ECONOMIC REFORM OF THE ELECTRICITY INDUSTRIES OF CENTRAL AND EASTERN EUROPE

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1. INTRODUCTION

“Communism is Soviet power plus the electrification of the whole country.”

V I Lenin, Report at the eighth All-Russia Congress of Soviets on the work of the Council of People’s Commissars, 22 December 1920.

The famous quotation from Lenin cited above demonstrates the importance of the electricity industry for Communist economies in Eastern Europe. For the 1990s, the role ascribed to electricity by Lenin would probably be given to the telecommunications industry. Nevertheless, as the quotation demonstrates, the electricity industry has been of great importance in terms of the ideology of Communist economic systems as well as for the practical development of a planned industrialised economy.

The electricity industry played a crucial role in the planning of the economic growth path led by heavy industry that dominated Soviet economic thinking and practice from Preobrazhensky and the first Stalin Five-Year Plan onwards. In consequence, the progress since 1989 in the economic reform of the electricity industry of the transition economies provides an interesting exercise in political economy as well as in the economics of utility reform.

More concretely, most of the countries of Central and Eastern Europe (CEE) outside the CIS (Commonwealth of Independent States) have Association Agreements with the European Union (EU) and have expressed the desire to join the EU as soon as possible. The countries of Central Europe including Slovenia, are pursuing early membership. In this context, the question arises as to whether these countries and the other CEE countries who hope to join soon after can meet the obligations of the EU Electricity Liberalisation Directive that was agreed in 1996.

In fact, progress in economic reform of the electricity industries of Central and Eastern Europe has been very slow. For the purposes of this paper, we define economic reform of the electricity industry as follows:

- the main consumer groups pay the full economic costs of the production and distribution of the electricity that they consume; and

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1 The authors would like to acknowledge financial support from the ESRC under its programme on the economic and political problems faced by new states in Central and Eastern Europe and also from the Regulation Initiative of the London Business School. We are also grateful for suggestions and comments from Nathan Francis, Paul Hare, David Newbery, Mark Schaffer and members of the Heriot-Watt economics staff seminar. Particular thanks go to Graham Houston and Ann Whitfield for their extensive comments on an earlier draft of the paper and to all of our Central and East European colleagues with whom we have worked over the last 6 years. All errors and omissions are the responsibility of the authors alone.
• the establishment of commercially viable electricity companies that can finance their investment requirements without recourse to subsidies or other financial assistance from the state.

These two criteria are clearly related, but not straightforwardly. The first criterion concerns relative prices between the main groups of consumers at least as much as the levels of absolute prices, raising some intriguing issues of the application of marginal cost pricing in transition economies. The second criterion is concerned with revenue requirements (and revenue collection) for financially viable and fully commercialised utilities. These two sets of issues will be the primary concern of this paper. As we will discuss in detail later, they are critical for the introduction of competition into the wholesale electricity market which is a frequent objective of electricity reform programmes and a requirement of the EU Electricity Liberalisation Directive.

1.1. An Overview on Progress to Date

Economic reform of electricity industries as defined above in CEE and CIS economies has been much slower than was expected or was hoped for by the World Bank and other international institutions. Some of the CIS countries (most notably Ukraine) appear to have embarked on radical electricity industry reform programmes, but it is questionable how radical they are in fact. It is also questionable whether the Ukrainian electricity reform will turn out to be sustainable, let alone successful, and a useful model for other East European economies.

One useful acid test is the response of private investment. Thus far, there has been little private investment in the electricity industries, domestic or foreign, apart from the (not unproblematic) case of Hungary. Further, most private investment, even in Hungary, has been portfolio investment rather than physical investment, eg purchases of bonds issued by CEZ, the Czech power company.

Stern (1994) provided a survey of regulatory reform in the energy sector of CEE economies and concluded that little progress had been made in introducing an effective and transparent regulatory framework. Three years later, the position seems hardly to have changed.

1.2. Purpose and Structure of the Paper

The purpose of this paper is the following: firstly, to chart how much economic reform of CEE electricity industries has taken place to date; secondly, to discuss why progress has been so limited; and, thirdly, to consider the prospects over the next few years.

In charting the economic progress to date, we will consider and discuss progress in electricity price unbundling and rebalancing; in utility commercialisation; in industry and market restructuring and liberalisation; and in privatisation, as well as the development of economic regulation. For the reasons outlined above, we will explore the pricing issues in
some detail as they are essential for understanding the difficulties in making progress in the other aspects of economic reform.

The analysis concentrates on the 10 countries with which the EU has an Association Agreement and who are stated candidates for EU membership (the EU 10). These countries are the Visegrad 4 in Central Europe (the Czech Republic, Hungary, Poland and the Slovak Republic); the three Baltic States (Estonia, Latvia and Lithuania); Bulgaria, Romania and Slovenia. In July 1997, the EU Commission recommended that negotiations for membership be commenced with the Czech Republic, Hungary, Poland, Slovenia and Estonia.

The countries that make up the EU 10 include the most developed economies and the most advanced reformers in the region. In addition, for these economies it is sensible to assess their position relative to the requirements of the 1996 EU Electricity Liberalisation Directive whose conditions they can expect to be required to satisfy as one of the EU membership conditions.

Although for the reasons given above the paper will concentrate on the EU 10 countries, we will at various points make comparisons with the position in some of the main CIS economies - primarily the Russian Federation, the Ukraine and Kazakhstan. Not surprisingly, it is in these countries that the problems of making and sustaining electricity reform have shown themselves most acutely.

The plan of the paper is as follows.

In the next section, we will discuss the context of general transition economic reform programmes within which reform of the electricity sector is taking place. In Section 3, we set out the history since 1988 of electricity production, trade, consumption and capacity. In Section 4, we discuss electricity costs and prices, tariff unbundling and end-user prices. This section includes a discussion of marginal cost pricing issues for electricity industries in transition economies.

In Section 5, we discuss the commercial performance and profitability of CEE power companies, including the issue of payments arrears in the electricity industry. Section 6 covers reforms to the industrial structure and trading structure of electricity industries. Section 7 covers regulatory reform, including price regulation, privatisation and private investment. In Section 8, we outline the main requirements of the EU Electricity Liberalisation Directive and discuss how the EU 10 countries stand in relation to its requirements.

The paper ends with a summary of the main conclusions, including the potential impact of the EU Liberalisation Directive.
2. COMMERCIALISATION OF THE ELECTRICITY INDUSTRY AND TRANSITION REFORM PRIORITIES

There are many critical aspects of transition reform. Achieving macro-economic stabilisation was an essential first step. However, for the purposes of considering utility and electricity reform programmes, the critical economic issues common to all the countries are:

(a) the abolition of the funding of investment by governments out of general tax revenue;

(b) the establishment of hard budget constraints on enterprises; and

(c) the major shift in relative prices consequent on general price liberalisation.

The price liberalisation includes, crucially, the opening-up of the economies to trade on a decentralised basis and the establishment of a single exchange rate with current account convertibility.

2.1. Enterprise Reform

Before 1989, electricity utilities (like other state enterprises) had their investment approved and financed by the state. For most countries (but not Hungary, Poland or Slovenia), this was an integral part of the still operative physical planning process. After 1989, the combination of (a) and (b) meant that enterprises had to cover their costs and finance their own investments. They could no longer rely on the state budget to cover their operating costs or to finance their investment.

Typically, budgetary subsidies in the CEFTA countries (the Visegrad 4 plus Slovenia) were around 10% or more of GDP pre-1989 but are now around 3% - similar to West European levels. However, other forms of subsidy, in particular what are referred to as cross-subsidies remain prevalent, particularly in the energy sector, and are sometimes used as a substitute for direct subsidies, especially in slower reforming countries with tax revenue constraints.

Of course, the degree to which privatised or state enterprises face genuinely hard budget constraints is variable. (By hard budget constraints, we mean a position in which the level of enterprise activity and output are constrained by whether or not it can meet its financial obligations to suppliers, employees and in taxes.) In general, budget constraints are harder for private enterprises than for state-owned companies. Electricity companies remain majority if not wholly state-owned in all CEE and CIS economies with the partial exception of Hungary. Similarly, budget constraints appear to be tighter in the Visegrad 4 and in Estonia and Latvia than in Romania (at least pre-1997) and, as yet, in Bulgaria. Judging not

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2 CEFTA is the Central European Free Trade Area. See Schaffer (1997) for information on budgetary subsidies.
3 See Section 2.4 below for a discussion of the various types of subsidy and their definition.
4 See Schaffer (1997) for a good survey of this issue.
least by accumulated tax arrears, budget constraints are weaker again in Russia and other CIS economies.\footnote{5}

Nevertheless, although variable in tightness, no electricity utility in any of the EU 10 or the CIS can now guarantee to maintain its levels of output irrespective of ability to pay its suppliers. More significantly, like other companies, they have to fund their investments either from their own sales revenues or from what finance they can raise. The state is no longer either able or willing to fund electricity sector investments out of the state budget. This is critical for as capital intensive a sector as electricity, particularly when 5 of the EU 10 have ongoing nuclear power programmes, as do Russia, Ukraine and many other CIS economies\footnote{6}.

2.2. Relative Price Issues

Concerning relative prices, the critical point is that the pre-1989 price structure for consumer goods bore no obvious relationship to the economic costs of production. Consumers faced very high prices for consumer durables (most obviously for imported consumer durables) and goods classified as luxuries - particularly when adjusted for the costs of queuing and shortages. Conversely they faced very low prices for goods classified as necessities: housing, heating and lighting, public transport, food etc. This pattern of relative prices was sustained (a) by a pattern of differential taxes on and subsidies to enterprises; and, (b) by the highly differentiated turnover tax.

For district heat, gas and sometimes electricity, the costs to households were often bundled into the rent for the house or apartment. This was common for district heating throughout the region, although uncommon for electricity outside the CIS economies.

Following 1989, the enterprise tax/subsidy system no longer exists and the turnover tax has evolved throughout the region into something much closer to a value-added tax. Consequently, governments no longer have the financial capacity to maintain via the tax system the previous low prices for the goods classed as necessities. Nevertheless, not surprisingly, there is considerable resistance by households and governments to raising the prices of these commodities to economic cost levels.\footnote{7}

It is one thing for the coming of the market economy to bring lower cost cars, televisions, clothing and reasonably affordable, good quality foreign goods. It is quite a different thing for it to bring 3-4 fold or more increases in rents, heating charges, electricity and gas prices, rail and bus fares, telephone and postal charges, water and sewage charges, health fees etc. There is widescale opposition to the upward rebalancing of the prices of these commodities.

\footnote{5} See Schaffer op cit Table 2.
\footnote{6} Bulgaria, Czech Republic, Lithuania, Romania and the Slovak Republic. Hungary also has an operative nuclear station (Paks) but no current nuclear construction plans, although new nuclear plant is being discussed as an alternative to new thermal plant.
\footnote{7} By “economic cost”, we mean long run marginal cost (LRMC). See Section 4 for a full discussion of economic costs and price setting issues.
Consumers have achieved sizeable welfare gains from the reduction of prices of tradable private consumption goods. However, this does not make large increases in the prices of subsidised (or cross-subsidised) utility and other services to households any the more palatable - particularly when income growth has been less than was hoped, unemployment has emerged on a sizeable scale and income inequality appears to be growing substantially.

