levels are not yet adequate to ensure short term financial viability. In other countries in CIS tariff levels seem to be close to this objective. The task before them is to reach for medium to long term viability. In most CEE and SEE states the residential tariff is higher than the weighted average tariff for all consumers indicating the decline in cross subsidies. Among the CIS states such a trend is noted in Armenia, Georgia, Moldova and Uzbekistan (Table 4.1)

Table 4.1: Electricity Tariff Levels in the ECA Region (2003) in Cents/kWh

Country	Residential Tariffs)	Weighted Average End User Tariffs	Cost recovery tariff
Albania	4.60	5.60	8.63
Armenia	4.14	3.56	3.70
Azerbaijan	1.96	2.50	3.80
Belarus	3.32	3.83	4.00
Bosnia and Herzegovina	6.20	5.30	6.40
Bulgaria	5.59	5.33	7.50
Croatia	8.17	7.45	7.50
Czech Republic	8.40	8.00	8.00
Estonia	5.41	5.20	6.00
Georgia	3.30	2.60	4.07
Hungary	9.20	8.05	8.00
Kazakhstan	2.40	2.64	2.80
Kyrgyz Republic	1.16	1.42	2.30
Latvia	5.80	5.30	6.00
Lithuania	7.40	6.80	7.00
Macedonia, FYR	3.70	4.50	7.50
Moldova	5.10	5.10	5.10
Montenegro	4.40	4.40	7.50

[33] In Ukraine for example, during 1992-1998, electricity and gas tariffs *increased* by 600% and heat tariffs in Kiev increased by 1600% while the household incomes *fell* by 57% (Ioannis N. Kessides, *Reforming Infrastructure-Privatization, Regulation and Competition,* World Bank Policy Research Report, 2004)

Country	Residential Tariffs)	Weighted Average End User Tariffs	Cost recovery tariff
Poland	7.60	6.55	8.00
Romania	6.80	5.70	7.03
Russian Federation	1.84	2.37	3.00
Serbia	3.90	3.90	7.50
Slovak Republic	8.90	8.60	8.60
Tajikistan	0.30	0.45	2.10
Turkey	8.50	8.68	8.00
Ukraine	2.33	2.87	4.00
Uzbekistan	1.33	1.28	3.50

Source: WB Infrastructure Data Base, ERRA Data Base, and EBRD Transition Report 2004.

Compared to other parts of the world, per capita electricity consumption was very high in this region in relation to its income levels and energy intensity of growth was also very high. On the basis of GDP (PPP dollars) per Kilogram Oil equivalent of energy, energy intensity of growth in the ECA region ranges from four times (in the CEE) to 13 times (in the CIS) the average for OECD countries.[34] Relative high levels of electricity consumption can also be gauged from Table 4.2. Adjustment of tariffs (in the power, gas and heat sectors) to reflect true costs of supply were thus also necessary to manage demand and encourage energy efficiency.

Table 4.2: Per Capita Annual Electricity Consumption Relative to Per Capita GDP

Country	Per Capita Annual kWh	Per Capita GDP ($)	Ratio	Country	Per Capita Annual kWh	Per Capita GDP ($)	Ratio
Middle Income Countries	1,422	1,770	0.80	Kyrgyz Republic	1,269	290	4.38
USA	12,183	35,430	0.34	Latvia	2,088	3,780	0.55
Total World	2,225	5,130	0.43	Lithuania	1,938	3,730	0.52
Armenia	1,113	800	1.39	Moldova	909	400	2.27
Azerbaijan	1,878	720	2.61	Russia	4,291	2,120	2.02
Belarus	2,657	1,380	1.93	Tajikistan	2,236	180	12.42
Estonia	3,882	4,540	0.86	Turkmenistan	1,371	860	1.59
Georgia	1,033	650	1.59	Ukraine	2,229	780	2.86
Kazakhstan	2,911	1,520	1.92	Uzbekistan	1,670	460	3.63

Source: Azerbaijan: Issues and Options associated with Energy Sector Reform, World Bank, March 2005

The situation in respect of *gas tariffs* is similar to that in power tariffs. Gazprom, the major Russian gas supplier to the region realized in 2003 an average of $131.6 per 1000 cubic meters from exports to West Europe, $43.6 from exports to former Soviet Union countries and $21.8 from its domestic sales.[35] Russia, Turkmenistan and Uzbekistan are the major gas producers. While Russia supplies to a large number of countries, Uzbekistan supplies to Tajikistan, Kyrgyz Republic and South Kazakhstan. Romania and Azerbaijan produce significant amounts of gas, but also import from Russia to meet their own domestic demand.[36] Since most countries import gas, there is a greater incentive to sell gas at prices which enable payment for the imports. The exporters are moving away from barter deals and refuse to supply if payment in cash is not made. Nonetheless countries like Romania and Serbia (till recently) and Azerbaijan were selling gas at a price lower than their import costs. A summary of the gas prices for select countries is given in table 4.3.

[34] Transition Report 2001, EBRD

[35] Russian gas prices for exports to west Europe have risen since 2003 to about $230 per 1000 cubic meters and Russia is trying to negotiate price increases to Ukraine and other FSU states.

[36] In the recent years Kazakhstan is also emerging as a notable producer of gas.

Table 4.3: Gas Sector Tariffs in Select Countries (2003) ($/mcm)

Country	Average Residential Tariff	Average Industrial Tariff	Weighted Average End User Tariff	Cost Recovery Tariff
Armenia	60.58	79.10	74.62	58.00
Azerbaijan	7.30	48.17	21.99	25.95
Belarus	42.20	42.70	42.60	46.90
Bosnia			277.00	200.00
Bulgaria	275.04	127.44	138.69	200.00
Croatia	262.31	269.00	278.21	200.00
Georgia	123.19	78.80	92.21	65.00
Kazakhstan			42.88	62.00
Kyrgyz Republic	69.51	83.79	77.80	65.47
Latvia			114.00	
Lithuania			310.00	
Macedonia			172.00	
Moldova	72.24	77.95	70.77	72.80
Poland	232.56	154.08	196.51	200.00
Romania	99.94	89.50	93.03	90.00
Russia	22.70	22.57	31.98	38.00
Serbia Montenegro	65.00			200.00
Tajikistan	56.65			63.74
Turkey	172.68			120.00
Ukraine	60.89	42.99	79.99	62.50
Uzbekistan	21.17			25.00

Source: World Bank: Infrastructure Database, World Bank, Regional Study of Regulatory Reform and Supply/Demand for Natural gas in the Baltics, Poland and South Eastern Europe, June 2003. Empty cells indicate that data are not available

In most countries short term financial viability would be more a question of improving operational efficiency in terms of loss reduction, and better metering, billing and collection than a question of raising tariff levels substantially. Cross subsidy of residential by industrial consumers exists notably in Armenia, Azerbaijan, Russia and Uzbekistan; it exists to a lesser extent in Moldova, Kyrgyz Republic and Tajikistan, where residential and industrial tariffs are nearly equal. In exporting countries like Russia and Uzbekistan, the need for the domestic gas prices to rise to a level at least equal to their long run marginal cost level for extraction, transmission and distribution would be a major consideration, from the point of view of managing demand and improving allocative efficiency. Most Russian gas exports to Western Europe are indexed to oil prices. The recent oil price increases would thus lead to further gas export price increases, which would impact on all the CIS, SEE and CEE importers making it necessary for them to adjust their sale prices.

Under Socialism, *Water tariffs* in the region were very low relative to costs. Through the transition period, tariffs have increased in many countries, resulting in the current levels (table 4.4).

Table 4.4: Water Tariffs in Europe and Central Asia in 2003

Country	Residential tariff ($/cubic meter)	Industrial tariff ($/cubic meter)
Albania	0.14	—
Armenia	0.07	0.08
Azerbaijan	0.06	0.18
Belarus	0.02	0.15
Bosnia and Herzegovina	0.24	—
Bulgaria	0.59	0.55
Croatia	0.71	—
Czech Republic	1.17	—

Country	Residential tariff ($/cubic meter)	Industrial tariff ($/cubic meter)
Estonia	1.22	1.22
Georgia	0.02	0.28
Hungary	0.62	—
Kazakhstan	0.16	0.14
Kyrgyz Republic	0.03	0.14
Latvia	0.9	0.90
Lithuania	1.32	—
Macedonia, FYR	0.26	—
Moldova	0.27	1.08
Poland	0.54	0.62
Romania	0.26	0.26
Russian Federation	0.09	0.22
Serbia	0.11	—
Slovak Republic	0.44	—
Slovenia	0.76	—
Tajikistan	0.04	0.09
Turkmenistan	0.003	—
Ukraine	0.05	0.37
Uzbekistan	0.02	—

Source: World Bank ECA Infrastructure Database and EBRD database. Non availability of data is indicated by (--)

Average regional residential tariffs were at $ 0.9 per cubic meter in Central and Eastern Europe, $ 0.3 per cubic meter in South Eastern Europe and $ 0.07 per cubic meter in the CIS. The wide divergence across regions (far in excess of any regional cost differentials) and the fact that water companies in the Central and Eastern Europe generally cover only operating costs demonstrate that tariffs are well below cost-recovery levels in the CIS and Southeastern Europe.

Although industrial tariffs are well above those for residential consumers (the average ratio of residential to industrial tariffs in the CIS is 0.3), and the unit cost of supplying industrial consumers is less than that for residential consumers, industries continue to pay less than the full cost of service across the transition countries. Further tariff increases will therefore be needed for both groups although relatively larger increases will be needed for residential consumers. This presents a social protection challenge.

Reform here is a priority if the water companies in the region are to be financially viable, which is crucial for two reasons: the huge financing requirements for investments—particularly for EU member states and accession countries in the context of the *acquis communautaire*—and the need to secure off-budget finance given fiscal constraints. The current water-related implicit subsidy is estimated to be up to 1 percent of GDP. This shows the order of magnitude of governments' contingent liability related to sector investment needs, should tariff increases not go ahead.[37]

Tariff reform is also important from a resource allocation perspective. While prices remain below cost-recovery levels, consumption will remain excessively high from an economic point of view. The average consumption per capita for the ECA region is 285 liters per capita per day, with particularly high consumption registered in Georgia, Kazakhstan, Russia, and Ukraine (all countries with particularly low tariffs) (table 4.5). As with levels of unaccounted-for water, these consumption levels must be viewed with care because of the low level of system metering. The reported figures for Georgia, for example, exceed those of any OECD economy. Urban households in Western Europe generally consume an average of no more than 150 liters per capita per day.

[37] Estache and Gassner (2004)

Table 4.5: Water consumption in selected ECA countries, 2002

Country	Water consumption (liters/capita/day)	Industrial consumption (%)
Armenia	203	14
Azerbaijan	220	15
Georgia	566	10
Kazakhstan	331	56
Kyrgyz Republic	196	41
Moldova	147	25
Russian Federation	324	50
Tajikistan	267	11
Ukraine	321	15

Source: World Bank ECA Infrastructure Database.

In all three sectors, there were also two other concerns of equal importance. First, in the context of steeply rising tariffs, there was a great need to keep in mind the affordability levels of the poorer sections of the population and devise appropriate social protection measures for them. Second, it became necessary to distance the political process from the task of tariff setting and create professional regulatory institutions to set tariffs in a transparent manner balancing the interests of consumers and service providers. These two issues are discussed in detail in the subsequent chapters.

Monitoring of financial performance

Identifying and monitoring performance indicators are important steps in assessing the pace of reform. In looking at a country's economy as a whole there are a number of well established measures to assess performance. At the sectoral level, however such measures are not as clearly defined. In the utility sectors, for example, issues such as the quality of the legislative framework, levels of competition and the state of governance within the sector are all important but not easily quantifiable.

In the 1999/2000 time frame, in its work in Russia, the World Bank concluded that perhaps the most significant measure to consider – the acid test as it were – is the level of subsidies provided by the utility service sectors to the economy as a whole.[38] This is, in effect, a simple measure of the financial viability of these sectors; but it also broadly measures whether each sector will be able to sustain and expand its services over time, whether it allocates scarce resources efficiently, and whether it relies on quasi fiscal flows that could endanger the macroeconomic stability of the country (Box 4.1).

In the context of a World Bank and IMF operation in Kyrgyz Republic and Tajikistan, the implicit subsidy values were computed with some rigor both for the gas and electricity sectors. The results are summarized in Table 4.6.

Table 4.6: Implicit Subsidies in the Power and Gas sectors in Kyrgyz Republic and Tajikistan

Year	Kyrgyz Gas Sector	Kyrgyz Power Sector	Tajik Gas Sector	Tajik Power Sector
2001	1.1	13.0	1.7	26.4
2002	1.0	12.8	1.1	20.7
2003	0.5	11.1	1.0	19.8
2004	--	8.9	0.8	18.3

Note: Implicit subsidy is expressed as a percentage of GDP. (--) denotes that data is not available
Source: Tajik Energy Utilities Reform Review, WB 2005 and WB internal documents

This indicates steady if slow improvement in Tajik energy sector and stagnation in Kyrgyz power sector.

[38] This is also commonly referred to as the "quasi-fiscal deficit" (QFD), "hidden cost" or "implicit subsidy".

This methodology was employed in a recent World Bank study for estimating the quasi-fiscal deficit or the implicit subsidy in the power sector and demonstrating the rate of its decline during 1993-2001 in six countries (table 4. 7).

Table 4.7: Implicit Subsidy in the Power Sector as a Percentage of GDP

Country	1995	1996	1997	1998	1999	2000
Hungary	1.1	0.8	0.3	0.2	0.1	-0.1
Poland	0.1	0.0	0.2	0.2	0.2	0.2
Armenia	10.7	8.0	7.1	4.2	3.1	2.9
Kazakhstan	6.4	4.3	3.1	-0.6	2.5	3.6
Georgia	8.5	8.5	7.4	7.9	10.1	8.8
Azerbaijan	18.0	12.0	8.9	9.4	10.9	10.6

Source: Julian Lampietti (Ed), Power's Promise, World Bank Working Paper No.40 (2004).

This indicates clearly the relative improvement in performance by Hungary, Poland and Armenia, compared to Kazakhstan and Azerbaijan and the relative stagnation in Georgia.

Box 4.1: Implicit Subsidy – A Measure of Sector Sustainability of the Services

While some assumptions have to be made about the true economic value of the services being provided, it is possible to calculate these subsidies on a sufficiently consistent basis both to chart progress in a specific country and to compare progress among countries. This implicit subsidy is calculated as a sum of three components:

- Subsidy attributable to excessive system losses. This is computed by multiplying the difference between actual system losses and normative system losses by the economic price of the service
- Subsidy attributable to collection inefficiency. This computed by multiplying the billed revenue by the difference between actual collection ratio and the normative collection ratio appropriate for the business
- Subsidy attributable to pricing inefficiency. This is computed by multiplying the billed quantity of service by the difference between the cost recovery price (or the economic price) and the actual price.

Normative loss levels and normative collection ratios are those prevalent in similar systems of comparable dimensions in well run commercial utilities in the developed world. The economic or cost recovery price is computed on the basis of long run marginal cost, or based on border prices adjusted for delivery costs. Tables 4.1 and 4.3 indicate these prices for electricity and gas sectors in the last column. The sum of the three components expressed as a percentage of the GDP of the country is comparable over time in the same country and comparable across countries to get a relative sense of progress towards financial sustainability of the service sector.

Some caveats are in order. Data over time and across the countries have to be assembled on a strictly consistent basis, which is a difficult undertaking in the region. Second the normative values for losses, and collection could tend to be somewhat subjective, but will have to be determined in a manner consistent over time and across countries. Finally the determination of the economic tariff will also have to be made in a consistent manner. Thus implicit subsidy values computed by several authors for several purposes at different points in time may not strictly be comparable. Further, as the economies grow and GDP increases, the QFD would drop even if there had been little or no progress in sector improvement, at least in the short run. The results thus have to be interpreted with caution. Nonetheless, when used properly, it is a very good measure of sector reform progress.

The Bank has recently undertaken the computation of the implicit subsidy values in the power, gas and water sectors covering 21 countries for power, 14 countries for gas and 15 countries for water in the course of assembling an infrastructure database for evaluating sector performance. The preliminary results are summarized below. Further work would focus on resolving data problems to further improve the quality of results.

In the *electricity sector* it may be seen that the implicit subsidy is declining as a function of upward tariff adjustments and improving efficiency in relation to losses, billing and collection. Increased GDP growth is also a factor in the decline of the ratio in some cases (Table 4.8).

Table 4.8: Implicit Subsidies in the Electricity Sector in ECA (as a % of GDP)

Country	2000	2001	2002	2003
Albania	10.49	7.41	6.14	4.16
Armenia	1.42	2.19	0.96	1.00
Azerbaijan	11.4	10.10	8.11	6.42
Belarus	2.51	2.22	0.75	negligible
Bosnia-Herzegovina	5.40	5.08	3.85	1.42
Bulgaria	9.45	8.12	7.04	3.80
Croatia	2.07	2.06	1.75	0.91
Georgia	12.21	6.85	6.45	5.97
Hungary	1.86	1.79	0.93	0.15
Kazakhstan	3.31	2.87	2.43	1.33
Kyrgyz Republic	18.64	25.23	19.02	9.16
FYR Macedonia	5.01	3.59	3.54	5.57
Moldova	10.84	7.66	3.20	2.71
Poland	0.25	1.40	1.07	0.76
Romania	3.80	3.67	2.47	1.33
Russia	5.36	3.56	3.11	1.01
Serbia-Montenegro	22.45	16.52	6.86	8.70
Tajikistan	28.18	24.95	22.95	16.53
Turkey	1.76	2.11	1.11	0.64
Ukraine	9.08	6.81	5.56	4.03
Uzbekistan	8.55	10.16	13.11	12.06

Note: Implicit subsidies have been presented as a percentage of GDP in constant 2001 prices
Source: World Bank Infrastructure Data Base.

For the ECA region as a whole, implicit subsidies in the electricity sector amounted to about 4.38% of GDP. It was lowest in CEE (less than 0.5%), followed by CIS Middle income countries (about 1.6%), SEE (3.3%) and CIS low income countries (7.7%). The better figure for the CIS middle income countries may have been caused, to some extent, by large GDP growth. In most countries tariff lagging behind the cost recovery level was major cause of the result. In countries such as Albania, Armenia, Azerbaijan, Georgia, Kyrgyz Republic and Moldova, excessive non-technical losses were the most significant factor. In countries such as Croatia and Kazakhstan collection appeared to be the significant factor.

In the *Gas sector* the implicit subsidy ratio is substantially lower than in electricity and is probably around 1.5% of GDP in the region. Since most countries (except Russia and Uzbekistan) import gas, tariffs are adjusted at least to pay for the imported gas, even if with a time lag. Collection inefficiency would appear to be the key factor behind the ratios in 2003 of Azerbaijan, Croatia, Georgia, Moldova, Russia, Ukraine and Uzbekistan.

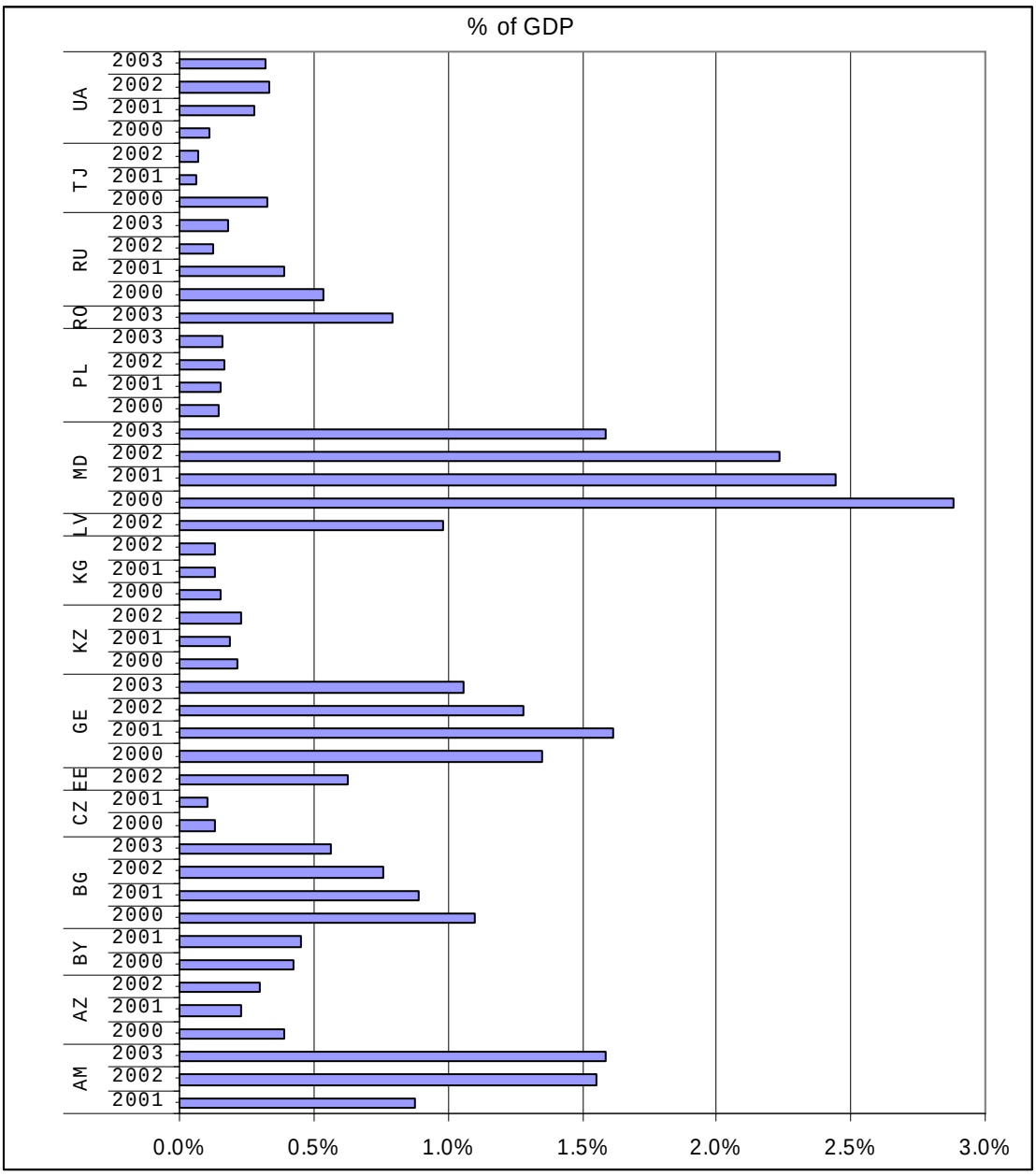
Table 4.9: Implicit Subsidies in the Gas Sector in ECA

Country	2000	2001	2002	2003
Armenia	0.38	0.19	0.15	0.48
Azerbaijan	1.40	1.19	1.09	0.89
Belarus	1.92	1.99	1.26	0.46
Bulgaria	1.37	1.06	0.70	1.02
Croatia	1.09	0.16	0.11	1.12
Georgia	0.95	1.95	1.25	2.34
Kazakhstan				2.15
Moldova	0.77	0.63	0.76	0.92
Poland	0.44	0.17	0.14	1.11
Romania	1.05	0.84	0.46	0.25
Russia	1.18	0.92	0.74	0.98
Turkey	0.10	0.16	0.14	1.80
Ukraine	3.72	5.09	1.06	1.03
Uzbekistan	2.95	3.36	5.95	8.45

Note: Implicit subsidies have been presented as a percentage of GDP in constant 2001 prices
Source: World Bank Infrastructure Data Base.

In the *water sector* Figure 4.2 provides an overview of the implicit subsidies or the hidden costs for 15 countries in this region. The range of implicit subsidies in these countries is from less than 0.5% to 2.5% of GDP. The larger countries (Russia, Poland and Ukraine) have the highest level in monetary terms while Tajikistan, Moldova, and Armenia have the highest costs as a percentage of GDP (about 2 % of GDP).

Figure 4.2: Implicit Subsidies in the Water Sector of ECA



Source: World Bank Infrastructure Data Base.

B. Transportation services

Railways restructuring and productivity improvements

Unlike in other sectors, railways in the CIS countries fared better financially than those in the CEE and SEE states. This happened despite the speedier reform of the sector by the CEE and SEE states than in CIS.[39] Railways in the region lost nearly 50% of their traffic volume during transition, largely on account of the decline in the heavy industry and in the manufacturing sectors, and partly on account of increasing competition from the road sector. Despite this, there was reluctance to downsize the rail network adding to the financial distress of the sector. Among the many factors influencing the financial viability of any national railways system, two are particularly important: (a) traffic density, and (b) the proportion of passenger services in the traffic mix. In terms of traffic density, the higher the traffic level on a particular line, the better the utilization of track, rolling stock and labor lowering the unit operating costs.[40] Further, for any given level of traffic density, passenger traffic units are generally more resource intensive than freight traffic units and also generates lower yield per traffic unit. Thus railways in Russia, Kazakhstan, Uzbekistan, Latvia, Lithuania, Estonia, Azerbaijan and Georgia, which have the high traffic densities and low percentage of passenger traffic managed to remain the least distressed financially through the transition with relatively low or no government subsidies (Table 4.10).

Table 4.10: ECA Railways: Traffic Density and Traffic Mix (2003)

Country	Total traffic units (passenger-km + tonne-km) (millions)	Traffic density (traffic units / route-km) (thousands)	Proportion of Passengers in the total traffic mix (percent)
Russian Fed.	1,663,100	19,442	9
Ukraine	243,685	11,037	21
Kazakhstan	143,537	10,557	7
Poland	63,873	3,158	27
Belarus	48,518	11,236	30
Romania	25,699	2,261	33
Czech R.	22,369	2,355	29
Uzbekistan	20,446	4,955	10
Hungary	18,283	2,366	58
Latvia	15,764	6,944	5
Turkey	13,352	1,540	41
Slovak R.	13,065	3,573	21
Lithuania	10,265	5,856	5
Estonia	9,874	8,270	2
Turkmenistan	8,603	3,410	13
Azerbaijan	7,564	3,565	8
Bulgaria	7,225	1,673	36
Georgia	5,476	3,584	7
Croatia	3,401	1,247	35
Serbia & M.	3,286	863	31
Moldova	3,030	2,705	10
Tajikistan	1,126	1,824	4
Armenia	500	703	10
Kyrgyzstan	438	1,050	10
Macedonia	432	618	23
Bosnia & H.	361	350	14
Albania	144	327	85

Source: Paul Amos (2004)

[39] Exception to this would be Russia and Kazakhstan where major structural reforms are underway.
[40] Nash and Preston (1992).

These are also the countries with a high and increasing freight traffic volume of oil and coal. It is interesting to note that in Georgia, railways is the only publicly owned infrastructure agency which remains viable, in large part because of Georgia's role as a transit country for goods coming from the Caspian region and from Armenia.

In contrast the railways with relatively low traffic density and high percentage of passenger traffic met with greater financial difficulties. These included Poland, Romania, Czech Republic, Bulgaria, Turkey, Croatia, FYR Macedonia, and Albania.

Railways in many countries in the region depend on budget support to meet the revenue shortfalls arising mostly from high passenger traffic. Unlike in the power, water and gas sectors where full cost recovery (with limited or no budget support) is a typical objective, in the railways sector few passenger services around the world recover all their costs from the passenger revenues.

Available data on subsidies, freight and passenger revenues and working ratios (defined as the ratio of operating expenses to operating revenue) for 21 countries are summarized below in Table 4.11

Table 4.11: Financial Indicators for Rail Sector in the ECA Region (2002)

Country	Subsidy (% of GDP)	Subsidy ($ million)	Freight revenue ($/ ton-km)	Passenger revenue excluding subsidy ($/passenger-km)	Passenger revenue including subsidy ($/passenger-km)	Working ratio (excluding subsidy)
Armenia	0	0	0.026	0.008	0.008	1.35
Azerbaijan	0	0	0.012	0.013	0.013	0.36
Belarus	—	—	0.013	0.008	—	—
Bosnia and Herzegovina	—	—	0.051	0.036	—	3.41
Bulgaria	0.4	66	0.022	0.013	0.026	1.05
Croatia	0.82	186	0.027	0.031	0.031	1.67
Czech Republic	0.29	203	0.036	0.025	0.056	1.12
Estonia	0.22	14	0.01	0.013	—	—
Georgia	--	--	--	--	---	0.62
Hungary	0.005	296	0.046	0.019	0.041	1.10
Kosovo	0.12	1.72	0.059	0.023	—	—
Latvia	—	—	0.018	0.041	—	0.34 [a]
Lithuania	—	0.27	0.005	0.009	0.009	0.41
Macedonia, FYR	—	—	0.060	0.014	—	—
Poland	0.1	164	0.027	0.023	0.029	0.78 [a]
Romania	0.5	248	0.022	0.017	0.034	0.80
Russian Federation	—	162[b]	0.007	0.008	—	0.50
Serbia	0.86 [c]	164 [c]	0.025 [c]	0.028 [c]	—	2.73 [c]
Slovak Republic	0.68	166	0.027 [a]	0.016 [a]	0.056 [a]	0.92
Slovenia	0.1	25	0.034	0.033	0.065	1.11
Turkey	—	—	0.014	0.001	—	3.89
Ukraine	—	—	0.008	0.005	—	—

— denotes that data are not available.

a. Data are for 2001. b. Data are for 1999. c. Data are for 2003.

Source: World Bank ECA Infrastructure Database.

A working ratio of less than one indicates that the entity has achieved short term viability. The railways in Russia, Romania, Poland, Lithuania, Latvia, Georgia and Azerbaijan have short term viability without government subsidies. Bosnia and Herzegovina, Croatia, Serbia, and Turkey have the largest gaps between their operating expenses and revenues. Rail sector subsidy is significant in many countries, in comparison with GDP or passenger revenue, or in absolute terms. Subsidy exceeds 0.5 percent of GDP in Croatia, Romania, Serbia, and the Slovak Republic.

Short term financial viability had been achieved by the railways in most of the countries, although often with significant levels of government budget support. This, however, does not mean that they have achieved their potential level of efficiency. Challenges remain to restructure the sector to improve efficiency, transparency and management accountability (in several countries the rail sector had been a magnet for corruption).

One may also discern from the high working ratios, that most railways in the region are unlikely to be financially viable in the medium term, as large investments for expansion or replacement of assets become necessary. While current levels of subsidy in the region are not dissimilar to levels of support provided in Western Europe, they will not be adequate to finance investments. It is neither practical in the context if fiscal constraints, nor economically justifiable to increase subsidies to finance investments. To improve the financial viability of the sector in the medium term, the key steps to be pursued include:

- Rebalancing or rationalization of tariffs to reflect to the extent possible the underlying cost differential. From an economic point of view, both passenger and freight charges should at least cover avoidable costs (defined as the cost reductions if services were withdrawn). One obvious policy is to increase charges in both market segments to provide finance for investments, particularly for railways in Central and Eastern Europe and Southeastern Europe.[41]
- Rationalization of passenger and freight service levels based on economic considerations, such as reductions in train size and frequency and closure of uneconomic lines. A substantially higher intensity of passenger traffic in the region compared to the West Europe indicates the scope for such rationalization, which could have a net positive financial impact. It could also reduce investment needs in additional rolling stock, track, infrastructure and the like) that would otherwise be required to support current levels of service.
- Sector restructuring to divest all non core activities such as railways supply entities, hospitals, hotels, and other social infrastructure and to enable a clear focus on the core business of freight and passenger services. Organizing business units for such core services and commercializing the operations.
- Productivity improvements, especially in terms of rationalization of the labor force, consistent with economies of such high density traffic levels.

Notwithstanding the scope for increasing fare, rationalizing service, and reducing cost, it is likely that many rail industries in the ECA region will continue to be subsidized for the foreseeable future. This expectation raises related reform challenges, given that current mechanisms for subsidy typically do not conform to best practice. The most common mechanism in the ECA region—and particularly in the CIS—is cross-subsidy between freight and passenger services, followed by lump-sum deficit financing (or part-deficit financing where funds are not available because of fiscal constraints). The ideal would be to pay a subsidy in the form of budgetary transfers, determined in advance according to transparent criteria and targeted to specific services or service levels.

[41] For a discussion on the extent to which prices should be raised above avoidable cost for different customer categories, see Kennedy (1997a) and Nash, Matthews, and Thompson (2005).

