

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 Ukraine²⁰ 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.

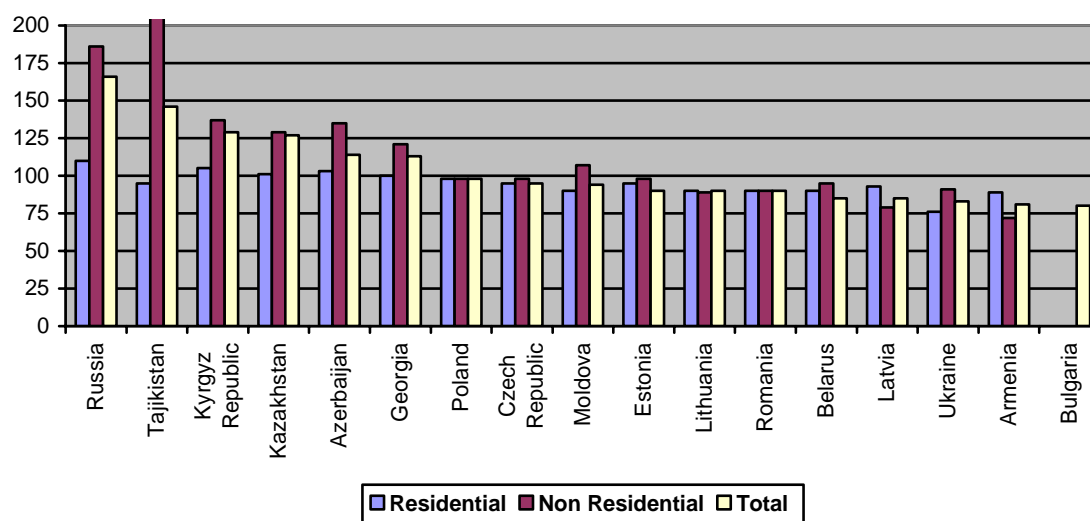
The *water sector* nonpayment problem is similar to the district heating sector in that water is considered a basic minimum human need and disconnection of supply to defaulters is not a practical solution in most cases. A recent survey of 18 countries in the region indicated that about 28% of the households 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.

²⁶In 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 dispatch²⁷ 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 al, 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.

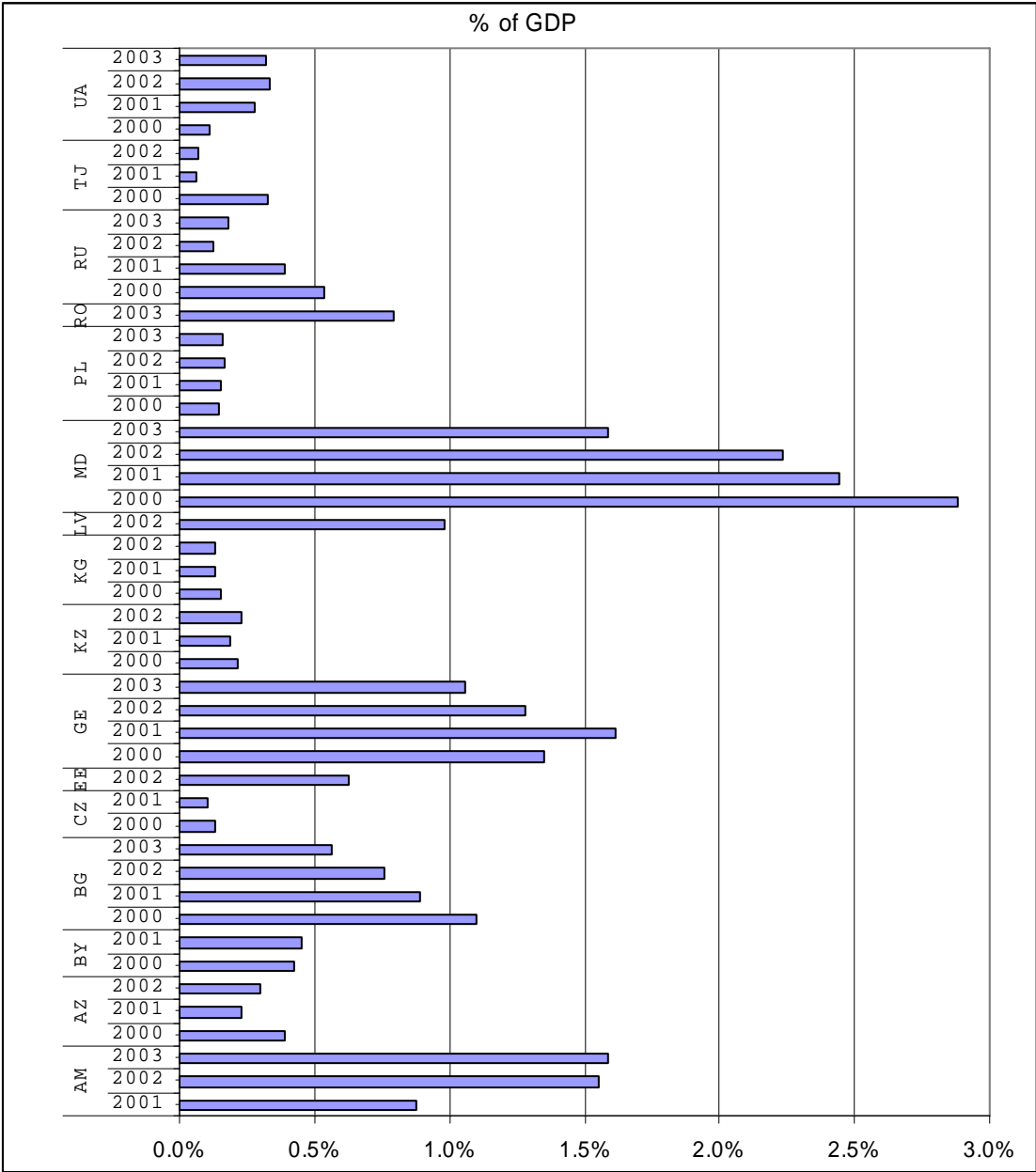
Table 4.9: Implicit Subsidies in the Gas Sector in ECA