The goods in question are all commodities where access and affordability are crucial, in all economies. In OECD economies, they are either publicly provided and regulated by government or privately provided but within explicit policy guidelines and subject to wide-ranging economic and general regulation.

The problem is that it is unambiguously clear to all concerned that, for utility and related services, the arrival of the market economy and the associated commercialisation of their supply will lead to significantly increased prices to household consumers. Since living standards remain substantially below EU living standards, even in the Visegrad 4, the popular response is that people should not have to pay OECD prices for these goods until living standards are comparable to those in OECD countries. Politicians in fragile new democracies (sometimes fragile new countries) are inevitably highly sensitive to the pressures to keep down the prices of these commodities. Hence, not surprisingly, the prices of these goods, particularly to household consumers, are a major political concern.

The result is that, in practice, no CEE or CIS government has raised the prices to households of more than a few of these goods to economic cost levels. In general, prices have been raised most where there has been:

(i) strong demand for increases in volume and improvements in quality;

(ii) major investment needs;

(iii) a willingness to pay; and

(iv) the threat of costly supply shortages.

Telecommunications best meets these criteria, particularly for business use. In consequence, both price rebalancing and economic reform in general (including the involvement of private capital) have proceeded furthest for CEE and CIS telecommunications industries than for any other infrastructure industry - although by no means as far as telecommunications economists would claim is necessary. The provision of health services is another example of where countries have raised charges to consumers because of supply problems. In both cases, the price rebalancing has been limited, and for telecommunications the focus remains clearly on industrial and commercial consumers. It is no co-incidence that

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8 The 1997 World Bank Atlas reports 1995 GDP per capita in US $ (at purchasing power parity) of 9,800 for the Czech Republic; 6,400 in Hungary; 5,400 in Poland. This compares with 14,500 in Spain; 12,700 in Portugal and 11,710 in Greece. Estonia, Bulgaria and Russia were all between 4-4,500.

8 See EBRD Transition Report 1996.
telecommunications is increasingly becoming a tradable good, nor that the EU has passed more and more comprehensive Directives on market opening in telecommunications than for other infrastructure industries.

At the other extreme to telecommunications are industries with substantial excess capacity and/or the ability to maintain a reasonable volume of supply without major new investment. The electricity industry in CEE economies has had substantial excess capacity; the water and sewage industry has been able to maintain service levels, albeit with serious concerns over quality levels and trends. (We will discuss CEE and CIS electricity demand and capacity in more detail in the next section.) Electricity is again basically a non-tradable good, although its fuel inputs are tradables (with the exception of lignite).\textsuperscript{10} In addition, it is an essential and major input into the production of some highly sensitive CEE and CIS exports such as steel, aluminium and bulk chemicals.

The need for large-scale new investment, particularly private investment, is the fundamental driving force for reform and hence for the choice of infrastructure and regulatory reform priorities.\textsuperscript{11} In transition economies, electricity, with limited exceptions, has so far not been an industry in need of major new investment to maintain supply. Nowhere in the EU 10 have there been major blackouts. In general, threats of power cuts arise primarily from inadequate maintenance, working capital and liquidity shortages and not from capacity shortages. These threats have been concentrated in those CEE and especially CIS countries in which economic reforms have most lagged most.

2.3. Utility Prices and Inflation

A particular concern of governments is the fear that rises in the price of utility and related services will substantially raise the rate of inflation both:

(i) through increasing the production costs of firms for whom these goods are inputs; and,

(ii) increasing the current rate of inflation and potentially the core rate of inflation, eg via a price-wage-price spiral.

It can be reasonably argued that such arguments confuse discussions of inflation in the shorter term with longer run price adjustment issues.

In the shorter term, most economists (including the authors) would argue that raising utility and related prices will only increase the core rate of inflation if the governments allowed an increase in nominal demand sufficient to accommodate an incipient inflation spiral. Of course, there are the questions of the size of inflationary shocks and this, in turn, raises the

\textsuperscript{10} Electricity trade within Western Europe has been primarily concerned with peak power exchanges between utilities. However, non-exchange electricity trade has been growing in recent years, France has developed a sizeable export trade and Italy is a major power importer. See next section for discussion of CEE electricity trade developments.

\textsuperscript{11} See Stern (1994) and (1997).
issue of how far economies can bunch together increases in utility and related prices (discussed in Section 2.2 above). It does not, though, lead one to expect major inflationary problems from raising electricity prices alone or even electricity and other energy prices, particularly beyond the very short run.

In the longer run, for CEE countries, increased economic integration with EU countries through higher mutual trade has and will raise the prices of firstly tradables and then wages and non-tradables to West European levels. This process will come about by real exchange rate appreciation as the CEE economies’ relative productivity levels increase towards EU levels. Such real appreciation can be generated by nominal exchange rate increases or by a constant nominal exchange rate and a higher inflation rate. So far, CEE economies have not been prepared to let their nominal exchange rates appreciate even when apparently justified by trade and capital inflow trends, primarily because of concerns over trade competitiveness (viz Poland).

This may seem like a digression. However, in practice, among the main practical impediments to electricity and other utility reform rebalancing are:

- the continued prevalence in transition economies of cost-plus theories of inflation among all but the most senior Ministry of Finance and Central Bank officials - and particularly among officials responsible for price regulation of electricity and similar industries; and

- confusion between shorter term inflationary processes and longer run relative price adjustments.

The former set of arguments are pervasive among the EU 10, while the latter is as yet more of a problem in the more advanced reformers like Poland and the Czech Republic. In practice, these concerns can prove surprisingly important as impediments to utility reform in general and electricity reform in particular.

2.4. Subsidies: Economic and Financial Subsidies and Cross-Subsidies in Electricity

In section 2.1 above, we broached the vexed question of “subsidies”. Within CEE countries, discussions about subsidies are typically very confused. This includes such issues as: whether or not there subsidies still exist, their magnitude and how they should be measured. A particular potential source of misunderstanding is whether or not the fact that the price of electricity to industrial consumers is lower than that to households, even though the costs of supplying industrial users is unambiguously lower, represents a “cross-subsidy”. The universal practice in CEE countries is to describe it as a cross-subsidy even though some stricter definitions of the term would claim that this was incorrect.

12 See Rollo and Stern (1992)
13 See Nuti (1996).
In consequence, before proceeding with the paper and the relationship of prices to economic costs, it is necessary to clarify the discussion by setting out more clearly the various definitions of the term “subsidy” and cross-subsidy. We do this in the context of economic reform of the electricity industry.

The essential distinction is between financial subsidies and economic subsidies.

There is no doubt that a payment to an electricity company from the state budget (eg to cover higher costs of supply from using a local technology or local coal) represents a subsidy. It is clear that this is both a financial subsidy and an economic subsidy. In what follows, we will call this a direct subsidy. The same terminology would be appropriate for budgetary subsidies to a distribution company to compensate them for mandatory low prices to households. The fact that direct budgetary subsidies of this type are rare in the energy sector in CEE countries (except for coal and sometimes for district heat) means that most governments frequently claim that there are no longer any subsidies in this area. As we shall demonstrate, this is an over-simplification.

The kind of compensation discussed above can also be provided by the state but off-budget. For instance, a power company may not be allowed to pass-on an increase in the cost of imported fuel in generation costs but may be given low interest loans, guarantees to obtain increased borrowing facilities from local banks etc. This again is unambiguously a subsidy, both in financial and in economic terms but an indirect subsidy. Such subsidies are now uncommon in Central Europe but are more apparent in other CEE economies and in CIS countries.

The difficulties, including the terminological difficulties, arise where the price of power does not reflect the economic cost. The problem typically arises when prices are kept down by the state earning a deliberately low rate of return on its assets.

In the past, for the UK (and many other countries), the Government (a) did not require that the state-owned utilities earned a normal real rate of return on the assets; and, (b) the assets themselves were valued at historic cost at a time when inflation rates averaged perhaps 5 per cent per year. The combination of these two factors meant that the real rate of return the state as the owner of the assets (ie to taxpayers) was much lower than that paid to investors in private industry. Instead, the state-owned utilities charged prices that gave a modest nominal rate of return on assets valued at historic cost.

During the late 1970s and 1980s, UK nationalised industries were required to use marginal cost pricing principles, but with the price level being fixed at the point so that they earned an 8 per cent real rate of return on capital valued at replacement cost. This system was complemented by a system of financial controls (via External Financial Limits) that set borrowing limits and provided a mechanism for the Exchequer to extract surplus cash out of the companies. The key point was that the prices set by this procedure could be taken as representing full economic costs or, using alternative language, a measure of long-run marginal costs (LRMC) from the perspective of a new entrant.
On the basis set out above, charging prices that only required a low rate of return on undervalued assets represents a - potentially sizeable - economic subsidy to consumers that is financed by the state (and hence taxpayers) foregoing revenues as the owner of the assets. As explained in more detail in Section 4, this perspective is far from being accepted in CEE economies where the reference price point for governments when regulating utility prices is still predominantly the price at which running costs are covered and a moderate nominal rate of return is earned on assets valued at historic cost.

In CEE economies, the reference price for making judgements on subsidy levels is therefore this latter price which, for capital-intensive utilities, is considerably lower than the full economic cost price. Not only is it difficult to persuade CEE policy makers that charging this lower price represents a sizeable economic subsidy to consumers, but, in addition, it is this price level that is the basis for making judgements about cross-subsidies. Hence, CEE power companies are typically earning a (quite reasonable) operating profit. All of this is earned from industrial customers and, indeed, sales to households may well not cover operating costs in many CEE economies. Hence, the pattern of relative prices is described as a “cross-subsidy” from industry to households.

This seems incorrect to many economists trained-up in modern price theory. They would argue a cross-subsidy would only exist if households paid a price below economic cost and if the industrial customers paid a price above LRMC. Neither in CEE nor in CIS economies is this the case; typically, industrial consumers pay around 80-100% of LRMC. Hence, according to the purists, we do not observe a genuine cross-subsidy; instead, we observe an implicit subsidy, heavily concentrated on household customers, which is financed by a lower rate of return to the owners of the utility (or distribution company).

While the state remains the sole share-holder, the difference between the two definitions of cross-subsidy is largely semantic. However, it can readily cause confusion. It becomes a much more substantive issue when there is substantial involvement of private capital in the industry.

In the rest of this paper, at the risk of offending the purists, we will follow conventional CEE usage and define the imbalance between household and industrial prices as a cross-subsidy. We will also use the terminology of direct (budgetary) subsidies and indirect (off-balance sheet) indirect subsidies as set out above. We recognise that there are economic subsidies arising from pricing below full economic costs and will discuss the implications in detail in section 4, but our definitions of subsidy will, as far as possible use the accepted CEE terminology.
3. ELECTRICITY DEMAND, SUPPLY AND CAPACITY TRENDS IN CEE ECONOMIES

3.1. GDP Trends and the Demand for Electricity

It is well-known that the declines in GDP experienced in CEE and CIS economies post-1989 are unprecedented in recent history. Indeed, in a recent survey paper on the contraction and its causes, Mundell claims that the only historical precedent is the Black Death in the fourteenth century - only the Black Death, unlike the post-1989 contraction, may have increased per capita income and consumption for the survivors.14 (One hesitates at making welfare comparisons).

Nevertheless, the contractions in real GDP in Central Europe were certainly comparable to the 20% fall in the US in the Great Depression and the contractions in the other CEE economies and the CIS were significantly higher. For the EU 10, measured real output levels have significantly recovered in Central Europe, to a lesser extent in the Baltic States and even less in Bulgaria and Romania. For CIS economies, there has as yet been little or no recovery in measured real GDP.