Industry restructuring

Serious reform of railway organizations in the transition economies has invariably been underpinned by new laws that attempt to create new organizational forms, sets new commercial objectives for rail industries, defines commercial rights and obligations, and establishes new forms of governance and accountability. In general, the CEE states were the first to adopt new railway laws as a part of the reforms needed for EU accession. Included here are Bulgaria, Estonia, Hungary, Poland, and Romania, though financial crisis was an equally important driving force in all but Estonia. More recently, CIS countries such as Kazakhstan, Russia, and Uzbekistan have adopted commercializing laws. Yet more than a third of countries in the ECA region retain the same (or very similar) legal provisions for railways as in the earlier command economy.

Typically, in the ECA region where rail industries had functioned within departments of government, they have now been corporatized—in principle allowing governments to focus on policy and regulatory functions and to give management greater autonomy.

Although there has been progress in some countries according to standard indicators (adoption of International Financial Reporting Standards, formal capital appraisal and prioritization methods, and so on), only the Estonian railway would appear to be fully commercial in its operations. In all other countries major challenges to commercial operation remain. For example, there is a need to introduce managers with commercial experience and a need to strengthen incentives, information flows, and accountability.

Although some restructuring has occurred and could support commercialization, as in the power sector, this restructuring has often been motivated by the objective of liberalizing rail freight markets, particularly for EU accession. In EU member states and accession and pre-accession countries different lines of business (infrastructure, passenger services, freight) must produce separate accounts, and freight train operators must have nondiscriminatory access to infrastructure. A number of countries have moved away from organizing along functional lines (permanent way, signaling, locomotives, and traffic operations) or regional management lines, and moved toward separate lines of business, whether these are cost centers, profit centers, subsidiaries within a holding company structure, or separately owned entities.

Productivity improvements

Caused by the decline in traffic in the 1990s, labor force in the Rail sector of the region had contracted by 37% during 1989-2002 or by some 1.4 million employees. Notable reductions were in Russia (35%), Romania (64%), Poland (60%), Kazakhstan (37%) and Croatia (60%). In terms of process, the one adopted by Poland is considered noteworthy.

Box 4.2: Best Practice in Labor Restructuring

The labor restructuring process of the Polish railways during 2001-2003 is considered the best practice. The process involved extensive prior consultation with trade unions, embedding the labor entitlements in the compensatory provisions of the Restructuring and Privatization Law of 2000, making the Polish Railway Company rather than the government responsible for the compensation payments to the retrenched labor, facilitating the Railway to secure IFI funding, and issuance of bonds to meet the costs of compensation, establishment of a well resourced unit in the Railways to implement the program, a generous financial package for separation that was also higher in areas of high unemployment, and a supporting program of counseling and retraining options.

Labor productivity indices show that labor rationalization had offset the traffic declines in Hungary, Latvia, Poland, Russia and Slovenia, while in most other countries productivity has fallen since 1989. This is notably so in Central Asia and the Caucasus regions. (Table 4.12)

Table 4.12: Railway Sector Labor Productivity Index, 1998–2003 (1989 = 100)

Country	1998	1999	20000	2001	2002	2003
Albania	28.5	32.1	34.9	38.3	39.8	39.4
Armenia	20.1	16.2	15.2	17.2	20.6	23.5
Azerbaijan	16.4	17.5	23.7	25.4	29.4	31.9
Belarus	32.2	35.9	37.5	35.1	38.3	40.1
Bosnia and Herzegovina	111.3	153.7	177.2	245.9	267.2	294.7
Bulgaria	73.4	65.3	71.2	70.3	65.9	75.2
Croatia	52.1	52.9	58.2	70.9	78.1	90.4
Czech Republic	73.0	69.2	74.1	71.9	68.2	69.9
Estonia	98.6	129.3	154.5	179.1	232.4	267.3
Georgia	38.9	48.0	59.5	65.1	71.9	72.6
Hungary	112.9	117.0	122.8	123.3	130.3	133.9
Kazakhstan	31.2	27.6	42.5	46.3	51.0	58.5
Kyrgyz Republic	17.4	15.4	15.3	15.0	16.2	22.0
Latvia	72.0	73.6	84.5	90.5	108.6	129.9
Lithuania	36.3	34.9	41.3	39.1	54.4	67.8
Macedonia, FYR	68.7	66.7	89.7	78.9	59.2	67.2
Moldova	25.2	15.6	18.7	23.3	27.5	29.5
Poland	78.2	78.4	84.3	86.7	93.1	106.0
Romania	54.2	46	48.9	48.7	50.4	58.3
Russian Federation	60.9	72.1	78.8	85.0	90.1	101.6
Serbia and Montenegro	45.9	25.1	39.9	41.2	45.1	50.3
Slovak Republic	60.8	53.0	61.0	62.4	61.7	60.5
Slovenia	120.2	118.4	123.0	122.7	133.6	150.3
Tajikistan	75.5	62.9	62.9	57.2	50.3	47.3
Turkmenistan	27.8	26.9	27.3	26.9	32.7	34.3
Ukraine	42.2	41.7	44.9	46.5	49.9	56.5
Uzbekistan	27.1	26.6	34.2	35.5	51.1	51.8

Source: World Bank ECA infrastructure database. Note: Productivity is measured as traffic units per employee.

Four key productivity indicators are assembled in Table 4.12 to gain an insight into the scope for further productivity improvements. The productivity level shown for Russia is nearly twice that for European Union. If we take into account the fact that traffic density in Russia is five times higher and that the share of passenger traffic in the traffic mix is substantially lower than in EU, we could infer that there is further scope for productivity improvements. In general, the two tables taken together lead us to believe that there is ample scope for productivity improvements in most countries in the region:

- Where productivity is substantially lower than in 1989, there is clearly greater scope for improvement. That some five countries (Russia, Latvia, Bosnia, Estonia, and Slovenia) achieved 1989 levels would suggest that it might be possible more widely. Thus six countries with less than 40% of the 1989 level and eight countries with about 60% of the 1989 levels would come in this category. However, expectations in this regard should be moderated by the intensity of border issues, trade and transit issues, the CIS countries faced and are facing since the dissolution of the Soviet Union.
- Where the productivity is low when benchmarked against other countries of similar or lower traffic density, there would be significant scope for improved productivity.

Table 4.13 Railway productivity indicators for selected countries in 2002

Country	Staff productivity (traffic units per staff) thousands)	Operating cost ($/traffic units)	Labor cost (% of revenue)	Labor cost (% of revenue, including subsidy)	Labor force (thousands)
Albania	62	—	—	—	2.32
Armenia	120	0.046	17	17	4.18
Azerbaijan	265	0.009	1.4	1.4	28.5
Belarus	644	—	—	—	75.3
Bosnia and Herzegovina	51	0.298	111	—	6.8
Bulgaria	205	0.037	56	48	35.19
Croatia	169	0.096	152	57	16.08
Czech Republic	273	0.068	97	89	77.5
Estonia	2639	0.10	29	29	3.6
Georgia	300	0.004			18.2
Hungary	261	0.071	97	97	55.7
Kosovo	98	0.070	69	—	0.6
Latvia	1176	0.010 [a]	—	—	13.4
Lithuania	802	0.020	35	—	12.8
Macedonia, FYR	112	—	—	—	3.86
Moldova	200	—	—	—	15.3
Poland	437	0.039[a]	—	49 [a]	145.9
Romania	267	0.036	46	33	87.6
Russian Federation	1361	—	—	—	1222
Serbia	111	—	—	—	28.9
Slovak Republic	304	0.019 [a]	66 [a]	51[a]	42.9
Slovenia	401	0.074	128	106	8.93
Turkey	324 [a]	0.059	359	—	39.8 [a]
Ukraine	659	—	—	—	369.7

— denotes that data are not available. *a.* Data are for 2001. *Source*: World Bank ECA Infrastructure Database.

Road transport sector

Most of the road networks all over the world are owned and operated by different levels of governments. Most of the road network, except the toll roads, is not capable of being operated on a strictly commercial basis. Even the toll roads require a minimum amount of traffic in order to be commercially viable. As a result even in industrialized countries, toll roads account only for about 5% to 10% of the primary road network, which itself represents only about 10% to 20% of the overall road network.[42] Toll roads in the US for example represent 0.08% of the paved roads. By and large the aim of all road administrations all over the world is to carry out the construction and maintenance of road works in a cost effective manner and try to recover from the road users as much revenue as possible to match the expenditure on roads. Motor vehicle tax and fuel tax are the two traditional sources of revenue. To the extent the revenue from them is not adequate to meet the road expenditure allocations are made from other general tax revenues of the state. Often a part of the revenues from the two sources are used for other purposes and only the remainder is allocated for the roads. To avoid this many governments used to credit the fuel tax and vehicle tax to a separate Road Fund account which would finance road maintenance expenses only. However, the more recent public finance practices of many governments do not seem to prefer this option on basis of greater flexibility of use of tax revenues.[43]

[42] Heggie, and Vickers, Commercial Management and Finance of Roads, World Bank Technical Papers No.409 (1998)

[43] International Monetary Fund's approach also does not favor the creation of such funds.

Analysis of the public expenditure patterns of 36 countries showed that their road expenditures represented about 1.25% of the GDP in 1998. The EU countries are allocating about 2% of their GDP. Many middle income countries have realized that they need to allocate at least up to 3% of their GDP to maintain their existing roads and bridges and support road investments called for by the rapidly growing economy. In the ECA region a much greater percentage of GDP would be needed to make up for the backlog in maintenance and for the construction of new roads needed to meet the demands of the transition.

Road expenditures as a percentage of GDP are given in Figure 4.3 for 13 countries in the region. In most cases it is well below 2%, the exceptions being Russia and Kyrgyz Republic in 2000. Russia, Romania and Kazakhstan have also abolished Road Funds.

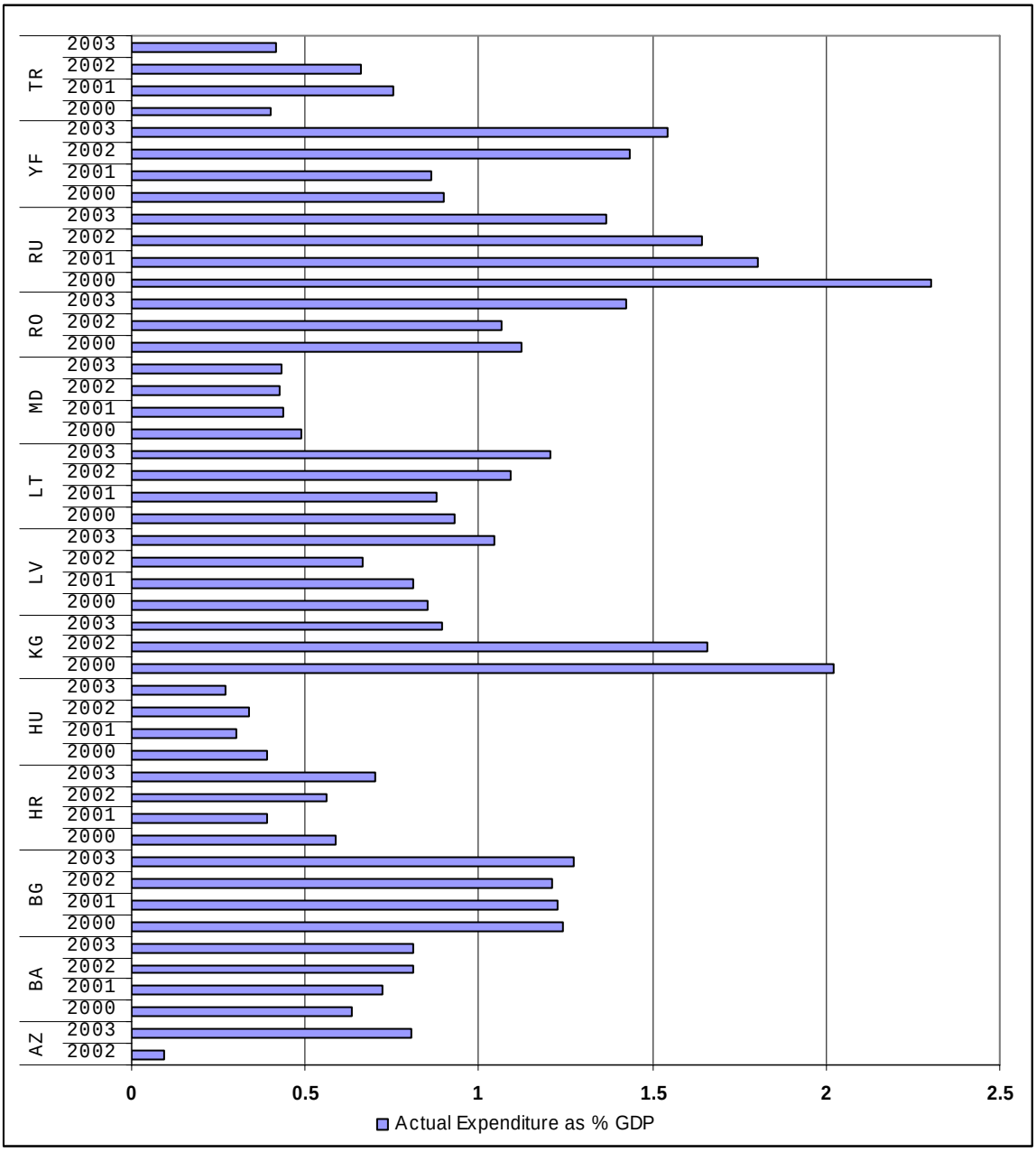
In the Baltic states of Latvia, Lithuania and Estonia they were in the range of 0.95 to 1.3%. Estonia and Lithuania do not collect vehicle tax. Their road expenses come from fuel tax and from other general revenue. They have also abolished their road funds.

In Russia the allocation for road expenses had been falling both in terms of a share of GDP and as an absolute amount. In 2002 it amounted to $1.8 billion or 0.51% of the GDP. It has been estimated that actually Russia needs an expenditure level of $13 billion or 4.25% of GDP to meet the expenditures relating to (a) the normal annual maintenance, (b) make up for the backlog of maintenance, and (c) construct the roads needed to support a GDP growth of 5% per year. With a fleet of 21 million cars and 0.3 million trucks, it has been estimated that Russia could conceivably raise $2 billion by way of vehicle taxes and $2.25 billion by way of a fuel surcharge. But only a fraction of this potential is being raised now. Another $4 million (or 0.5% of the expanding GDP) could come from the federal budget. The balance will have to come from borrowings from IFIs or other sources and from private investments and PPPs in suitable new toll roads and motor ways.[44]

As mentioned in the earlier chapter, in the CEE states (excluding Latvia and Slovenia), Romania and Bulgaria, actual maintenance expenditure on roads is less than what is needed despite the revenues from road users being much larger than the road allocations.

[44] Ben Eijbergen and others, *Russia: The Transport Sector*, The World Bank Policy Note, August 2004

Figure 4.3: Actual road expenditure as a % of GDP



In other SEE states the road user charges and vehicle taxes are much lower than the road maintenance needs and are lower than the levels in EU. Vehicle tax on a 20 ton truck is about Euro 450 per year compared to Euro 700 to 2000 per year in EU states. Diesel tax at Euro 0.31 per liter is 38% lower than in EU. Gasoline tax is 32% lower.

Poland has actually set up a new Road Fund, the details of which are given in Box 4.3.

Box 4.3: Poland's New Road Fund

Poland is a country which has actually set up a new National Road Fund (KFD), which commenced operation in January 2004 to implement its ambitious program of upgrading and modernizing its road networks, in the context of its becoming a member of EU. Its revenues will come from a special fuel surcharge, which is expected to generate Euro 250 million per year. Using this revenue as some form of equity, KFD will float Bonds and resort to other forms of borrowing too from IFIs and others. It will also manage on behalf of the ministry of finance the grant funds provided by EU.

The fund finances new investment in, and maintenance and rehabilitation of, national roads. Other qualifying expenditures include loans to concessionaires, shadow tolls and availability payments to concessionaires, and the costs of administering the road fund. In future, it may also finance road safety interventions. The Road Administration prepares an approved list of projects each year for financing through the Fund and the Fund then pays contractors and concessionaires directly. The Fund is subject to annual audits.

The Fund has three attractive features. First, since the fuel surcharge is an additional tax, it does not divert revenues away from other sectors (i.e., it is budget neutral). The fuel charge is more akin to a road tariff than a regular tax. Second, the fuel surcharge is collected by the Customs Department under an agency agreement (i.e., under a subcontract with the Ministry of Finance), the agency fee for which appears to be rather low. Third, the road fund is managed under a contract between the Ministry of Infrastructure and the Polish Central Bank (BGK). BGK has established a small 5 person unit to administer the Fund, under a head who reports directly to a Deputy President on BGK's Management Board.

However, in order to be successful in its borrowing program and efforts to secure guarantee assistance, it may have to have a suitable Board of Directors with proper oversight and fiduciary responsibilities and adopt long term financial planning and acceptable performance criteria.

5. Affordability of the infrastructure services

A. Can the consumers afford the price of services?

The first phase of transition impoverished the population of the region to such an extent that by 1998, nearly 21% of the population (or 102 million people) were classified as poor living on a daily income of $ 2.15 or less.[45] Another 34% of the population (or 161 million people) were classified as economically vulnerable living on a daily income of $4.30 or less. The existence of such widespread poverty made the utility reform process difficult and called for social protection measures to mitigate the impact of increased cost of utility services on the family budgets of the poor households.

Largely because of the resurgence of economic growth in CIS, during 1998-2003, the situation has improved to some extent. By 2003, the share of the poor in the total population fell to 12.8%, the share of the vulnerable fell marginally to 32%, while the share of the non-poor increased to 55%. Variations within the sub-regions were notable. The percentage of the poor was less than 5% in CEE, between 5% and 20% in SEE and middle income CIS and greater than 40% in low income CIS.

To ensure financial sustainability of the utility services, reform programs focus on adoption of improved metering and billing systems, enforcing payment discipline and improving collections and even more importantly setting levels of tariffs to generate adequate internal cash to contribute to the investment needs for rehabilitation after meeting all operational expenses and debt service obligations. In addition, tariff reform also focuses on correcting the distortions in the structure of tariffs and eliminate the cross subsidization of residential tariffs by industrial and commercial tariffs. A reform program focused on this set of objectives directly impacts on the share of utility services cost in the total household expenses of residential consumers. In the case of poor households, the increase in utility bills may force them to: (a) reduce their consumption to a level lower than desirable; (b) switch to unhealthy, dirtier and environmentally unsound choices; and or (c) reduce consumption in respect of other basic needs such as nutrition, clothes, and healthcare.

Affordability ratios

Affordability ratio for any particular utility service is the percentage share of the expenses on that utility service in the total household expenses. An analysis of this ratio across income slabs (usually quintiles or deciles) with reference to a normative ratio (or threshold) provides useful insights, especially for understanding what happens to the poorer households when tariffs are raised. When a tariff increase or a collection enforcement program results in the affordability ratio of the poor exceeding the threshold, it usually indicates the need for social intervention to offset the adverse impact. For the power sector in the region, a threshold ratio of 10% to 15% has often been used for countries in which electricity is also used for space heating, cooking and hot water and a ratio of 10% if other fuels are used for these purposes. Tepic and Frankhauser suggest a ratio of 25% for all utility services covering electricity, heat, water supply and sanitation.[46]

Household Budget Surveys (HBS) and Living Standards Measurement Surveys (LSMS) which are periodically carried out by the government authorities in these countries are the main sources of information for affordability analyses. The survey data provides only limited or partial insights into the

[45] In other region regions of the world people living on a daily income of $1.0 or less are classified as poor. In the ECA region a higher level of $2.15 is adopted to allow for the cold climate which requires heating and warm clothes.

[46] Sladjana Tepic and Samuel Frankhauser, *Can Poor Consumers Pay for Energy and Water? An Affordability Analysis for the Transition Countries*, Working Paper No. 92, EBRD, May 2005. This paper also suggests that to even out seasonal variations in expenditure, the ratio should cover a full year.

access, quality and affordability of the utility services, as the objectives of the surveys are much wider in scope than utility expenses. Until special utility business oriented surveys are commissioned and the results are reconciled with the utility records, HBS / LSMS is the only available source for affordability analyses. The interpretation of the raw survey data by different authors could give different results and comparisons have to be handled with caution.

Tepic and Frankhauser estimate that in the 27 transition countries, the average electricity payment accounts for no more than 5% to 6% of the total household expenditures. A summary of their disaggregated affordability ratios for electricity, heat and water sectors in 2003 both for all households and for the households in the lowest income decile is given in Table 5.1

Table 5.1: Affordability Ratios for Utility Services (2003)

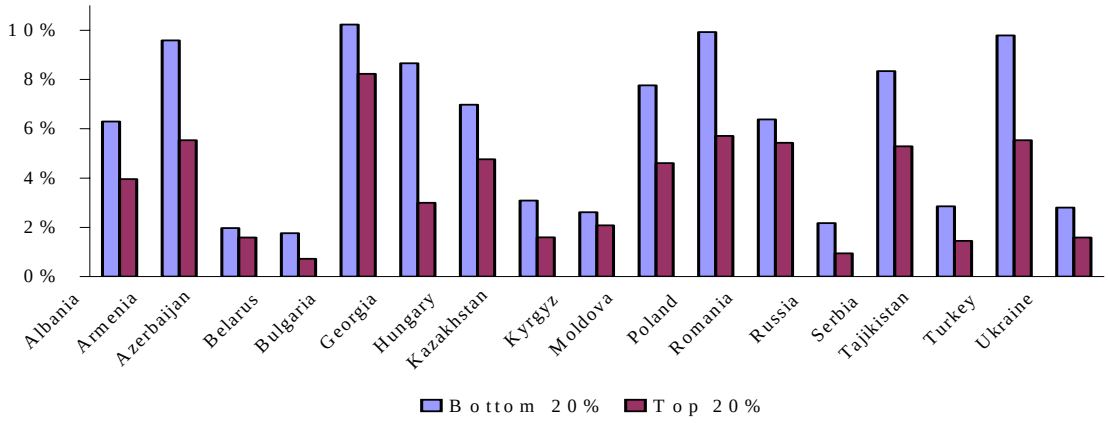
Area/ Sub-region	Affordability ratio for Electricity (%) Average		Affordability Ratio for Heat (%) Average		Affordability Ratio for Water (%) Average	
	For all households	For bottom decile	For all households	For bottom decile	For all households	For bottom decile
CEE	3.8	6.5	3.7	5.7	1.6	2.3
SEE	5.2	8.3	1.6	1.9	1.5	1.9
CIS	2.3	4.1	1.4	1.5	1.0	1.2
ECA Region	3 to 4	6 to 6.5	2.0	3	1 to 2%	1.8

Source: Tepic and Frankenhauser (2005)

They have also estimated that if payment discipline were to be enforced fully the electricity affordability ratios would rise from 8.5% to 10% in SEE and from 4.1% to 6.6% in CIS.

The above analysis is based on the published secondary data relating HBS/LSMS and it also takes into account households which make no payments for utility services. The Bank carried out a special review and analysis of the raw survey data, eliminated the households which make no payments for electricity and estimated the electricity affordability ratios for the lowest and the highest quintiles of the population for 17 countries. On the basis of this analysis, the average electricity affordability ratio for all households for 2002 was 5% for the region, 6.5% for CEE, 7.6% for SEE and 3.2% for CIS. The impact was more adverse on the households in the bottom income quintile. The affordability ratio for them in 2002 was 6.5% for the region, 8.5% for the CEE, 10% for the SEE and 4.5% for the CIS (Figure 5.1).

Figure 5.1: Electricity Affordability Ratios in 17 ECA Countries (2002)

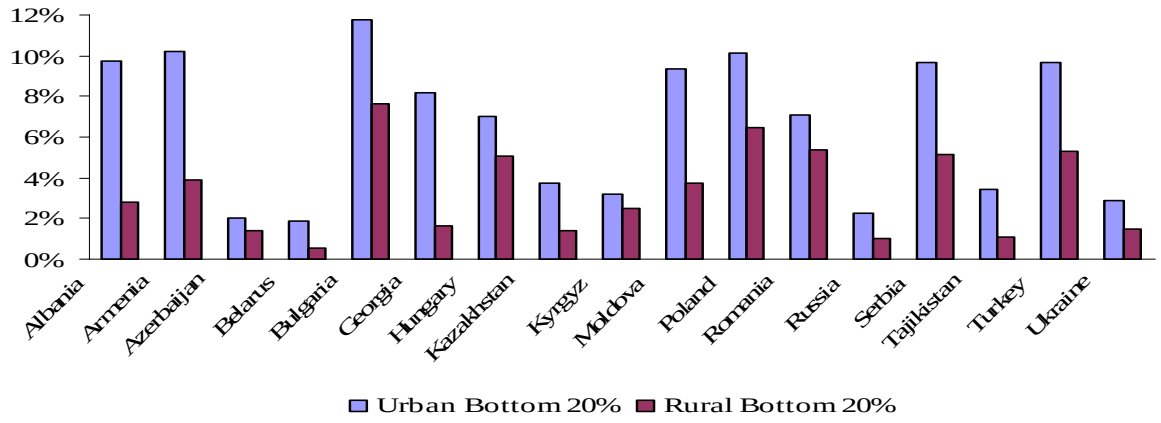


Source: World Bank Staff estimates based on WB archived data base of HBS/LSMS

Note: Data for Bulgaria and Tajikistan relate to 2003.

The ratio is high in SEE since its income levels are not as high as in CEE and its power supply costs are not as low as in CIS. Further, in many SEE countries electricity is the only resource for space heating. The ratios are high in Armenia, Bulgaria, Georgia, Moldova, Poland, Serbia and Turkey, reflecting the results of significant tariff increases and in some cases collection enforcement. The ratios are lower in Azerbaijan, Belarus, Russia and Tajikistan reflecting lower supply costs and lower tariffs and slow tariff reform. Despite extensive use of electricity for space heating in Kyrgyz Republic, the ratio is low because of low tariffs and poor collections. It is relatively lower in Romania (because of the extensive use of gas for space heating) and Hungary (because of effective social protection measures).

Figure 5.2: Electricity Affordability Ratios in the Bottom Quintile in Urban and Rural Areas (2002)

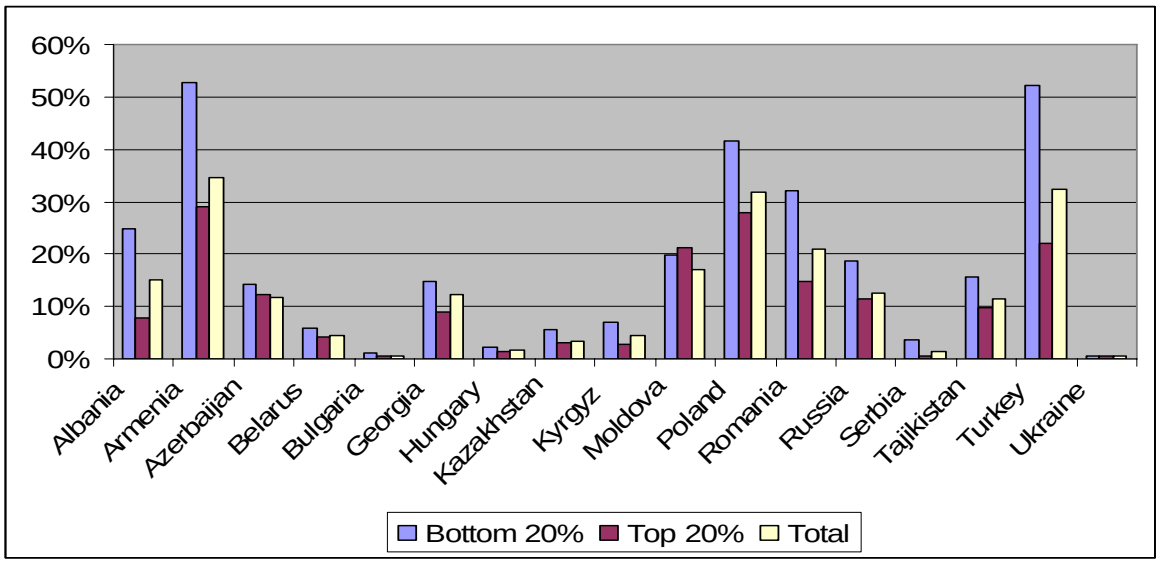


Source: World Bank Staff estimates based on WB archived data base of HBS/LSMS Note: Data for Bulgaria and Tajikistan relate to 2003.

The poor households in urban areas have worse affordability ratios than the poor households in rural areas (Figure 5.2). This however does not imply that the affordability concerns of the rural poor are insignificant. The lower expenditure of the rural households on network utility services is often due to lack of power supply to rural areas. Poor rural households may also be prone to use dirtier fuel substitutes such as coal, biomass and animal dung for cooking and heating, both on account of lack of power supply and district heating and on account of their inability to pay for electricity.

The above analysis excludes all households which reported no payments to utilities. They constitute a significant percentage (12% to 13%) of total households. The percentage of such households in the poorest quintile is high (18% for the region) compared to the highest quintile (10% for the region) (Figure 5.3). Part of this could be attributable to the range of social protection mechanisms already in operation such as, 50-100% tariff discounts for 12 to 16 different categories of privileged consumers such as pensioners, war veterans, handicapped persons, Chernobyl victims and the like and other energy compensation payments. Part of this could also be attributed to the simple failure to pay the bill on the part of the consumers and failure to send bills on the part of the utilities. The rest is difficult to explain except in terms of the survey design and mechanisms not having been made to address our concerns. The high percentages in Turkey, Romania, Poland and Armenia are otherwise inexplicable.

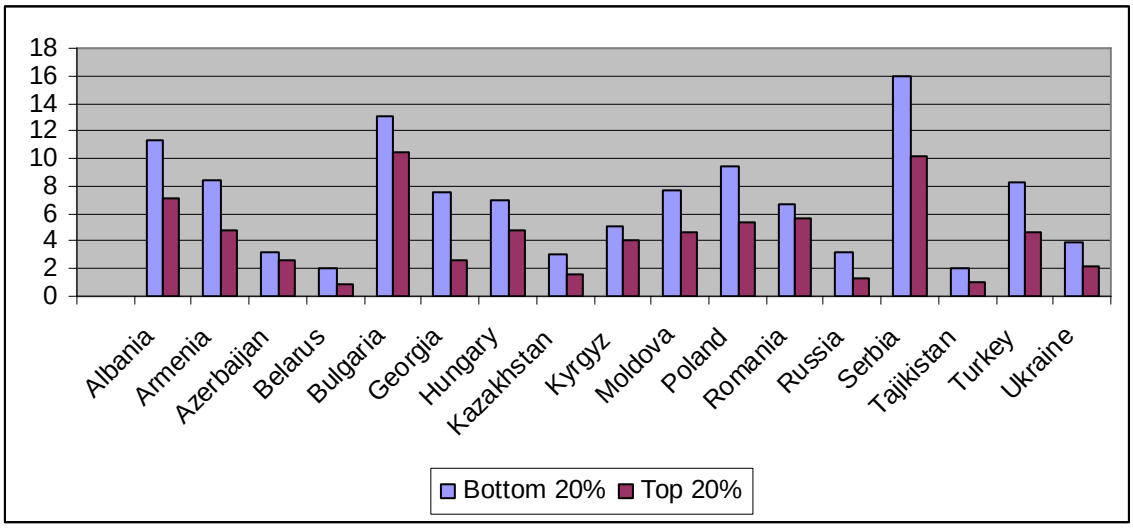
Figure 5.3: Percentage of Households which make No Payment to Power Utilities



Source: World Bank Staff estimates based on WB archived data base of HBS/LSMS

Note: Data for Bulgaria and Tajikistan relate to 2003.

Figure 5.4: New affordability Ratios, if Cost Recovery Electricity Tariffs Are Used



Source: World Bank Staff estimates based on WB archived data base of HBS/LSMS

Note: Data for Bulgaria and Tajikistan relate to 2003.