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 of 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	2000	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

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

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

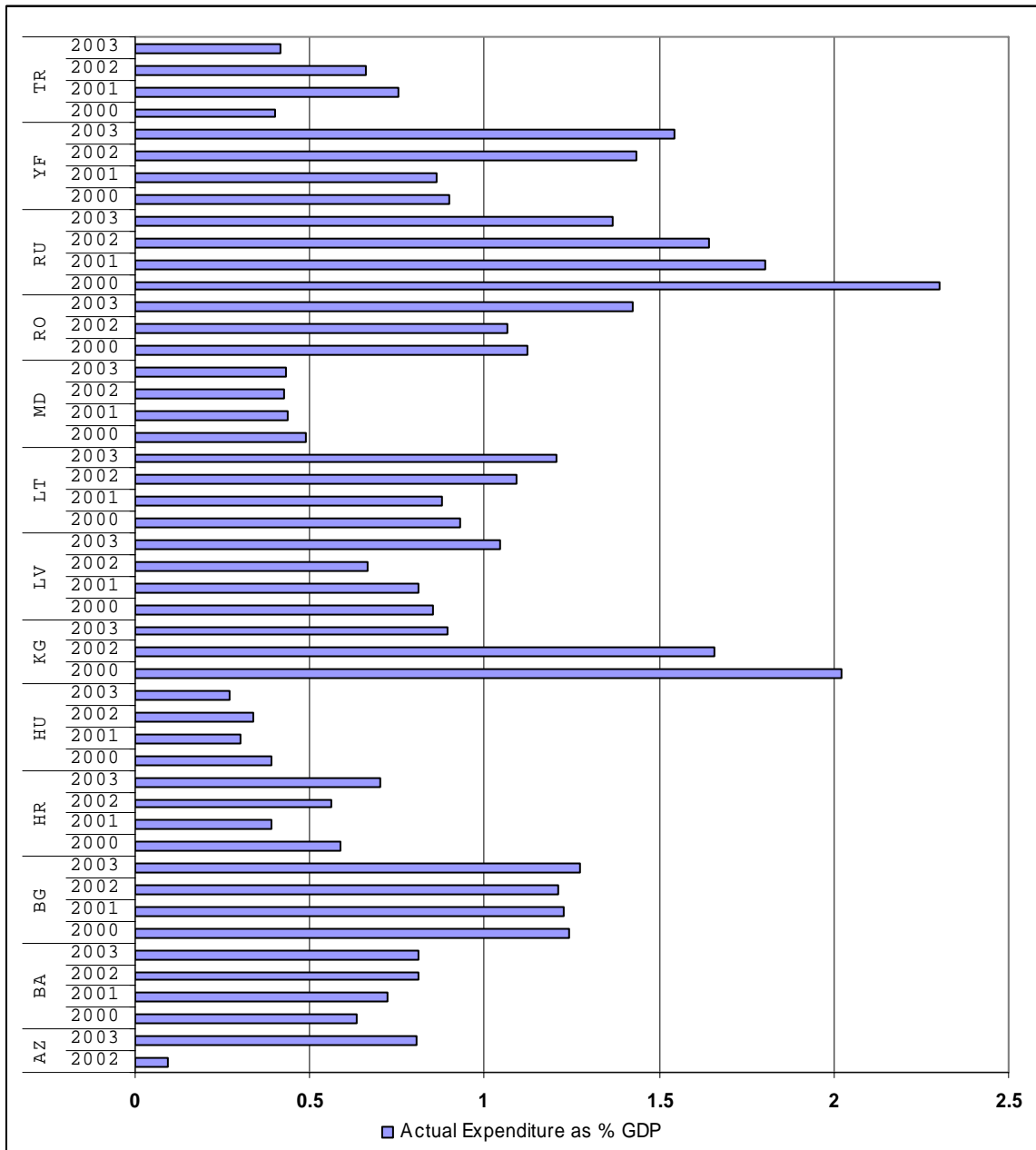
⁴³ International Monetary Fund's approach also does not favor the creation of such funds.

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.

Figure 4.3: Actual road expenditure as a % of GDP



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.

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.

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