There is, of course, a major debate on the meaning as well as the causes of the apparent declines in real GDP. One major issue is the extent to which the statistics in recent years understate output because of the growth of services, informal trading as well as semi-legal and illegal economic activity. However, our concern is with the demand for electricity so we can by-pass this debate. On the output measurement issue, the single most important determinant of the demand for electricity is the massive reductions in industrial output, particularly for the output of heavy industry. This is the least likely area of economic activity to be under-recorded in post-1989 statistics.

Table 1 below shows, for the period 1989-94, (a) the lowest; and (b) the most recent levels of real GDP for the EU 10 relative to 1989..

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14 See Mundell in Blejer and Skreb (1997)
Table 0.1
Real Output Levels in Central and Eastern Europe 1989-96
(as percentage of 1989 output level)

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<tr>
<td>Kazakstan</td>
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Sources: 1989-94 data from De Melo, Denizer and Gelb in Blejer and Skreb (1997)
1996 data from EBRD Transition Report 1996

The CEFTA countries had an average maximum contraction of around 20% and have had reasonably steady GDP growth since 1993-94. The Baltic countries had sharper declines but some recovery in GDP since 1994-95. (Alternative estimates for 1989-94 by WEFA reported by Mundell give a minimum GDP level for Latvia of 49 in 1994. This is more consistent with the EBRD year-by-year growth figures.) The largest contractions have been in the CIS economies where we still await a return to positive growth. Following the macro-economic crises in Bulgaria and Romania in 1996-97, the 1996 GDP outturns in those countries are likely to be worse than shown in Table 3.1 above.

Only in Poland has GDP returned to its 1989 level, although there has been positive and reasonable growth in the other CEFTA countries. For the other members of the EU 10, GDP levels imply that electricity demand is likely to remain depressed as there has been little recovery in real output. This applies even more strongly to the CIS countries.

The decline in industrial output was larger than the fall in GDP. This is shown by the declining share of industrial output in GDP, which was on average over 10% for the countries listed in Table 3.1. Given the high percentage of electricity supplied to the industrial sector, this will also tend to keep down the demand for electricity. However, in the CEFTA countries, growth in personal sector real incomes and demand for electricity-using consumer durables will have provided some demand offset. This will have been

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15 See De Melo, Denizer and Gelb op cit. The estimates of the size of the declines in the 1989-94 period vary considerably both by country and by whether estimated in current or constant prices, which is likely to reflect problems over deflators. Hungary had a below average decline in the share of industry share on both measures; Slovakia and, to a lesser extent, Bulgaria, an above average decline on both measures.
augmented by government policies (as in the Czech Republic) to raise the relative price of district heating and allow little real increase in household electricity prices since 1992. In addition, increases in the price of coal, oil and other fuels used for domestic heating purposes are also likely to have increased the demand for electricity.

3.2. Electricity Output and Trade

In Table 3.2 below, we show how electricity output has declined since 1988. Figures for before 1991/2 are not readily available from standardised international sources for countries emerging from the former Soviet Union or the former Yugoslavia.

Table 0.2
Electricity Production TWh (Terawatt hours) 1988-94

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Czech Republic</td>
<td>63.3</td>
<td>59.3 *</td>
<td>58.7</td>
</tr>
<tr>
<td>Hungary</td>
<td>29.2</td>
<td>30.0</td>
<td>33.5</td>
</tr>
<tr>
<td>Poland</td>
<td>144.4</td>
<td>134.7</td>
<td>135.3</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>24.4</td>
<td>22.5*</td>
<td>24.7</td>
</tr>
<tr>
<td>Slovenia</td>
<td>N/A</td>
<td>12.1*</td>
<td>12.6</td>
</tr>
<tr>
<td>Estonia</td>
<td>N/A</td>
<td>11.8</td>
<td>9.2</td>
</tr>
<tr>
<td>Latvia</td>
<td>N/A</td>
<td>3.8*</td>
<td>4.4</td>
</tr>
<tr>
<td>Lithuania</td>
<td>N/A</td>
<td>18.7</td>
<td>10.1</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>45.0</td>
<td>38.9</td>
<td>38.1</td>
</tr>
<tr>
<td>Romania</td>
<td>75.3</td>
<td>56.9</td>
<td>55.1</td>
</tr>
<tr>
<td>Russia</td>
<td>N/A</td>
<td>1,008.5</td>
<td>875.9</td>
</tr>
<tr>
<td>Ukraine</td>
<td>N/A</td>
<td>255.5</td>
<td>209.1</td>
</tr>
<tr>
<td>Kazakstan</td>
<td>N/A</td>
<td>82.7</td>
<td>66.8</td>
</tr>
</tbody>
</table>

* 1992
N/A = Not available.

Source: United Nations International Statistics Yearbooks

The declines in output are sizeable, at around 7-10% for the Central European countries, 15% in Bulgaria and Russia and 20% or more in Romania, Ukraine and Kazakstan. (The figures for the Baltic countries reflect their heavily interconnected systems and problems with the Ignalina nuclear station in Lithuania.)

In Table 3.3 below, we show comparable data on net imports of electricity.
Table 0.3
Net Imports of Electricity (TWh and as percentage of net production) 1988-94

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Czech Republic</td>
<td>N/A *</td>
<td>-3.0 (-5%)</td>
<td>-0.4 (-0.7%)</td>
</tr>
<tr>
<td>Hungary</td>
<td>+11.3 (39%)</td>
<td>+7.3 (24%)</td>
<td>+2.0 (6%)</td>
</tr>
<tr>
<td>Poland</td>
<td>+4.5 (3%)</td>
<td>-2.5 (-2%)</td>
<td>-2.7 (-2%)</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>N/A *</td>
<td>+1.5 (7%)</td>
<td>-0.8 (-3%)</td>
</tr>
<tr>
<td>Slovenia</td>
<td>N/A</td>
<td>-1.8 (-15%)</td>
<td>-1.7 (-13%)</td>
</tr>
<tr>
<td>Estonia</td>
<td>N/A</td>
<td>N/A</td>
<td>+1.7 (18%)</td>
</tr>
<tr>
<td>Latvia</td>
<td>N/A</td>
<td>+4.0 (103%)</td>
<td>+1.8 (41%)</td>
</tr>
<tr>
<td>Lithuania</td>
<td>N/A</td>
<td>-5.3 (-28%)</td>
<td>+1.1 (11%)</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>+4.5 (10%)</td>
<td>+2.1 (5%)</td>
<td>-0.1 (-0.3%)</td>
</tr>
<tr>
<td>Romania</td>
<td>+7.2 (10%)</td>
<td>+7.0 (12%)</td>
<td>+0.7 (1%)</td>
</tr>
<tr>
<td>Russia</td>
<td>N/A</td>
<td>-16.0 (-2%)</td>
<td>-21.0 (-2%)</td>
</tr>
<tr>
<td>Ukraine</td>
<td>N/A</td>
<td>-5.0 (2%)</td>
<td>-1.0 (-0.5%)</td>
</tr>
<tr>
<td>Kazakstan</td>
<td>N/A</td>
<td>+14.1 (17%)</td>
<td>+10.1 (15%)</td>
</tr>
</tbody>
</table>

* CSFR net imports of 2.1 TWh in 1988 and 1.9 TWh in 1991.

Source: United Nations Energy Statistics Yearbooks

The Table shows clearly that the electricity consumption in Central European countries fell markedly more than production, particularly for Hungary and Poland. Hungary has dramatically reduced its power imports, which accounts for its low reduction in domestic production.

Hungary, Bulgaria and Romania all imported sizeable volumes of electricity from the former Soviet Union, mainly from the Ukraine. These imports have fallen dramatically and this is reflected in the sharp fall in Ukrainian net power exports. (The increase in Russian power exports appears primarily to represent its increase in net power exports to other CIS economies.)

Between 1988 and 1984, taking account of the decline in net imports, electricity consumption fell by 12% in Poland, 15% in Hungary, 24% in Bulgaria and 25% in Romania. Between 1992-94, it fell by 17% in the Ukraine and 14% in Russia. All of these reductions are much less than the falls in real GDP in Table 3.1, so that, at least over that period, the already high electricity intensity of output further increased.

EBRD reports estimate that the energy intensity of output (per unit of GNP at purchasing power parity exchange rates) in CEE countries was in 1994 around twice that in EU countries. CIS economies had an electricity intensity of output of more than twice that of North America, where it is around 50% greater than in the EU.16

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These figures suggest that shortages of capacity to meet expected growth in demand are highly unlikely to exist now or in the near future, particularly if increases in the price of electricity and other measures (demand-side management, etc) can be developed to increase efficiency in production, transmission and consumption. This, however, assumes that existing capacity is in a reasonable condition. (See Section 3.5 below for further discussion.)

3.3. Electricity Consumption for Industry and Households

The 1996 EBRD Transition Report reports that, for the region as a whole, while electricity consumption by industry fell substantially, electricity consumption by households rose. This is confirmed for some of the main CEE economies in Table 3.4 below.

![Table 3.4](data:image/png;base64,iVBORw0KGgoAAAANSUhEUgAABAAQAAAQCAYAAAAm5BIAAAAgAElEQ...)

The Table shows declines in industrial electricity consumption that are very similar to the declines in real GDP in Table 3.1, particularly for the Central European countries (22% for the Czech and Slovak Republics, 24% for Hungary and 17% for Poland). The industrial electricity consumption reductions are larger than the GDP falls for Bulgaria and Romania. For Bulgaria, this presumably reflects the major reductions in heavy industrial output; for Romania, the trends are exaggerated because 1988 was an extremely difficult year for the Romanian economy and household consumers in particular.

The table shows industrial electricity demand beginning to recover in the Central European economies in 1993-94. However, the real point of interest is the growth in residential electricity consumption. For Hungary, the increase was 20% over the 1988-94 period, while for the CSFR it was a massive 57%, including a 32% increase between 1993 and 1994. Of course, weather trends may well have contributed to this, but it is hard to believe that household price trends did not play a significant role.

One point to note from the consumption data is that the increasing share of household consumption means that the electricity load curve is becoming significantly more peaky. CEE (and CIS) electricity systems are dominated by base-load generation; there is very little peaking capacity (pump storage and other hydro plants, or open-cycle gas or oil powered turbines). This has caused problems in several countries. One approach is to use some thermal powered base-load plant in peaking mode, but this is inefficient and imposes a number of costs. Another alternative is to arrange for peak period imports. The Visegrad...
countries are all actively constructing additional pumped storage or similar peaking
capacity, but the price of this power is, of course, above the average cost.

3.4. Recent Developments in Production, Trade and Consumption in the
Czech Republic

The patterns described above for the 1988-94 period can readily be updated for the Czech
Republic for 1995-96. They show a continued rapid increase in household demand and in
net imports. These patterns may be more dramatic in the Czech Republic than in some other
countries, but they demonstrate features common to other countries, particularly the Central
European countries who are candidates for early EU membership.

Between 1994 and 1996, Czech electricity production rose from 58.7 TWh to 64.3 TWh (ie by
9.5% over two years). Net imports increased by 0.4 TWh so that Czech demand rose by
9.7% over this period. Residential demand has continued to rise fast with demand by low
voltage consumers rising by 5.8% in 1995 as against an increase in total demand of 3.8%.
Industrial demand has been growing steadily, but only at about two-thirds the rate of GDP
growth.