The household budget data had also been used to simulate to impact of an instantaneous tariff increase to the cost recovery level indicated in Table 4.1 and assuming a price elasticity of – 0.15 (i.e., 10 percent

increase in the price of electricity would reduce demand by 1.5%) in 12 countries.[47] The results are in Figure 5.4

The results indicate that affordability ratios of the poor households would remain the same or decrease slightly in respect of nine countries (Armenia, Belarus, Georgia, Hungary, Kazakhstan, Moldova, Poland, Turkey and Ukraine), as their tariffs in 2002 were equal to or slightly higher than the cost recovery tariff levels. In respect of the remaining, the new ratios are well within the 10% thresholds except in the case of three countries (Table 5.2). Albania, Bulgaria and Serbia would have ratios in the range of 11% to 16% because of the extensive use of electricity for space heating, cooking and hot water.

Table 5.2: Impact of Power Tariff Increase on the Affordability Ratios of the Poor Households

Country	Affordability Ratio in 2002	Affordability Ratio with cost recovery tariffs	Increase in the ratio
Albania	6	11	5
Armenia	10	8	(2)
Azerbaijan	2	3	1
Belarus	2	2	0
Bulgaria	10	13	3
Georgia	9	8	(1)
Hungary	7	7	0
Kazakhstan	3	3	0
Kyrgyz Republic	3	5	2
Moldova	8	8	0
Poland	10	9	(1)
Romania	6	7	1
Russia	2	3	1
Serbia	8	16	8
Tajikistan	3	2 (?)	?
Turkey	10	8	(2)
Ukraine	3	4	(1)

Source: World Bank Staff estimates based on WB archived data base of HBS/LSMS

Note: Data for Bulgaria and Tajikistan relate to 2003.

Further, the analysis is meaningless in respect of Tajikistan, where the 2002 tariff/kWh of 0.3 cents has to be increased by 700% to reach the cost recovery level of 2.1 cents. Such cases highlight the need to adopt a phased approach to tariff increases, while designing and adopting social protection for the poor households. When tariff increases are phased over the medium term, the income increases of households and their ability to replace inefficient household appliances would help to moderate consumption and pay for it.

Access to gas supply, district heat and piped water and affordability ratios for these services estimated from the HBS raw data for the poor households (lowest quintile) are provided in Table 5.3, which also provides the estimated affordability ratio for all energy related expenditures (power, gas, liquid fuels, wood, coal and central heating).[48]

[47] Price elasticities from –0.15 to –0.75 have been used in Taiwan (Holtedahl and Joutz 2004), India (Filippini and Pachauria 2004) and Ethiopia(Kebede, Almaz and Kedir 2002).

[48] The sum of the ratios for individual items will not be the same as the ratio for total energy expenditure as different households will have a different mixture of energy sources.

Table 5.3: Access and Affordability Ratios for Gas, District Heat and Water (2002)

Country	Gas access (% of poor popu lation)	Gas expenditur e (% of house hold income)	District heating access (% of poor popu lation)	District heating expenditure (% of household income)	Total energy expenditure (% of household income)	Water access (% of poor popu lation)	Water expendi ture (% of house hold income)
Albania	—	—	0	—	—	48	1
Armenia	28	7	3	—	—	91	2
Azerbaijan	57	2	13	1	4	64	1
Belarus	93	—	79	—	—	78	
Bulgaria	1	3	13	12	16	90	4
Georgia	13	8	0	8	14	75	1
Hungary	53	11	10	15	20	90	4
Kazakhstan	15	3	10	12	9	44	1
Kyrgyz Republic	17	4	9	7	4	24	1
Moldova	23	9	20	19	9	21	3
Poland	34	7	20	10	13	93	3
Romania	21	7	14	12	—	30	3
Russia	66	3	60	4	—	79	1
Serbia	4	7	12	1	15	82	—
Tajikistan	16	—	3	7	—	36	2
Turkey	1	29	1	—	13	85	4
Ukraine	57	4	36	7	9	66	1

Source: World Bank Staff estimates based on WB archived data base of HBS/LSMS

Note: Data for Bulgaria and Tajikistan relate to 2003. –denotes that data are not available.

The number of households with access to gas in the ECA region is lower than the number with access to power. Access is highest in urban areas, where average access for the poor across the region is about 47 percent. Access of the urban poor to gas is more than 50 percent in Central and Eastern Europe, about 55 percent in the CIS, and 10 percent in Southeastern Europe (this figure, however, excludes Romania, where there have been historically abundant gas supplies, and where the gas infrastructure is well developed).
Average access of the urban poor to district heating is about 30 percent across the region and in each sub-region.

The average affordability ratio for gas for poor consumers in the ECA region is 7.4 percent. For district heating, the ratio is about 9 percent. Total energy affordability is about 8 percent for poor consumers in the CIS, 15 percent in Southeastern Europe, and 16 percent in Central and Eastern Europe.

Access rates for piped water are substantially lower in rural areas (56 percent) than urban (91 percent). The biggest difference between water and energy relates to expenditure as a share of income: Households spend substantially less on water (some 1 percent to 2 percent of income) than on energy.

Tariffs are near cost recovery levels in CEE, while they lag behind cost recovery levels in SEE and much more so in CIS. The region as a whole and the CIS in particular are registering notable rates of GDP growth and household incomes. In this context rates of tariff increases needed to catch up with full cost recovery level[49] by 2007 and to maintain them in real terms, would be lower than the rate of household

[49] The full cost recovery tariff assumed for this purpose are: (a) Electricity—8 cents/kWh in CEE and SEE and 6 cents/kWh in CIS countries; (b) District Heat—4 cents/kWh in CEE and SEE and 3 cents/kWh in CIS; and Water--

income growth in CEE, while the opposite would be the case in SEE and CIS. Taking into account the GDP and household income growth, income elasticity and price elasticity and assuming a set of cost recovery tariffs for each sub-region to be reached by 2007, Tepic and Frankhauser have estimated the affordability ratios for the poor households (bottom income decile) for 2007. They have also estimated the ratios for 2010 on the basis of assuming that full cost recovery tariffs would be in place only by 2010. Both are summarized in table 5.4.

Table 5.4: Future Affordability Ratios

	Affordability Ratios 2007 (%)			Affordability Ratios 2010 (%)		
Region/Scenario	Electricity	Heat	Water	Electricity	Heat	Water
CEE Scenario I	5.2	6.1	3.2	4.7	5.6	2.9
CEE Scenario II	5.2	5.9	2.9	4.7	5.6	2.9
SEE Scenario I	10.9	7.6	6.8	10.0	7.2	6.3
SEE Scenario II	9.9	3.8	4.4	10.0	7.2	6.3
CIS Scenario I	5.9	8.2	10.3	5.2	7.4	9.4
CIS Scenario II	4.5	3.8	6.3	5.2	1.4	9.4

Source: Sladjana Tepic and Samuel Frankhauser 2005

Scenario I involves cost recovery tariffs by 2007. Scenario II implies Cost recovery tariffs only by 2010

A phased tariff increase on the basis of a well planned medium term tariff plan to reach full cost recovery level would clearly ease the affordability concerns to some extent in the poorer CIS countries. However the delay in the utilities reaching financial viability would adversely affect the quality of supply to industries and commerce leading to a slowing down of the economic growth needed to lift the low income households out of poverty. Appropriate trade offs will have to be made in each country depending on its growth factors. Relatively rapid tariff reform complemented by effective social protection of the poor appears to be the optimal course of action.

How the governments tended to cope with affordability problems?

In the context of significant tariff increases which took place during the transition to offset the effects of inflation, and steeply rising costs, the governments in the region had been adopting a variety of methods to ease the burden of the people. They include:

- Allowing the tariff for industrial and commercial consumers to cross-subsidize residential tariffs
- Tolerating nonpayment of utility dues and not disconnecting supply to nonpaying residential customers, especially in the district heat supply;
- Providing 50% to 100% tariff discounts to 12 to 16 different classes of privileged persons such as pensioners, war veterans, handicapped persons, Chernobyl victims, military and police personnel, war widows, and persons decorated for acts of bravery, patriotism and other great achievements. Often these discounts covered as much as 50% of the population
- Life line rates under which the lowest block of consumption was charged at a rate substantially lower than the average tariff
- "Burden Limits" approach under which the households were expected to pay a specified percentage of their household disposable income. Payments above that are to be paid by the government to the utility. Such payment was generally limited to the notional amount of service to which the household is "entitled" (a predetermined basic needs level of consumption)
- Earmarked cash transfers under which cash payments are made to selected households for payment of a part of the utility bills to ensure that the families meet a specified household income target. These

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$1.4/cubic meter of piped water in CEE and SEE and $1.0/cubic meter in CIS (all figures are at constant 2007 dollars)

amounts could be used only for payment of utility bills. Energy vouchers which are payable to the utilities instead of cash belong to this category, and

- Non-earmarked cash transfers under which the households get an income supplement enabling them to have the stipulated minimum monthly incomes, but the households have the freedom to spend it as they like.

Evaluation of options

The first two options are clearly not conducive to the financial viability of the utilities and the focus of the reform had been to minimize cross subsidies and enforce payment discipline. The privileged tariff discount system was not designed to alleviate poverty but to reward services or achievements and to compensate for injury or illness and it is not surprising that its coverage of the poor is low, its leakage of benefits to non-poor is very high and that it lends itself to high levels of billing abuse. It still lingers in its original or modified form in many CIS countries and the focus of the reform is to monetize the (reward or compensatory) benefits, so that they do not distort the prices of services and erode the finances of service providers.[50]

The appropriateness of any of these options for any sector in any country has to be evaluated with reference to criteria such as:

- Coverage—what percentage of the poor is being reached by this instrument?
- Targeting—what percentage of the subsidy goes to the poor?
- Predictability—can the poor be sure how they will receive and plan accordingly?
- Price distortion—does the scheme cause price distortions and economic welfare costs in the system?
- Administrative cost—how expensive is the scheme to administer? How practical is it under the country circumstance?
- Target consumption—how good is the scheme in ensuring that households achieve a minimum level of consumption considered socially desirable?
- Balanced approach—how good is the scheme in balancing the financial viability needs of the utility and the ability to pay by the consumers
- Cross subsidization—within the sector(e.g., electricity) and between sectors (e.g., between electricity and heat)

Laszlo Lovei et ale provided one of the earliest generic quantitative evaluations among the alternatives and recommended detailed surveys of the consumers and analysis of the sector before applying them in any country, especially for deciding on the relative weights to the criteria.[51] A more recent evaluation of these options was made in the context of a social protection review of the energy sector in Tajikistan and Uzbekistan is reproduced below to indicate how choices are to be made for the circumstances of the country and the sector (Table 5.6). This was the result of a review of experiences in a range of countries in the region and the related literature.

[50] Laszlo Lovei et ale, 2000, Maintaining Utility Services for the Poor, World Bank Report 20874, Washington DC.
[51] Ibid.

Table 5.6: Evaluation of Options for Social Protection in the Utility Services

Options/ Criterion	Lifeline tariffs			Burden limit	Other ear-marked cash transfer	Non ear-marked cash transfer
	Two blocks	Three blocks	Floating blocks			
Coverage	Elec: good Gas: med DH: poor	Elec: good Gas: med DH: poor	Elec: good Gas: med DH: poor	Poor	Medium	Medium
Targeting	Poor	Medium	Medium	Poor	Good	Good
Predictability	Good	Medium	Good	Medium	Medium	Good
Price distortion	Medium	Good	Medium	Poor	Poor	Strong
Administration cost	Good	Good	Medium	Poor	Poor	Poor
Target consumption	Good	Good	Good	Poor	Good	Medium
Balanced approach	Medium to good	Medium to good	Medium to good	Medium	Medium	Good
Cross subsidies	Good to medium	Medium to poor	Good to medium	Good	Good	Good
Fiscal sustainability	Good to medium	Good to medium	Good to medium	Medium to poor	Medium to poor	..

Source: Design of Sustainable Social Protection Schemes under Energy Sector Reforms in Tajikistan and Uzbekistan, Shaw Stone and Webster Consultants, April 2005.

By and large, the relative benefits and shortcomings of the key options can be summarized as in table 5.7 below.

Table 5.7: Relative Benefits and Shortcomings of the Options

Mechanism	Benefits	Shortcomings
Notional burden limits approach	Benefits can be predicted with reasonable certainty; relatively low administration costs	Coverage and targeting of the poor is usually relatively low; there are heavy administrative burdens on the poor associated with its application; it is one of the most distortionary mechanisms of all utility subsidy mechanisms on the demand side; costly for the budget; a network of offices needed to administer the scheme.
Life-line tariffs	High coverage of the poor; targeting ratio improves as the size of the initial block decreases; the benefits received are highly predictable, especially through a two-block life-line tariff; the scheme is simple to administer.	Since the poor tend to be under-represented among those with utility connections, many would not benefit; it requires reliable (tamper-proof) metering or a reasonable proxy (such as apartment size for heating) to estimate consumption; disciplined meter readers/controllers are needed; there is a significant burden on the budget, on the finances of the utility, or on other (industrial) consumers (if the cost is recovered through a higher industrial tariff).

Mechanism	Benefits	Shortcomings
Other earmarked cash transfers	The targeting ratio is relatively high; the net financial burden on utilities is low.	Coverage of the poor as achieved by earmarked cash transfer schemes is highly uncertain, and in most surveyed countries was low; it is administratively demanding.
Non-earmarked cash transfers	Coverage depends on the ability and willingness of the poor to meet the eligibility criteria; it is the least distortionary of the utility subsidy mechanisms; there are no additional administrative requirements if a social assistance system is already in place; there is no financial burden for utilities or other (non-household) consumers.	The targeting ratio of the poor is usually at a medium or low level; there is a significant fiscal cost.

Source: Azerbaijan: Issues and Options Associated with Energy Sector Reform, World Bank (2005)

Lifeline rates are in use in Albania, Bulgaria, Hungary, Serbia, Kyrgyz Republic and Tajikistan. In Moldova and Romania consumers have the option to choose between a two block system and the normal uniform pricing system. Armenia, Hungary, Kazakhstan, Romania and Tajikistan operate dedicated energy or water assistance programs. Bulgaria and Georgia have seasonal programs to assist vulnerable consumers during the heating season. Burden limits approach had been adopted in Russia, Ukraine, Kazakhstan, Kyrgyz Republic, Slovakia and Latvia. In Russia the federal government sets the policies and standards while the provincial and municipal governments implement them. In Ukraine the program is administered at the national level. Earmarked cash transfers are adopted in Hungary, Latvia, Romania (Heating Assistance Program) and Bulgaria. Armenia, The list of countries which do not operate lifeline tariffs and also do not provide utility services specific earmarked cash transfers include, Armenia, Azerbaijan, Bosnia, Croatia, Kazakhstan[52], FYR Macedonia, Montenegro, Turkey, Turkmenistan, and Uzbekistan. They rely on non-earmarked cash transfers like pension and social security payments. Kyrgyz Unified Monthly Benefit and Armenian Poverty Family Benefit schemes are examples of non earmarked cash transfer schemes. As is evident, many countries operate more than one option simultaneously in an attempt to improve coverage and targeting.

Cash transfers

Theoretically non-earmarked cash transfers intended to ensure a minimum level of family income is the most desirable and causes the least distortion. This can be achieved by increasing pensions, social security payments and minimum wages. This would be practical only in those countries where poverty levels are low (generally less than 10%) and state budgets can accommodate the administrative and substantive costs, and informal incomes are low or insignificant so as not to distort means testing necessary to design the levels of income supplement. Further, payment discipline must be strictly enforced, since the recipients of cash transfers would have the freedom of choice as to how they use their income supplement. Examples of such countries would be Hungary and Poland.[53]

Analysis of the HBS data (2002) relating to 17 countries indicates that the coverage by cash transfers such as pensions, family allowance, child benefit, unemployment benefit, housing allowance and means tested benefits is on average 69% of the poor for the region, the range being 25% in Turkey to 100% in Hungary.[54] Also in terms of targeting, the percentage of these cash transfers reaching the poor rarely

[52] Kazakhstan changed over from burden limits approach to non-earmarked cash transfer approach in 2002, but still in many oblasts the former is believed to be in operation.
[53] Julian Lampietti (Ed), Power's Promise, World Bank Working Paper No.40 , 2004
[54]Poland, Romania and Bulgaria had coverage of 90%, 92% and 93% respectively.

exceeds the percentage of the poor in the population. Thus the design of any targeted subsidy for the poor based on these cash transfer systems would also have only a moderate coverage of the poor and high levels of leakage to the non-poor.[55]

Given the decade old culture of nonpayment for services and the extensive poverty prevailing in the region (especially in the CIS and some SEE states), as well as the compelling need to raise rapidly tariffs for utility services to cost recovery levels, reliance on non-earmarked cash transfer may not be practical in many CIS states. More importantly fiscal space would be problematic and non-payment culture may still jeopardize the financial health of utilities. Earmarked cash transfers or burden limits approach based on the notions of realistic basic minimum needs might be somewhat better, if the amounts are transferred directly to the utility or paid to the consumers only up on production of receipts for full payment of utility bills.[56] The administrative costs to identify and target the poor would still be considerable.

Lifeline rates

Lifeline rates would be practical only if all consumers are effectively metered and meter reading, billing and collection practices are efficient. Thus in respect of district heat and water, it would be unpractical. Even in respect of gas supplies, where a significant number of consumers remain without meters, its use would be limited. It may be relevant in the power sector, where metering is relatively more extensive. Also in countries where poverty levels are high making the other choices more difficult and administratively more challenging, life line rates would be a reasonable option, provided metering discipline is in place. In the absence of such discipline, billing abuses and fraud can take place. Armenia gave up on the use of lifeline rates in 1999 because of extensive fraud. In Kyrgyz Republic and Tajikistan the full consumption of almost all residential customers was billed at the lifeline rate.

In many countries using lifeline rates, the cost of subsidy provided to the lowest block(s) is recovered from the consumers in higher blocks by charging them at rates higher the cost of supply. Where the consumption at lifeline rate is a high percentage of the total sales, it may be more prudent for the state budget to reimburse the costs of the subsidy to the utility to avoid distorting the tariff structure. Box 5.1 outlines the other key variables which need to be taken into account while using the lifeline rate alternative.

In the case of district heat (as well as water and gas till extensive metering is in place) lifeline rate would not be possible and reliance has to be on earmarked targeted subsidies. Even in the case of power, lifeline rate approach may have to be supplemented by a targeted subsidy to improve targeting. As experience is gained in the targeted subsidy mechanism, the lifeline rate may be phased out, and the targeted subsidy may take over the social protection role fully.

Other steps

In addition to lifeline rates and income transfers, there are other actions which could mitigate the effects of tariff reform on the poor households. They include:

- Linking tariff increases to service quality improvements such as 24 hour supply and better voltage and frequency regulation. When supply is short, or of poor quality, the poor households suffer disproportionately, as their ability to use substitutes is limited and they resort to the use of dirty fuels. Public relation campaigns highlighting the benefits to consumers arising from higher tariffs could build support for tariff reform.

[55] Bank staff estimates based on an analysis of HBS raw data in the Bank archives.
[56] The latter course was successfully used in Kazakhstan

Box 5.1: Design of lifeline tariffs to protect the poor and support energy efficiency

The appropriate size of the first consumption block in a lifeline tariff structure will be country specific. It will depend on whether electricity is the only reasonable option for cooking, space heating and hot water.

The range for the first block in the region is from 80 kWh per month in Romania—where power is typically used for lighting and appliances only, gas being the available alternative for cooking, space heating and hot water—to 350 kilowatt hours per month in Serbia, where power is the only viable source for heating in Belgrade and other cities.

Where power is used for heating it would seem reasonable to have *seasonal* lifeline tariffs, with the first consumption block increasing during winter. A first block that covers some or all heating needed in winter will be overgenerous through the rest of the year and create perverse incentives for energy efficiency.

If power is used for heating only by a part of the population that can be reflected in the design of the lifeline. Doing so requires calculating the amount of power required for heating, tailoring the first block to this level, and making only households with consumption above a minimum threshold (derived according to how much power is required for heating), below a maximum threshold (to preserve incentives for energy efficiency), and with no connection to either gas or district heating eligible for the lifeline.

Small groups within the poor may remain at home through the day (single pensioners and families with young children might fall into this category). They may need to consume above-average levels of power to remain warm. Special discounts or allowances might be made available on the basis of whether a household is registered for a specific benefit or can prove itself to be poor.

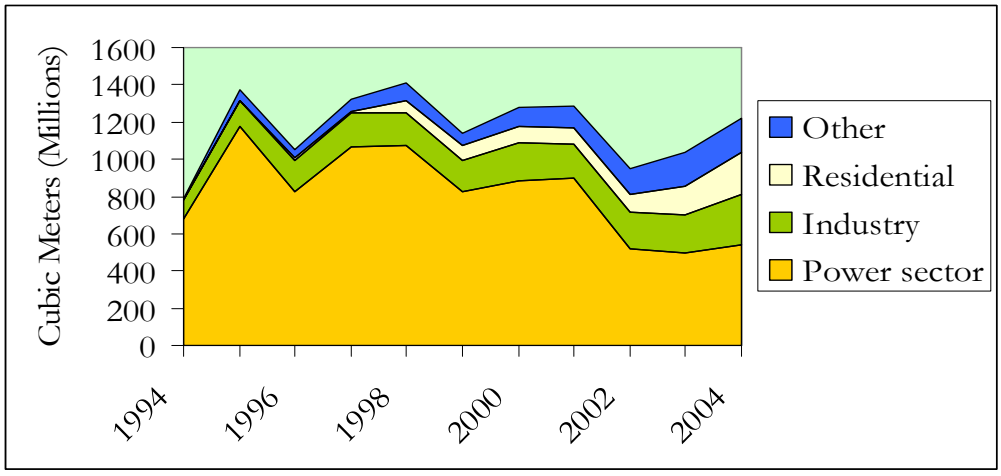
In Romania a hybrid mechanism has introduced some targeting. Customers can choose to pay a low marginal rate for the first consumption block and a higher marginal rate for additional consumption. Alternatively, they can choose optional tariffs which are based on constant marginal tariffs that fall somewhere between the two rates of the block tariff structure. Tariffs are set so that the block tariff is attractive to customers who consume only to cover basic needs and no more. For other customers with higher consumption, alternative options are more attractive.

This sector-specific safety net targets the poor, assuming that consumption is related to income (so the block tariff supports low-consumption, low-income customers). Under this assumption the subsidy covers the poor effectively, though less so for the poor consuming in the second block. The block tariff is not ideal from a pricing perspective, because the marginal tariff for the second consumption block is high relative to marginal cost and encourages under-consumption for one class of customers. Nevertheless, the Romanian model may be regarded as a good interim solution that could be replicated in other similar ECA countries.

- Using medium term tariff plans and phased adjustment of tariffs. This would help avoid tariff shocks, allow time for people to minimize their welfare losses by reducing their demand and increasing the use of substitutes and take advantage of income growth
- Increasing access to clean and reliable substitutes such as gas. HBS data indicate that electricity affordability ratios are lower for house holds with gas connection. This may be a good strategy in Central Asia and in SEE states like Serbia, where people use electricity for heating and cooking while there is scope for increasing gas access. Promoting fast growing fuel wood plantations and promoting the use of fuel efficient stoves using biomass in a clean way could help in the rural areas.
- Promoting energy use efficiency. There is scope for high return investments in residential energy and water use. Better insulation of houses to reduce heat losses and use of energy efficient appliances and lighting could help households to reduce energy consumption. However, given the design of district heating systems in which the consumer has no way of reducing his consumption, the home insulation programs should be applied only in residences with decentralized heating.

The experience of two of the poorer CIS countries, Armenia and Moldova, which have been able to raise tariffs to cost recovery levels and maintain payment discipline, is relevant in this context. Armenia restored 24 hour power supply since 1996 in most areas and generally maintained the quality of supply during the reform period. Also during 1997-2004, nearly a quarter of million residential consumers were connected to the natural gas network, enabling people to switch over to gas for cooking, space heating and hot water (Figure 5.5).

Figure 5.5: Increase in Residential Gas Consumption in Armenia



Source: Gevorg Sargsyan, Lessons from Armenia's Power Sector Reforms, World Bank (2005)

In Moldova too, both the private sector operator and the public sector operators improved the quality of supply and ensured 24 hour supply. This is believed to have benefited the poor disproportionately. The availability of gas and district heating options in the urban areas also helped.[57] Anecdotal evidence from the power distribution company in Georgia suggests that monthly collections fall or increase depending on whether the supply in the previous month was reliable or not.

Overall, the region has come a long way since the days of regional economic collapse, and most of the countries are experiencing dynamic growth. The number of people below the poverty line is reducing. In a majority of countries in the region power tariffs are already close to cost recovery levels. With suitable social protection in place, the affordability problems of the poor households should broadly be manageable. In a country like Tajikistan, where the tariffs are to rise substantially to match the cost recovery level, special efforts (both national and international) might be needed. In most of the low income CIS countries, international assistance would be needed to design suitable and practical social protection measures and to enable the governments to meet the social protection costs.

B. Can governments afford the funding needed for the provision of services?

The level of access for services in the region, especially in the low income CIS countries, are substantially high compared to those in countries in other regions of the world with similar GDP levels. The per capita consumption levels assumed for designing the facilities are even higher than those in OECD countries in respect of many services. This raises questions of affordability at the level of the state to operate and maintain systems of these sizes and support such high levels of consumption through subsidies in the absence of full cost recovery. To this also is added the burden of having to protect the poorer households

[57] Moldova Sharing Power: Lessons learned from the Reform and Privatization of Moldova's Electricity Sector, World Bank Report No. 30376-MD, December 2004

when tariffs are raised. When the Soviet Union was dissolved, and the economies of the region collapsed and all customers lost the ability to pay even the minimal prevailing tariffs, the stock of infrastructural facilities became excessive in relation to the greatly reduced demand. This is often referred to as the problem of over-dimension of infrastructural facilities.

Problem of over-dimension

The phenomenon of over-dimension has to be looked at in terms of its sectoral, spatial and temporal aspects. Its extent and the ability of governments to cope with it varied across countries and over time as a function of the extent of contraction of GDP and pace and extent of subsequent economic recovery. It also varied across sectors. Over-dimension is more relevant to electricity and possibly heat and, in a much more limited way, railways. In respect of waste water treatment and telecommunications, the access was substantially lower and the problem was one of creating additional assets to service the economy. While some of the gas distribution networks were allowed to deteriorate for want of funds to pay for gas imports, gas sector on the whole did not represent a case of over-dimension. In the case of water, over-dimension was more technical in the sense of using pipes of larger diameter, and pumps of higher HP and lower efficiency than normally used in other countries and the use of pumped sources, rather than gravity sources of water supply. There can not be much quarrel about universal access to safe water. The problems in the transport sector had a different flavor. The new passenger traffic and freight traffic from the large number of new small and medium industries called for expansion and reinforcement of road networks. Though the railways lost freight from heavy industry, a good part of such reduction was made up by the rising demand for the transport of energy products and minerals and chemicals and rail sector called only for a certain amount of rationalization and no large scale abandonment of assets.

Problems of over-dimension loomed large during the first phase of transition and abated to some extent as growth and demand for services resumed and as payment discipline was restored in the region. Still considerable over capacity existed in respect of electricity generation even in the in the second phase of transition. The rehabilitation of the generation assets (especially in countries such as Russia, Ukraine, Belarus, Kazakhstan and Uzbekistan) will have to be linked to the prospects of growth in domestic demand or firm electricity exports. Mothballing expenses relating to such generation assets were effectively transferred to the private sector in Kazakhstan by privatizing them at low prices, thus transferring to them also the responsibility for funding the rehabilitation costs when the domestic or export demand emerges. Transmission overcapacity was moderate and tolerable, while distribution capacity was highly strained and called for extensive reinforcement as growth gained dynamism since 2000. It is in the district heating sector, the collapse was more dramatic and many heat distribution systems substantially curtailed their coverage or were totally abandoned in the smaller CIS countries which simply could not pay for the imported fuel. Thus the intensity of the problem and the speed of its abatement varied (and will continue to vary) as a function of the growth and export prospects of each economy.

Spatially the problem was relatively minor and lasted only for a short time in CEE. Most countries in CEE have substantially commercialized their infrastructure sectors and transferred the investment responsibilities for electricity, water, gas, telecommunication, and heat and also parts of the rail and road systems to the private sector. The government budget provides for social protection and for the remaining portion of the infrastructure facilities (such as passenger traffic in rail, road transport other than toll roads) which are not easily amenable to commercialization or privatization. In SEE the situation was some what similar and the states are proceeding on similar lines. For all practical purposes, the problem in these states now (as in the case of most developing countries in the world) is to find resources to expand infrastructural capacity to support further economic growth.

It is worrisome and long lasting in the low income CIS countries, and especially in some of the Central Asian Republics. In CIS the problem was acute in the initial phase of transition, when several heat distribution systems and gas distribution systems were abandoned for want of funds to operate and maintain. Power generation assets proved excessive to the greatly declined demand and were allowed to languish without operating and maintaining them. These power assets are being rehabilitated as domestic demand revives and as export opportunities arise. Most infrastructural assets (such as those in power generation, railways and water) require rehabilitation to make them fully operational again and the pace of rehabilitation will depend on the growth in solvent demand.

In the larger middle income CIS countries (such as Russia, Ukraine, Kazakhstan and Belarus) with secure fuel supplies, growth dynamism since 2000 helped to overcome the problem to a notable extent. Economies are growing and demand is rising and fiscal deficits have narrowed and have become fiscal surpluses. In all four middle income CIS countries no significant new power generating capacities are needed till 2010 or even 2015. On the other hand most countries would need significant investments in telecommunication, road networks, and wastewater treatment systems.

Estimates of needed investments

How much investment the ECA region should make to maintain its growth dynamism? Though there is clearly a high degree of correlation between the availability of adequate infrastructure and the rates of growth, the nature of the causal relationship is not clear. Infrastructure is known to improve the welfare of the people, reduce costs of production and enlarge markets and thus lead to increased output. It is also known that countries with high outputs are the ones which are able to increase the stock and quality of infrastructure further. Clearly there is a mutual or cyclic causality—increased infrastructure leads to increased output and the latter, in turn, enables further increases in infrastructure. Further, an adequate stock of infrastructure assets is a necessary but not a sufficient condition of growth. They have to be functional; and the quality of service is a key ingredient. The problem (in this region and elsewhere) often is not so much to provide the infrastructure stock as to improve the quality of its service. Using data relating to 127 countries over the period 1960-2000, Cesar Calderon and Loius Serven have demonstrated not only the positive correlation between infrastructure stock and long term growth, but also the robust negative impact of infrastructure stock and quality on income inequality.[58]

In most other regions of the world, the question relates to how much investments should be made to increase the infrastructure stock to support the desired economic growth. In the transition economies, the question often raised is how much of the stock of infrastructure assets should be rehabilitated and kept operational to enable the recovery of the economies to at least the level of growth prevailing in 1989. In other words how much investment is needed in ECA region in relation to infrastructure to keep up the growth momentum?

Without carrying out a detailed appraisal of the assets in each sector in each country and forecasting the demand growth, it is not possible to build up from the bottom an infrastructure investment estimate for the region for the next five or ten years. Estimates for certain sectors in certain countries are available, but that does not help to estimate regional infrastructure investment needs. Marianne Fay and Tito Yepes analyzed the data relating to 147 countries covering the period 1960 to 2000 and developed a regression model which helps to understand the correlation between infrastructure investments and growth levels and thus estimate the infrastructure investment levels for the various regions of the world.[59] The sectors covered in their analysis were electricity generation, fixed and mobile phones, roads, railways, water and

[58] Cesar Calderon and Loius Serven, The Effects of Infrastructure Development on Growth and Income Distribution, World Bank, Washington. D. C.