Most interestingly, gross imports have risen very sharply over the whole period. They rose
from 1.0 TWh in 1992 to 3.1 TWh in 1996 ie a three-fold increase representing an annual
average growth rate of 33% per year. Most of this increase in gross imports (balanced by
offsetting exports) represents imports of power to meet winter peaks. Indeed, CEZ reports
that, in 1996, around 80% of imports were purchased to meet winter requirements.

The CEZ Annual Report cites a 2,200 MW increase in the installed capacity of direct electric-
powered space-heating between 1992-95 as a main cause of the sharp increase in winter
peak loads. This increase represents 20% of maximum peak load. In addition to the newly
purchased heaters, households are making increased use of existing electric heating capacity
which also contributes to the increase in winter peak loads.

The fact that household prices have been held so low is certainly seen by CEZ as a
significant contributory factor to the growth in household demand. This must be correct for
any plausible value of price elasticities.

3.5. Capacity Utilisation and Capital Requirements

As yet, there is no evidence of serious capacity constraints either in generation or in
transmission and distribution in the region. The winter peak problems in Central Europe are
primarily a result of inadequate amounts of peak-load capacity relative to base-load
capacity. A recent article in Transition gave an estimate of 30% spare capacity in the
Russian power system.18

17 See CEZ Annual Report 1996.
18 Transition, June 1997.
It is difficult to estimate capacity utilisation in quantitative terms, but there appears to be little doubt that there is currently no need to expand installed capacity. Hungary is beginning to plan for a generation tender for some 2,000 MW of new capacity to be installed before 2006, 800 MW to be installed by 2003. However, only about one-third of this would be capacity expansion, the rest would be replacement of obsolescent plant. Similarly, the Czech Ministry of Industry and Trade has recently announced a tender for 300-600 MW of new lignite-fired capacity to be installed by 2002. It would not be surprising if other countries also began planning capacity expansions for installation by 2005 or thereabouts.

The absence of a current need to expand installed capacity does not mean, though, that there is no need for new investment. Some major new investment projects are taking place - most obviously the completion of the nuclear plants in the Czech Republic (Temelin), the Slovak Republic (Mohowce) and Romania (Cernovada). However, their completion may well lead to some closure of older plant. There is also investment proceeding in small-scale CHP (combined heat and power) and co-generation plants, usually selling power into local networks. The World Bank and EBRD are also lending to increase peaking capacity in Hungary and elsewhere.

More generally, there is investment in upgrading and rehabilitating old power plants (including the CHP plants mentioned above) and poorly maintained networks. Much of this upgrading is to meet new pollution limits from tougher environmental standards, for the Central European countries, primarily driven by EU environmental standards. In general, (particularly in Bulgaria, Romania and eastwards into the CIS) the requirement is to invest to improve the efficiency of existing plant, to reduce the very large maintenance costs and to raise effective capacity towards rated installed capacity.

To give some indication of current investment levels, in 1995, CEZ carried out investment expenditures on physical assets of Kč 25 billion (about $900 million) and, in 1996, of Kč 22.2 billion (about $800 million). In 1996, Kč 7.7 billion (35%) was spent on the construction of the Temelin nuclear station and Kč 6.9 billion (31%) on environmental investment on plant and Kč 2.1 billion (10%) on nuclear waste management storage. This investment programme is sizeable relative to CEZ electricity revenues of Kč 55 billion in 1996 and is approaching twice the level of its pre-tax profits.

CEZ has been able to finance this investment programme by large-scale debt issuance. It has long-term debt of Kč 30 billion on its books of which Kč 13.7 billion is in foreign currency. The latter includes $300 million in two US bond-market issues. (In July 1997, it issued a further $200 million tranche.)

Such financing options are not available to most other countries in the region who are much more dependent on the international lending agencies, both directly and for access to private capital markets. Even in the Czech Republic, continuing the investment programme at anything like current levels is not sustainable unless CEZ is allowed to charge higher

prices for its power, which implies higher end-user prices, particularly to households. The same is true in Hungary and Poland.

Raising efficiency and reducing pollution are the areas that have been highlighted by EBRD as those where investment is most needed. They are also the basis for the very large claims of investment requirements by power company managers, government officials and bankers. A (relatively moderate) example is that of Mr PJ Kalff, Chairman of ABN-AMRO who cited Polish estimates of a need for $45 billion over the next 15 years to replace one-half of its generating capacity.20

These supposed essential investment requirements are not, however, by any means obviously unavoidable to maintain a continuous supply of power. They typically involve some or all of the following:

- raising efficiency standards of generation and transmission to, eg West European levels;
- adopting West European (EU and Rio Convention) pollution standards;
- adopting an age-structure of plant comparable to that in OECD countries; and
- ensuring self-sufficiency in electricity supplies.

Clearly, raising efficiency will reduce costs, but it is not obvious what are the appropriate technical efficiency standards for CEE economies, nor what is the appropriate target date by which they should be reached. Indeed, given the different factor endowments and factor prices in (and between) CEE economies relative to their EU neighbours, careful thought needs to be given to the appropriate definition of technical efficiency targets if the cost efficiency objectives are to be achieved.

Similarly, it is by no means clear that a cost-benefit analysis would show that the Czech Republic or the other early EU candidates should adopt EU emissions limits in the near future, let alone countries like Bulgaria and Romania with much lower per capita income levels. Other types of environmental expenditure (eg water and sewage or heavy metals related) may well, at least at the margin, show greater reductions in morbidity and mortality. In addition, some statements on environmental investment “needs” for electricity assume that major investments are the only way to meet emissions targets eg retro-fitting of scrubbers to coal burning plant to remove sulphur dioxide rather than imports of low sulphur coal or installation of coal-washing facilities.

Greater use of gas-powered CCGTs for new generation would also probably be a cost effective way of reducing air pollution problems, albeit it would for most countries increase their dependence on Russian gas supplies.

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20 Supplement on Investing in Central and Eastern Europe, Financial Times 11 April 1997
Finally, the objective of national self-sufficiency in electricity supply seems to be remarkably unchallenged even though there may well be potentially large gains from trade. As shown in Table 3.3, until 1989, several CEE countries imported over 10% of their power, with Hungary importing over one-third.21

The discussion above should make clear the point that there are clear substitution possibilities. Investment can be postponed, albeit usually at the cost of higher operational costs. For instance, much plant can continue in operation beyond its stated design lifetime with higher current expenditure on maintenance and/or some upgrade. The investments in these and the other areas discussed in this section may or may not look worthwhile when compared with investments elsewhere in the economy. In addition, they can (and should) only be undertaken when the power companies can finance them.

This raises the critical issue of electricity prices. The demand for electricity and the requirements for capacity expansion over the next 10-15 years depend on whether and how quickly CEE countries raise prices towards economic cost levels. Similarly, unless power companies are allowed to earn a reasonable rate of return (and have the expectation of continuing to earn a reasonable return), they will be unable and/or unwilling to make major investments beyond the minimum required to maintain supply and meet legislative requirements, eg on environmental limits.

It is for these reasons that the EBRD is quite correct to emphasise that the establishment of cost-reflective tariffs and the enforcement of bill payment is the essential first step before the sector can support major investment expenditure.22 However, it is also true that, in practice, the major driving force to raise prices remains the need to fund new investment, together with the need to sustain existing and planned borrowings. Ultimately, rehabilitation, replacement investment and other investment can only be postponed for so long. Unless governments are willing to return to state financing of that investment, this will ultimately drive prices to a level where they cover all costs including capital costs on existing as well as newly installed assets. As yet, in the 8 years since the fall of the Berlin Wall, this has not happened and it may yet take some time to achieve. But, it will happen at some point.

21 The Visegrad 4 are now operationally linked to UCPTE, the West European power system, with which they maintain synchronous interconnection. The combination of UCPTE rules with the absence of third-party access to transmission systems both in Western Europe and in Central Europe encourages the drive to self-sufficiency and the apparent need for high investment levels.

4. ELECTRICITY PRICES AND PRICE SETTING IN CEE ECONOMIES

Thus far, this paper has circled around the issue of pricing and the relationship of prices to costs. In this section, we confront the issues directly.

We begin by setting out data on end-user prices to household and industrial users. There is general agreement that marginal cost pricing is the appropriate basis for the making and regulation of electricity prices. We will therefore continue with a discussion of marginal cost pricing issues in conditions of:

(i) considerable amounts of spare capacity;

(ii) the inheritance by CEE and CIS power companies of a large and inefficient capital stock but with no offsetting debt or other financial liabilities on balance sheets; and

(iii) very limited current depreciation or accumulated depreciation funds.

We only present data on end-user tariffs. There are various arrangements for bulk supply tariffs among the 5 CEFTA countries which have separate distribution companies. However, with the partial exception of Hungary, these are derived by working backwards from the end-user prices and then carrying out a “pie sharing” revenue allocation exercise between generators, transmission and dispatch providers. We will discuss this in more detail later.

Nowhere in the region has transmission pricing been separated out from generation pricing, although Poland has begun the process. Separate pricing of transmission and transmission services are essential for meeting the requirements of the EU Electricity Liberalisation Directive and its opening up of access. Within CEE economies, there has so far been no opening of access on transmission networks.

4.1. Electricity Prices to Household and Industrial Consumers

In Table 4.1 below, we summarise electricity price data. The figures reported are for 1994 and the most recent comparable, which is mainly 1996. The 1994 estimates are taken from Gray (1995); the others were assembled by the authors from various sources, including the IEA for the Central European countries. The table not only shows the level of prices in US cents, but also the ratio of household to industrial prices, which is a key statistic.
Table 0.1
Electricity Prices to Industrial and Household Consumers (US cents/kWh)

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Price US cents/kWh</td>
<td>Price US cents/kWh</td>
<td></td>
<td>Price US cents/kWh</td>
<td>Price US cents/kWh</td>
<td></td>
</tr>
<tr>
<td>Czech Republic</td>
<td>5.6</td>
<td>2.7</td>
<td>0.5</td>
<td>5.9</td>
<td>3.9</td>
<td>0.6</td>
</tr>
<tr>
<td>Hungary</td>
<td>5.2</td>
<td>5.5</td>
<td>1.1</td>
<td>4.9</td>
<td>5.6</td>
<td>1.1</td>
</tr>
<tr>
<td>Poland</td>
<td>3.7</td>
<td>5.1</td>
<td>1.4</td>
<td>4.4</td>
<td>7.2</td>
<td>1.6</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>4.6-5.5</td>
<td>2.7</td>
<td>0.6</td>
<td>5.0</td>
<td>3.2</td>
<td>0.6</td>
</tr>
<tr>
<td>Estonia</td>
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<td></td>
<td></td>
<td>3.9</td>
<td>6.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Latvia</td>
<td></td>
<td></td>
<td></td>
<td>4.5</td>
<td>5.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Lithuania</td>
<td></td>
<td></td>
<td></td>
<td>7.0</td>
<td>4.0</td>
<td>0.6</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>2.2</td>
<td>1.4</td>
<td>0.6</td>
<td>3.0(^1)</td>
<td>1.9(^1)</td>
<td>0.6</td>
</tr>
<tr>
<td>Romania</td>
<td></td>
<td></td>
<td></td>
<td>5.0(^2)</td>
<td>2.4(^2)</td>
<td>0.5</td>
</tr>
<tr>
<td>Russia</td>
<td>2.7</td>
<td>0.6</td>
<td>0.2</td>
<td></td>
<td>0.4-3.6 (^3)</td>
<td></td>
</tr>
<tr>
<td>Ukraine</td>
<td>1.4</td>
<td>0.34</td>
<td>0.3</td>
<td>3.9(^2)</td>
<td>4.4 (^3)^ (^5)</td>
<td>1.2</td>
</tr>
<tr>
<td>OECD</td>
<td>7.4</td>
<td>13.7</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU average</td>
<td>7</td>
<td>15</td>
<td>2.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North America</td>
<td>4</td>
<td>7</td>
<td>1.8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^*\) Includes VAT or equivalent consumption tax.