[59] Marianne Fay and Tito Yepes, Investing in Infrastructure: What is needed from 2000 to 2010?, Policy Research Working Paper No.3102, World Bank, July 2003

sanitation. Based on this model they estimated the annual infrastructure investment needs in the ECA region during 2005-2010 to be of the order of $98 billion (or 7% of the GDP) including the annual maintenance needs estimated at $59 billion (or 4% of the GDP). This compares with an estimate of $465 billion (or 5.47% of GDP) for annual investment including $232 billion (or 2.73% of GDP) for annual maintenance for all developing countries of the world. Their paper projects sector wise investment needs also (see table 5.7)

Table 5.7: Sector-wise Annual Investment Estimates for the ECA Region for 2005-2010

Item	Power	Land phones	Paved roads	Rail Roads	Mobile	Water	Sanitation	Total
Investment ($million)	12,643	5,157	9,800	743	9,740	235	750	39,069
Maintenance($ million)	20,333	6,677	16,454	4,035	7,298	1,436	2,616	58,849
Total ($ million)	32,976	11,834	26,254	4,778	17, 038	1,671	3,366	97,918
Investment as a % of GDP	0.89%	0.36%	0.69%	0.05%	0.69%	0.02%	0.05%	2.76%
Maintenance as a % of GDP	1.44%	0.47%	1.16%	0.29%	0.52%	0.10%	0.18%	4.16%
Total as a % of GDP	2.33%	0.83%	1.85%	0.34%	1.21%	0.12%	0.23%	6.92%

Source: Marianne Fay and Tito Yepes (2003)

The above estimate does not provide fully for rehabilitation needs arising from backlog of maintenance and *may be taken as indicative of the lower bound of the investment needs of the region.*

Further studies on these lines by Cecillia Briceno-Garmendia, Antononio Estache and Nemat Shafik would appear to further increase these estimates for all developing countries from $465 billion (or 5.47% of GDP) to $550 billion to $650 billion (or 6.5% to 7.7% of GDP).[60] Efficiency improvements and reduction of corruption are believed to have the potential to reduce these investment needs to the level of $400million to $450 billion. These authors suggest that investment needs as a percentage of GDP would be higher for low income countries (7.5% to 9%), compared to lower middle income countries (5.5% to 7%) and upper middle income countries (3%). ECA region consists mostly of the first two categories of countries. Within ECA region the burden would be greatest on the low income CIS, followed in the descending order by the SEE states, middle income CIS and CEE.

Are the investments affordable?

Are investments of this order affordable by the governments of transition economies?
Given the ubiquitous role of the governments and the innumerable and changing demands made on them by societies, no government in the world (except perhaps the major oil exporting economies in the middle east) can confidently answer the question in the affirmative. According to the American Society of Civil Engineers, even United States of America is believed to have a backlog of needed infrastructure investments of the order of $1.6 trillion to bring its aging national infrastructure (roads, bridges, and from schools to sewer lines) up to reasonable standards.[61] Overall the economic outlook in the transitional economies has become much better. Seven percent of their combined GDP of $ 1.5 trillion in 2004 is higher than the annual investment level of $98 billion estimated by Marianne Fay and Tito Yepes. Driven by oil and gas exports the CIS states are registering notable rates of growth. Inflation in the region is in single digit. Fiscal deficits and current account deficits are moderate and a number of countries (Russia, Kazakhstan, Georgia, Estonia, Azerbaijan, Bulgaria, Moldova and Uzbekistan have reported fiscal

[60] Cecillia Briceno-Garmendia, Antononio Estache and Nemat Shafik, Infrastructure Services in Developing Countries: Access, Quality, Costs and Policy Reform, World Bank Policy Research Working Paper No.3648, December 2004

[61] Felix G. Rohatyn and Warren Rudman, *It is Time to Rebuild America-A Plan for Spending More and Wisely on Our Decaying Infrastructure*, Washington Post, Issue dated 13 December 2005

surpluses for 2004. Russia, Kazakhstan, Ukraine and Uzbekistan have recorded notable current account surpluses. After a few years of dormancy, foreign direct investment seems to be reviving again (Table 5.8).

Table 5.8 Overall Macroeconomic status of Transition Economies (2004)

Region/ Sub-region	GDP $ billion	Mean Inflation (%)	Fiscal Deficit as a % of GDP	Current Account Deficit as a % of GDP	Net Foreign Direct Investment $ billion
CEE	568.4	4.3	-2.4	-6.6	16.29
SEE	176.6	5.4	-1.6	-10.3	9.16
CIS	752.2	8.9	-1.3	-2.3	13.70
ECA Region	1498.2	6.7	-1.8	-5.6	39.15

Source: Transition Report 2005, EBRD

Note: The GDP of CIS consists of $710.9 billion for the four middle income countries and only$41.3 billion for the eight low income countries.

The annual infrastructure investment needs of 7% of the GDP compares with the present fiscal deficit of 1.8% of GDP and quasi fiscal deficit of about 7% of GDP in power, water, gas and heat sectors. While the situation is clearly much better than in the last decade, fiscal stability could prove fragile in the oil and gas importing economies. Fiscal space could continue to be scarce in the low income CIS economies and in many of the SEE states.

Possible strategy

Under these circumstances, the strategy for governments would be to transfer the responsibility for operation, maintenance, rehabilitation and investment from the state budget to the state owned corporate entities and facilitate their running on commercial lines, generating net internal cash (after meeting all operational expenses and debt service) adequate to meet at least 30% to 40% of the rehabilitation and investment needs. These entities should be enabled to borrow the remaining funds from domestic banks, commercial sources and IFIs on the strength of their balance sheet and on the basis of limited sovereign guarantees (if necessary). To the extent private investors are forthcoming, transfer of investment responsibilities to them by way of asset sales, or concessions or through joint ventures would be sensible. Focus on the development of domestic financial markets and the promotion of the regional and municipal governments to become credit worthy is a complementary strategy to promote such a development. Direct funding from the budget is best limited to those infrastructure sectors which do not directly lend themselves to cost recovery mechanisms, such as roads, some segments of water and sanitation systems and to meet the costs of social protection arrangements in respect of power, gas and heat for the targeted poor. *In the continuum from rural roads at one end and mobile phones at the other the approach to investment funding from private sources or public sources would vary as a function of the extent to which the activity lends itself to commercial operation.* An approach such as this would be able to isolate investments which has to be in the public domain. The state budget then will have to accommodate such investments and social protection costs for the poor as well as the contingent liability arising from exposure to the guarantees it has provided for public sector companies and to the private investors in the context of PPP arrangements.

Fiscal space has to be found for these. Traditional approaches to this are to prioritize and prune possible present expenditure items, raise additional tax revenues by imposing new taxes and improving tax collection efficiency, maximizing the receipt of external grants, and increasing borrowing.[62] Increased borrowing or increased resort to sovereign guarantees has to be moderated by considerations of additional debt service and contingent liabilities they would impose in the future and thus endanger fiscal

[62] Peter S. Heller, *Understanding Fiscal Space*, IMF Policy Discussion Paper, March 2005

sustainability and solvency in the medium term. Reducing existing levels of expenditure by minimizing corruption and improving implementation efficiency is also an important component. To deal with the problem of fiscal space among competing claims of investments, prioritization in terms of economic and social rates of return will have to be made. Also one should keep in mind possible future burdens the operation of the projects would impose on the government budgets, and plans should be made to minimize them. Closely associated with this is the high priority need to minimize and eliminate the quasi-fiscal deficits in the electricity, gas, water and heat sectors, amounting to about 7% of GDP (see Chapter 4).

Arguments have been made that the approach to fiscal balance should be reformed to remove the bias in the present approaches against infrastructure investments.[63] Infrastructure has an unusual cash flow, with high short term costs and high long term returns. Standard fiscal accounting ignores this and introduces a bias against any project with costs incurred at present and returns accruing over a long time. This leads to an excessive compression of investments and maintenance expenses relating to infrastructure. Consistent adherence to such an approach would greatly diminish public sector contribution to capital accumulation, especially in infrastructure. The lower economic growth and less efficient poverty alleviation associated with such compression of investments could fuel fiscal insolvency, which is the main concern which expenditure cuts were supposed to address. It has been argued that solvency by definition is an intertemporal concept and has to rely on the present value of both assets and liabilities. It does not seem correct to assess the strength of fiscal accounts only from the time path of gross financial liabilities. In the light of these considerations, both IMF and World Bank have begun to explore these issues in a few pilot countries. The results could be helpful to the low income CIS and some of the SEE states.

[63] This draws from Antonio Estache, *Emerging Infrastructure Policy Issues in Developing Countries: A Survey of the Recent Economic Literature*, October 2004

6. Regional approach and trade

The dissolution of the Soviet Union into many states of the CIS and the geographic location of the ECA countries adjacent to the Western Europe have significant implications for adopting a regional approach in the operation of infrastructural services to promote internal trade among the countries of the region as well as external trade between the states in the region and Western Europe. Trade with China, Iran, Pakistan and Afghanistan are also significant for the Central Asian Republics. Three aspects of the trade related issues would be discussed in this chapter.

Regional approach to the operation of facilities

First, the location and size of the infrastructural facilities designed and constructed during the Soviet regime became unsuitable for many of the new much smaller FSU states. This was especially so in the energy sector. The energy systems in many of the FSU countries became unbalanced upon their becoming independent states. Some of the small countries could not make the best use of large facilities, unless they could export the output to the other states. Other small states had to depend heavily on energy imports from its neighbors. The complementarities among the hydro, thermal and nuclear power and irrigation facilities which existed during the Soviet rule as a matter of routine allocations within a single centrally planned economy ceased to exist, and the optimal least cost operation of these facilities became a matter of trade among independent states, each of which developed concerns of national energy security. Given the uneven distribution of natural resources and the location of the generation/ production facilities, least cost provision of services depended on the continued adoption of originally designed operating regime supplemented by fair, free and viable energy trade arrangements among the FSU states. The situation relating to the operation of Toktogul Multipurpose Reservoir in Kyrgyz Republic illustrates this point (see Box 6.1)

Countries like Tajikistan and Kyrgyz Republic with large multipurpose reservoirs must export electricity in summer and import electricity and fossil fuels in winter as they do not have adequate thermal capacity or adequate fossil fuels to meet winter power and heating needs. Given the contiguous nature of the FSU countries and the extensive transmission and distribution links both in the power and gas sectors, creating conditions for the orderly exchange of energy based on fair trading arrangements is a matter of high priority. The governments of all four Central Asian states are endeavoring to operate the Central Asian Interconnected Power system as an integrated grid.

Trading takes pace among the national utilities designated for imports and exports, often on the basis of inter-governmental agreements regarding quantities and prices. Throughout the region there is a notable amount of electricity trade on such a basis. Russia is the largest net exporter. Other net exporting countries include Armenia, Bosnia, Bulgaria, Kazakhstan, Kyrgyz Republic, Lithuania, Poland, Romania and Ukraine. Net importers include Albania, Azerbaijan, Belarus, Georgia, Macedonia, Moldova, Serbia Montenegro, Tajikistan and Turkey.

Box 6.1: Water Energy Nexus in the Central Asian Republics

Toktogul reservoir in the Kyrgyz Republic was designed during the Soviet rule as a multi-year storage facility to enable the storage of water inflows in wet years, for irrigation use in downstream countries during the normal and dry years. The irrigation oriented operating regime called for the release of 75% of the annual releases of water from the reservoir in summer months and for restricting the releases during the winter season to 25% of the annual release. Power generation followed the irrigation regime and the excess power produced in summer was fed into the Central Asian Power System for use by Kazakhstan and Uzbekistan and winter deficits in energy in the Kyrgyz Republic was met by allocation of oil, gas and coal needed for heat and electricity from Uzbekistan and Kazakhstan.

Once the Soviet Union was dissolved and these countries became independent, these arrangements came under great strain. Toktogul reservoir came to be increasingly used to meet the power needs of the Kyrgyz Republic, reducing summer releases and increasing winter releases of water causing irrigation problems in summer and flooding problems in winter in the downstream countries. To mitigate this problem, a 1998 Framework Agreement among the upstream and downstream riparian countries sought to compensate the former by the latter for the annual and multi-year water storage services through the purchase of surplus summer electricity from the Kyrgyz Republic and supply of fossil fuels needed for Kyrgyz winter needs. In actual practice the annual agreements concluded under this arrangement proved unsatisfactory and difficult to enforce.

The World Bank carried out an economic analysis which demonstrated that net Syr Darya basin benefits are substantially higher under the irrigation regime of reservoir operation (i.e., a minimum of 6 BCM of water releases in summer and a maximum of 3 BCM of water releases in winter) than under the power regime (i.e., reduced summer releases and increased winter releases). While it duly recognized the major contribution made by the Framework Agreement in an attempt to restore the sensible reservoir operating regime, it pointed out the key areas in which the Framework Agreement should be improved to ensure better implementation. These relate to: (a) the need to pay explicitly for the water storage services in cash; (b) the need to use a multi-year rather than annual perspective to take into account unusually wet and dry years as well as normal years; (c) the need to divide the compensation package for water storage services into a fixed and a variable component; (d) the need to link the fixed portion of the compensation to the value of the Kyrgyz fossil fuel needs for the winter months; and (e) the need to have a monitoring and guarantee mechanism to ensure compliance with agreed obligations.

Further, the Study highlighted the areas for institutional improvement to ensure more effective water and energy coordination, regulation, monitoring and enforcement.

Source: Central Asia Water and Energy Nexus Study, World Bank, 2003

In respect of natural gas the largest net exporter is Russia and other net exporters are Turkmenistan, Uzbekistan and Kazakhstan. Azerbaijan is expected to emerge also a notable exporter soon. All other countries in the region are net importers of gas.

Volume of intra-regional trade in electricity and gas during the 1990s declined from the levels of exchange in the previous decade on account of the inability to pay for imports, and rising concerns of national energy security. Poor financial viability of the importing utilities (caused by high losses, prices below cost recovery level and poor collections) was the major constraint causing the decline in trade within the region, and especially within the CIS. A much greater level of trade governed more by considerations of cost rather than concerns of national energy security would, on the whole, lower the costs of supply, reduce shortages and improve quality. A key prerequisite for such energy trade expansion is the restoration of the financial viability of the importing energy entities.
While trade in electricity is taking place among the national utilities designated to handle imports and exports of power, structural reforms would put the trade on a sustainable and commercial footing. Such reforms in these countries are focused on unbundling the sector and tariffs by function (namely generation, transmission, and distribution) providing non discriminatory transmission access and transparent transmission tariffs.

Such reforms had been carried out substantially in the CEE states to be inconformity with the EU energy related directives and be able to participate in the large EU electricity market. The SEE states are also pursuing reform in this regard and have actually become part of the UCTE covering Western Europe.[64] They are signatories to the Athens Memorandum (2002) to establish a SEE Regional Energy Market, initially for promoting competition and trade within the SEE energy market, and later for competitive trade in the larger liberalized EU energy market. The competitive trade envisaged under the EU energy directives involves the ability of distribution companies and eligible consumers[65] to choose their suppliers within and across country borders. They would buy on the basis of negotiated market prices.

Among the CIS countries, reforms of this type are either less advanced or less effective on account of poor payment discipline. Unbundling by function had been done by most countries except Tajikistan. Unbundling of gas and electricity tariffs have also been done in most countries. Competitive wholesale market covers only a small part of the electricity business in Russia. In Kazakhstan most of the sales takes place through bilateral contracts negotiated in a competitive environment between the several generators and large consumers and distribution companies. In most other countries the electricity prices are regulated. Trade across the border is however is between national transmission entities or other nationally specified entities.

Studies are being conducted to explore the possibility of electricity trade among the seven countries surrounding the Black Sea. They cover Bulgaria, Georgia, Romania, Russia, Turkey and Ukraine—all countries with a Black Sea coastline, as well as Moldova. This would involve integrating eventually the CIS interconnected power system of Russia, Georgia, Moldova and Ukraine, the UCTE to which Romania and Bulgaria belong, and the isolated power system of Turkey which will soon become part of UCTE. Preliminary studies have identified complementarities among these systems and the scope for mutual trade among them and a potential scope for export of power from Russia to Europe via Turkey. Pursuit of this would hasten the sector reform process in the CIS to extract the maximum benefit from such trading arrangements (Figure 6.1). [66]

Approach towards partially constructed projects

The second aspect relates to the conditions under which it would make sense to complete the infrastructure projects on which large investments had already been made during the Soviet regime, but which were allowed to languish for want of further funds after the dissolution of the Soviet Union. Because of the large amounts of sunk costs already incurred, they could be completed at relatively low costs compared to new (or Greenfield) projects of similar dimensions. However, in most cases, their dimensions are large in relation to the present and forecast demand in the country and sub-region in which they are located. The completion and operation of such projects would make sense only if most of the output could be exported to the neighboring markets against firm export contracts. Many of these are located in the poorer among the FSU states, which cannot raise the resources needed for such projects. A recently completed World Bank study which evaluated such large hydro and thermal power projects in

[64] Albania, however, is an exception, which has not yet become a part of UCTE.

[65] These are consumers with a large annual consumption (such as 25 GWh) to start with, the threshold being lowered in stages to make most consumers eligible in an agreed time frame. Thus eligible consumers would buy at negotiated market prices, while the ineligible or "captive consumers" would buy from the distribution companies at regulated prices. While the generators/ producers would be free to sell a good part of their production at market prices, they will have public supply obligations under which a specified percentage of their production would be directed to the captive consumers at regulated prices.

[66] *Study of Electricity Trade Potential in the Black Sea Region*- Draft Final report of October 2005 to World Bank by Economic Consulting Associates Ltd, London ,UK

Central Asian Republics and outlined a strategy for the development of these projects to export power to Russia, Iran, Afghanistan and Pakistan initially and also to China eventually illustrates the conditions under which the completion of such projects would make economic sense (Box 6.2).

Figure 6.1: Potential Electricity Trade among Black Sea Region Countries.

Source: Economic Consulting Associates, UK.

Approaches of the above type would enable an electricity export led strategy for the growth of the relatively poorer states. Even in large CIS states like Russia, Ukraine, Belarus and Kazakhstan, demand for electricity is not expected to catch up and exceed the 1989 levels at least for a decade or more. In this context the burden of excess generation capacity in these countries could be turned into a blessing of export capability through rehabilitation of a large number of unutilized generation assets. It would make economic sense, if export contracts with West Europe and other solvent neighbors could be tied up and conditions are created to operate the regional electricity grid (known as “Centrall”) in synchronism with West European Grids (like UCTE, Baltrel and Nordel).

The role of transit countries

This leads us to the third aspect of the trade related discussion, namely the role and significance of the transit countries in the energy trade. Trade activity in the region and between the region and its neighbors has increased significantly during the last several years. Trade in energy, in particular, has a major impact on the economies of a number of countries in the region and Western Europe’s own economy now has a sizable dependence on energy supplies from Russia and other CIS countries that transit through the CIS countries and Central and Eastern Europe.

The energy trade between the CIS countries and Western Europe has been a significant activity for a number of years. In 1989, the Soviet Union supplied about 37% of Europe’s gas, 26% of its oil and 16% of its primary energy. During the transition period, the CIS countries have maintained their share of the

European energy market. In 2003, the CIS countries supplied almost 30% of both oil and gas and almost 20% of primary energy overall.

The CIS energy exporters derive significant benefit from their access to European markets. It is estimated that in 2004, fiscal revenues associated specifically with the export of hydrocarbons amounted to about ten percent of GDP in Russia, six percent of GDP in Kazakhstan and five and a half percent of GDP in Azerbaijan.

Other CIS and Central and Eastern European countries also benefit from this relationship. Ukraine, for example earns about $1.5 billion per year from the transit of natural gas from Russia to Europe. Belarus, Moldova, Bulgaria, the Slovak Republic and the Czech Republic also benefit from gas transit revenues associated with Russian supply to Europe. Georgia currently earns about $10 million per year from pipeline oil transit, and in the future, Georgia can expect the transit revenues to increase to about $50 million a year when the Baku-Tbilisi-Ceyhan oil pipeline becomes fully operational. Georgia will also benefit from the transit of gas from Azerbaijan's Shah Deniz field to Turkey. A number of other countries in the region currently also benefit from oil transit arrangements and there is every prospect that in the future electricity transit will become an activity that benefits both suppliers (in Russia and Central Asia) and transit countries.

There is, therefore, considerable mutuality of interest in this energy trade relationship, and there is every indication that the level of energy trade between the CIS countries and Europe will continue to increase. Oil production in Kazakhstan and Azerbaijan is projected to increase significantly over the next several years resulting in oil exports from them increasing by as much as 90 million tons (or 1.8 million barrels per day[67]) by 2010. Oil production in Russia has reached a level of 458 million tons (or just over 9 million barrels per day) in 2004 and some analysts believe that production would increase to 600 million tons (or 12 million barrels per day) by 2010. This is expected to increase the level of exports by 130 million tons (or 2.6 million barrels per day) mostly to Western Europe.

[67] World Energy Outlook 2004 of IEA forecasts an export volume increase of 2.0 million barrels per day by 2010.

Box 6.2: Export Possibilities from Partially Constructed Projects in Central Asia

The Regional Electricity Export Potential Study of the Central Asian Republics made a load forecast for the four countries and concluded that through 2020 the incremental demand would be so small that it could be met by rehabilitation of existing generating units and transmission and distribution systems and loss reduction and efficiency improvement programs. It evaluated the technical and economic feasibility of the completion costs of the partly constructed projects and ranked them in the ascending order of the generation cost/kWh from them as shown below:

Rank	Country	Project	Details	Capacity MW	Capital Cost $ million	Generation cost Cents / kWh economic	Generation cost Cents / kWh Financial
1	Uzbekistan	Talimardjan I	Gas fired TPP	800	100	1.68	1.75
2	Tajikistan	Sangtuda I	Run of river HPP	670	370	1.97	2.44
3	Tajikistan	Rogun I	Storage HPP	1200	785	2.46	2.91
4	Kyrgyztan	Bishkek II	Gas fired CC TPP	400	196	2.55	2.67
5	Uzbekistan	Talimardjan II	Gas fired TPP	2400	1200	2.76	2.92
6	Tajikistan	Rogun Phase II	Storage HPP	3600	2455	2.83	3.24
7	Kyrgyztan	Kamabarata II	Run of river HPP	360	280	3.72	3.95
8	Kyrgyztan	Kambarata I	Storage HPP	1900	1940	7.17	8.54

It identified the possible markets, and compared the sum of the generation costs from the above projects and the associated transmission costs with the marginal generation costs in the export markets, and demonstrated the economic feasibility of exports to Russia, Iran, Afghanistan, Pakistan and China as shown below: (all costs in cents/kWh)

Export Market	Marginal Cost in Export Market	Supply Options As ranked above	Generation cost	Transmission Cost	Landed cost of Imported Power
Afghanistan	3.7	1,2,3 and 5	1.75 to 2.92	0.51	2.26 to 3.43
Iran	3.6	1,2,3 and 5	1.75 to 2.92	0.54	2.29 to 3.46
Pakistan	5.6	1,2,3,5,6 and 7	1.75 to 3.95	0.51	2.26 to 4.46
China	3.6	1 and 2	1.75 to 2.44	0.72	2.47 to 3.16
Russia	3.0	1 and 2	1.75 to 2.44	0.55	2.30 to 2.99

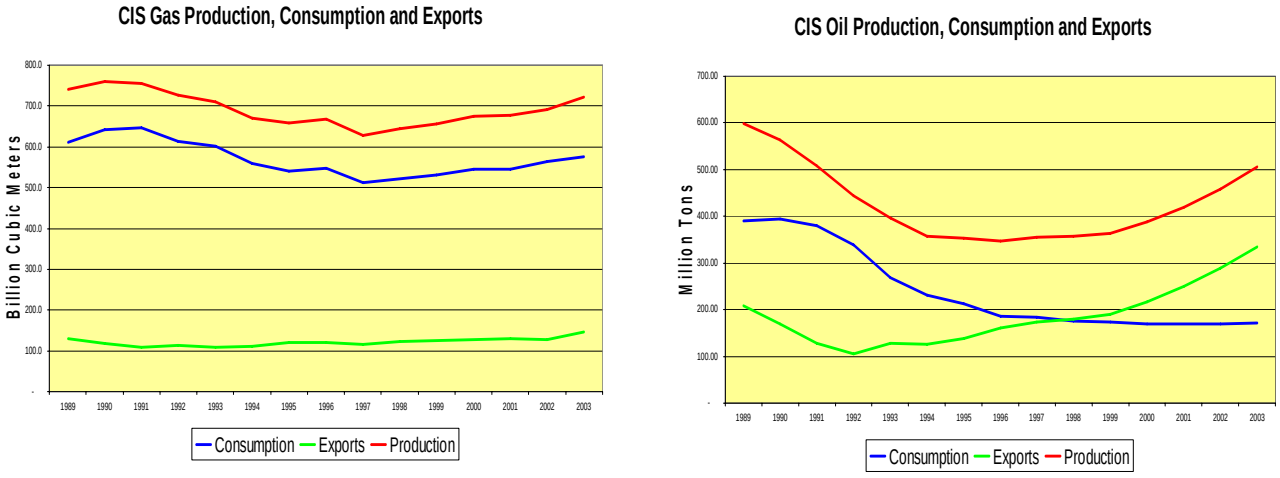
In choosing projects for any given export market, proximity was also taken into account.

The completion of the first ranked Talimardjan thermal project is handled by Uzbekistan itself and it is expected to be commissioned very soon. For the second ranked Sangtuda I hydro power project a public private partnership strategy was suggested under which equity investments would be made by Tajikistan, Russia and the other importing governments, as well as private investors and IFIs. Debt funds would be raised from commercial markets on the strength of the export contracts and on the basis of guarantees from IFIs. Tajik government, RAO UES of Russia, and AES of USA are actively following up on the suggestion and are working with IFIs to structure the transaction appropriately, tie up the export contracts with Pakistan and Afghanistan and cooperative arrangements for the construction and operation of the generation and transmission facilities and the handling of export operations. Iran has concluded a preliminary agreement with Tajik government for equity investments for a downstream Sangtuda II project. RAO UES of Russia is also considering the possibilities of investment in Kambaratta and Rogun Hydro projects.

Source: Central Asian Regional Electricity Export Potential Study, World Bank, 2005

Russian gas production is expected to increase from the level of 608 BCM in 2003 to the level of 655 BCM by 2010 and 898 BCM by 2030. Its net exports are expected to rise from 169 BCM in 2002 to 182 BCM by 2010 and 274 BCM by 2030. This takes into account the considerable amount of gas which Kazakhstan, Turkmenistan and Uzbekistan are committed to supply to Gazprom. Of the total gas exports of Russia, 119 BCM went to Western Europe in 2003. This is projected to increase to 137 BCM by 2010 and 155 BCM by 2030.[68]

Figure 6.2: Production, Consumption and Exports of Oil and Gas in CIS 1989-2003



Russian electricity exports in 2004 amounted to 18.8 TWh and export receipts amounted to $460 million. Over 57% (10.8 TWh) of this went to Finland. Norway got 188 GWh . Six CIS countries (Azerbaijan, Belarus, Georgia, Kazakhstan, Moldova and Ukraine) as well as China and Latvia were the other notable importers. In the export receipts 69% came from Finland, Norway and China.[69] In the previous years Russia had also exported to Turkey, Poland and Estonia. RAO UES of Russia has set up a special subsidiary RAO Inter (in which it holds 60% of the equity and the balance of 40% is owned by Rosenergatom, the owner and operator of all nuclear plants in Russia) to promote exports to FSU states and to Europe. A recent forecast by the company indicates that exports from Russia might reach 40 TWh by 2020. RAO Inter also sets up subsidiaries in the importing countries and through them gets involved in handling retail sales to maximize its receipts and possibly to improve the system integrity in those countries or provinces.

Russia seeks the Nordic markets through Baltic ring arrangements (known as Baltrel) and markets in Turkey through Georgia, and markets in Moldova, Romania and the Balkans (constituting the so called second UCTE systems, which have recently been synchronized with UCTE of West Europe) through Ukraine. It also has long term interests in supplying profitable markets in China, South Korea and Japan making use of the large hydro resources in the Far East Russian regions. It also aspires to synchronize its grid with West European systems in the not too distant a future. In pursuit of its aims RAO UES has been acquiring generation and distribution assets in Armenia, Georgia, Ukraine, and Kazakhstan. RAO Inter is also eyeing the possibility of importing inexpensive hydropower from CAPS, partly to balance the regional systems in Russia like Omsk and partly to augment its pool of exportable surplus. Acquisition of the generation assets at Ekibastuz in Kazakhstan and in Moldova, offers to buy summer power from the Kyrgyz Republic and Tajikistan, and offers of help to construct Sangtuda, Kambarata and Rogun hydro

[68] These data are from World Energy Outlook 2004 of IEA
[69] Annual Report of RAO UES of Russia, 2004

power projects would appear to be part of this strategy. Operation of CAPS in synchronism with the Russian system and the new 500 kV North South line in Kazakhstan should greatly enhance the export possibilities of power from CAPS to Russia. It will however be driven by the competitive nature of the cost of power from CAPS. If Russia succeeds in exporting its electricity to the UCTE countries at prices around 4.0 cents/kWh then it would provide a rationale for import of power from CAPS at prices higher than Russia's own cost of generation. Russia's recent ratification of the Kyoto Protocol may also be a reason for Russia to be looking at importing hydroelectricity from the CARs.

This trading relationship however does face risks and the overarching risk is the potential for failure of infrastructure facilities in the transit countries. Such a failure would create significant transit risks and would increase the potential for geopolitical interference with commercial trading relations. The challenge for the CIS exporters, led by Russia, has been to find ways to mitigate these risks and this goes a long way to explain certain Russian actions over the last several years:

- In the case of gas, for example, the decision to construct the Blue Stream gas pipeline across the Black Sea to Turkey rather than take advantage of lower cost overland routes through the South Caucasus was driven by past problems in dealing with transit arrangements, most notably with Ukraine. For the same reason Russia has been anxious to secure an equity interest in the gas sectors of transit countries. It has, for example, succeeded in doing so in Moldova and some of the countries in Central and South-East Europe (Bulgaria, Estonia, Latvia, Lithuania and Romania) and is currently very interested in negotiating an arrangement with Ukraine that will allow it to take an active role in managing gas transit through participation in a consortium to manage the trunk transmission lines. Russia is also looking at the potential to construct the North Transgas pipeline to connect Russia and Germany via the Barents Sea.
- In the electricity sector, RAO UES has been building or is attempting to build an equity position in the domestic power sectors of countries along potential access routes to international markets.

Concerns related to the availability of infrastructure services along the supply routes have arisen in the past. As an example, there have been occasions when Ukraine has disrupted the flow of gas to certain markets as a result of appropriating gas supplies from the trunk transmission line to meet domestic needs. It is certainly possible to envisage a scenario in which a major failure in the electricity sector in a transit country could lead to interruptions in energy transit activities either as a result of physical problems (such as lack of electricity supply to compression or pumping stations) or as a result of overt government action to draw attention to its problems. One can also envisage the situation in a gas producing country where gas volumes destined for export markets are forcibly diverted to make up shortfalls in the domestic market.

The European consuming countries do not yet appear to have highlighted this as an issue of potential major concern. Russia, however, has identified this as a concern and is pursuing equity investments in the energy sectors of several countries in the region. (Figure 6.3)

A key positive element of Russian involvement is that it is a potential source of capital for investment. The risks associated with energy transit will be more thoroughly mitigated, however, if other stakeholders, such as the European importing countries, also make funding available for the investment needs for the rehabilitation and proper upkeep of the systems in the transit countries and help them evolve into "good transition countries" within the meaning of the term defined by Professor Paul Stevens of the University of Dundee.[70] While technical assistance is welcome (particularly in the form of grants) what is really needed is direct equity investment support.

[70] Peter Thomson, The Outlook for Energy Trade Between the CIS Countries and the Western Europe, Presentation made in Leipzig, Germany, March 8,2005

Figure 6.3: Russian Interest in FSU Energy Sector

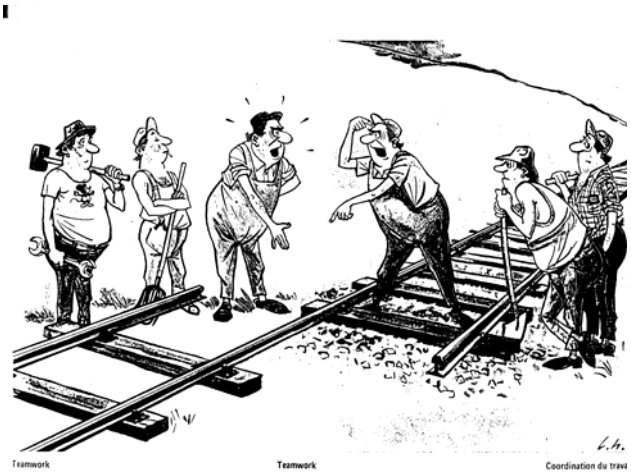
Trade and transport facilitation

The regional approach discussed in relation to the energy sector above is equally important in the transport sector. Trade, a key driver of growth, is dependent on the availability of efficient transport network to reduce transportation and transaction costs and to improve the competitiveness of the country. The direction of trade from CEE is towards EU. This is increasingly the case in respect of SEE states too. The CIS states trade mainly among themselves, the destination of the goods from the smaller states being generally Russia, or Belarus or Ukraine. The Central Asian states trade with Russia through north-south rail links and they also have the potential to increase trade with China, Iran, and Afghanistan if transport links are strengthened.