\(^1\) 1995
\(^2\) 1997 Q1
\(^3\) Household prices set according to cost based regional tariff plus 5% profit margin. Industrial prices at regional average plus margin of 1.15-1.25 times costs.
\(^4\) Regionally differentiated. Low prices if close to low cost generation.
\(^5\) 2.9 cents for electric stoves and heaters.


The statistics set out above need careful interpretation.

1. The figures in the table (particularly the movements between 1994-96/7) reflect exchange rate changes as well as changes in the prices denominated in local currency. This is particularly important for Bulgaria and Romania, where there have been major currency depreciations, as well as for the CIS economies. Some of the largest changes in nominal local terms have done no more than maintain real prices in $ terms. However, even in the Czech Republic, Hungary and the Slovak Republic exchange rate adjustments will have led to changes of at least +/- 10% in $ terms.
2. These prices are not always the “effective” price paid for electricity. Late payments, and payment by barter, means that the receipts by the power companies may be worth much less than indicated by the table, particularly in high inflation environments. Late and non-payment problems do not now exist in the Central European economies and appear to be under reasonable control in the Baltic States, but they have been serious in both Bulgaria and Romania where they contributed to the 1996-97 macro-economic crises. Both late payment and barter problems remain acute in the CIS economies so that the table considerably exaggerates the effective price paid, especially by industrial consumers. (We discuss these issues further in Section 5.2.)

3. At the time of writing (August 1997), further price rises have been announced or signalled eg in Romania, Bulgaria and some other countries. Our understanding is that they are very unlikely to change the pattern greatly from what we report here.

The main points arising from Table 4.1 are as follows:

- In all developed market economies, electricity prices charged to households are more than 1.5 times the price charged to large industrial consumers; in the EU, on average, they are twice as high. This reflects the fact that industrial consumers take power from higher voltage networks, have less peaky demand patterns and impose much lower billing and other supply costs, etc.

Of the transition economies listed above, only Hungary, Poland, Estonia, Latvia and (apparently) Ukraine have raised household prices above prices to industrial consumers. Only Poland and Estonia have rebalanced prices to achieve a price ratio comparable to that in OECD economies.

- The Czech and Slovak Republics have rebalanced household prices rather less than most of the other CEE economies and significantly less than Hungary or Poland. In absolute terms, their household prices are also low - particularly in the Slovak Republic.

In the Czech Republic, the industry claims that it costs around Kc 1.7/kWh to supply a residential consumer, whereas the average revenue received is only Kc 0.9.23 These figures indicate the degree of pure cross-subsidy from industrial to household consumers.24 (Kc 1.7 represents 6 US cents/kWh at 1996 exchange rates, 5 cents at mid-1997 exchange rates.)

- If we take 6 cents as a reasonable estimate of the price at which household consumers can be supplied while covering operating costs, only Poland and Estonia have reached that level of prices, although Hungary is close. In all the other

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24 The discussion here uses the conventional CEE definition of “cross-subsidy”. See Section 2.4 above for a full discussion.
economies, industrial consumers are clearly cross-subsiding household consumers to a considerable degree, at least before correcting for differential non or late payment.\(^{25}\)

- In absolute terms, the prices remain low relative to estimates of long run marginal cost (LRMC). EBRD suggests taking average prices in the EU as the relevant cost comparator for the CEE economies and average prices in North America as the relevant cost comparator for CIS economies. (The latter reflects the abundance of natural gas and hydroelectric resources.)\(^{26}\) In what follows, we take the chosen EBRD cost comparator as a reasonable measure of LRMC for electricity in the transition economies.

- On the EBRD-based approach, prices to industrial consumers are around 55% of LRMC in Estonia; around 60-65% in Poland and Latvia; around 70% in Hungary, Romania and the Slovak Republic; about 75% in the Czech Republic; and around LRMC in Lithuania.\(^{27}\) The table also suggests that industrial prices in Ukraine are around LRMC levels, but this abstracts from prevalent late and non-cash payment which considerably reduces the “effective” price paid.

- For household prices, the EBRD-based procedure suggests that only in Poland is the household price approaching even 50% of LRMC. For Hungary, Latvia and Estonia, it is around 30-35%; around 25% for the Czech Republic and Lithuania; and 15-20% for the Slovak Republic and Romania. However, these figures may well be over-pessimistic given the scope for increasing the efficiency and reducing prices to household consumers in many EU countries.

- EBRD themselves suggest that average tariff levels are around 50% of the levels in the comparator areas in both the CEE and the CIS economies.

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\(^{25}\) The Czech authorities have raised power prices to households by 15% this year, although much of this is from an increase in VAT rates for energy. They are, however, planning to raise household prices by a further 35% in 1998-99 which would raise the household price marginally above the price to industry by 2000. However, not only is this apparently intended to be the limit of price rebalancing; but there is also considerable opposition from within the Government coalition as well as from outside it to the current proposals, including publicly stated opposition from Prime Minister Klaus.


\(^{27}\) The estimates for the Czech and Slovak Republics apply to the pre-depreciation price in $. The recent depreciation of these currencies against the $ will reduce the local currency price when expressed in $, but LRMC will increase in $ terms for these countries from the increased cost of fuels and other tradable inputs. Thus, the figures reported exaggerate the price as a percentage of LRMC by about 10 percentage points, assuming a 15% depreciation. Similar corrections should be made for other countries with significant exchange rate changes.
4.2. Discussion and Appraisal of Pricing Policy

The reason for the price patterns observed is quite clear.

Electricity companies are now required to cover their current costs in accounting terms and they are also expected to earn a positive operating profit. However, depreciation rates remain very low in almost all CEE countries. More importantly, the required rate of return and depreciation are calculated on the basis of historic book values.28

However, a very high proportion of the capital stock was inherited from pre-1989 without any corresponding financial liability. Allowing companies to charge prices based on earning a normal real rate of return on assets valued at replacement cost and to recover full CCA depreciation would mean that they would earn sizeable revenues but without the dividend or debt payment obligations of an OECD utility. For countries without any need for large-scale capacity expansion programmes, this would leave the companies with potentially very large amounts of retained earnings, in circumstances of weak corporate governance and regulatory institutions.

Apart from Hungarian generation and distribution companies, the other CEE electricity companies remain state-owned. There are minimal or no dividend or debt obligations on SOEs. Further, there are no financial control systems comparable to UK External Financing Limits (EFLs) that would allow the state to extract surplus cash from the companies. This is a major deterrent against allowing the companies to charge LRMC prices.

In these circumstances, charging LRMC prices would, at best, allow electricity companies to embark on large and potentially wasteful investment programmes. At worst, governments would be facing companies with large cash surpluses which would not be needed for the financing of investments in the core business for some years. This clearly raises concerns over the temptation to use such surpluses for generous expenses and wages; for the purchase of other businesses, related or unrelated (including suppliers, banks, newspapers, etc); and the purchase of political influence.

These problems as they affect electricity companies are not as severe as with some gas companies which earn large revenues in transit fees, but they certainly raise worries within CEE countries over political influence and power as well as economic concerns. Traditionally, power companies have been powerful forces in these economies, more likely to be running their line Ministries than to be run by them. Given the weaknesses of regulation and of government departments in CEE economies, it is hardly surprising that governments prefer to hold down electricity companies’ revenues, nor that they choose to do so primarily by holding down household prices. Indeed, one can well understand the logic of this approach.

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28 Poland has introduced replacement cost valuation of capital but has, significantly, decided to phase this in slowly for the electricity and district heat industries because of the implications for prices.
In essence, electricity utilities are being allowed to charge prices that (in toto) cover operating costs and allow the financing of a minimalist investment programme. It is a form of regulation by cash limits. This can be sustained while the utilities remain in majority state ownership, even if corporatised, as the government still retains effective control over borrowing by the companies.

Once instance of this approach is that governments frequently forgo their rights to dividend payments from the utilities on their share stake. Indeed, in the Czech Republic, the government prevented CEZ (a 30% privately owned company) from issuing a dividend in 1997, on the grounds that it was unnecessary and would lead to prices being higher than otherwise necessary. The notions (i) that the government and taxpayers were entitled to a return on their share stake in CEZ and to a return of surplus capital; (ii) that such a dividend requirement was a useful device to encourage efficient management and asset use; or (iii) that paying a dividend might enable CEZ (which has already borrowed significantly on international capital markets) to reduce its future costs of raising equity capital do not seem to have carried much weight, even though there were clearly no problems at all over dividend coverage.

Governments in the Czech Republic and most other CEE economies prefer to maintain the quasi-cash control approach and to collect revenues from the companies in the form of corporate income tax payments. This could not be described as an optimal incentive structure for encouraging efficiency within the utilities.

The framework described above runs into difficulties, however, with private owners who require a normal rate of return on the purchase value of their assets and the ability to depreciate capital on an economic basis. It is this more than anything else that has led to the recent confrontation in Hungary between, on one side, the private (and foreign) investors who own sizeable (48-50%+1) stakes in the generation and distribution companies and, on the opposite side, the Government which, in late 1996, refused to accept the price increases recommended by the Hungarian Energy Office. Indeed, Tractabel, which owns 50%+1 of a Hungarian generating company, threatened legal action over this refusal and won better terms than were originally offered.

4.2.1. The choice of price time path adjustment

The choices faced by CEE governments is demonstrated in the figure shown below which illustrates some alternative price paths that CEE countries could have adopted.

In Figure 1 below, we show LRMC as the new entrant price in a contestible market. This is equivalent to the price that would be charged by an efficient incumbent earning a normal real of return on MEA-valued assets (ie assets valued at net replacement cost). We draw the LRMC curve as (slightly) downward sloping because of expected technical progress and normal efficiency gains. There are other definitions of LRMC that are in use and which would give rise to similar, but not identical price levels. One such is the World Bank approach under which the additional investment and related costs of a long-term increment (or decrement) in output are discounted back to the present.
The figure also equates SRMC with running costs. This is, of course, only correct in periods of surplus capacity.

![Figure 1: Time Patterns for Price Adjustment](image)

The governments could have adopted an approach of rapid adjustment to charging full economic prices post 1989, as advocated by the World Bank and others. This is shown by the left-hand hatched line. It would have allowed companies to recover capital costs (including a normal rate of return) on all assets, including inherited assets. It would, however, have required putting in place:

- companies (and company balance sheets) with financial liabilities corresponding to the economic value of the inherited assets;
- an effective system of corporate supervision, preferably including total or majority privatisation; and
- a credible and effective system of economic regulation.

The CEE governments were unable and/or unwilling to do this.

In economic efficiency terms, the costs were that electricity prices were (and remain) at the margin substantially below the level required to maximise allocative efficiency for new energy-using investment decisions. Hence, the signals for increasing energy efficiency remain weak. In addition, commercial incentives for the companies are far from optimal so that incentives for dynamic efficiency gains are also weak. The combination of these two factors means that energy demand will be higher than necessary. This in turn implies that the time at which new investment is needed to expand capacity will be unnecessarily
brought forward, so that the net present value of industry costs is higher than it would be under the rapid price transition path.

Conversely, the governments were able to reap the benefits from holding down electricity prices (particularly to households) set out in Section 2.2. In addition, they were able to avoid the - by no means insignificant - political economy risks outlined in Section 4.2 above. Finally, given all the practical difficulties of achieving the institutional reform necessary to support this option, it is not surprising that the governments preferred to rely on modifications to existing control frameworks on the companies and to reject the radical price transition path.

The solid line for the period to 1997 demonstrates the path that has been adopted in Central Europe and aimed at (sometimes successfully and sometimes not) in the Baltic States and the Balkans. Electricity companies are allowed prices sufficient to earn a reasonable margin over running costs plus an allowance for a modest amount of historical cost depreciation.

Clearly, the radical price adjustment path could be adopted from now on. This is still unlikely and, as described above, the Hungarian government rejected it in 1996. It is more attractive if countries wish to introduce competition into generation markets which is why more interest has been shown by power companies in Poland. (See Section 6.2 for a discussion of the relationship of market structures to pricing policy.)

The most likely outcome remains a gradual path with prices reaching LRMC levels in some years time, eg by around 2010 when the need for substantial replacement and expansion investment can no longer be avoided. This is shown in the hatched line drawn to reach the LRMC line asymptotically at the end of the period on the figure. This seems to be the policy of most countries, perhaps most clearly set out by the Czech Republic.

There are, however, some countries which may try to adopt a path of further postponement, as shown by the hatched line which remains substantially below LRMC at the end of the period. This policy is, of course, unsustainable unless governments revert to financing or large-scale subsidisation of electricity investment. However, the countries who might be most tempted by such a policy are probably the least likely to have the necessary tax resources. Among CEE countries, such a policy stance appears to have been attempted in the 1990s in Bulgaria and, to a lesser extent, in Romania and Lithuania. If sustained into the future, it would at some point require a major and rapid price hike that would probably be crisis induced and would certainly be difficult to justify.

4.3. Application of Marginal Cost Pricing Principles to CEE Electricity Industries

The previous section discussed pricing policy on the basis that electricity prices in the EU 10 should be set on LRMC principles and that full LRMC levels were the appropriate benchmark price.
This implicit assumption seems unchallengeable as the basis for setting prices once the systems have replaced or rehabilitated most of the capital stock inherited in 1989. However, this could well be 10-20 years away or more. On the basis of arguments in previous sections, we would argue that prices should be set to reach LRMC levels rather sooner - at the point at which the systems are requiring substantive capacity expansion (including major plant rehabilitation to maintain capacity as well as pure new build). At this point, LRMC prices (including proper remuneration of the pre-1989 capital stock), are needed to give the correct price signals for the use of electricity and hence for the basis for evaluating the need for the proposed investments. The resulting average level of generation, transmission, distribution and supply prices is likely to be similar to averages in the EU.

It is unclear when this point will be reached. The evidence from tenders in Hungary and the Czech Republic cited in Section 3.5 suggests somewhere in the period 2000-2005. For countries with larger amounts of spare capacity, it could be later - provided that the spare capacity is readily available without major expenditure. For countries with major rehabilitation needs to maintain effective levels of capacity (eg Romania), it could be earlier. Similarly, it could be earlier for countries which may be closing some nuclear generation, particularly if it is being closed for reasons of nuclear safety rather than because it has reached the end of its planned life. The most difficult to assess are the CIS countries (like Russia and Kazakhstan) with apparently large volumes of spare capacity but with major rehabilitation needs at some point.

However, even if it may take some time before it is necessary to reach full LRMC price levels, that does not mean that LRMC price principles should not be applied earlier. In particular, we would strongly advocate that marginal cost considerations should be applied as soon as possible to the rebalancing of industrial and household electricity prices in the EU 10. For reasons to be set out in Section 8, we would argue that this is essential for the countries to be able to introduce any competition into generation and to meet the terms of the EU Electricity Liberalisation Directive.

In Section 4.3.1 below, we outline the relevant economic considerations and outline a possible strategy for rebalancing prices and transitioning towards full LRMC price levels.

4.3.1. Price rebalancing and marginal costs

The main impediment to further economic reform of the electricity industry in the EU 10 CEE countries is the fact that power companies still lose money on sales to household consumers and that these losses have to be recouped from other customers. Unless and until this is corrected:

Among the EU 10, Bulgaria, Lithuania and the Slovak Republic have nuclear reactors of the RBMK and VVER 440/230 type in operation, which lack a secondary containment structure. They have, in consequence, been strongly urged, on nuclear safety grounds, to close these plants as soon as possible. However, this will require replacing some of the lost capacity in construction of new generating capacity which is costly. In consequence, the countries have expressed their clear unhappiness at early closure, at least in the absence of financial compensation from Western governments. The same problems apply (but much more acutely) in the Ukraine over Chernobyl, as well as in Armenia and Russia.
(i) distribution companies (cost centres) cannot freely operate on a commercial basis;

(ii) complicated arrangements need to be put in place to ensure the financial viability of distribution companies and to handle the position of distribution companies with low percentages of household consumers, further weakening commercial incentives; and

(iii) competition cannot be introduced into the supply of bulk power to large industrial consumers as required by the EU Electricity Liberalisation Directive as it would destroy the basis of the cross-subsidy. It would therefore threaten the bankruptcy of the distribution companies unless specific measures were introduced to compensate them. (See Section 8 below.)

One way of considering the basis for the setting by utilities and the regulation of electricity and similar prices is to divide the pricing problem into two parts:

(a) set the revenue requirement; and

(b) allocate the revenue requirement between and among the main customer groups in the most economically efficient way.

For the reasons discussed previously in Section 4.2, CEE governments have decided to set their revenue requirement by a quasi-cash control mechanism which allows them to charge prices that cover operating costs and to finance agreed investments but not to earn a full rate of return or to charge economic depreciation on their existing asset stock. However, we pointed out that, even defining the revenue requirement in this way, the average price of delivered power would rise over time to LRMC levels, where the latter are defined to include capital costs including the expectation of a normal rate of return on the full asset stock.

It is worth emphasising that the quasi-cash control method of price setting was (and is) not uncommon in West European countries or the UK. It has been a standard method of regulating prices of state-owned power companies and particularly for establishing costs and prices in transmission and distribution networks. It essentially operated as a kind of “pay-as-you-go” financial approach under which depreciation can only be included in prices as an allowable cost to the extent that it is required for replacement investment and is not seen as a way of recovering past capital expenditure.

The recent UK regulatory reviews of NGC (the National Grid Company) and, especially of Transco, the British Gas pipeline company have revived the issues not only of asset valuation (share price or replacement cost), but also of allowable depreciation and when it can be taken. In particular, the question has arisen as to whether depreciation can be charged for funding new investment (e.g., setting depreciation profiles on a renewals basis) or to allow recovery of past capital expenditure. Critics of the recent reviews would argue that they represent a major step backwards to a quasi-cash limit approach. These issues are, therefore, by no means unique to transforming economies.
The issue to be addressed in the rest of this Section is the second component, namely how to set the structure of prices.

Microeconomic theory implies that the key requirement is for consumers to pay the full costs of supply at the margin. Allocative efficiency is maximised over time when prices are set on this basis. Infra-marginal units do not need to be charged at marginal cost to maximise efficiency. This provides the justification for the economic efficiency of tariff structures with fixed elements and multi-part tariffs. It is also the basis of the justification of low “lifeline” tariffs, which are frequently recommended by the World Bank in developing economies. It is this approach that we draw on in what follows.

4.3.1.1. The current basis for setting household and industrial electricity prices in CEE economies

The current basis for setting relative electricity prices for household and industrial consumers in CEE economies is clearly highly sub-optimal when judged by the criteria set out above. There is no reason to believe that either industrial or household consumers pay the full costs of supply on marginal units. Indeed, the allocation system was explained to one of the authors as follows:

(1) estimate the revenue requirement based on demand projections, estimated fuel and other costs;

(2) establish with Ministers what it is reasonable to charge household consumers (in the light of prices for other types of energy, other pressures on living standards, expected inflation etc);

(3) estimate the average per unit price to industrial (and commercial etc) consumers given the results of (1) and (2); and

(4) if not giving unacceptable price implications for industrial consumers, conclude. Otherwise, iterate on the basis of changes in assumptions.

This process yields a figure for expected revenues and some end-user prices. Prices to be charged by bulk suppliers to distribution companies are then agreed (or, more frequently, imposed) as a set of “transfer prices”. They are typically at the level to ensure that each company operating in the industry remains solvent and achieves a similar rate of return on its assets. Thus, in the Czech Republic, the bulk supply price at which the distribution companies buy power from CEZ is different for each distribution company, depending on their mix of industrial and household consumers. Agreeing transfer prices each year is a major and bitterly fought exercise. (In Poland, where there are separate generating companies selling to the grid company PSE which, in turn is a monopoly seller of bulk

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30 Lithuanian prices to industrial users are the one exception from Table 4.1.
31 The description may be somewhat over-simplified but is a fair representation of the underlying rationale.
power to distribution companies, there is a similar ‘pie-sharing’ exercise but mainly involving the prices at which generators sell to PSE and PSE’s transmission charges.)

Again, one should say that there is a clear logic to this approach, but it is a logic that completely omits the potential role of prices as a signalling device for the allocation of resources.

(Note that all the EU 10 have, until very recently, adamantly required nationally uniform electricity prices, particularly for household consumers. In 1997, the Polish government allowed regional variations of up to +/- 10%)

4.3.2. Introducing marginal cost considerations: a potential way forward

Taking the logic set out above, we would suggest the following way forward.

The essence is that initially (say by 2000):

(i) Industrial consumers should be charged full LRMC prices (including a reasonable rate of return and full economic depreciation) as soon as possible - preferably immediately but certainly with a transition of no more than 1-2 years.

(ii) Household consumers would be assigned a “super-lifeline” amount of at prices that cover operating costs, but that they would pay full LRMC prices for units above the super-lifeline. In addition, as far as possible, the volumetric element of household tariffs would be the full economic cost so that the economic subsidy would be concentrated on the standing charge element of the household tariff.

(iii) The economic subsidy to households would be financed by setting-up transitional “back-to-back” contracts between distribution companies and generators for generation to supply the customers on the super-lifeline.

The price transition would then take place by progressively reducing the band of the super-lifeline (and/or introducing tranches with intermediate prices) until household consumers paid full LRMC prices on all units purchased above a small conventional lifeline amount over some pre-announced period. This would take place by adjusting the standing charge. The transitional contracts would phase out as the volume of subsidised electricity fell.

Clearly many variations on this theme are possible including using current prices as a standard lifeline price (which may or may not be removed in the long-term). But, the general principles are reasonably clear. They have an obvious family resemblance to ways in which utility “stranded asset” problems are often handled - including the British Coal contracts after the 1989 England and Wales electricity privatisations.