In most cases, the goods transported by road and rail have to travel great distances and transit through many borders before they reach the destination. In order to reduce the “effective distance to the market”, action is needed not merely in such areas as, proper maintenance of the transport network (especially along the export corridor), and adoption of policies for ensuring inter-operability and promoting inter-modal competition, but also in respect of ensuring access to the transport network based on transparent, fair and stable access fees, harmonizing, standardizing and streamlining customs and border crossing procedures and standardization of rules relating to vehicles axle load, computerizing customs records and information systems, and improving communication on the basis of a regional cooperative approach (Figure 6.2). The latter set of actions (which go under the rubric of trade facilitation) would reduce the time for border crossing, and non-tariff costs to trade and transport and help eliminate or minimize smuggling and the pervasive corruption at the border crossings and contribute to increased trade flows. Wilson, Luo and Broadman estimate that if the ECA countries reach half-way to the EU-15 average

capacity for trade facilitation, their intra-regional trade gains would amount to $94.5 billion and that their global trade gains could amount to $178 billion.[71]

Figure 6.4: Need for Interoperability and Harmonization in Export Corridors in ECA



Source: Vision for Integrated Trade and Transport Corridors, a presentation by Paulus Guitink, World Bank, June 17, 2005

Under the TACIS program the EU provided technical assistance to 12 ECA countries (including Southern Caucasus) to promote such a regional approach and cross border cooperation. The EU has also funded the technical assistance for the Corridor Europe Caucasus Asia program which promotes the development of a transport corridor on a east-west axis from Europe across the Black Sea through the Caucasus and the Caspian Sea to the Central Asia.

The World Bank had supported the first Trade and Transport Facilitation in South East Europe initiative (TTFSE-I) of 2000 and, based on the successes of that program and lessons learnt, is currently preparing operations to support to a broader initiative (TTFSE-II) (Box 6.3).

Box 6.3: The World Bank Experience in Trade and transport Facilitation in SEE States

The first regional cooperative trade and transport facilitation initiative was designed by the World Bank at the request of six countries of SEE (Albania, Bosnia-Herzegovina, Bulgaria, FYR Macedonia, Croatia and Romania) and the related MOU was signed by them in February 2000. Two more countries (Moldova and Serbia-Montenegro) joined the program later. The program led by the World Bank and supported by EU, USA and other European bilateral donors, focused on: (a) reducing non-tariff costs to trade and transport; (b) reduce smuggling and corruption at border crossings; and (c) improving customs administration and other border control agencies (such as Border Police, Veterinary Control, Phyto-Sanitary Control, Road Taxes).The projects in three countries have been completed and three more would be completed in 2005. Significant benefit flows are already apparent. Bulgaria reports: (a) 81% reduction in clearance time at the three pilot project border crossings; (b) increase in customs revenues by 2.7 times; (c) growth in foreign trade volumes by 2.14 times; and (c) a 17.5% reduction in customs expenses /customs revenues ratio.

For the whole program, annual cost savings in 2004 attributable to the waiting time reduction in the 30 border crossing and inland clearance terminals have been estimated at about $64 million. During 2001-2004, trade for all

[71] *From Disintegration to Reintegration: Eastern Europe and Former Soviet Union in International Trade*, World Bank (forthcoming).

countries increased by 92%, customs expenses/customs revenue ratio improved by 25%, and customs revenue increased by 2.34 times. The average waiting time (in all border crossings covered by the pilot projects) decreased by 72%.

The TTFSE-II has a broader scope based on the lessons of TTFSE-I and would cover such aspects as inter-operability, multi-modal considerations and would also consider more fully rail transport related issues. Similar efforts in rail transport (along Corridor IV and X) would have the effect of more than halving the total transport time, by speeding up processing and cutting down waiting times.

Source: (1) Presentations made in the TTFSE conference in Zagreb on June 17, 2005 and (2) Progress Report for the Program (2004)

The lessons learnt in SEE are also being applied in formulating trade and transport facilitation projects for Georgia and Azerbaijan.

7. Role of the private sector

There was a widespread belief in the 1990s that with sector reform and regulatory improvements the private sector should be able to finance and operate most of the infrastructure facilities in the region and on that basis the IFIs and development organizations sought to reduce their direct financing of public sector investments in infrastructure. Much of the infrastructure reform in the ECA region was thus driven by the objective of attracting and enabling private sector investment. Though the process was difficult and often frustrating, notable successes were achieved in attracting such investments. Investments in infrastructure projects with private participation in region during 1990-2004 amounted to about $139 billion covering about 550 projects. This compared with $375 billion in 1055 projects in the Latin America and Caribbean region and $200 billion in 767 projects in the East Asia and Pacific region.[72]

About 70% of the investments in the ECA region were in telecom, followed by energy (23%), transport (4%), and water and sewerage (3%). Bulk of the project investments involved divestiture (51%), followed by green field investments (43%), concessions (4%) and management contracts and leases (2%). The CEE countries had a share of 51% of the investments, followed by CIS (25%), Turkey (12.5%) and SEE (11.5%). The total privatization receipts at $42 billion amounted to less than 5% of the GDP of the region. Private participation in ECA infrastructure peaked in 2000 at around $25 billion and has declined subsequently to about half that level.

Electricity sector had attracted about $20.7 billion or about15% of the total regional private investments mostly in generation and distribution segments. Transmission systems generally remain in the public sector, the only slight variation being in the case of Georgia and Russia. In Georgia the transmission grid is under management contract, while in Russia, RAO UES, the apex power company which owns large hydro and thermal power generating units and the national grid at 500 kV and above has about 49% private shareholding of which about 30% is from foreign investors (see Box 7.1).

Bulgaria, Hungary, and Slovakia have privatized their entire power distribution systems. Several others such as Kazakhstan, Lithuania, Moldova and to a slightly lesser extent Czech Republic, Romania and Ukraine have transferred a significant parts of their power distribution sector for private ownership and operation. In Georgia one of two distribution companies had been privatized while the other is under management contract. In Albania the state owned utility manages the entire power system jointly with a management contractor. In Azerbaijan the power distribution systems have been transferred to private operation under a management contract, though the transaction is essentially a concession arrangement with investment obligations. Distribution privatization had taken place to some extent in Poland and Estonia also.

Kazakhstan has privatized in the mid 1990s most of its “national level” generating units, while in Hungary and Armenia more than 50% of the generating facilities had been privatized. Czech Republic, Poland and Georgia have privatized a notable percentage of their generation assets.

On the whole private sector participation in the power sector had been beneficial. The private operators generally succeeded in improving collections and reducing theft, improving liquidity in the system by paying in cash for the purchased power and certainly by making power supply a lot more reliable in the areas of their franchise. Tariff related disagreements were minor in CEE states and were quickly sorted out. In the CIS, these disagreements were more frequent and, at least in two cases, resulted in disinvestments. A contract dispute between the western investor (operating the power and heat

[72] The data in this section is from the PPI database of the World Bank

distribution systems in Almaty area) and the government on the level of collection losses to be allowed in computing supply costs resulted in international arbitration, and the exit of the investor with a compensation of $100 million in Kazakhstan. Another western investor covering Karaganda area in the same country also disinvested based on tariff related disagreements. In Georgia, the American investor in distribution (in the Telasi region) and generation (both hydro and thermal units), found it difficult to sustain improvements, (despite tariff adjustments) due to systemic nonpayment problems and sold his interests to RAO UES of Russia.

Private participation experience in the power sector of the region has provided several important lessons.[73] Unbundling and privatization ahead of ensuring payment discipline, cost recovering tariffs, and credible regulatory arrangements leads to serious problems for the investor and the sector. This is illustrated by the experience of a number of countries such as Ukraine, Georgia, Kyrgyz Republic and Kazakhstan. Privatization ahead of clear decisions on the desired sector structure (as in the case of Russia) makes it difficult to make desired structural reforms later (Box 7.1).

Box 7.1: Premature Privatization in Russia - Advantages and Constraints

In the early 1990s, Russian power sector was reorganized with RAO UES as the apex federal level power company owning 22 large thermal power stations and five large hydroelectric power generating companies, as well as the national power grid at 500 kV and above and about 72 Regional Energos serving the constituent oblasts or republics. These regional energos were vertically integrated utilities owning smaller thermal units (mostly CHPs) and hydro units, transmission grids at 220 kV and below and the distribution networks. The government owned 51% of the shares in RAO UES and the rest was by foreign investors (30%), institutional investors and individuals (19%). In turn, RAO UES was the largest shareholder in most Regional Energos with average shareholding of 49%. The rest of the shares in these companies were owned by private investors, some foreign investors and institutional investors and individuals. This structure gave RAO UES stability of management and a near complete control to improve the operations of regional energos. The success achieved by RAO UES in the governance of these energos and completely eliminating non-payment and substantially eliminating non cash payments is truly remarkable. However, further attempts to restructure the sector away from monopolistic set up to a competitive one involving the unbundling of RAO UES and the regional energos has been going on for several years now without much tangible results. Apart from other political obstacles, the premature privatization of the sector and the presence of private sector in the monopolistic set up is also a significant constraint to further reform, making it very complicated and difficult.

The sale of shares to private sector in RAO UES and in the regional electricity companies in Russia (even while they were monopolies) has made the further restructuring particularly difficult and complicated. This is also likely to be the case in respect of Czech Republic, where the utility CEZ has been partly privatized. It is interesting that both RAO UES and CEZ are active in acquiring power sector assets in the other countries of the region. Bulgaria on the other hand systematically tackled macroeconomic and sector problems related to losses and collections, decided on sector structure consistent with EU directives, unbundled the sector and privatized its entire distribution and a good part of generation assets in an orderly fashion.

Lack of adequate oversight on the conditions needed to maintain a competitive framework leads to fresh vertical re-integrations not conducive to competition. This happened in Georgia when AES the company owning Telasi distribution network was allowed to acquire generation assets. In Hungary, RWE and EdF have acquired both generation and distribution assets. Poland appears to favor the concept of “national champions” whereby a number of large generating units and some distribution areas are grouped together to form large and strong companies which can better withstand international competition than smaller generating companies.

[73] For a more detailed discussion of these aspects, see Krishnaswamy and Stuggins (2003)

While the focus of privatization efforts on *strategic investors* from the west might have been appropriate in the early years, there is a need to look wider for local, regional and international investors from all parts of the world and for those who specialize in turning around poorly performing assets. The experiences in Georgia and Armenia present a striking contrast (Box 7.2) and provide lessons in the sequence of reform, and the need to look beyond the narrow group of the western strategic investors.

Box 7.2: Georgia and Armenia - A Study in Contrast

Georgian power sector was suffering from very levels of theft of power, nonpayment and corruption. Tariff levels were clearly inadequate to cover costs. However, unbundling and privatization were seen as the way of overcoming these. Telasi distribution network covering the national capital region was privatized to a western strategic investor, who was later also allowed to acquire hydro and thermal generating units with a total capacity of about 883 MW. Allowing the distributing company to acquire such a large generating capacity was not conducive to the objective of competition. However the level of corruption was so high, that the investor could not effectively overcome the problems of theft, nonpayment, social protection needs and staff indiscipline, despite higher tariff increases in the capital region with dense load than the rural areas with sparse loads. Systemic nonpayment problems in the economy affecting liquidity at the generation and wholesale market levels created major problems. This also coincided with major global setbacks for western energy companies and the investor sold all his assets to RAO UES of Russia and left the country. Georgia had not been successful in privatizing the remaining generation and distribution assets. It is managing them as well as the transmission grid and the wholesale market operation using management contracts. The sector is still in difficult conditions with collections running at about 50% and till recently operators were facing political interference when they attempted to disconnect the non-payers. The quality and reliability of supply continued to be poor. It is only recently the operator of the network outside Telasi distribution area has reported better cooperation from the government and some improvement in collections.

Armenia, on the other hand, improved collections to a level of 70% to 80%, adopted cost recovery tariff and laid solid institutional and regulatory foundations during 1995-2000 and had improved the reliability of power supply substantially, before it privatized its distribution. Its several attempts to privatize through competitive bidding limited to strategic investors did not succeed, because of the withdrawal of many western investors from the emerging markets, and it finally privatized its distribution assets to a financial investor specializing in turning around non-performing assets on the basis of a negotiated contract in 2002. The investor did remarkably well. Collections were improved to 96%, commercial (theft) losses were reduced to less than 5%. It raised the salaries of staff and introduced bonuses and incentives to reduce theft and with the active cooperation of the government disconnected any customer for payment default. Supply quality and reliability were significantly improved. The turn around was so good that the company was able to sell its assets and franchise to RAO UES of Russia at a price believed to be six times that of its acquisition cost. The power sector ceased to be a burden to the economy.

The Moldovan experience indicates that when part of the distribution is privatized and the other part is left in public sector, the latter is effectively and beneficially challenged by the former for efficiency improvements. The demonstrational effect appears to have been strong.

The *natural gas sector* attracted $11 billion or about 8% of the private sector investments in the region. The vertically integrated gas companies operating the entire gas network had been transferred to the private sector in Armenia, Estonia, Latvia, Lithuania, Moldova and the Slovakian Republic. In Hungary and Czech Republic, the gas sector had been unbundled into transmission and distribution segments and both had been privatized. In Bulgaria concessions had been granted in respect of municipal gas distribution systems in Sofia, Varna and a few other cities. Georgia has also private participation in the gas distribution sector through a swap of equity for gas related debts. In Russia the dominant gas company is Gazprom, in which the state has 50% of the shares plus one share. The rest of the shares are owned by individuals and institutional shareholders. In 2005, Romania succeeded in privatizing its two gas distribution companies following sector unbundling in 1998, establishing an independent gas sector

regulator in 2001, achieving collection levels well over 90% and adjusting gas tariffs to cost recovery levels in the last three years and committing to reach border price levels for gas by 2007.[74]

Box 7.3: Demonstrational Effect in Moldova

Moldovan power sector was unbundled into five distribution companies and three of them were purchased by Union Finosa of Spain in early 2000. The other two could not be sold to the same party because of the legal prohibition of one company owning all distribution areas. Because of the changes in investment climate, attempts to privatize the other two units did not succeed and they were owned and operated as state owned entities. Union Finosa serving an area with 60% of the population achieved near 100% collections (all of it in cash). Supply interruptions had been substantially reduced. Tariff adjustments to cover costs and rebalancing them to reduce cross subsidies had been secured. Major efforts had been initiated to reduce the level of thefts. In all these aspects, the two state owned distribution companies appear to have kept pace with Union Finosa in a competitive spirit. As a result the sector has been fully monetized and the government has been relieved of the liability to pay for the imported energy. The demonstrational effect of private sector on the public sector in this country is considered remarkable and noteworthy.

Source: Krishnaswamy and Stuggins (2003) and Lampietti (2004)

In the *district heating sector*, FYR Macedonia privatized the country's only district heating company to its employees. Private sector participation has occurred covering a notable part of the DH facilities in Czech Republic (70%), Estonia (70%), Lithuania (30%), Slovakia (30%), Hungary (15%), Latvia (10%) and Romania (5%). Private Participation has also occurred in Poland and Russia. In the latter country multi-utility companies such as Russian Communal Systems (RKS), Regional Communal Investments (RCI) and CES-Multyenergetika (CESM) are active in this sector. They handle the distribution of power, water, heat and gas and other housing and communal services. They seem to handle this business on the basis of "long term delegated management contracts combined with an undertaking of significant investment commitments". The term management contract here may cover a range of lease and concession arrangements as well.[75] Private participation in the heat distribution networks had generally been by way of concessions, leases or through joint-ventures with the municipalities. In CEE many DH systems operated by private companies are well managed. There have also been cases in which the investor had only short term interests and allowed the quality of service to fall behind publicly owned DH utilities. The experiences in Hungary (Debrecen Municipality) and Lithuania (Vilnius DH Company operated by Dalkia International) clearly indicate that both privately run DH systems and publicly run DH systems can work equally well.[76]

The *water supply and sewerage sector* attracted $3.8 billion or about 3% of the total private investment in the region. Private sector participation is extensive in Czech Republic where over 70% of the population is served by private water utilities. BOT type of contracts had been used in Hungary, Poland, Slovenia, Slovakia and Estonia. Three major cities in Romania and the capital of Bulgaria have private sector operated water supply and sewer systems. Other cities in SEE using private sector water concessions include Elbasan in Albania, Zagreb in Croatia and a small region in Kosovo. In the CIS BOT contractors operate waste water treatment plants in Moscow and St Petersburg. Management contracts are in use in some Russian, and Ukrainian cities as well as in Imisli in Azerbaijan and Yerevan in Armenia. Albanian water sector also uses management contracts in some areas. In Kazakhstan, local governments have privatized to domestic investors more than 20% of the service providers in the country. Management contracts have been used in Tajikistan and Turkey.

[74] Romania has both substantial domestic production and imports of gas.
[75] For a more detailed discussion of these companies see Peter Kelly, *Public-Private Partnerships in District heating: How Russian Cities can learn from International best Practice*, World Bank, 2005 (draft)
[76] Coming in From the Cold, IEA, Paris 2004

The experience of Czech Republic and Bulgaria under two high profile water and waste water system concessions are outlined in Box 7.4.

Box 7.4: Water Concessions in Czech Republic and Bulgaria

In Brno municipality of the *Czech Republic* a private company had been granted the concession to operate the water and waste services in the mid 1990s. The levels of service and collection performance (over 99%) were good even before the grant of concession. The company maintained and improved the quality of service to EU standards in the last five years and the high collection levels. It reduced the labor strength from 720 to 600 and modernized and improved the efficiency of the system operation by introducing (a) bulk system meters to isolate losses in specific distribution zones; (b) computerization for the control of pumping stations and treatment plants; and (c) a Geographic information system. However the unaccounted-for water remained at 25%. Investment for the replacement of pipes which might be needed for this is not within the scope of concession and is the responsibility of the municipality. Also the level of losses might be considered acceptable or economic. The investment responsibility of the company appears to be limited to rehabilitation and expansion of the water treatment plant, which the company had carried out during 2000-2005.

The water and waste water services in the Sofia municipality of *Bulgaria* have been operated by an international company on the basis of a concession granted in 1999. The firm was selected *on the basis of bids for the lowest tariffs*. The company introduced a range of modern methods to improve the efficiency of operation and customer service. It reduced the labor strength by about 31% while a number of activities have been outsourced. Collections have improved from 82% to 89% during 2001-2003, but additional expenses by way of service centers and payment outlets to achieve this may have neutralized the increased revenue. Unaccounted-for-water remains at a high 64% despite extensive replacement of consumer meters and improvements to billing system. The reason for losses may thus be technical. The company is installing district or bulk metering to identify the zones with high network losses. The company is under an obligation to reduce the level of unaccounted-for-water to 36% by October 2006, failing which it would face heavy penalties. This would perhaps lead to contract renegotiation. The contractor has an investment obligation of $150 million over 15 years. Of this, it had made an investment of $40 million in rehabilitation of head works and network. Compliance with stringent service quality standards appears to have been reasonable.

Armenia had a successful management contract experience, leading to a long term leasing arrangement for Yerevan water and waste water system (Box 7.5)

Box 7.5: Armenian Experience in Management Contract for Water Supply

A management contract was awarded to an Italian firm on the basis of international competitive bidding for managing the water and wastewater system of Yerevan in Armenia in 2000. It was initially for four years and was later extended for one more year. Payment was based partly on performance and partly on fees. Performance was linked to targets for lowing electricity consumption, and improvements to metering, hours of supply and revenue collections. During the contract period the contractor was able to reduce electricity consumption by about 30%. The volume of water covered by metering improvements more than tripled. In the course of three years, hours of daily supply increased by more than 50%. However with increased hours of supply the number of breaks in the water and wastewater systems also increased by 40% to 50%. Presently, more than 50% of the consumers get 24 hour water supply. Collections increased from 20% to near 100%, partly helped by the government's Debt Forgiveness Law, which allowed writing down debts when the consumers signed the water supply agreements. Though there were serious complaints regarding water quality in the earlier years of the contract, service quality improved considerably and water quality monitoring became better and secure after the recent installation of modern chlorination equipment. Based on this experience the government has decided to lease the future operation of the system to a contractor to be selected by competitive bidding. Investments would be financed by the government partly with the help of loans from IFIs and other official sources. Tariffs will have to be raised and efficiency of collections sustained to raise the balance of investment resources.
Source: WB Project Appraisal Document (2005) and Fichtner (2004).

Poland's experience in the operation of municipal water and waste water system of Bielsko-Biala through a joint stock company with shareholding by the municipalities and an international investor proved sustainable and successful, and is worthy of replication in similar circumstances (Box 7.6)

Box 7.6: Polish experience in Public private Partnership through a Joint Stock Company

The water and waste water systems of the municipality of Bielsko-Biala in Poland are owned and operated by the Joint Stock Company Aqua S.A. in which the municipality of Bielsko-Biala holds 51% of the shares. A private investor United Utilities (Poland) B.V holds 33% of the shares. This company from Netherlands was previously known as International Water UU Holdings B.V. The remaining shares are held by three adjoining towns and nine adjoining communes to whom the services of this company extend. The association of International Water with this company dates back to 1999. The company itself had been operating from 1990. The company is managed by two-member Management Board and a five-member Supervisory Board in terms of the Company Law of Poland. It enjoys considerable autonomy of operation. It caters to about 37,350 consumers, 81% of whom are households. Its meter calibration and replacement program, billing and collection systems are so good and the tariff adjustments so timely and efficient that the per capita consumption of water had been reduced by about 60% to 105 liters/day in the last 9 years. Aqua had been continuously expanding its service area and picking up bulk consumers to offset the effects of such demand management measures. Because of the increase in sales and reduction of staff, its labor efficiency has improved to 1.4 employees per 1000 customers compared to 2.8 employees in 1996 and much better than the level of 2.5 employees planned in 1996. Tariff increases for water and waste water had been 51% and 68% higher than what was planned in 1995. Its electricity consumption came down by 15% during the last several years. The company maintains high levels of customer service and service quality standards and is able to comply with EU standards. It has consistently been able to make profits and declare dividends and generate more than the forecast level of net internal cash to pay for its investment needs. This resulted in its reducing its withdrawal from the World bank loan. Its cash position is so strong that it initiated prepayment of the World Bank loan. Its shares are traded actively in the Polish secondary trading market.
Source: World Bank's Implementation Completion Report (2005), Audit Report of the Company (2004)

In the *roads sector*, private participation is limited to a few toll road (motorway) concessions in Hungary, Poland and Croatia. In Hungary, it became necessary to protect the toll road operator from the volume of traffic risk by transferring it to the state. Thus toll based concessions have been replaced by payments for road availability (Box 7.7).

Box 7.7: Hungary's Experience in Motorway Development

Hungary awarded the first concession in 1993 for the design, finance, construction and operation of the motorway M1/M15, providing a link with Austria. Initially, the project involved 100% financing by private investors with the traffic risk allocated fully to the private sector, a revenue-maximizing toll rate and a competitive tender. The 35-year concession contract was finalized with a consortium of French, Austrian and Hungarian investors. Financial closing was achieved based on a limited recourse project finance package of Euro 320 million with a 80%/20% debt/equity mix. Government support for the project included preliminary design and building permits, environmental clearance and land acquisition. The M1 opened in January 1996 on schedule and within budget. However, actual traffic volumes were 45% below forecast and the maximum toll rate allowed under the contract (about Euro 0.15/km) corresponded to about a one day worker's salary. Following legal action initiated by the Hungarian Automobile Club, a court ordered a 50% reduction in the toll rate. This caused a 30% revenue shortfall which resulted in insolvency and default of the consortium on its debt in January 1998. In April 1999, the company's outstanding debt was transformed into government debt and the consortium was substituted by a fully state owned special purpose vehicle. Given lower toll rates, traffic volumes increased, while revenues fell 45% year-on-year.

Another BOT concession contract was signed for the construction of the M5 highway with a French-German led consortium. Toll rates were significantly lower at Euro 0.07/km. As a result, in the first year of operation, average traffic and revenue collected met almost 100% of forecast. However, once again the Hungarian Automobile Club complained about toll levels, as a result of which the government replaced the toll system by an availability payment scheme. Under the agreement, the state pays AKA a fixed annual availability payment which covers the project's

debt service. Performance under the availability contract is monitored based on a penalty point system under which deductions are made in the case of unavailability of services. The project raised Euro 750 million in re-financing with a 20-year term.

Based on this experience, the third concession of a motorway was structured as an availability fee payment mechanism from the beginning. The M6 motorway was awarded to a German-Austrian consortium with additional funding from the Hungarian Foreign Trade Bank for 10% of sponsor equity. The concession is for 22 years with a 2 year construction period. The availability/ performance mechanism covers the debt repayment of the Euro 450 million project finance.

Source: World Bank Documents

In the *railway sector*, Estonia has substantially privatized its rail system, while several freight licenses to private sector companies had been issued in Poland and Kazakhstan. In Russia, private sector operations of freight services are likely to materialize soon. Czech Republic, Latvia and Romania have transferred some of their passenger service operations to private companies with subsidy arrangements for public service obligations. Poland is also planning on similar lines. The privatization of the rail system in Estonia proceeded in a systematic and orderly manner and the results appear to be favorable (Box 7.8)

Box 7.8: Privatizing the Estonian Railways

Following Estonian independence, a national railway company—Eesti Raudtee—was established in 1992. The management of the new company was inexperienced and lacked some technical and managerial skills. But the advantage was that there was no heritage of the embedded bureaucratic culture and apparatus that had characterized management of the Baltic Railway headquartered in Latvia during the Soviet rule. In 1997 the state-owned enterprise was split into a number of new entities:

- The main company became a joint stock company (Eesti Raudtee AS) operating under commercial legislation, responsible for the main international lines and freight services using them.
- Predominantly domestic passenger lines in the south and east were vested in a new passenger company (Edeleraudtee Ltd.), which was then privatized. Edelaraudtee also now offers some passenger services on Eesti Raudtee's network under a service contract with the government, for which it pays track access fees to Eesti Raudtee.
- International passenger services (to and from St. Petersburg and Moscow) were transferred to a train operating company, EVR Express; 51 percent of shares were sold to investors and 49 percent were retained.
- Commuter trains around Tallinn were transferred to a suburban train operating company, Electriraudtee Ltd., which is still publicly owned.

Traffic declined during the post-socialist era; by 1995 traffic was about half of 1989 levels. Although passenger traffic has continued to decline, freight traffic started to increase in the mid-1990s, more than doubling by 2000 and thus surpassing 1989 levels. Such a rebound had not happened anywhere else in the region. Traffic levels on the Estonian railway were then higher than those in some larger ECA countries such as Bulgaria and Croatia, and traffic density was twice the EU average. These favorable characteristics, and the fact that 98 percent of traffic was freight, made the Estonian railway industry a good candidate for privatization.

Sixty six percent of the share capital of Eesti Raudtee AS was sold in 2001 to a strategic investor through an international competitive bidding. The strategic investor was Baltic Rail Services (BRS), a company comprising Estonian, U.S., and U.K. shareholders. The U.S. shareholders have extensive experience in the railway industry internationally, and the U.K. shareholders have been heavily involved in rail infrastructure maintenance and renewal activities in the United Kingdom.

Although the financial performance of Eesti Raudtee was improving before privatization, the impact of private ownership and management was significant. The company completely replaced the locomotive fleet and achieved substantial improvements in nearly all conventional measures of commercial performance, including traffic volume, profitability, capital utilization, labor productivity, and financial reporting, as well as improvements in safety. Under private ownership, labor strength had come down by 37% and labor productivity in the Estonian railway industry

has become the highest in the ECA region--about four times that of the European Union. This is partly due to the traffic characteristics. The company remains significantly profitable. Government, however, continues to subsidize the unprofitable passenger services segment.

In the *telecommunications sector*, private sector participation is extensive in mobile telephony, covering almost all transition economies. This has encouraged a spectacular growth in access to mobile telephones and internet connections. In most cases the governments have retained some minority shareholding or a "golden share" to prevent hostile take-over. Participation in fixed line telephony had lagged behind, especially in the low income countries of Central Asia. Considerations relating to EU accession such as the need to open up markets in line with the 1998 Telecom Directive of the EU as well as accession to the World Trade Organization had spurred reform in many counties in the region. Privatization proceeded through asset sales (as in Lithuania) or through Initial Public Offering (IPO) 9as in Poland. Hungary sold shares in the first and second stages to a strategic investor and resorted to IPO in the third stage. Estonia on the other hand issued IPO in the first stage and sold shares to a strategic investor in the second stage.

Privatization often proceeded before introducing regulatory arrangements. Many governments got away with it and realized reasonable levels of privatization proceeds because of the existence of suppressed demand for phone services and major technological developments taking place. At least one did not. The unhappy experience of telecommunication privatization in Armenia highlights the need for the establishment of proper regulatory arrangements before privatization and adoption of caution in granting exclusivity of license over very long periods (Box 7.9)

Box 7.9: Privatization of Telecommunication in Armenia ahead of Regulatory Arrangements

Unlike in the case of power Armenia did not have a properly constituted regulatory body before it privatized its telecommunication sector. Armatel was established in 1995 as a joint venture between the Ministry of Communications and Transport (51% share) and a consortium of US and Russian companies called Trans-world Telecom Limited (49% share). This company had begun refurbishing the basic telephone infrastructure in five cities, but the fixed line network in Armenia remained incomplete and other telephony services were non existent. It had failed to keep up with its investment obligations. However, the government proceeded to further privatize Armatel in 1998 to the Greek government owned Hellenic Telecommunication organization (OTE). The problem with the license issued to Armatel/OTE was its exclusivity for long periods over for the fixed line services (15 years) and mobile services (5 years).This had seriously inhibited the entry of competitive providers of mobile services. Armatel is widely believed to have inflated its reported investment plan and stifled growth in potentially competitive markets for internet service provision and cable television through prohibitive access fees for "international data transfer" services. Armenia lagged considerably behind Azerbaijan and Georgia. Its tariffs for both fixed and mobile phones were higher. Its fixed line density was growing at half the pace and its mobile penetration was only 0.2% of the population compared to 3.5% in Azerbaijan and 1.8% in Georgia.

In 2003, the Government unilaterally amended the OTE/Armatel license revoking its monopoly over mobile services. This led to an international arbitration in London. The dispute was, however, settled among the parties in end 2004 resulting in: (a) enabling the entry of one other new mobile provider; (b) reduction of the exclusivity period from 15 to 11 years; and (c) Public Services Regulatory Commission getting jurisdiction over the regulation of the license conditions of OTE/Armatel.

In most countries there has been industry liberalization resulting in plenty of competition in the mobile telephone market. More recently competition is emerging in the fixed line markets also. Railway companies and power companies are laying fiber optic lines of their own. Competition also comes from numerous internet service providers. Unlike in power sector, there could be a number of networks in each country and network access could be governed by bilateral agreements between parties.

As pointed out earlier in this Chapter, private sector investment in the region peaked in 2000 and has since declined to half of that level. This was arguably a consequence of both the continued lack of deeper

economic reforms in many parts of the region and the deteriorating global market environment for private financing of infrastructure assets. The drop in investor confidence along with developments in the international financial markets, such a steep drop in equity valuations, widening credit spreads, and a withdrawal by banks in response to increasing loss provisions provided a hostile external environment for emerging market financing during the last few years. The market and governance turmoil in infrastructure sectors over the last few years forced most operators to return to more conservative corporate strategies and financial policies, reducing borrowings and exiting non-core markets in order to maintain their investment grade ratings. Similar financial pressures on the infrastructure and energy sectors drove the trend in declining creditworthiness in the European utilities sector in 2002 and 2003. In 2002, downgrades by S&P outnumbered upgrades by 24 to 3. S&P placed 28% of the rated energy issuers on "Credit Watch with negative implications" or assigned them "Negative Outlook". Dominant sponsors in the infrastructure projects in ECA region suffered deteriorating credit quality as indicated by the decline in their ratings by Moody's (Table 7.1)

Table 7.1: Decline in Corporate Credit Rating of Infrastructure Firms, 1997–2002

Corporation	1997–98	1999–2000	2001–02	Comments
Suez			A2	Steady at A2, but with a negative outlook
Sonera	Aaa	Aaa	Aa3	Downgrade in 2002
Vivendi		Baa2	Baa1	Downgrade in 2002 and placed on "Watch"
AES	Baa3	Ba2	Ba3/B3	Steady downgrading
RWE			Aa3/A1	Downgrade in 2002
EdF	Aaa	Aaa	Aa3	Downgrade in 2002
Eon	Aa2	Aa2	Aa2/A1	Downgrading in 2002
Vattenfall	Aa3	A1	A3	Steady downgrading in 2002

Source: World Bank 2004e.

This resulted in problems for the countries which tried to privatize their assets especially when focusing on the western strategic private investors. Thus attempts to privatize their infrastructure assets by Moldova (power distribution), Armenia (power distribution), Georgia (power distribution), Ukraine (Kyiv Vodokanal) and Russia (Ulyanovsk river port) attracted little or no response from such investors despite several rounds of bidding.

The slack arising from the withdrawal of western investors appears to have been taken up to some extent by the emerging regional investors. Thus RAO UES and Gazprom of Russia and their subsidiaries have acquired energy assets in Kazakhstan, Georgia, Moldova, Armenia, Ukraine and other countries. VSE of Slovakia has acquired distribution assets in Ukraine. CEZ of Czech Republic has also become an active player in acquiring power assets abroad. It acquired recently distribution assets in Romania. New mobile licenses in Russia have gone to local Russian investors. Mobile Telesystems and Vimplecom of Russia have also been buying into the Ukrainian mobile market. Armenia's privatization of its distribution system to a firm specializing in financial turnaround had proved successful. Azerbaijan's power distribution sector had been given during 2002-2003 on a 25 year-concession (though called a management contract) to two regional firms with full investment responsibilities. Also the business cycle appears to be turning around, though, slowly. Privatizations in Bulgaria, Czech Republic, Slovakia and Romania in 2004-2005 in the energy sector proceeded smoothly.

The change in the market sentiment may help only the CEE states and some of the SEE states in an advanced stage of EU accession reflecting the depth of their economic reforms as well as the cautious and selective approach of the investors. The investor would be influenced not only by the depth of sectoral reform, but also by country specific risks which may be institutional or legal. It may also include macroeconomic risks arising from high fiscal deficits, high current account deficits, high inflation and high levels of country's external indebtedness. The correlation between these factors and the level of foreign direct investment is brought by Table 7.2 covering 14 countries in the region.

Table 7.2: Macroeconomic indicators for countries with near-term infrastructure privatization potential, 2003

Country	Government balance (% of GDP)	Current account balance (% of GDP)	Inflation (%, average)	External debt (% of GDP)	FDI ($ millions)
Bosnia and Herzegovina	–0.2	–17.4	1.0	34.9	320
Bulgaria	–0.4	–8.4	2.3	65.6	1,398
Croatia	–6.3	–6.1	1.8	81.8	1,100
Czech Republic	–13.0	–6.2	0.2	33.4	5,000
Estonia	3.1	–13.2	1.3	70.5	743
Georgia	–2.9	–7.9	4.9	49.5	306
Hungary	–6.1	–8.9	4.7	62.3	874
Latvia	–1.6	–8.6	3	82.6	328
Lithuania	–1.7	–6.7	–1.2	40.6	3,372
Poland	–4.2	–2	0.7	50.2	3,839
Romania	–2.4	–5.8	15.4	34.6	1,528
Russian Federation	1.1	8.3	13.7	42.1	-3,002
Slovak Republic	–3.6	–0.9	8.5	56.3	549
Slovenia	-2.0	0.0	5.6	53	-118

Source: EBRD 2004.Note: The net FDI in Russia is negative because its investments abroad exceed foreign investments in Russia.

The other SEE states and CIS states have to carry out in full measure the basic reforms which are the critical factors for success in making their infrastructure services fully functional on a financially viable basis. The larger countries may also focus in the development of their domestic financial markets and attracting domestic investors. In Kazakhstan, for example the government is planning to encourage the channeling of the growing pension funds and insurance funds into infrastructure investments. In Russia a large number of domestic private entrepreneurs are emerging in respect concessions for water and heat services and in the retail service sector in general. Approaches to private sector participation would also encompass regional investors, financial investors from all parts of the world and the firms which specialize in turning around poorly performing assets. But the greatest emphasis would be on turning around the public sector entities to be financially viable entities with possible access to the debt markets based on the strength of their balance sheets and performance indicators. The needed focus for this on cost reduction, right prices, efficient collection, and the overarching governance improvements going under the rubric of "public enterprise reform" would be the subject of the next Chapter.

While private sector investment has played a notable role in the past and is likely to play an even more important role in the years to come, it cannot be regarded as the panacea for all the ills or requirements of the regional infrastructure. Clearly it will remain focused on sectors and activities with high returns and lower risks. Nor can it handle the burden of social protection. All costs relating to the provision of infrastructural services have to be met ultimately by the consumers and the tax revenues of the state. Their respective shares would depend on the extent to which these services could be classified as "public goods" (and possess positive externalities for the societal welfare) or "commercial goods". It would also guide the choices of the public or private sector instruments or agencies or a suitable mix of both to provide these services. It would also influence the shares in financing of the capital investments of infrastructure facilities (including the rehabilitation and replacement of existing assets) by tax revenues and or funds from commercial or official sources.

A great deal of the activities in the energy and telecommunications sector would clearly be regarded as providing mainly commercial goods. In water and district heat, rural areas would remain unattractive to private providers. In the ownership and operation of road and rail transport, it is unrealistic to expect full

coverage by private service providers, who may focus only on the railway freight services and perhaps some of the high profile motorways. Also the returns from much of the infrastructure activities, while reasonably steady, are not as attractive as in many other economic activities. Thus public sector may have to remain for the long haul in many of the infrastructure sectors, in many of the countries in the region. In such cases the key to success is to create efficient and sustainable public sector operation for reliable services at reasonable cost. From the sectoral point of view this is also the condition for attracting private investors into the activity. Till private sector actually decides to invest based on its perceptions of the sector risk and country risk *and its own investment priorities*, the public sector should continue to function well and deliver the services reliably and in a sustainable manner. The resources needed for this have to come from user fees and tax revenue (mainly for social protection). To the extent there is a financing gap, the IFIs would have a role in providing catalytic funding, conditioned upon economic reforms to increase fiscal revenues and user fees and securing further sector reforms. The IFIs may also play the role of reducing the risk to the financial markets in providing support to such public sector services through its guarantee operations. Clearly the IFIs and development agencies have a clear role in encouraging the countries to adopt sound macroeconomic policies, institutional and legal reforms designed to reduce country risks for potential investors. The recent use of the Bank's guarantee mechanism to reduce the regulatory risk and facilitate the privatization of energy sector assets in Romania is one such imaginative use of the instruments at their disposal. The enabling of the private sector participation in the power sector of the Gorno Badkhshan area of Tajikistan – one of the poorest and remotest regions in ECA by the Bank Group is another example of the Bank making the best use of its instruments (Box7.10)

Box 7.10: Private Participation in Power supply in Tajikistan

Gorno Badakshan is in the south-eastern part of Tajikistan in the Pamir mountain area which is arguably one of the remotest and isolated regions of the world. It is a small electricity system and is also isolated for all practical purposes. Aga Khan Foundation (AKF) a non-government organization has been granted a 25 year concession to construct a 14 MW hydropower station called Pamir 2, rehabilitate and operate the existing generation stations, transmission and distribution system in this area It has set up a new vehicle for this purpose called Pamir Energy Company (PEC) in which it holds an equity of $7.6 million and IFC has provide an equity of $ 3.3 million and a debt of $4.3 million. The World Bank provided a loan of $10 million from its IDA resources to the government, which has re-lent it to PEC. PEC will complete Pamir 2 hydropower project with the total resources thus raised. Tariffs would be maintained at a level to provide 10% return on equity. The average tariff is expected to grow from 0.75 cents/kWh in 2002 to 3.0 cents by 2010 and remain at that level thereafter. The levelized tariff for the 25 year period would be 2.1 cents/kWh. Costs of social protection (needed in the context of the use of the life line rates and making tariff increases for residential consumers gradual) would be met from a Swiss government grant of $5 million and the re-lending margin of the IDA credit.

8. Critical success factors for infrastructure reform

The transition economies are transiting from centrally planned systems to market oriented systems. To facilitate and accelerate the process, reform prescriptions have generally tended to focus on the separation of the sector policy formulation, ownership, operational and regulatory responsibilities of the government among government ministries (Ministry of Finance or State Property Fund for ownership functions, and Sector Ministries for policy formulation) corporatized service providing entities (for operation) and regulatory bodies (for tariffs and sector regulation). Steps along the path of reform generally included: (a) enacting needed legislation for reform; (b) corporatizing the service providing entities with their own legal identities under the company law; (c) commercializing their functions; (d) unbundling monopolistic services by function, setting up corporate entities for each function and creation of commercial relations among them; (e) creating independent regulatory bodies to set prices and carry out sector regulation; (f) creating sector structures suitable for competition in those segments where competition is possible (g) privatizing the supply entities to strategic investors to secure investments, improve efficiency and enable competition within and across the borders. Transition indicators have also been developed to track progress along these lines.

However, transition indicators imply equal expectations for transition end points. Such expectations would be misplaced. Each country needs to consider its system size, location in relation to relevant natural resource, technical talent, local and national government capacity for governance in designing the balance between public and private provision of the services, and for each the specific organization and regulation. Larger systems have more scope for capturing gains from commercialized or private organization. Further, while all the reform steps mentioned above are clearly desirable, not all of them could be considered critical (or the only alternative) to ensure that infrastructure sectors function effectively. Not long ago, most West European infrastructure systems were operating at high levels of effectiveness and efficiency even as state owned monopolies. The effectiveness and efficiency of their systems were clearly superior to those in the transition economies. They resorted to de-monopolization and competition in search of further efficiency gains. Even now the electricity and gas sectors in France continue to remain in the public sector without effective domestic competition. In Nordic countries there is effective competition in the power sector despite it being substantially in the public sector. Germany, till recently, did not seem to have had independent regulators. While there is no reason why the transition economies should not straightaway leapfrog to the state-of-the-art sector structures and competitive provision of the services, it may be more practical for the reform efforts to focus initially on those critical factors which must be in place to ensure that the infrastructure service entities (whether owned and operated by public sector or private sector) function effectively on a financially sustainable basis.

The central objective to be achieved is the sustained financial viability of the entities providing infrastructure services. Not being a drain on the state's budget, they would be able to provide the services on a sustainable basis. It may be attained by any of the several methods: as state-owned entities or privately owned entities; vertically integrated monopolistic entities or unbundled and competing entities; through concessions, management contracts or public-private partnerships or even by combination of two or more among such choices. Whatever be the choice, the real challenge is what it takes to achieve sustained financial viability. Based on the experience in the ECA region in the last 15 years, the following four elements in the public domain would appear to be the critical success factors:

- Recognition of the key problems in all their configurations and dimensions
- Ownership of the program (with such components as payment discipline, tariff adjustments and fair regulation) to overcome them and commitment for its implementation
- Transparency in all transactions to enable meaningful accountability

- Governance adequate to ensure effective sector management including the oversight of the agencies to ensure that they do provide the services to their customers at acceptable levels of quality and reliability.

These encompass concepts of respect for property rights, prevention of theft, enforcement of contracts and regulation—all of which are clearly public goods and can be provided only by the government. They form the inescapable foundation on which infrastructure service delivery systems of any type—public, private, monopolistic, unbundled or competitive—rest. They also include corporate governance and public enterprise reform in respect of entities remaining in the public sector.

Recognition

Recognition of the problems has to do with understanding the conflicts inherent among political, economic and social objectives and striking a balance through appropriate trade-offs. Short to medium term political objectives tend to favor policies which keep the moneyed lobby groups and vote banks happy. The economic objectives call for prices to be raised to cover costs, collections to be enforced to keep the utility financially viable and operational efficiencies of the utilities to be improved to reduce costs of supply and ensure service quality. Raising prices and enforcing collections tend to cause disaffection among the consuming public and cause affordability problems to the poor. It is not always easy to identify the real poor and find the budget resources to subsidize them adequately. Politicians, thus, tend to neutralize the state's efforts in this direction. Regulators may be subject to "capture" by special interest groups derailing true reform. Efficiency improvements in utilities face concealed hostility from managers and staff, who have a vested interest in the *status quo* wherein they exercise undue degrees of discretion and indulge in unchecked corrupt practices. They are also opposed openly by labor unions, which fear that reforms will lead to job losses.

Governments which recognize these problems and associated pitfalls fully, succeed in designing programs which reform the sector while ensuring political stability. Thus Poland and Hungary focused on labor agreements on downsizing, retraining, redeployment and acceptable separation packages. RAO UES of Russia focused on elimination of inefficient and corrupt managers and replacing them by competent ones.
Armenia and Moldova focused on service quality improvements moving *pari passu* with tariff increases and collection enforcement.

Ownership

Ownership of the program has to do with adhering to the program despite setbacks and opposition and being able to sell the program to the people. This is discussed in terms of three important variables, namely, payment discipline, tariff adjustments and independent regulation.

Payment discipline

Laws need to be enacted to make theft of infrastructure services a criminal offence, punishable with deterrent penalties. Procedures for fair and speedy prosecution and trial need to be notified. The right of the service entity to deny service to those who do not pay should be specifically provided for in the law and should be scrupulously respected by governments at all levels. Such laws and procedures are broadly in place in CEE and most of SEE. In the case of CIS, the right of the utilities to disconnect for nonpayment is still not clear in many countries. Even in Russia, the civil codes had to be amended in the late 1990s to clarify this right.

Many CIS countries still maintain long lists of critical agencies and facilities which can not be disconnected for nonpayment on the ground that they perform nationally important functions or that disconnection would cause serious harm or production losses. If these agencies or activities are so

important that they should never be disconnected then, it is all the more necessary to ensure, on a priority basis, that they have adequate funds to pay for the services they need, all the time.

Lack of payment discipline of the departments, agencies and enterprises of the federal, provincial and municipal governments is still a major problem in many CIS countries.[77] In the late 1990s, RAO UES of Russia disconnected defaulting high profile consumers (such as missile silos) to dramatize the issue. In Armenia and Azerbaijan too, the governments enabled the new private sector owners/operators of power distribution to enforce payment discipline by disconnecting even high profile consumers for payment default. The governments, which focused on eliminating their own debts to the utilities and ensuring payment discipline of their own agencies (Russia, Ukraine, Kazakhstan and Armenia), succeeded in enabling their infrastructure sectors function better.

Interference by provincial and local officials, who forcibly enter substations or dispatch centers and restore supply to feeders disconnected for nonpayment, is still common in many CIS countries such as Georgia. This was the norm in many oblasts of Russia, Ukraine, Armenia and Kyrgyz Republic in the past. The first three countries were able to restore reliable supply after this practice was substantially reduced. It still continues in the last country, where the powers of the Special Representative of the President appointed to enforce payment discipline were withdrawn, when he was succeeding notably in his mission through the effective use of denying supplies to nonpaying customers. In Romania, substantial progress was achieved only after the government ministers were reined in from transferring, or otherwise getting rid of the key utility officials who resisted political intervention and tried to enforce payment obligations. Reining in such public officials and enforcing a political code of conduct to respect contract rights and obligations is a necessary requirement if the utilities have to function on a sustainable basis. By focusing on such aspects, countries like Ukraine and Romania have recently improved greatly the collection performance of their publicly owned power entities. Serbia succeeded in eliminating the practice of paying utility bills by the method of setoffs. Russia achieved high levels of collection under public sector ownership even earlier.

These responsibilities are those of the government and unless the government effectively discharges them, reform options such as privatization cannot work. Private sector can detect theft and illegal consumptions, but cannot do much more in the absence of effective legal framework to have such thefts prosecuted and punished. It can read meters, bill customers efficiently and keep better accounts and identify the defaulting customers to disconnect, but it will be of no use if it is not allowed to disconnect or forced to reconnect a non paying customer.

Tariffs

Allowing prices to rise to cost recovery levels is often a political question, and this is especially so when the increases relate to the residential consumers. Even in a country like Hungary, even after the distribution companies and generation companies had been privatized, the government showed reluctance to allow retail prices to rise, when price increases became necessary in 2000. In response to the protests by the private distribution companies, the government protected their margins, by forcing the state owned transmission company (which was also the single buyer in the wholesale market) to buy power from privatized generation companies at a higher price and sell it to the distribution companies at a lower price. While by and large the electricity and gas tariffs have reached short term viability[78] in most countries in the region, they have to go up further to reduce the quasi fiscal deficits and be able to generate enough internal funds to finance a portion of the urgently needed system rehabilitation and reinforcements. Also

[77] Nonpayment for electricity by water companies and state owned irrigation pumping companies is a pervasive problem, since their own tariffs are very low and since they face severe nonpayment from their own customers.
[78] By this term we denote positive cash flow, which is an operating surplus after meeting all cash operating costs. This is the minimum needed to keep the activity ongoing in the short term

the tariffs for residential customers need to rise substantially to reflect the higher costs of supply to them. Tariffs need to be allowed to rise, while ensuring that the poor people are protected from the impacts of such price adjustments through suitable social protection mechanisms without eroding the financial viability of the supply entities. This is clearly the basic remit of the state. The governments have to politically commit themselves to a reasonable program of tariff adjustments from the very low levels to levels approaching cost recovery over a medium term and allow the regulators to implement the tariff trajectory without further interference. Some elements of the approach to moderate tariff increases under the circumstances of the low income CIS countries are given in Box 8.1. Decisions therein are political and need to form part of the government approved tariff policy. Thereafter the regulators may be relied upon to make adjustments to tariffs taking into account the interests of all stakeholders.

Box 8.1: Possible Approaches to Moderate Tariff Increases in the Medium Term

Given the affordability concerns in the CIS, and the need to moderate and phase in the tariff increases in tandem with the forecast income increases, the governments may possibly consider writing down the asset values to provide a short term cushion. The reduced rate base would result in moderate tariffs on the basis of Rates of Return formula. In the event of asset sales, the approach could be on the basis of a binding tariff increase trajectory over a five year period, rather than on the basis of recovering maximum asset values based on historical book values and replacement values. Similar approaches would apply to concession contracts also. In respect of the operation of state owned utilities the tariff formulae could be forward looking, based on the need to generate adequate internal cash to meet all cash operating expenses, full debt service and still leave funds needed to finance the urgently needed system rehabilitation and improvements (such as metering). Annual tariff adjustments could then be driven by the needs of rehabilitation investments needed for the next year. In all cases however, efficiency indicators such as technical losses, commercial losses and collection efficiency should be linked to benchmarked targets, for revenue determination.

Regulation

Oversight of the sectors from the points of view of safety, quality of supply, service standards, protection of customer interests and environmental norms is clearly the role of the government. These as well as the economic regulation are best carried out by specialized and competent regulatory bodies independent of the service entities (to avoid conflict of interest) and of the executive branch of the government (to divorce their decision making processes from political considerations), but are often carried out by the government departments in certain countries and certain sectors. Clearly regulation is also in the remit of the public domain.

The role and focus of regulation in the region have varied across the sectors and countries. In telecommunication, technological innovations have spawned high levels of competition. The focus here is not so much on price regulation as on ensuring non discriminatory network access, quality of service, promoting competition and attracting new investment. In the water sector technological advances are slow and demand growth is limited, potential for competition is low and potential for adverse environmental impacts are high and therefore regulation has to focus on prices, quality of supply, and environmental issues. In the railways sector the focus is on enabling track-network access to promote competition in freight transport, and also in promoting inter-modal competition among railways, roadways and inland water transport for freight. In power and gas sectors, competition has become possible in generation and retail sales segments, while the network services remain monopolistic. The focus of the regulation is network service charges, non-discriminatory network access, promotion of competition in generation and retail sales, and price regulation of generation where necessary. Maintaining a balance between the interests of the consumers and service providers, quality and reliability of supply and environmental and safety concerns inform all sectors.

In the water sector, such autonomous regulatory bodies are not common. EU accession does not require the establishment of independent water sector regulatory bodies. In many member countries of the EU a locally implemented regulatory framework is in operation. In the water sectors of the ECA region only a few countries have established what could be called an independent water sector regulator. Sector regulation had been fully or partially decentralized to municipal levels in all countries except six (Albania, Belarus, Bosnia-Herzegovina, Kyrgyz Republic, Tajikistan and Turkmenistan). Even where private sector investors are operating, municipalities retain the price regulatory role with some allowance for the investors to have recourse to independent panels for arbitration.

These arrangements appear to be working well at present. There have been no major regulatory disputes in the large private water projects in the region (box 8.2). In some cases commercial financing for investment—without the need for sovereign or municipal guarantees—has been mobilized without private participation. It is important to note that major tariff reviews—the most contentious aspect of the regulatory process—in the cities where the private sector has entered have yet to be undertaken. Pending reviews in several cities will indicate whether local arrangements are sustainable. In cases where commercial finance has been mobilized without private sector participation widespread replication of pilot projects would indicate that this type of arrangement is sustainable.

Box 8.2: Regulation of private operators in the Bulgarian and Czech water sectors

Under the terms of the Sofia water and wastewater concession, monitoring is carried out by an independent body with three members: a technical expert, a customer services expert, and a financial expert. This body is the primary point of contact for the concessionaire. It acts as a technical advisor to the municipality, collecting information and carrying out expert analysis of the concessionaire's performance.

Should a dispute occur, it may be referred to a Concession Dispute Resolution Board (CDRB). The CDRB consists of three members: a lawyer trained in arbitration and dispute resolution, a technical member, and a financial member. The members are chosen at the beginning of the concession and make periodic site visits to keep in touch with developments.

The dispute resolution procedures used by the CDRB are informal and the parties' lawyers play a minor role. If neither party decides to contest a CDRB decision by going to arbitration within 30 days, the decision becomes binding on the parties, as if it were a contract amendment. Moreover, the CDRB decision can be admitted as evidence in any subsequent arbitration. Should such arbitration be required, it would be carried out under international rules with an international appointing authority.

So far there have been no major disputes. Tariffs were increased by 35 percent in real terms in accordance with formulas written in the concession. The concessionaire has failed to meet all of the extensive service quality targets, some of which may have been set unrealistically high and may require renegotiation. One potentially contentious area is the pending review of tariffs, during which targets for cost reduction will be set and the allowed cost of capital determined.

In the Brno water and wastewater concession, contract monitoring is undertaken by the municipality. In the event of a dispute, a sole expert—an independent engineer with appropriate experience in the water and wastewater sector—is jointly selected by the municipality and the concessionaire to make a final and binding decision.

To date there has been no major dispute. Tariff increases of about 25 percent in real terms were implemented in accordance with the terms of the concession during 1999–2003. There will shortly be a review of tariffs during which, as in Sofia, there will be determinations of targets for efficiency gains and the cost of capital. To provide a third-party view on the allowed cost of capital, the municipality has hired an international investment bank to act an adviser.

The evidence available leaves open the question of whether national independent regulators will be required for the water sector in the region or whether the types of local arrangements that have been introduced will suffice. In favor of national bodies is the argument that they would have more legitimacy than local independent panels (established under primary legislation, approved by parliament, subject to more accountability, and with more staff and country experience), particularly in a context of sector privatization.

In municipal-owned—rather than privatized—companies, it is unlikely that local arrangements will allow recourse to independent panels. As a result widespread access to commercial finance may be constrained. It is unlikely that municipalities in the region will be seen by financiers as having sufficient independence and expertise to set tariffs in a manner that provides cash flows adequate to support investment. A national regulator could help depoliticize the municipal tariff-setting process, with a view to ensuring that tariffs cover both operating and capital costs and to mobilizing commercial finance for investments.

The majority of water and wastewater companies in the ECA region are likely to remain under municipal ownership for the time being. This is a strong argument for developing national regulatory bodies. Such bodies might then oversee all municipal companies—including privatized companies (taking over the responsibilities of local expert panels in private projects)—to exploit economies of scale and scope. National regulators in Bulgaria and Romania certainly will have a role in regulating existing concessions.

Such national regulators might fulfill a range of functions. They include benchmarking costs and service quality, setting service quality standards, developing tariff-setting frameworks, providing opinions on tariff determinations at the local level, and setting tariffs. It is not clear a priori which roles should be given to a national regulator (this should be determined case by case), but it would seem that the more limited the institutional capacity is at the municipal level, the greater should be the range of functions under the responsibility of the national regulator.

In the District Heat sector, regulatory responsibilities (in countries such as Latvia, Romania and Hungary) are split between national and local authorities. National or provincial power sector regulators regulate the price of heat from CHP units, while the municipal level or provincial level regulators handle the regulation of heat tariffs from heat-only-boilers and heat distribution networks. Occasionally this causes problems since the municipalities tend to set the end use tariffs below the cost of heat from CHPs. In Russia and larger CIS states, federal, provincial and municipal regulators are involved. The last regulates prices in terms of methodologies prescribed by the first two sets of bodies.

In the railway sector too, the EU accession does not require the establishment of independent regulators. In the ECA region, the railway ministry handles the responsibility for regulation in most countries except Czech Republic, Estonia, Kazakhstan, Latvia, Poland, and Slovenia, where autonomous regulatory arrangements have been established. Further, Croatia, Hungary and Russia plan to establish independent regulatory bodies. In the railway sector there is scope for private entry and competition in the freight transport business. The major focus of regulation in the sector is to ensure nondiscriminatory track access, transparent determination of track access charges and promotion of competition in that segment. Independent regulation of the sector covering all aspects could enable rail sector joint stock companies raise commercial finance without sovereign guarantees for sector investments.

In respect of power, gas[79] *and telecommunications* sectors, separate regulators or regulatory bodies (called variously as Authority, Agency, or Commission) outside the utilities and outside the Ministries

[79] The electricity and gas directives of the EU require the establishment of independent regulators to monitor nondiscriminatory transmission access and to fix or approve tariff methodologies for transmission and distribution network tariffs, and ideally to set tariff levels.

responsible for the sector have been established in most of the ECA countries, exceptions being Azerbaijan, Belarus, Serbia[80], Tajikistan, Turkmenistan and Uzbekistan. In larger CIS countries such as Russia and Ukraine, there were also Regional Energy Commissions for the constituent oblasts or republics in addition to the National level Energy Commission. In 2003-2004, Russian Federal Energy Commission was abolished and Federal Tariff Service was created as a subordinate agency of the government with a very limited tariff setting role.[81] In Kyrgyz Republic, State Energy Agency and State Communication Agency have been abolished and the work had been transferred to the Anti-Monopoly Committee.

The regulatory arrangements in 28 countries have been reviewed in terms of six key dimensions: (a) whether they are separate and not a part of the ministry or the utility; (b) whether the regulators are being given fixed tenures; (c) whether the regulatory bodies are being funded from industry levies; (d) whether they have been delegated with full tariff setting power; (e) whether the regulatory bodies adopt transparent procedures; and (f) whether there are redress provisions for parties aggrieved by regulatory decisions. The results are summarized in table 8.1.

Table 8.1: Power Sector Regulatory Bodies in the ECA Region (2004)

Country	Separate regulator	Fixed-term appointment	Industry funding	Full tariff-setting power	Transparency	Redress
Turkey	Y	Y	Y		Y	Y
Slovak Republic	Y	Y		Y	Y	Y
Slovenia	Y	Y	Y	Y	Y	Y
Czech Republic	Y	Y			Y	Y
Hungary	Y				Y	Y
Croatia	Y	Y	Y		Y	Y
Lithuania	Y	Y	Y	Y	Y	Y
Poland	Y	Y	Y	Y	Y	Y
Romania	Y	Y	Y		Y	Y
Albania	Y	Y	Y	Y	Y	Y
Bulgaria	Y	Y	Y		Y	Y
Latvia	Y	Y	Y	Y	Y	Y
Bosnia and Herzegovina	Y	Y	Y	Y	Y	Y
Estonia	Y			Y		
Moldova	Y	Y	Y	Y	Y	Y
Macedonia, FYR	Y	Y	Y	Y	Y	Y
Montenegro	Y	Y	Y	Y	Y	Y
Serbia						
Belarus						
Armenia	Y			Y	Y	Y
Ukraine	Y	Y		Y	Y	Y
Kazakhstan	Y			Y	Y	Y
Georgia	Y	Y	Y	Y	Y	Y
Azerbaijan	Y					Y
Russian Federation	Y			Y		Y
Kyrgyz Republic	Y			Y	Y	Y
Uzbekistan	Y					
Tajikistan						
Turkmenistan						

Source: World Bank Internal documents; CEER 2004; USAID 2003

[80] A separate Regulatory Authority is planned in Serbia on the basis of a law enacted in 2004.

[81] This seems to indicate a reversal of the earlier policy of independent regulation. This may have implications for other CIS states, many of which tend to follow Russian example. The entries in Table 8.1 represent the situation before the change.

The above table gives the impression of substantial progress towards the creation of independent regulatory organizations in the region. The actual state on ground is less sanguine. A special survey carried out by EBRD in 2004 indicates that 70% of telecom regulators and 50% of the electricity regulators were not allowed to serve out their full term. Line ministries responsible for infrastructure sectors were reluctant to delegate responsibilities to the regulatory bodies, many of which actually continued to report to the line ministries. In more than 30% of the cases, regulatory decisions were reversed by the governments through decrees. In actual practice prior formal or informal government approval was needed in most countries[82] for key tariff decisions especially when it related to residential consumers. In Bulgaria and Romania the tariff methodology must be approved by the government. The situation on the whole is better in CEE and many SEE states. Some of the smaller CIS states such as Armenia and Moldova also did well on this score.

The regulatory bodies remain subject to possible political influence and "capture" by the state owned utilities or by the influential private investors. Protection against such developments lie in the direction of laying emphasis on the requirements of transparency and accountability such as the need to: (a) hear all affected parties, (b) record full reasons for the decisions, (c) publish all rules, regulations and decisions, and (d) publish well documented annual reports. Procedures of redress by way of appeal to courts or recourse to international arbitration could help (see Box 8.3). These practices are becoming more widespread encouraged by the association of energy regulators in the region and the maintenance of frequently updated websites by the regulatory bodies.

Ensuring independence of regulators is a long term process. As one chairman of the Regional Energy Regulatory Commission in Russia put it, ultimately only God is truly independent and the mortals can only struggle towards it. It is a function of political development and social values. Meanwhile the region is focusing on creating the conditions under which such independence could evolve. Regulation by nature is subject to some political control and influence. Regulators are appointed by a political institution and operate within the legal and policy framework. Thus independence of regulators is a matter of degree. Some amount of political control is unavoidable, and may occasionally even be desirable from the point of view of potential danger of regulatory capture. Thus independence has to be circumscribed by accountability.[83]

Emerging lessons in the region include: (1) the need to incorporate in the Regulatory law the principles of tariff setting; (2) the need to detail the tariff policy in terms of the principles in the subordinate legislation (the rules framed under the law); (3) the need to outline (in the initial regulatory order to be issued by the regulatory body) the actual tariff methodology in line with the tariff principles and policy; (4) the need to follow the three in all the tariff determinations by the regulatory body on the basis of giving equal opportunity to all relevant stakeholders to present their points of view; (5) the need for the regulator to record in writing clearly the reasons for its decision; and (6) the need to embed in all privatization or concession contracts the tariff principles, policy and the actual methodology to minimize contract disputes. Essentially the role of the regulatory body is one of implementer of the law and the policy. This kind of approach would minimize the regulatory risk for potential investors. It would also help the state owned commercially operated utilities access commercial finance for its investments. Often in the absence of regulatory institutions, the concession or privatization contracts have been concluded embedding in them multi-year tariff regimes and the associated investment obligations and efficiency upgrades. While this may be the practical solution in respect many municipal services which are not parts of national networks (such as water supply and sanitation systems, district heat networks or even isolated small power systems covering remote areas), it may not be the best method in respect of nationally networked sectors like power or gas. In respect of such sectors this approach often creates problems of

[82] For example, Russia, Ukraine, Georgia, Croatia, Czech Republic, and Hungary.
[83] *Coming in From the Cold*, IEA, Paris 2004

consistency of practice across the sector and complicates the creation of sector wide regulatory approaches later on. Further, experience all over the world suggests that such contracts always lead to contract disputes and renegotiation as it is impossible to foresee (at the stage of contracting) developments during the life of the concession.[84]

Box 8.3: Power sector regulation in Kazakhstan and Moldova. Usefulness of the Arbitration Clause

Starting in 1996 Kazakhstan began radical reform of the power industry and made more early progress than any other CIS country. Power generation, transmission, and distribution were unbundled, the private sector introduced in some areas, and the market for large users (including distribution companies) liberalized.