This proposal would:

- preserve economically efficient price signals on the purchase of marginal units;
• ensure that no power was sold for less than the operational costs of supply to the relevant consumer group;

• concentrate the implicit subsidy on smaller household users and thereby make it at least more progressive in its incidence; and

• provide a way of transitioning straightforwardly into charging prices to all main groups of consumers that fully cover economic costs, thereby removing the remaining economic subsidies.

There is also a simple economic rationale for fixing the value of the subsidy available for the super-lifeline. As we discussed in Section 4.2, the main reason for average electricity prices being so low is that electricity companies are not allowed to include other than minimal capital costs in prices. The capital asset base on which capital costs are estimated is, in almost all cases, the historic (book-value) cost of capital.

The current level of the economic subsidy to households can be expressed as follows\(^{32}\) (assuming that the quasi-cash limit approach set out in Section 4.2 is used for setting the revenue requirement based on historical cost asset valuation):

$$\text{Current Value of Economic Subsidy} = (\text{RRR} - \pi)K_{RC}$$

where  
$K_{RC}$ is the capital stock valued at replacement cost;  
$\text{RRR}$ is an appropriate real rate of return on assets; and  
$\pi$ is the (implicit) real rate of return on MEA valued assets.

But, CEE governments do not set a rate of return in real terms. Hence, for practical policy purposes, it is useful to consider the following similar expression for setting the value of the economic subsidy to be ascribed to household consumers at the start of the price transition path:

$$\text{Starting Value of Subsidy to Households} = r(K_{RC} - K_{HC})$$

where  
$K_{HC}$ is the capital stock as currently valued at historic cost; and  
$r$ is an appropriate real rate of interest eg 10%.

As the very low valued pre-1989 capital is replaced and as the capital stock is revalued, so the difference between $K_{RC}$ and $K_{HC}$ goes to zero. The policy requirement is to set this transition path so that this difference reaches zero when capacity surpluses are eliminated, eg at some date between 2005 and 2010. At that point, all capital should earn RRR on the full replacement value.

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\(^{32}\) The authors are grateful to David Newbery for this helpful suggestion.
The necessary narrowing of the super-lifeline can then proceed in line with the running
down of the subsidy between 2000 and the terminal date. If the subsidy is ascribed to
household standing charges, proper marginal price signals would be achieved throughout.

Of course, to make this approach operative, it is necessary for regulatory institutions and
companies to carry out a replacement cost valuation of the capital stock of the electricity
companies. Replacement cost accounts are, however, essential tools for the companies,
since inflation rates in CEE countries are still little short of 10% at best. (The stock market
valuation at the point of privatisation could, in principle, be used where privatisation has
taken place. However, in CEE circumstances, it is likely that stock market valuations of
power companies will be heavily influenced by expectations of how regulatory institutions
will behave, particularly on price setting viz Hungary.)

We give below some additional comments on the proposal as it would affect (a) industrial
and (b) household consumers.

4.3.2.1. Prices to industry

CEE and CIS countries have had very intensive use of electricity and other forms of energy
by industry and in highly inefficient ways. For various reasons, including the low prices
paid, energy intensive basic industries (eg iron and steel, basic chemicals and aluminium)
have become an important part, not just of their economies, but also of their exports.

Raising electricity and other energy prices to LRMC levels over a 1-2 year period would
therefore help achieve the following - assuming that the enterprises genuinely face hard
budget constraints which is not yet the case in all CEE economies and certainly not in the
CIS:

(i) it would encourage energy saving activity and investment by the enterprises as part
of a cost-minimising strategy. The evidence is that relative price effects on energy
demand are concentrated on investment and capital modification. Therefore, it
clearly makes good sense for industrial enterprises to face the correct energy price
signals when restructuring;

(ii) it would mean that electricity (and, hopefully, other energy) input prices were set on
the same basis as competing producers in EU and other countries and thereby
reduce the pressures for (and any justification of) EU trade protection, including
voluntary quotas, anti-dumping actions etc);

(iii) the allocative benefits from the price rises do not create actual or perceived equity
problems as do changes in household prices. In addition, setting industrial prices at
full LRMC maximises the value of the subsidy available for the super-lifeline.

Of course, some areas and industries might find the transition insupportable. Some of these
would represent activities that are uneconomic at world prices and should be closed down.
Others may be able to restructure successfully, eg with the aid of specifically targeted assistance.

The arguments for converting economic subsidies to energy prices into explicit subsidies (such as restructuring expenditure, regional assistance etc) are as strong as if not stronger in this area than anywhere else in transition economies. This is (a) because the outputs (and most of the inputs) are tradable goods; and (b) because such a policy is integral for establishing viable, commercial industrial companies facing strong and coherent financial disciplines.

4.3.2.2. Prices to households

The case for the “super-lifeline” tariff is to meet the concerns of governments in CEE economies about the pressures of transition of households with around average earnings. Conventional arguments for lifeline tariffs emphasise their role in providing some protection for the poor, particularly where social safety nets may be weak. In CEE and CIS economies, such arguments fall flat because the concern of governments over the prices of electricity and similar goods relates to the living standards of a much wider range of people than (say) the bottom decile of household incomes.

The economic efficiency arguments against a more substantial super-lifeline are weak to the extent:

(a) that electricity utilities genuinely do not need to accumulate large volumes of retained earnings to support current investment; and

(b) households do face full LRMC prices at the margin.

Note that the first point (which is critical) would not hold in Asia, Latin America or most developing economies where the electricity industry and most utilities have major capital needs to satisfy the current level and growth of demand.

One example of a super-lifeline approach is the structure of household tariffs in Italy. Household consumers with low consumption levels have meters with a maximum capacity of 3 KW. They pay 39.9 Lira per kWh (around 2 cents US) for the first 75 kWh consumed per month with the price rising in successive tranches until, above 225 kWh, they pay 159 Lira/kWh (around 9 cents US). Other households with standard meters of capacity of 3-6 KW pay 159 lira/kWh on all units consumed. Average household electricity consumption in Italy is around 2,100 kWh per year. In addition, all consumers pay a tariff surcharge. This is about 2 cents/kWh but lower for the household customers with 3KW meters.

For CEE and CIS countries, allowing initially a single tranche of (say) 3-500 kWh per quarter should be straightforward in terms of operational billing requirements. Care would need to taken though over incentives for households to split themselves into several smaller family units to take advantage of the lower priced tranche. The super-lifeline tranche would then be reduced over time (and possibly even eliminated) as suggested above.
5. THE FINANCIAL POSITION OF CEE ELECTRICITY COMPANIES

In the previous sections, we have discussed investment needs and prices. At various points, we have mentioned the fact that power companies are unable to (or prevented from) making appropriate provision out of their sales revenue for depreciation and also the problems of arrears on payments.

In this section, we will consider each of these in turn.

5.1. Profitability of Power Companies in CEE Countries

We have collected accounting data from recent annual reports for the Czech Republic (CEZ), Romania (RENE), Estonia (SE Eesti), Latvia (Latvenergo) and Lithuania (Lietuvos Energija). All except CEZ are fully vertically integrated companies with responsibility for electricity distribution, generation and transmission as well as production and sales of significant amounts of heat from CHP plants. This group of companies provides a reasonable range of coverage across the EU10.

The accounts are all based on varying local accounting standards, although CEZ’s accounts are audited by Arthur Andersen who also report a consolidated financial statement according to International Accounting Standards. However, in view of the problems over asset accounting (including depreciation), we concentrate in what follows on cash flow measures of operating income, excluding depreciation where possible.\(^{33}\)

Table 5.1 below sets out some summary financial indicators for these companies.

\(^{33}\) We do this because depreciation is a use of funds by the firm rather than a source of funds and hence it is not an element of operating costs.
# Financial Performance of CEE Power Companies

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<tbody>
<tr>
<td><strong>Pre-tax Operating Profit (gross of allowances for depreciation) as % of Sales Revenues</strong></td>
<td>37%</td>
<td>8%</td>
<td>N/A</td>
<td>3%</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Pre-tax Operating Profit (net of allowances for depreciation) as % of Sales Revenues</strong></td>
<td>22%</td>
<td>2%</td>
<td>0.7</td>
<td>-5%</td>
<td>12%</td>
</tr>
<tr>
<td><strong>Pre-tax Operating Profit (gross of allowances for depreciation) as % Value of Net Fixed Assets</strong></td>
<td>16%</td>
<td>0.3%</td>
<td>7%</td>
<td>1.2%</td>
<td>15%</td>
</tr>
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</table>

1. Total assets
2. Net of depreciation and as % of asset value net of accumulated depreciation.

**Sources:** Annual Reports of Companies

The information on rates of return on capital is recorded for interest. Other than for CEZ, it probable says more about asset valuation methods in the various countries than providing reliable data on rates of return. Latvian asset values in particular look very low at less than 70% of the annual level of sales. (The auditor expresses the view in his report that asset values in the accounts are much less than their market value.)

The table shows a relatively healthy financial position for CEZ, which has been able to set aside funds for nuclear decommissioning as well as make reasonable provision for depreciation. Both interest payments and receivables seem to be manageable. One would expect the rate of return on assets to be reduced if estimated on the replacement cost of capital. Even at 16%, it represents a real rate of return of only around 6-7% on a (very low value) historic cost asset base. The 1996 Annual Report emphasises the CEZ argument that their financial position will deteriorate rapidly unless the government allows higher electricity prices, particularly to household consumers, which would then allow CEZ to charge higher bulk power prices.

RENEL, the Romanian power company, not surprisingly appears to be in a much less healthy financial position. The published accounts are not exactly transparent. In particular, they provide no information on receivables, which other information suggests is a major problem in Romania in general and for RENEL in particular.

Problems with the accounting data make it difficult to make conclusive judgements on the financial health of the Baltic power companies. Insofar as one can judge, the position of Lietuvos Energija looks poor. The position of Eesti Energia looks healthier. The Latvian position looks healthiest, but the accounts as published in English are far too summary to
allow any reliable appraisal. Other evidence suggests that the financial health of these companies has been improving since 1995.

5.2. Power Company Arrears

Energy sector arrears remain a serious problem accounting for as much as 6% of GDP in some cases and 4% or more of GDP in most CIS economies. As such, they are sufficiently important to be the subject of a recent IMF Survey article. Of course, by no means all of them represent electricity arrears, although arrears to the power sector appeared to account for over half the total in Russia.

Among CEE economies, arrears to power sector companies do not now appear to be a serious problem in the Visegrad countries or Estonia. Arrears to energy companies have represented a major problem in Latvia (where they reached around 6% of GDP in mid-1996 before falling back), Lithuania and in both Bulgaria and Romania. However, this also reflects the position on arrears in the economy in general. The countries with major energy or electricity arrears problems are those with general arrears problems. Energy sector arrears are part of the structure of inter-enterprise arrears; only, in most CIS countries (and in Latvia), the chain involves debts, sometimes very substantial, to Russia and Turkmenistan for gas imports (eg Ukraine, Kazakhstan).

5.2.1. Normal and problematical arrears

It is tempting to think that large volumes of arrears are a problem per se. It is true that in a high inflation environment large arrears can cause significant liquidity problems, particularly if no interest or other penalties are levied for late payment. This is clearly a problem for electricity sector arrears in CEE and CIS economies outside Central Europe and it also means that the “effective” price paid for electricity can be much less than the posted price. For instance, with inflation at an annual rate of around 100% (as for Ukraine in 1996), a three month delay in payment reduces the real price paid by 18%, a 6 month delay by 41%.