The regulator for the power sector was separate from any ministry but subject to a high degree of political influence. The legal basis for tariff setting was vague, with primary legislation stating only that prices should cover (undefined) costs and possibly allow a profit to be made. As a result disputes invariably occurred at each quarterly tariff review.

The methodology used by the regulator allowed a profit of 10–30 percent margin on revenue. Though technical losses were set equal to an industry norm, no allowance was made for non-payment, though it was extensive. Various categories of cost incurred by regulated companies (such as insurance payments) were not allowed to be passed through. Though the tariff methodology was embedded in the contract, the allowance for nonpayment problem was not made clear. Such nonpayment being as high as 25%, a contract dispute arose between the regulator and the private investor.

In these circumstances the private sector operator found it difficult to sustain businesses and *sought recourse to international arbitration, as allowed under the privatization contract.* In the event no arbitration took place. The government settled the claim by granting to the company a compensation of $100 million on exiting its investment in 2000. The assets reverted to public ownership.

The power sector in Moldova during the 1990s suffered poor cash collections (about 25 percent) and commercial losses (largely caused by illegal connections and tampering with meters) of about 25 percent. This situation was not sustainable, particularly given Moldova's dependence on imported energy and its tight fiscal constraints. As a result external arrears grew and supplies were interrupted.

In response, an industry restructuring and privatization program was undertaken to improve payments discipline. An independent regulator was set up in 1997, an energy law passed in 1998, and privatization commenced in 1999. In February 2000 three distribution companies were sold to a strategic investor in a difficult country investment climate, and payments discipline has subsequently been improved.

Of particular interest in Moldova is the regulatory framework for power distribution companies, which provides both incentives for efficient performance and security for investors. *The tariff-setting mechanism is enforceable outside Moldova through potential recourse to international arbitration.* The basis for any potential judgment is provided by a well specified set of rules under which tariffs are set on a seven-year forward-looking basis, with cost pass-through of real exchange rate movements and allowance for technical and commercial losses. The rules also provide incentives for reducing costs and improving payments discipline.

One clause in the tariff methodology stated that base values for operating costs and for losses would be reviewed after one year. This was initially problematic, with disputes between the regulator and the company over both these variables, though subsequently a resolution satisfactory to both parties was agreed *and recourse to arbitration was avoided.*

Cost of service regulation is the most widely used tariff methodology in the region in the electricity, gas, water, heat and railway sectors. Tariffs are set annually to enable revenues to match allowed costs and profit margin. Incentive or price cap methodologies are being used in Bulgaria and Romania (water and power), Czech Republic and Estonia (water) and, Hungary, Lithuania, FYR of Macedonia, Moldova, Slovakia and Ukraine (power). Under the incentive regulation, tariffs are set over a number of years (usually five years) to equalize the present value of forecast revenues and costs. Once the tariffs are set,

[84] Guasch,J.L (2004)

the incentive for the regulated company is to outperform the forecasts—by reducing costs, reducing losses, increasing collections, and generating extra demand or revenue. The extra profits thus made, often referred to as efficiency gains, are retained by the investor. At the time of the next tariff revision, these gains are passed on to the consumer in the form of lower prices.

Price caps may be attractive in the ECA region, as it provides scope for easing the affordability burden. Transaction costs are also lower compared to cost of service regulation. Cost of service regulation calls for more detailed and more frequent scrutiny of possibly inflated costs and imposes great burdens on the small pool of qualified regulatory staff and their small budgets. However, there are legitimate concerns that under the price cap methodology, the investors might be prone to invest less than provided for in tariff estimates and make excess profits. This risk is generally handled by providing for downward adjustment of the tariffs in proportion to the under-spending.

While clearly price regulation in the monopolistic segments of the sector is a major responsibility of regulatory bodies, their other responsibilities are equally important. They include enforcement of the quality and reliability of supply, adjudication of disputes among the various stakeholders in the sector, enforcement of investment obligations, enforcement of grid code, and oversight of the orderly functioning of the market.
As the markets are liberalized, the focus of the regulation will shift more towards maintaining conditions conducive to competition, enforcing transmission and network access, discouraging anti-competitive behavior, and prevention of accumulation of excessive market power. It will also have to focus on the rights of captive consumers and enforce public supply obligations, in accordance with law.

Governance

Public enterprise reform and improvements in corporate governance are the key essential set of steps needed to make the state owned service providing entities function efficiently and meet the demands of their mission. Combined with the pricing and payment discipline approach discussed above, they would pave the way for their financial sustainability. They would also reduce considerably sector and institution related risks for potential investors, should they become candidates for privatization. Such public enterprise reform steps include:

- Transferring ownership of assets and responsibility for their operation and provision of service from the government ministry to a joint stock corporation under the company law and imposing it “hard budget constraints” Hard budget constraints imply that the entity would no longer get routine transfers from the state budget to meet its expenses in excess of its revenues and that it is obliged to pay its taxes and debt service payments to the government according to law or the borrowing agreements, and be current on all its payables to others. While corporatization had been extensive in almost all countries of the region, conformity to hard budget constraint varies across countries and sectors.
- Deciding on the sector and market structure on along term basis for efficient and where possible (nationally or internationally) competitive provision of services is the next step. In the electricity, gas and heat sectors these decisions had been taken (not always correctly) in most countries. In other sectors especially in railways this is an ongoing process. Further steps involve creating business units within the corporate entity along the lines of the decided sector/market structure, making them transact with one another on the basis of internal contracts, and based on such experience convert the business units into subsidiary companies and later into separate independent companies.
- Carrying out accounting and financial reforms involving (a) adoption of a commercial set of accounts (with double entry book keeping and accrual accounting) conforming to the regulatory requirements, the needs of national accounting standards and disclosure requirements of the security exchange commissions and lending institutions, (b) introduction of a meaningful internal audit function to

improve internal controls and curb unauthorized or corrupt practices and for an independent external audit, (c) introduction of modern Management Information Systems, which enable the flow of all relevant information to managers to make key decisions correctly, and (d) changing over to International Accounting Standards or the International Financial Reporting Standards consistent with the national program in this regard and to external audits based on such standards by international auditors (Box 8.4).

Three other areas of enterprise reform are worth mentioning. First is the approach to the Board of Directors (called the Supervisory Boards in the region as opposed to the executive boards consisting exclusively of the company's top executives). Compact boards with a minimum of government representatives (usually representing the government ministry responsible for state property and or the ministry of finance) and two or three reputed business leaders in manufacturing, banking and law and the Chief executive of the company—all with fixed tenures seems to work best. Once the Boards are constituted, the governments have to learn to let them run the business and intervene only in its capacity as a shareholder in respect of matters reserved for consideration in the annual shareholders meeting. This had not been easy in any part of the world, but progress is being made in the region especially in cases where there is some notable minority shareholding by institutional and individual shareholders.

Second, the practice of annual performance contracts between the government and the company providing for specific annual goals and for some incentive bonuses above the normal salaries for better performance and more importantly for sanctions (by way of demotion, reassignment, or removal from service)for nonperformance is generally believed to be effective. RAO UES of Russia had achieved remarkable performance enhancements in its 72 regional electricity companies by removing or reassigning chief executives who did not achieve the agreed target for collection improvements and replacing them by young and competent ones. Such performance contracts could aim at achieving benchmarked levels of performance and quality standards, graduated over a few years.

Third, focus on improvement of labor productivity and labor restructuring seem to be of significance, since as departments of government, these entities are usually overstaffed and suffer from low levels of labor productivity. Key elements in this include:

- A freeze on routine hiring of new personnel even for the vacancies caused by death, resignation, retirement or separation of existing personnel and adoption of a standard retirement age for all personnel.
- Provision of a reasonable severance package for early retirements
- Retraining programs and use of laid off staff in small companies which get outsourced work on contract
- Assistance for relocation and support to community activities which can absorb the retrenched labor.

Russia and Ukraine seem to have used these methods fairly effectively. In Poland, Hungary and other CEE states privatization became relatively smoother on account the lot of groundwork done in this regard. The success in the railways sector in Russia and several countries in the region in this regard is notable.

Transparency

In most SEE and CIS countries the entities use national accounting standards and provide translations into IAS format for meeting the needs of international lenders and investors. Changing over from this to IFRS could only be in the medium term and IFIs could play a helpful role in this through their technical assistance mechanisms.

Box 8.4: The transition to IFRS in Transition Countries

An important element in effective management of both public and private enterprises is the use good management information systems based on accounting systems that are capable of providing an accurate and transparent record of financial performance. Acceptable books of accounts are essential if enterprises are to secure access to financing on reasonable terms. They are also an important element in assuring good governance of the enterprise.

The European Union has mandated that the publicly listed companies in its member countries must change over to International Financing Reporting Standards (IFRS) by January 1, 2006. The World Bank believes that enterprises in the countries of its ECA region would do well to adopt IFRS for their financial reporting. It is expected that gradually there would be convergence between IFRS and the Generally Accepted Accounting Standards of USA (GAAP). In areas where the IFRS does not as yet provide guidelines (such as a number of aspects relating to the accounting for oil and gas industry operations) the enterprises may have to use US GAAP to supplement IFRS.

IFRS is a relatively new development and only the four large accounting firms in the world have the expertise to introduce the system. The demand for accounting services to switch over to IFRS in Western Europe combined with increasing demands placed on the accounting profession in USA as a result of the Sarbanes/Oxley Act could lead to a shortage of expertise to support the implementation of the IFRS in the ECA countries. Further even for migrating from International Accounting Standards (IAS) or other systems conforming to good international practice period of one year provided in the EU may not be sufficient. To migrate from the national accounting standards of many ECA countries to IFRS could take as long as five years, since the large four accounting firms have not developed procedures for such migration as they have done for systems using IAS.

In this context the IFIs could help in developing an implementation program for migration from national systems to IFRS through a set of pilot programs. Meanwhile consistent use of national standards and translation of accounting statements into IAS would have to be continued.

In most of the CIS and SEE countries, there is an air of secrecy relating to the release of operational data by the public sector entities and, when released, are often inexplicably inconsistent. This lack of transparency in disclosure is not conducive to the efficient functioning of the entities as the supervisory authorities and external reviewers would not be able to meaningfully judge performance and prescribe remedial action. It may also be a breeding ground for corrupt and undesirable behavior on the part of staff and executives and the misuse of entities by the governments to further their individual and political agenda running counter to the commercial and public policy interests of the entities. High standards of transparency and disclosure are the corner stone in the foundation of good governance. It makes the entities as well as government (which owns them) accountable to the public and all other stakeholders. The public sector entities should be obliged to adopt transparency and provide periodically consistent set of correct data with explanations for variations (Box 8.5).

According to the OECD Guidelines on the Corporate Governance of SOEs, “the state should act as an informed and active owner and establish a clear and consistent ownership policy, ensuring that the governance of SOEs is carried out in a transparent and accountable manner. Large or listed SOEs should disclose financial and non-financial information according to the international best practice”. At the request of OECD, Standard and Poor’s carried out in 2005 a survey of transparency and disclosure of 11 large companies with substantial state ownership in Russia. It showed that the Russian state owned companies scored an average of 47% (meaning disclosure of 47% of the possible disclosure items) compared to a score of 52% for the 10 largest listed Russian private companies and a score of 63% for comparative peer group from Western Europe and North America. This indicates the progress so far achieved and further room for improvement in transparency.[85] The survey seems to indicate that qualitatively the disclosure lapses could be even more worrisome.

[85] Standard & Poor’s, Transparency and Disclosure by Russian SOEs, June 2005

Box 8.5:Transparency Requirements for State Owned Utilities

Disclosure Requirements to the General Public:
Minimum requirements are those that pertain to a publicly quoted utility:

- Annual financial statements (which should be prepared in accordance with international accounting standards) for the consolidated operation and its major business units.
- Quarterly interim financial statements.
- Statistics on all aspects of operating performance.

Disclosure to the Government:
The Government has a valid basis for seeking disclosure of any information it requires to ensure that these State owned assets are being efficiently managed.

Disclosure to Lenders:

- Detailed financial information (including, ideally, accounting statements audited in accordance with international accounting standards).
- Project specifics (in the case of project financing).

Disclosure to the Regulatory Authority:
Information required by the Regulator to make a determination of the appropriate course of action associated with any regulated activity such as tariffs, transmission/track or network access and compliance with service standards, licensing conditions, anti-competitive behavior, compliance with operational codes and the like. They would include:

- Detailed accounts
- Operating costs
- Actual and projected capital costs
- Administrative and general costs
- Borrowing costs
- Customer data
- Physical data
- Quality of service indicators
- Any other data deemed pertinent to the decision making process*

*Confidential information may be requested by the Regulator, but may not be disclosed by it.

Source: Azerbaijan: Issues and Options associated with Energy Sector Reform, World Bank, March 2005

The road to success

Through a combination of enforcement of payment discipline, implementation of the program of tariff adjustments towards cost recovery, institution of regulatory arrangements and pursuit of enterprise reform, the public enterprises would be enabled to move towards financial viability. Their objective would be to generate internal cash adequate to meet all cash operational expenses including taxes, all debt service and contribute at least 35% to 40% of the capital cost of the urgently needed capital investments for asset rehabilitation or replacement. At this point they could hope to borrow from the debt market the remaining funds required for capital projects on the strength of their balance sheets, initially with sovereign guarantee and later without it. Once the entity reaches this stage, it can sustain its operations in the future. It can afford to wait for any length of time for business cycles to turn and investors to become interested in it. As long as it is run well and prudently it can even hope to issue IPOs in the domestic market and hope to use the proceeds for system expansions. In these stages the entities become subject to thorough external scrutiny by domestic and international lenders, and by the international rating agencies. Securing better ratings from them becomes a major motivating factor for performance enhancement.

Many countries in CEE followed such a classic route for enterprise reform and further towards privatization, securing attractive privatization receipts, ensuring orderly delivery of quality services to their people, and attracting high quality investors who have contributed for further efficiency enhancements. The experience of Bulgaria and Hungary are noteworthy. Among the FSU states

Lithuania's experience in this regard had also been well documented. Among the CIS countries Armenia went about reforming its energy enterprises in a patient manner making full use of the interlude in which there was a loss of interest in the region by the western investors.

A number of other countries which considered privatization as a panacea for all its ills and jumped towards privatization of their infrastructure assets without going through the right sequence of reform (involving restoration of payment discipline, cost recovering tariffs, transparent regulation, and enterprise reform) faced serious difficulties including low privatization receipts, disputes with investors on tariffs, disinvestments, deterioration of service quality and a loss of several years before some normalcy could be restored to sector operation.

At the end, we can do no better than quoting a contemporary French economist who said, "Because private involvement in infrastructure projects is potentially a great source of savings, some people see privatization as a panacea. Particularly so, when facing a corrupt and inefficient government. But in reality private provision is never pure and always involve (and should involve) a dose of public decision and control. The efficiency of the private sector is contingent upon the form and magnitude of this public control. Unfortunately, governments unable to deliver efficiently public services are also governments unable to control efficiently private enterprises contracted to do it. And these governments are even more unable to create the independent bodies or regulation agencies needed to arbitrate disputes between public and private. The sad and the well known paradox is that usually the countries that would most need a large dose of privatization are also the countries least equipped to inject it properly. Conversely, the countries that are most able to conduct and oversee a privatization process are also those where this process is least needed. *Privatization of infrastructure therefore should not be seen as a panacea. It is a desirable goal, at the end of a long and arduous road.*"[86]

[86] Rene Prud'homme, *Infrastructure and Development*, Annual Bank Conference on Development Economics, Washington, May 2004.

Annex 1. BEEPS surveys and infrastructure

The World Bank and EBRD have jointly conducted the Business Environment and Enterprise Performance Surveys (BEEPS) in 1999, 2002 and 2005 covering most of the countries in the ECA region. These surveys cover a wide range of businesses. The 1999 survey covered 3,000 enterprises in 20 countries. The 2002 survey covered 6,100 enterprises in 26 countries, and the 2005 survey covered 9,500 enterprises in 27 countries. Turkmenistan is the only country not covered.

Survey had a wide range of questions for the respondents and only a few were relevant to the infrastructure. The raw survey data relating to 2002 and 2005 surveys was analyzed using the Stata SE8 program and results relating to each country, each sub-region and the ECA region compiled into convenient tables, which are given as a part of this annex for ready use. The average for each country is the average of responses from firms in that country. The averages for the sub-region and region are also the averages of responses received from the firms of the sub-region or the region. No attempt was made to calculate population-weighted averages. Enterprises who did not respond were ignored. The analysis was carried out by Sanjay Sinha, while the raw survey data and explanatory help were provided by James Anderson. Their help is gratefully acknowledged. This annex contains the following tables:

2002 Survey
1. Power Outages and Surges from the Electricity Grid- Number of days
2. Insufficient or Intermittent Water Supply- Number of days
3. Unavailable Telephone Services- Number of days
4. Unofficial Payments for Water and Electricity Services
5. Number of days of waiting for Electricity Connection
6. Number of days of waiting for Telephone connection

2005 Survey
1. Power Outages and Surges: frequency (days), duration (hours) and consequent loss of sales as a percentage of annual sales
2. Insufficient or Intermittent water supply: frequency (days), duration (hours) and consequent loss of sales as a percentage of annual sales
3. Unavailable telephone service: frequency (days), duration (hours) and consequent loss of sales as a percentage of annual sales
4. Unofficial payments/gifts for electricity and water services.
5. Number of days of waiting for electricity connection
6. Number of days of waiting for telephone connection

2002 and 2005 Surveys Comparative Tables
1. How problematic was *electricity service* for the operation and growth of business?
2. How problematic was *transport service* for the operation and growth of business?
3. How problematic was *telephone service* for the operation and growth of business?
4. How problematic was *regulatory uncertainty* for the operation and growth of business?

1. Power Outages and Surges from the Electricity Grid- Number of days in 2002

Region	Country	Rural	Urban	Rural and Urban
Baltics	Estonia	3.6	3.8	3.8
	Latvia	2.6	2.8	2.7
	Lithuania	1.8	1.3	1.4
Baltics Average		**2.5**	**2.6**	**2.6**
CEE	Czech	3.0	1.6	2.2
	Hungary	2.9	2.9	2.9
	Poland	4.2	1.6	2.2
	Slovakia	5.2	2.0	2.6
	Slovenia	2.8	1.0	2.0
CEE Average		**3.4**	**1.9**	**2.3**
CIS - Central	Belarus	2.0	1.1	1.2
	Kazakhstan	19.2	9.0	10.5
	Russia	6.8	5.4	5.6
	Ukraine	18.3	7.5	9.4
CIS - Central Average		**11.8**	**5.9**	**6.9**
CIS-7	Armenia	4.9	4.4	4.5
	Azerbaijan	161.2	44.3	61.5
	Georgia	97.6	56.6	63.2
	Kyrgyzstan	54.3	15.9	26.7
	Moldova	23.9	3.5	10.7
	Tajikistan	73.1	28.0	38.2
	Uzbekistan	34.4	15.7	21.8
CIS-7 Average		**51.5**	**24.9**	**31.7**
SEE	Albania	53.9	46.1	47.5
	Bosnia	6.0	4.2	4.5
	Bulgaria	7.8	4.3	5.6
	Croatia	4.0	2.8	3.3
	FYROM	10.7	5.5	6.5
	Montenegro	12.0	9.9	10.3
	Romania	10.0	5.9	7.2
	Serbia	12.0	9.9	10.3
SEE Average		**11.5**	**11.1**	**11.2**
Turkey	Turkey	3.4	2.5	2.7
Turkey Average		**3.4**	**2.5**	**2.7**
ECA Average		**16.0**	**9.4**	**11.0**

2. Insufficient or Intermittent Water Supply- Number of days in 2002

Region	Country	Rural	Urban	Rural and Urban
Baltics	Estonia	1.2	1.4	1.4
	Latvia	1.9	1.4	1.6
	Lithuania	0.9	0.5	0.6
Baltics Average		**1.3**	**1.1**	**1.2**
CEE	Czech	0.8	0.8	0.8
	Hungary	0.9	0.8	0.8
	Poland	0.8	0.4	0.5
	Slovakia	0.0	0.7	0.6
	Slovenia	0.5	0.1	0.3
CEE Average		**0.7**	**0.6**	**0.6**
CIS - Central	Belarus	0.3	2.4	2.1
	Kazakhstan	11.6	2.8	4.1
	Russia	9.4	6.7	7.2
	Ukraine	32.7	29.0	29.6
CIS - Central Average		**15.8**	**12.3**	**12.9**
CIS-7	Armenia	16.5	29.8	26.7
	Azerbaijan	40.9	7.0	11.6
	Georgia	46.6	28.6	31.5
	Kyrgyzstan	21.7	3.1	8.3
	Moldova	81.2	3.2	31.0
	Tajikistan	34.6	26.2	28.1
	Uzbekistan	48.8	17.7	28.1
CIS-7 Average		**44.7**	**17.0**	**24.0**
SEE	Albania	9.9	17.3	15.9
	Bosnia	3.0	2.9	2.9
	Bulgaria	7.3	4.2	5.4
	Croatia	1.1	0.5	0.8
	Macedonia	9.4	8.5	8.7
	Montenegro	6.9	2.3	3.2
	Romania	23.9	4.4	10.6
	Serbia	6.9	2.3	3.2
SEE Average		**9.6**	**5.2**	**6.4**
Turkey	Turkey	0.6	1.0	0.9
Turkey Average		**0.6**	**1.0**	**0.9**
ECA Average		**13.7**	**7.7**	**9.2**

3. Unavailable Telephone Services- Number of days in 2002

Region	Country	Rural	Urban	Rural and Urban
Baltics	Estonia	2.4	1.8	1.9
	Latvia	0.7	0.8	0.8
	Lithuania	1.1	1.5	1.4
Baltics Average		**1.3**	**1.4**	**1.4**
CEE	Czech	0.9	0.8	0.8
	Hungary	1.2	1.7	1.6
	Poland	1.6	1.4	1.4
	Slovakia	0.7	1.6	1.4
	Slovenia	0.7	1.6	1.1
CEE Average		**1.1**	**1.4**	**1.3**
CIS - Central	Belarus	3.7	1.4	1.8
	Kazakhstan	17.8	3.6	5.6
	Russia	23.8	4.5	7.8
	Ukraine	4.1	0.8	3.4
CIS - Central Average		**13.2**	**3.4**	**5.0**
CIS-7	Armenia	10.7	7.1	7.9
	Azerbaijan	0.2	3.7	3.2
	Georgia	13.6	13.9	13.9
	Kyrgyzstan	24.5	12.5	15.9
	Moldova	2.7	1.2	1.7
	Tajikistan	62.3	37.9	43.4
	Uzbekistan	37.1	3.3	23.6
CIS-7 Average		**23.5**	**13.6**	**16.1**
SEE	Albania	6.7	9.2	8.8
	Bosnia	2.7	4.8	4.4
	Bulgaria	1.6	1.8	1.7
	Croatia	1.3	1.1	1.2
	Macedonia	3.2	3.3	3.3
	Montenegro	14.3	13.1	13.3
	Romania	1.8	2.1	2.0
	Serbia	14.3	13.1	13.3
SEE Average		**3.7**	**5.4**	**5.0**
Turkey	Turkey	0.8	17.0	0.8
Turkey Average		**0.8**	**0.8**	**0.8**
ECA Average		**7.9**	**5.0**	**5.8**

4. Unofficial Payments for Water and Electricity Services

Unoffical Payments/gifts for electricity and water services in 2002

Region	Country	Never	Seldom	Sometimes	Frequently	Usually	Always
Baltics	Estonia	84%	9%	5%	1%	1%	1%
	Latvia	87%	8%	4%	0%	1%	1%
	Lithuania	93%	4%	3%	0%	0%	1%
Baltics Average		**89%**	**6%**	**4%**	**0%**	**0%**	**1%**
CEE	Czech	78%	10%	6%	2%	1%	2%
	Hungary	76%	14%	5%	4%	0%	1%
	Poland	84%	10%	3%	1%	1%	1%
	Slovakia	83%	10%	4%	2%	1%	0%
	Slovenia	81%	11%	7%	1%	0%	0%
CEE Average		**77%**	**12%**	**6%**	**3%**	**1%**	**1%**
CIS - Central	Belarus	81%	11%	5%	2%	1%	1%
	Kazakhstan	74%	12%	9%	2%	1%	1%
	Russia	64%	16%	11%	5%	3%	1%
	Ukraine	68%	16%	8%	4%	3%	2%
CIS - Central Average		**70%**	**14%**	**9%**	**4%**	**2%**	**1%**
CIS-7	Armenia	90%	4%	4%	0%	2%	0%
	Azerbaijan	64%	9%	17%	7%	1%	2%
	Georgia	61%	18%	10%	9%	2%	0%
	Kyrgyzstan	61%	18%	12%	4%	3%	2%
	Moldova	62%	28%	8%	1%	1%	1%
	Tajikistan	35%	29%	16%	8%	9%	2%
	Uzbekistan	78%	11%	6%	3%	0%	1%
CIS-7 Average		**65%**	**16%**	**10%**	**4%**	**3%**	**1%**
SEE	Albania	29%	36%	21%	9%	4%	1%
	BiH	48%	19%	17%	13%	1%	1%
	Bulgaria	67%	13%	10%	5%	5%	0%
	Croatia	69%	17%	10%	3%	0%	0%
	FYROM	57%	28%	9%	4%	1%	1%
	Romania	75%	13%	8%	2%	2%	0%
SEE Average		**60%**	**20%**	**12%**	**6%**	**2%**	**1%**
Turkey	Turkey	57%	16%	15%	9%	3%	1%
Turkey Average		**57%**	**16%**	**15%**	**9%**	**3%**	**1%**
ECA Average		**69%**	**15%**	**9%**	**4%**	**2%**	**1%**

5. Number of days of waiting for Electricity Connection

Region	Country	National 2002
Baltics	Estonia	1.8
	Latvia	1.7
	Lithuania	1.1
Baltics Average		**1.5**
CEE	Czech	0.1
	Hungary	3.9
	Poland	5.3
	Slovakia	2.9
	Slovenia	3.3
CEE Average		**3.5**
CIS - Central	Belarus	9.6
	Kazakhstan	2.5
	Russia	5.9
	Ukraine	9.2
CIS - Central Average		**6.2**
CIS-7	Armenia	1.4
	Azerbaijan	4.4
	Georgia	1.0
	Kyrgyzstan	4.1
	Moldova	6.2
	Tajikistan	11.5
	Uzbekistan	5.7
CIS-7 Average		**5.0**
SEE	Albania	10.8
	Bosnia	1.0
	Bulgaria	3.5
	Croatia	0.6
	Romania	4.4
	Serbia	3.1
SEE Average		**3.7**
Turkey	Turkey	0.9
Turkey Average		**0.9**
ECA Average		**3.9**

6. Number of days of waiting for Telephone connection

Region	Country	National 2002
Baltics	Estonia	2.4
	Latvia	2.2
	Lithuania	8.2
Baltics Average		**2.5**
CEE	Czech	1.9
	Hungary	6.0
	Poland	7.6
	Slovakia	2.9
	Slovenia	7.8
CEE Average		**5.4**
CIS - Central	Belarus	59.9
	Kazakhstan	21.1
	Russia	14.4
	Ukraine	13.8
CIS - Central Average		**14.9**
CIS-7	Armenia	59.9
	Azerbaijan	21.1
	Georgia	14.4
	Kyrgyzstan	13.8
	Moldova	7.8
	Tajikistan	17.4
	Uzbekistan	8.9
CIS-7 Average		**10.2**
SEE	Albania	18.1
	Bosnia	1.9
	Bulgaria	20.1
	Croatia	5.0
	FYROM	8.9
	Romania	6.0
	Serbia	29.7
SEE Average		**13.4**
Turkey	Turkey	1.5
Turkey Average		**1.5**
ECA Average		**9.4**

1. 2005 Survey: Power Outages and Surges: frequency (days), duration (hours) and consequent loss of sales as a percentage of annual sales

Power outages or surges from the public grid. No. of days in past 12 months

Region	Country	Rural	Urban	Rural and Urban
Baltics	Estonia	3.1	1.3	1.8
	Latvia	2.4	1.2	1.6
	Lithuania	1.8	0.8	1.1
Baltics Average		**2.4**	**1.1**	**1.5**
CEE	Czech	0.5	0.3	0.4
	Hungary	2.5	2.1	2.2
	Poland	1.4	0.9	1.0
	Slovakia	0.3	0.3	0.3
	Slovenia	1.6	0.7	1.2
CEE Average		**1.4**	**1.0**	**1.1**
CIS - Ce	Belarus	2.7	2.5	2.5
	Kazakhstan	13.9	5.7	6.7
	Russia	5.6	3.2	3.5
	Ukraine	2.5	5.0	4.7
CIS - Central Averag		**6.4**	**4.3**	**4.6**
CIS-7	Armenia	2.8	1.6	1.9
	Azerbaijan	78.4	10.6	16.0
	Georgia	110.6	45.9	56.9
	Kyrgyzstan	25.5	10.0	14.4
	Moldova	2.9	1.8	2.1
	Tajikistan	42.3	35.0	36.6
	Uzbekistan	6.0	9.0	8.0
CIS-7 Average		**22.8**	**13.8**	**15.9**
SEE	Albania	182.4	197.5	194.2
	Bosnia	4.5	1.7	2.2
	Bulgaria	5.8	5.2	5.4
	Croatia	3.1	1.4	2.1
	FYROM	8.7	2.9	3.9
	Montenegro	6.7	2.5	4.8
	Romania	5.3	4.2	4.5
	Serbia	7.3	3.2	3.9
SEE Average		**20.1**	**23.8**	**22.8**
Turkey	Turkey	5.5	3.8	4.1
Turkey Average		**5.5**	**3.8**	**4.1**
ECA Average		**10.9**	**9.4**	**9.8**

Power outages or surges from the public grid. Average duration (hours/day)

Region	Country	Rural	Urban	Rural and Urban
Baltics	Estonia	5.3	3.5	4.3
	Latvia	11.8	5.9	8.1
	Lithuania	5.6	4.4	4.8
Baltics Average		**7.6**	**4.6**	**5.8**
CEE	Czech	6.0	5.3	5.7
	Hungary	3.1	3.9	3.7
	Poland	5.3	5.4	5.4
	Slovakia	8.8	6.4	6.8
	Slovenia	4.9	2.7	4.3
CEE Average		**4.7**	**4.6**	**4.6**
CIS - Ce	Belarus	7.8	4.9	5.5
	Kazakhstan	5.8	6.0	6.0
	Russia	6.3	6.2	6.2
	Ukraine	4.8	6.7	6.4
CIS - Central Averag		**6.0**	**6.1**	**6.1**
CIS-7	Armenia	7.1	5.7	6.1
	Azerbaijan	3.3	3.6	3.6
	Georgia	4.2	4.0	4.0
	Kyrgyzstan	6.2	6.8	6.6
	Moldova	4.9	8.2	7.1
	Tajikistan	8.3	6.9	7.2
	Uzbekistan	6.3	6.4	6.4
CIS-7 Average		**5.9**	**5.9**	**5.9**
SEE	Albania	3.1	4.1	3.9
	Bosnia	4.6	4.1	4.2
	Bulgaria	4.5	2.8	3.3
	Croatia	5.9	4.8	5.3
	FYROM	4.8	5.7	5.5
	Montenegro	6.5	2.5	5.2
	Romania	4.3	4.0	4.1
	Serbia	5.2	4.7	4.8
SEE Average		**4.5**	**4.1**	**4.2**
Turkey	Turkey	4.8	5.8	5.6
Turkey Average		**4.8**	**5.8**	**5.6**
ECA Average		**5.4**	**5.3**	**5.3**

Power outages or surges from the public grid. % of total sales lost

Region	Country	Rural	Urban	Rural and Urban
Baltics	Estonia	1.1	1.3	1.2
	Latvia	1.5	1.5	1.5
	Lithuania	1.2	1.6	1.4
Baltics Average		**1.3**	**1.5**	**1.4**
CEE	Czech	1.5	9.8	4.4
	Hungary	1.4	1.5	1.4
	Poland	2.0	1.8	1.8
	Slovakia	1.5	1.0	1.2
	Slovenia	1.4	1.0	1.3
CEE Average		**1.7**	**2.0**	**1.9**
CIS - Ce	Belarus	3.3	3.9	3.8
	Kazakhstan	2.2	2.5	2.5
	Russia	2.8	1.9	2.1
	Ukraine	2.1	3.2	2.9
CIS - Central Averag		**2.4**	**2.6**	**2.6**
CIS-7	Armenia	2.8	2.4	2.5
	Azerbaijan	8.3	5.4	6.3
	Georgia	19.3	8.5	10.7
	Kyrgyzstan	4.7	4.1	4.3
	Moldova	4.3	2.6	3.1
	Tajikistan	10.0	7.6	8.1
	Uzbekistan	3.7	3.1	3.2
CIS-7 Average		**7.8**	**5.6**	**6.1**
SEE	Albania	8.5	12.1	11.2
	Bosnia	1.8	2.9	2.8
	Bulgaria	1.1	1.8	1.5
	Croatia	1.9	3.1	2.4
	FYROM	1.9	2.1	2.0
	Montenegro	6.0	1.0	4.3
	Romania	2.2	2.5	2.4
	Serbia	3.2	2.3	2.5
SEE Average		**3.4**	**4.9**	**4.4**
Turkey	Turkey	2.0	2.3	2.3
Turkey Average		**2.0**	**2.3**	**2.3**
ECA Average		**4.2**	**4.1**	**4.1**

2. 2005 Survey: Insufficient or Intermittent water supply: frequency (days), duration (hours) and consequent loss of sales as a percentage of annual sales

Insufficient water supply
No. of days in past 12 months

Region	Country	Rural	Urban	Rural and Urban
Baltics	Estonia	0.2	0.2	0.2
	Latvia	1.3	0.4	0.7
	Lithuania	0.6	0.3	0.4
Baltics Average		**0.7**	**0.3**	**0.4**
CEE	Czech	0.7	0.2	0.4
	Hungary	0.4	0.5	0.5
	Poland	0.2	0.2	0.2
	Slovakia	0.0	0.2	0.2
	Slovenia	0.3	0.0	0.2
CEE Average		**0.4**	**0.2**	**0.3**
CIS - Ce	Belarus	1.3	0.9	0.9
	Kazakhstan	9.1	3.5	4.2
	Russia	10.3	1.7	3.0
	Ukraine	0.6	6.2	5.4
CIS - Central Averag		**6.1**	**3.2**	**3.6**
CIS-7	Armenia	1.3	2.6	2.3
	Azerbaijan	33.8	3.7	6.1
	Georgia	22.1	8.8	11.0
	Kyrgyzstan	10.2	1.9	4.2
	Moldova	4.2	1.3	2.3
	Tajikistan	12.7	9.1	9.9
	Uzbekistan	5.2	1.9	3.0
CIS-7 Average		**8.6**	**3.8**	**4.9**
SEE	Albania	95.1	89.1	90.5
	Bosnia	22.8	4.7	7.7
	Bulgaria	7.4	3.6	5.0
	Croatia	0.2	0.2	0.2
	FYROM	0.0	0.9	0.7
	Montenegro	1.4	0.0	0.8
	Romania	2.6	2.1	2.2
	Serbia	1.8	0.8	1.0
SEE Average		**11.1**	**9.4**	**9.9**
Turkey	Turkey	1.0	0.5	0.6
Turkey Average		**1.0**	**0.5**	**0.6**
ECA Average		**5.3**	**3.6**	**4.0**

Insufficient water supply
Average duration (hours/day)

Region	Country	Rural	Urban	Rural and Urban
Baltics	Estonia	3.2	7.3	6.2
	Latvia	10.7	9.5	10.1
	Lithuania	4.5	3.5	3.8
Baltics Average		**8.0**	**7.0**	**7.4**
CEE	Czech	4.2	8.1	7.1
	Hungary	2.9	6.6	5.8
	Poland	4.8	6.2	5.8
	Slovakia		11.7	11.7
	Slovenia	5.0	24.0	6.4
CEE Average		**4.4**	**7.2**	**6.3**
CIS - Ce	Belarus	24.0	9.5	11.2
	Kazakhstan	10.1	9.6	9.7
	Russia	6.0	8.8	8.0
	Ukraine	12.9	9.2	9.5
CIS - Central Averag		**8.9**	**9.2**	**9.2**
CIS-7	Armenia	12.7	7.6	8.6
	Azerbaijan	2.5	3.6	3.3
	Georgia	8.3	4.7	5.1
	Kyrgyzstan	8.5	11.8	10.6
	Moldova	5.4	9.9	8.2
	Tajikistan	8.0	6.4	6.6
	Uzbekistan	7.1	8.1	7.8
CIS-7 Average		**7.2**	**7.2**	**7.2**
SEE	Albania	6.7	6.4	6.4
	Bosnia	10.2	5.9	6.8
	Bulgaria	6.2	8.8	7.7
	Croatia	5.6	7.3	6.5
	FYROM	2.0	6.3	6.0
	Montenegro	5.0		5.0
	Romania	5.6	7.6	6.9
	Serbia	6.5	9.3	8.8
SEE Average		**6.1**	**7.4**	**7.0**
Turkey	Turkey	11.8	5.4	6.2
Turkey Average		**11.8**	**5.4**	**6.2**
ECA Average		**6.9**	**7.7**	**7.5**

Insufficient water supply
% of total sales lost

Region	Country	Rural	Urban	Rural and Urban
Baltics	Estonia		1.5	1.5
	Latvia	5.0	1.0	3.0
	Lithuania		2.0	2.0
Baltics Average		**5.0**	**1.5**	**2.2**
CEE	Czech		2.5	2.5
	Hungary	1.0	2.3	2.0
	Poland	2.3	2.1	2.2
	Slovakia		1.0	1.0
	Slovenia	6.5		6.5
CEE Average		**3.1**	**2.1**	**2.5**
CIS - Ce	Belarus	15.0	5.0	6.7
	Kazakhstan	2.0	2.1	2.1
	Russia	1.3	2.3	2.1
	Ukraine	1.0	2.9	2.7
CIS - Central Averag		**2.9**	**2.7**	**2.7**
CIS-7	Armenia	3.0	3.7	3.6
	Azerbaijan	3.8	3.3	3.5
	Georgia	4.3	4.6	4.6
	Kyrgyzstan	5.7	4.0	4.7
	Moldova	4.0	10.5	7.8
	Tajikistan	6.1	4.2	4.6
	Uzbekistan	5.3	3.1	3.6
CIS-7 Average		**4.8**	**4.7**	**4.7**
SEE	Albania	9.0	4.9	5.6
	Bosnia	16.0	12.1	12.8
	Bulgaria	1.0	3.1	2.5
	Croatia	2.3		2.3
	FYROM		1.2	1.2
	Montenegro	1.0		1.0
	Romania	2.1	3.3	2.9
	Serbia	2.7	1.8	1.9
SEE Average		**3.6**	**4.2**	**4.0**
Turkey	Turkey	1.0	1.0	1.0
Turkey Average		**1.0**	**1.0**	**1.0**
ECA Average		**3.9**	**3.8**	**3.9**

3. 2005 Survey: Unavailable telephone service: frequency (days), duration (hours) and consequent loss of sales as a percentage of annual sales

Unavailable mainline telephone service? No. of days in past 12 months

Region	Country	Rural	Urban	Rural and Urban
Baltics	Estonia	0.9	0.3	0.4
	Latvia	0.8	0.4	0.5
	Lithuania	0.8	0.6	0.6
Baltics Average		**0.8**	**0.4**	**0.5**
CEE	Czech	2.3	0.5	1.4
	Hungary	3.3	0.9	1.5
	Poland	0.9	0.7	0.7
	Slovakia	0.0	0.4	0.3
	Slovenia	0.9	0.6	0.8
CEE Average		**1.6**	**0.7**	**0.9**
CIS - Ce	Belarus	5.5	0.4	1.2
	Kazakhstan	1.0	3.0	2.8
	Russia	2.3	2.0	2.1
	Ukraine	4.4	2.4	2.7
CIS - Central Averag		**3.0**	**2.2**	**2.3**
CIS-7	Armenia	1.1	0.7	0.8
	Azerbaijan	0.7	0.6	0.6
	Georgia	18.7	1.7	4.6
	Kyrgyzstan	4.8	1.7	2.6
	Moldova	1.4	0.5	0.8
	Tajikistan	2.1	4.9	4.3
	Uzbekistan	3.4	4.3	4.0
CIS-7 Average		**3.5**	**1.8**	**2.2**
SEE	Albania	9.9	8.5	8.8
	Bosnia	0.4	1.1	1.0
	Bulgaria	0.9	2.8	2.1
	Croatia	0.9	0.8	0.9
	FYROM	4.5	1.0	1.6
	Montenegro	0.0	0.0	0.0
	Romania	0.9	0.6	0.7
	Serbia	15.3	1.2	3.6
SEE Average		**3.1**	**1.7**	**2.1**
Turkey	Turkey	0.1	0.3	0.3
Turkey Average		**0.1**	**0.3**	**0.3**
ECA Average		**2.4**	**1.5**	**1.7**

Unavailable mainline telephone service? Average duration (hours/day)

Region	Country	Rural	Urban	Rural and Urban
Baltics	Estonia	2.3	2.7	2.6
	Latvia	17.4	8.2	11.2
	Lithuania	5.6	4.4	4.7
Baltics Average		**8.2**	**5.2**	**6.2**
CEE	Czech	8.2	6.7	7.0
	Hungary	2.8	6.7	6.0
	Poland	9.9	10.0	10.0
	Slovakia		8.4	8.4
	Slovenia	6.3	6.9	6.5
CEE Average		**7.2**	**8.4**	**8.1**
CIS - Ce	Belarus	6.6	5.2	5.7
	Kazakhstan	5.4	8.4	8.2
	Russia	5.3	9.1	8.7
	Ukraine	10.7	10.4	10.4
CIS - Central Averag		**6.8**	**9.0**	**8.8**
CIS-7	Armenia	7.2	5.9	6.2
	Azerbaijan	1.0	4.1	3.8
	Georgia	3.0	6.8	6.2
	Kyrgyzstan	10.4	11.7	11.3
	Moldova	3.9	9.2	7.4
	Tajikistan	8.7	7.3	7.5
	Uzbekistan	8.5	10.7	10.0
CIS-7 Average		**7.1**	**7.8**	**7.6**
SEE	Albania	20.0	10.6	12.5
	Bosnia	18.0	6.8	8.1
	Bulgaria	10.8	8.7	9.3
	Croatia	6.3	5.3	5.7
	FYROM	4.5	8.5	7.7
	Montenegro			
	Romania	6.4	5.7	5.9
	Serbia	8.6	5.2	6.2
SEE Average		**9.6**	**7.3**	**7.9**
Turkey	Turkey	13.0	7.7	8.0
Turkey Average		**13.0**	**7.7**	**8.0**
ECA Average		**7.9**	**8.0**	**8.0**

Unavailable mainline telephone service? % of total sales lost

Region	Country	Rural	Urban	Rural and Urban
Baltics	Estonia	5.0		5.0
	Latvia		1.0	1.0
	Lithuania		1.0	1.0
Baltics Average		**5.0**	**1.0**	**1.8**
CEE	Czech		3.7	3.7
	Hungary		1.0	1.0
	Poland	1.5	1.6	1.6
	Slovakia		2.0	2.0
	Slovenia	1.0	1.0	1.0
CEE Average		**1.3**	**1.7**	**1.6**
CIS - Ce	Belarus	1.0		1.0
	Kazakhstan		1.2	1.2
	Russia		2.5	2.5
	Ukraine	2.0	2.1	2.1
CIS - Central Averag		**1.5**	**1.9**	**1.9**
CIS-7	Armenia		2.7	2.7
	Azerbaijan		3.0	3.0
	Georgia	1.5	1.8	1.8
	Kyrgyzstan	1.0	2.7	2.3
	Moldova			
	Tajikistan	2.3	2.0	2.0
	Uzbekistan	1.3	1.3	1.3
CIS-7 Average		**1.6**	**2.1**	**2.0**
SEE	Albania	2.0	2.8	2.7
	Bosnia		6.3	6.3
	Bulgaria	1.0	1.0	1.0
	Croatia	1.0	2.2	1.9
	FYROM	5.0	3.5	3.7
	Montenegro			
	Romania	1.7	1.7	1.7
	Serbia	6.2	1.2	2.3
SEE Average		**3.4**	**2.5**	**2.6**
Turkey	Turkey			
Turkey Average				
ECA Average		**2.4**	**2.1**	**2.1**

4. 2005 Survey: Unofficial payments/gifts for electricity and water services.

Region		Never	Seldom	Sometimes	Frequently	Usually	Always
Baltics	Rural	88%	6%	4%	1%	0%	0%
	Urban	94%	3%	2%	1%	0%	0%
Baltics Average		**92%**	**4%**	**3%**	**1%**	**0%**	**0%**
CEE	Rural	82%	8%	7%	1%	1%	0%
	Urban	83%	10%	4%	2%	1%	0%
CEE Average		**83%**	**9%**	**5%**	**2%**	**1%**	**0%**
Central CIS	Rural	74%	15%	8%	1%	2%	1%
	Urban	78%	11%	6%	2%	2%	1%
Central CIS Average		**77%**	**12%**	**6%**	**2%**	**2%**	**1%**
CIS-7	Rural	67%	14%	15%	3%	0%	2%
	Urban	66%	16%	12%	4%	1%	1%
CIS-7 Average		**66%**	**15%**	**13%**	**4%**	**1%**	**1%**
SEE	Rural	76%	11%	7%	3%	2%	1%
	Urban	69%	16%	9%	4%	1%	1%
SEE Average		**71%**	**14%**	**9%**	**4%**	**1%**	**1%**
Turkey	Rural	80%	9%	8%	1%	1%	1%
	Urban	81%	6%	6%	3%	2%	1%
Turkey Average		**81%**	**7%**	**7%**	**2%**	**2%**	**1%**
ECA Average		**76%**	**12%**	**8%**	**3%**	**1%**	**1%**

5. 2005 Survey: Number of days of waiting for electricity connection

Region	Country	Rural	Urban	Rural and Urban
Baltics	Estonia	3.1	10.5	8.4
	Latvia	37.4	24.6	31.0
	Lithuania	2.5	38.5	30.2
Baltics Average		**17.0**	**25.1**	**22.5**
CEE	Czech	5.9	13.8	11.4
	Hungary	10.9	10.0	10.2
	Poland	17.8	11.2	13.3
	Slovakia	10.6	5.0	6.0
	Slovenia	12.3	30.7	17.9
CEE Average		**12.2**	**11.7**	**11.8**
CIS - Ce	Belarus	18.8	18.8	18.8
	Kazakhstan	2.5	15.4	13.9
	Russia	11.9	16.8	16.1
	Ukraine	33.1	29.6	30.4
CIS - Central Averag		**21.4**	**21.2**	**21.2**
CIS-7	Armenia	3.0	3.1	3.1
	Azerbaijan	8.1	1.7	2.3
	Georgia		2.3	2.3
	Kyrgyzstan	12.8	14.1	13.8
	Moldova	33.5	24.7	28.8
	Tajikistan	7.2	6.5	6.6
	Uzbekistan	5.2	14.4	12.0
CIS-7 Average		**14.0**	**7.2**	**8.7**
SEE	Albania	17.3	31.0	26.6
	Bosnia	6.4	7.6	7.3
	Bulgaria	42.6	31.5	35.5
	Croatia	7.8	23.4	18.6
	Romania	20.5	24.5	23.0
	Serbia	12.5	17.6	16.8
SEE Average		**18.2**	**20.8**	**19.9**
Turkey	Turkey	7.4	5.8	6.1
Turkey Average		**7.4**	**5.8**	**6.1**
ECA Average		**14.9**	**13.3**	**13.7**

6. 2005 Survey: Number of days of waiting for telephone connection

Region	Country	National 2005
Baltics	Estonia	5.5
	Latvia	11.8
	Lithuania	6.4
Baltics Average		**8.8**
CEE	Czech	4.8
	Hungary	27.7
	Poland	14.2
	Slovakia	8.0
	Slovenia	12.2
CEE Average		**10.3**
CIS - Ce	Belarus	23.8
	Kazakhstan	17.2
	Russia	19.7
	Ukraine	35.5
CIS - Central Averag		**27.8**
CIS-7	Armenia	8.1
	Azerbaijan	2.1
	Georgia	9.0
	Kyrgyzstan	8.4
	Moldova	13.3
	Tajikistan	9.7
	Uzbekistan	17.4
CIS-7 Average		**10.0**
SEE	Albania	36.3
	Bosnia	4.9
	Bulgaria	18.0
	Croatia	9.6
	FYROM	16.0
	Romania	16.7
	Serbia	80.2
SEE Average		**25.9**
Turkey	Turkey	8.8
Turkey Average		**8.8**
ECA Average		**16.5**

1. How problematic was *electricity service* for the operation and growth of business?

Electricity 2002

Region	Country	No Obstacle	Minor Obstacle	Moderate Obstacle	Major Obstacle
Baltics	Estonia	67%	18%	5%	10%
	Latvia	81%	9%	7%	4%
	Lithuania	69%	18%	9%	5%
Baltics Average		**72%**	**15%**	**7%**	**6%**
CEE	Czech	74%	14%	6%	5%
	Hungary	85%	8%	5%	1%
	Poland	69%	16%	9%	5%
	Slovakia	71%	14%	12%	3%
	Slovenia	87%	11%	2%	1%
CEE Average		**76%**	**14%**	**7%**	**4%**
CIS - Central	Belarus	88%	6%	2%	3%
	Kazakhstan	80%	10%	6%	4%
	Russia	74%	16%	6%	5%
	Ukraine	70%	16%	8%	6%
CIS - Central Average		**76%**	**13%**	**6%**	**5%**
CIS-7	Armenia	56%	13%	15%	16%
	Azerbaijan	53%	16%	11%	20%
	Georgia	25%	25%	27%	22%
	Kyrgyzstan	62%	17%	16%	5%
	Moldova	70%	19%	7%	4%
	Tajikistan	32%	34%	20%	14%
	Uzbekistan	73%	13%	8%	6%
CIS-7 Average		**54%**	**19%**	**14%**	**12%**
SEE	Albania	9%	15%	19%	57%
	Bosnia	58%	21%	15%	6%
	Bulgaria	70%	13%	8%	8%
	Croatia	84%	10%	5%	1%
	FYROM	62%	25%	7%	5%
	Romania	62%	19%	10%	9%
	S and M	56%	24%	14%	6%
SEE Average		**58%**	**18%**	**11%**	**12%**
Turkey	Turkey	44%	25%	14%	17%
Turkey Average		**44%**	**25%**	**14%**	**17%**
ECA Average		**65%**	**17%**	**10%**	**9%**

Electricity 2005

Region	Country	No Obstacle	Minor Obstacle	Moderate Obstacle	Major Obstacle
Baltics	Estonia	79%	13%	5%	3%
	Latvia	77%	12%	6%	4%
	Lithuania	74%	14%	8%	4%
Baltics Average		**76%**	**13%**	**7%**	**4%**
CEE	Czech	57%	16%	12%	16%
	Hungary	85%	8%	6%	2%
	Poland	71%	17%	8%	4%
	Slovakia	76%	16%	5%	3%
	Slovenia	85%	11%	2%	3%
CEE Average		**74%**	**14%**	**7%**	**5%**
CIS - Central	Belarus	84%	14%	1%	1%
	Kazakhstan	75%	16%	7%	3%
	Russia	75%	14%	6%	5%
	Ukraine	77%	12%	6%	5%
CIS - Central Average		**77%**	**14%**	**5%**	**4%**
CIS-7	Armenia	59%	27%	10%	3%
	Azerbaijan	60%	19%	16%	5%
	Georgia	30%	22%	14%	34%
	Kyrgyzstan	70%	15%	11%	4%
	Moldova	67%	21%	9%	3%
	Tajikistan	38%	35%	17%	10%
	Uzbekistan	60%	22%	10%	7%
CIS-7 Average		**57%**	**23%**	**12%**	**8%**
SEE	Albania	23%	20%	23%	35%
	Bosnia	61%	15%	16%	8%
	Bulgaria	79%	9%	6%	6%
	Croatia	82%	13%	2%	2%
	FYROM	60%	16%	12%	12%
	Romania	62%	18%	12%	8%
	S and M	61%	19%	14%	5%
SEE Average		**63%**	**16%**	**12%**	**10%**
Turkey	Turkey	55%	22%	14%	9%
Turkey Average		**55%**	**22%**	**14%**	**9%**
ECA Average		**68%**	**17%**	**9%**	**6%**

2. How problematic was *transport service* for the operation and growth of business?

Transportation 2002

Region	Country	No Obstacle	Minor Obstacle	Moderate Obstacle	Major Obstacle
Baltics	Estonia	63%	22%	11%	4%
	Latvia	74%	16%	7%	3%
	Lithuania	78%	15%	6%	3%
Baltics Average		**72%**	**17%**	**8%**	**3%**
CEE	Czech	63%	22%	12%	2%
	Hungary	69%	20%	7%	4%
	Poland	67%	19%	9%	6%
	Slovakia	59%	24%	11%	6%
	Slovenia	85%	10%	4%	0%
CEE Average		**68%**	**19%**	**9%**	**4%**
CIS - Central	Belarus	80%	13%	4%	2%
	Kazakhstan	76%	14%	5%	4%
	Russia	70%	18%	8%	4%
	Ukraine	72%	19%	8%	2%
CIS - Central Average		**73%**	**17%**	**7%**	**3%**
CIS-7	Armenia	59%	22%	10%	9%
	Azerbaijan	81%	16%	2%	1%
	Georgia	61%	22%	11%	5%
	Kyrgyzstan	72%	16%	9%	3%
	Moldova	64%	18%	9%	9%
	Tajikistan	45%	36%	15%	4%
	Uzbekistan	75%	11%	9%	5%
CIS-7 Average		**66%**	**20%**	**9%**	**5%**
SEE	Albania	42%	23%	11%	24%
	Bosnia	53%	25%	16%	6%
	Bulgaria	75%	12%	7%	6%
	Croatia	73%	16%	8%	3%
	FYROM	63%	21%	11%	5%
	Romania	65%	17%	10%	8%
	S and M	63%	19%	13%	4%
SEE Average		**63%**	**19%**	**11%**	**8%**
Turkey	Turkey	57%	24%	11%	8%
Turkey Average		**57%**	**24%**	**11%**	**8%**
ECA Average		**67%**	**19%**	**9%**	**5%**

Transportation 2005

Region	Country	No Obstacle	Minor Obstacle	Moderate Obstacle	Major Obstacle
Baltics	Estonia	80%	11%	7%	2%
	Latvia	72%	17%	7%	5%
	Lithuania	75%	14%	6%	4%
Baltics Average		**76%**	**14%**	**7%**	**4%**
CEE	Czech	52%	19%	14%	15%
	Hungary	71%	15%	10%	4%
	Poland	68%	18%	9%	5%
	Slovakia	72%	21%	6%	1%
	Slovenia	81%	14%	4%	1%
CEE Average		**68%**	**17%**	**9%**	**5%**
CIS - Central	Belarus	78%	17%	3%	2%
	Kazakhstan	75%	15%	8%	2%
	Russia	73%	15%	8%	4%
	Ukraine	78%	12%	6%	4%
CIS - Central Average		**76%**	**14%**	**7%**	**3%**
CIS-7	Armenia	48%	27%	16%	9%
	Azerbaijan	76%	19%	5%	1%
	Georgia	57%	16%	10%	17%
	Kyrgyzstan	77%	13%	7%	2%
	Moldova	65%	21%	10%	4%
	Tajikistan	65%	23%	11%	2%
	Uzbekistan	70%	17%	10%	3%
CIS-7 Average		**65%**	**20%**	**10%**	**5%**
SEE	Albania	53%	21%	14%	12%
	Bosnia	49%	26%	16%	8%
	Bulgaria	79%	12%	5%	4%
	Croatia	79%	13%	6%	1%
	FYROM	60%	21%	13%	5%
	Romania	60%	20%	13%	7%
	S and M	66%	18%	12%	4%
SEE Average		**64%**	**19%**	**11%**	**6%**
Turkey	Turkey	60%	19%	15%	7%
Turkey Average		**60%**	**19%**	**15%**	**7%**
ECA Average		**68%**	**17%**	**9%**	**5%**

3. How problematic was *telephone service* for the operation and growth of business?

Telecommunications 2002

Region	Country	No Obstacle	Minor Obstacle	Moderate Obstacle	Major Obstacle
Baltics	Estonia	67%	23%	5%	5%
	Latvia	74%	14%	9%	3%
	Lithuania	60%	23%	13%	4%
Baltics Average		**67%**	**20%**	**9%**	**4%**
CEE	Czech	69%	21%	8%	2%
	Hungary	79%	13%	6%	2%
	Poland	62%	22%	12%	5%
	Slovakia	75%	16%	7%	2%
	Slovenia	81%	16%	2%	1%
CEE Average		**71%**	**19%**	**8%**	**3%**
CIS - Central	Belarus	81%	14%	3%	3%
	Kazakhstan	80%	13%	5%	3%
	Russia	71%	17%	8%	4%
	Ukraine	73%	17%	5%	5%
CIS - Central Average		**75%**	**15%**	**6%**	**4%**
CIS-7	Armenia	56%	18%	15%	11%
	Azerbaijan	79%	12%	5%	4%
	Georgia	73%	11%	9%	6%
	Kyrgyzstan	66%	18%	12%	4%
	Moldova	78%	14%	6%	2%
	Tajikistan	46%	35%	15%	4%
	Uzbekistan	75%	10%	9%	6%
CIS-7 Average		**68%**	**17%**	**10%**	**5%**
SEE	Albania	50%	20%	12%	18%
	Bosnia	61%	22%	14%	3%
	Bulgaria	71%	16%	6%	7%
	Croatia	83%	11%	4%	1%
	FYROM	67%	22%	7%	4%
	Romania	67%	18%	8%	7%
	S and M	56%	21%	12%	10%
SEE Average		**65%**	**19%**	**9%**	**7%**
Turkey	Turkey	46%	31%	12%	11%
Turkey Average		**46%**	**31%**	**12%**	**11%**
ECA Average		**68%**	**19%**	**8%**	**5%**

Telecommunications 2005

Region	Country	No Obstacle	Minor Obstacle	Moderate Obstacle	Major Obstacle
Baltics	Estonia	84%	12%	1%	2%
	Latvia	77%	8%	12%	3%
	Lithuania	81%	13%	3%	3%
Baltics Average		**81%**	**11%**	**6%**	**3%**
CEE	Czech	52%	19%	13%	15%
	Hungary	79%	13%	5%	2%
	Poland	69%	19%	9%	3%
	Slovakia	83%	12%	3%	2%
	Slovenia	87%	10%	2%	0%
CEE Average		**72%**	**16%**	**7%**	**4%**
CIS - Central	Belarus	82%	14%	3%	1%
	Kazakhstan	79%	14%	4%	2%
	Russia	78%	13%	6%	2%
	Ukraine	79%	12%	5%	4%
CIS - Central Average		**79%**	**13%**	**5%**	**2%**
CIS-7	Armenia	54%	24%	18%	5%
	Azerbaijan	76%	19%	4%	1%
	Georgia	67%	18%	5%	10%
	Kyrgyzstan	85%	9%	3%	2%
	Moldova	72%	19%	7%	3%
	Tajikistan	65%	27%	5%	4%
	Uzbekistan	81%	12%	4%	3%
CIS-7 Average		**71%**	**19%**	**7%**	**4%**
SEE	Albania	51%	25%	14%	10%
	Bosnia	63%	20%	15%	2%
	Bulgaria	80%	10%	5%	4%
	Croatia	79%	17%	3%	2%
	FYROM	60%	16%	14%	10%
	Romania	63%	20%	11%	6%
	S and M	63%	19%	12%	6%
SEE Average		**66%**	**18%**	**10%**	**6%**
Turkey	Turkey	61%	19%	14%	7%
Turkey Average		**61%**	**19%**	**14%**	**7%**
ECA Average		**72%**	**16%**	**8%**	**4%**

4. How problematic was *regulatory uncertainty* for the operation and growth of business?

Uncertainty about regulatory policies — 2002

Region	Country	No Obstacle	Minor Obstacle	Moderate Obstacle	Major Obstacle
Baltics	Estonia	17%	34%	37%	12%
	Latvia	14%	18%	41%	27%
	Lithuania	16%	20%	30%	34%
Baltics Average		**16%**	**23%**	**36%**	**25%**
CEE	Czech	16%	30%	33%	20%
	Hungary	28%	27%	24%	21%
	Poland	6%	10%	27%	57%
	Slovakia	11%	22%	23%	45%
	Slovenia	27%	30%	31%	12%
CEE Average		**16%**	**21%**	**28%**	**36%**
CIS - Central	Belarus	7%	13%	20%	59%
	Kazakhstan	29%	35%	18%	19%
	Russia	17%	21%	31%	32%
	Ukraine	9%	15%	29%	47%
CIS - Central Average		**15%**	**20%**	**26%**	**39%**
CIS-7	Armenia	20%	18%	31%	32%
	Azerbaijan	62%	19%	12%	7%
	Georgia	6%	18%	32%	44%
	Kyrgyzstan	19%	25%	29%	28%
	Moldova	8%	8%	32%	53%
	Tajikistan	13%	30%	26%	31%
	Uzbekistan	24%	24%	31%	21%
CIS-7 Average		**21%**	**20%**	**28%**	**31%**
SEE	Albania	8%	21%	22%	49%
	Bosnia	21%	16%	22%	40%
	Bulgaria	8%	10%	23%	60%
	Croatia	15%	18%	31%	36%
	FYROM	20%	19%	24%	37%
	Romania	13%	14%	29%	43%
	S and M	12%	10%	30%	48%
SEE Average		**13%**	**15%**	**26%**	**46%**
Turkey	Turkey	13%	9%	25%	54%
Turkey Average		**13%**	**9%**	**25%**	**54%**
ECA Average		**16%**	**19%**	**28%**	**38%**

Uncertainty about regulatory policies — 2005

Region	Country	No Obstacle	Minor Obstacle	Moderate Obstacle	Major Obstacle
Baltics	Estonia	49%	25%	21%	5%
	Latvia	23%	22%	33%	22%
	Lithuania	19%	28%	30%	23%
Baltics Average		**31%**	**25%**	**28%**	**17%**
CEE	Czech	15%	25%	38%	22%
	Hungary	28%	22%	23%	26%
	Poland	13%	19%	25%	43%
	Slovakia	34%	27%	26%	13%
	Slovenia	26%	30%	33%	12%
CEE Average		**20%**	**23%**	**27%**	**30%**
CIS - Central	Belarus	23%	27%	27%	23%
	Kazakhstan	41%	30%	20%	9%
	Russia	18%	23%	33%	26%
	Ukraine	24%	18%	26%	31%
CIS - Central Average		**27%**	**24%**	**26%**	**23%**
CIS-7	Armenia	30%	33%	24%	12%
	Azerbaijan	64%	27%	7%	3%
	Georgia	17%	10%	28%	45%
	Kyrgyzstan	9%	22%	36%	33%
	Moldova	10%	20%	38%	32%
	Tajikistan	41%	33%	20%	6%
	Uzbekistan	34%	30%	24%	12%
CIS-7 Average		**30%**	**26%**	**25%**	**19%**
SEE	Albania	23%	22%	36%	19%
	Bosnia	14%	24%	27%	35%
	Bulgaria	24%	19%	29%	28%
	Croatia	31%	25%	27%	18%
	FYROM	34%	19%	20%	28%
	Romania	19%	19%	28%	34%
	S and M	8%	11%	20%	61%
SEE Average		**21%**	**19%**	**27%**	**33%**
Turkey	Turkey	28%	12%	28%	32%
Turkey Average		**28%**	**12%**	**28%**	**32%**
ECA Average		**25%**	**22%**	**27%**	**26%**

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