The above is true even if the bills were settled by cash payments, which, in the Ukraine and other CIS economies, is frequently not the case for industrial consumers. It is for this reason that there was so little discussion of electricity prices in the CIS in Section 4.1. In most CIS economies, electricity bills are frequently met by various forms of barter, mutual debt offset etc. (See Section 5.2.3 below.)

Nevertheless, substantive arrears problems relate much more to the flow of arrears than to the level of the outstanding stock. A stable stock of arrears of around 2 months duration (the average duration of the Estonian power company’s receivables) does not appear to cause problems and is similar to levels observed in Western economies. We call it trade credit. As Schaffer has clearly demonstrated, the problems only arise if the volume of arrears is

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increasing. Pathological arrears are a flow problem and typically represent inadequate financial discipline imposed by the state.

Schaffer demonstrates that the main pathological arrears problem manifests itself in growing non-payment of taxes by companies, particularly financially distressed companies. Firms in financial distress pay their suppliers and their employees so that they can remain in business. They may pay late but they typically pay. However, they extract government subsidy by non-payment of taxes. They expect never to pay these tax arrears as governments would have to bring difficult and highly contentious legal cases, typically against enterprises that would otherwise close.

Schaffer shows that, under some limited circumstances, a large stock of arrears can itself be a problem. This tends to be either when firms collude and lobby for a government bailout and/or when toleration of tax arrears spreads to firms not in financial distress. Both of these have involved the energy sector. In Russia, until recently, Gazprom and the UES power system were able to escape tax payments on the grounds of the debts that were owed to them. Gazprom is now being forced to pay its tax liabilities and is therefore getting tougher on both its Russian and non-Russian debtors.

In the Russian power sector, UES cash collection rates are apparently only around 12-15%. To increase collection rates, it was announced in July 1997 that industrial consumers who pay on time and in cash will receive a tariff discount of 30%. There are also plans for the liberalisation of wholesale electricity sales whereby generators would have more freedom to sell direct to industrial consumers at a discounted price relative to the regional Energos - provided payments were made in cash. But, this could cause problems for the Energos who face losing more of their higher tariff customers.

It remains to be seen how these proposals work out, whether UES and the regional power companies do actually adopt a more stringent policy on disconnection and whether the new tougher policy on tax arrears helps halt and unwind the problems of escalating inter-enterprise and tax arrears.

In this context, it is worth noting that enterprise arrears to electricity companies and other utilities can be thought of as analogous to tax arrears. Power companies are highly visible and publicly owned (although not always effectively publicly controlled) companies. Debts to them are different from debts to other (typically privately owned) companies. Stopping the supply of power or gas to a major industrial company, eg in a seriously depressed area or a company town, raises major concerns for central and local government. The municipality may pay for, or far more likely encourage, the accumulation of arrears rather than accept debt enforcement.

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35 See Schaffer op cit and the list of references.
37 With limited exceptions, eg Hungary and the partial (but insider) privatisation of UES.
Within the CIS, governments can be more directly involved in creating the problem of rising power company debt levels. This is because of chronic non-payment of their bills by government Ministries, the armed forces and other central and local government institutions. In Russia, continued power supplies have been extracted more than once from suppliers via the power that flows from the barrel of the gun. Non-payment by governmental bodies is also a chronic problem in Ukraine and other CIS economies.

Allowing the debts to accumulate can be in the interests of the energy companies. They can have an interest in colluding with the government or allowing debt accumulation by companies. Such collusion can mean that the debts can be used to gain control cheaply of the debtors’ assets - even more so if the energy companies are using these debts to them as a reason for not paying their corporate taxes. Early in 1997, there were proposals that Gazprom be allowed to take a sizeable ownership stake in UES as payment of the debts owed to it by UES. There have been a number of such debt-for-equity proposals involving Gazprom and gas companies in other CIS and Baltic countries.

Summarising, pathological arrears for power companies and other energy industries indicate an unwillingness and/or inability by governments to enforce payment obligations on companies. It is very noticeable that power company arrears are much more of a problem concerning industrial consumers. Households are required to pay and, on the whole, are cut-off for non-payment. The same is not true for companies.

5.2.2. Power sector arrears problems in CIS and CEE economies

Gurgen (IMF 1997) classifies energy sector arrears under the following headings:

- **Decreasing ability and willingness to pay by consumers.** This is the case of the financially stretched enterprises discussed above. It may also be a problem where countries have tried rapidly to raise power prices (and other energy prices) eg Albania and some CIS economies.

- **Inadequate payments discipline and weak collection efforts.** This heading covers poor enforcement of bill payment and inability or unwillingness to disconnect so that the expectation of government bail-out becomes prevalent. Problems in this area can be compounded by shortages of meters and deficient metering.

- **Government intervention.** This heading covers non-payment by government bodies of their bills and protection of strategic industries from closure (discussed in the previous section). It also covers government guarantees on imports of fuels for power stations, mainly gas, which have reduced the pressures for effective revenue collection in several CIS economies.

The discussion so far has concentrated on electricity-related arrears problems in CIS economies. This is because they have, in general, been so much more virulent and deep-
seated in the CIS countries than in the EU 10. Nevertheless, they have been almost as pressing in Bulgaria and, at times, in Latvia, Lithuania and Romania.

For example, in 1996, Romania RENEL was owed around 1,500 billion Lei (almost US$300 million) in unpaid bills by Romanian factories. However RENEL itself owes its suppliers 2,000 billion lei (around US$400 million). Even if all RENEL’s debtors were to pay up, it would still have around US$100 million in short-term payment debts. Moreover, the government was (in 1996) continuing to force RENEL to sell its energy at prices that do not cover its operational costs. Consumers were paying around US$38 per MWh of energy, which costs RENEL US$42.70 to produce.38

This example shows clearly that, although arrears problems can be a major component of weak financial performance of power companies, it is far from the only reason or, at least in CEE economies, the main reason. Among the EU 10, payment enforcement and arrears are much less important for low (or negative) power company profitability than governments’ regulatory policy of holding down power prices.

However, such regulatory policies can cause arrears problems elsewhere in the economy. For instance, holding down power prices can cause arrears problems to suppliers. Thus, the accumulated electricity and heat non-payments in Bulgaria led to non-payment of coal bills by NEK, the Bulgarian power company, and the heat companies. Continued supply through the chain was achieved by government guarantees to the banks for extending additional credits to NEK and the heat companies, which contributed to the enfeeblement of the banking sector. This was a not insignificant factor in the build-up to the financial crisis in Bulgaria in 1996.

Similar problems have arisen in Romania and elsewhere, albeit on a lesser scale. They arise because of a combination of price regulation that maintains prices at less than the cost of supply, together with weak payment discipline and requirements for continued supply to major customers. For electricity, the latter are typically major industrial consumers, frequently financially distressed ones, such as the Kremikovsky steel works in Bulgaria - which also happens to be within demonstration-marching distance of Sofia.

The Baltic States have started to improve revenue collection and tackle weak energy sector finance. They now cut off supplies to delinquent consumers, set up repayment schedules for those who owe money and are strengthening their billing and collection systems and outturns.39

5.2.3. Manifestations of acute power sector arrears

Cash payments make up only a small proportion of payments for countries like Russia and the Ukraine where arrears problems affecting the power sector are most acute. Settlements of bills by industrial consumers typically take place by barter or quasi-barter methods. The

38 OMRI, 1996.
same applies, in Ukraine, to payments by local Energos to generation companies and, in Russia, of payments to UES.

Among the methods of payment used are:

- multi-way trade barter
  (It is officially illegal in the Ukraine to settle electricity bills by barter, but it is still apparently widespread, particularly if fuel supplies or power company inputs are involved);

- mutual, frequently multi-way, debt offsets between companies;

- trade in discounted Government or Ministry power sector IOUs; and

- merchants supplying fuel to generators in return for taking ownership of the power generated.
  (This has occurred in industrial companies in Bulgaria. It tends to become a way of sucking value added out of the company.)

These payment techniques are clearly those that one would expect to see develop in situations of payment indiscipline and soft budget constraints. It is not surprising that they lead to the build-up of major arrears to power companies and more widely across the economy. This is particularly likely when coupled with widespread government non-payment of bills and unwillingness of Ministers to allow disconnection of major industrial customers or distribution companies.
6. THE INDUSTRIAL AND TRADING STRUCTURE OF THE ELECTRICITY INDUSTRY IN CEE ECONOMIES

Following Hunt and Shuttleworth (1996), we identify the four following main structural models for the electricity industry:

Model 1: *The monopoly model.*
A fully vertically integrated utility encompassing generation, transmission and distribution, like EDF (Electricité de France);

Model 2: *The purchasing agency model.*
Typically, an integrated generation and transmission company, but with separate distribution companies, like the CEGB (Central Electricity Generating Board) in England and Wales pre-1989. Model 2 also covers competition in generation but with the purchase of all generation by a monopsony-monopoly transmission company (as in Northern Ireland);

Model 3: *Wholesale competition.*
The trading structure under which there are separate generating companies which can sell directly to large industrial consumers and distribution companies (as in England and Wales post-1989); and

Model 4: *Retail competition.*
The trading structure under which all consumers can purchase electricity from any licensed supplier (including generators and electricity traders) as in Norway and scheduled for introduction in the UK in 1998.

In the context of the EU 10, it is worth making the following points concerning these models.

1) The typology above assumes that the trading (or contract) structure follows the industrial structure, eg that where there are separate generation companies, they are able to sell directly to some customers. This is typically the case in Britain and in most other OECD countries where monopoly power companies have been unbundled. It is not, however, necessary. Separate generation companies can be set-up but with contractual obligations to sell all their generation to a monopsony-monopoly transmission (or transmission and distribution) company - as in the cited Northern Ireland example.

2) There are clearly degrees of wholesale competition. In England and Wales, the definition of customers eligible to buy direct from suppliers other than their local distribution company initially encompassed only the very largest (over 1 MW). This was reduced to 100 KW in 1994. The introduction of retail competition is thus the end of a long process of liberalisation.
3) Whether or not there are separate distribution companies may seem relatively unimportant. In fact, it can be very important indeed. Firstly, it greatly increases the degree to which the power industry is commercially driven by focusing the companies’ activities on customer needs. Secondly, it is much easier to develop wholesale competition and open access to the transmission and distribution networks if there are separate and independent distribution companies.

4) Whenever power companies have been vertically disintegrated, there are continual pressures to re-integrate them either by merger or by contract. There is considerable potential for restricting competition by the use of long-term power contracts with take-or-pay (or equivalent) provisions. This raises serious competition policy concerns.

6.1. Industrial Structure of CEE Power Companies

Within the EU 10 countries, the power sector industrial structures can be placed on a continuum. At one end of the continuum, there is full vertical integration of generation, transmission and distribution (usually involving total state ownership); and, at the other end, full separation of generation, transmission and distribution into separate companies. Lithuania may be said to illustrate the vertically integrated position and Hungary the unbundled industrial structure. The Czech Republic occupies an intermediary position with separate distribution companies but transmission and distribution integrated.

It is worth setting out these industrial structures in more detail. They are as follows:

- Lithuanian Energy (LE) is a vertically integrated electricity company with 91% state ownership and 9% of the equity privately owned. LE provides 50% of Lithuania’s generating capacity covering, all fossil fuel generation, transmission, distribution and supply of electricity. LE also owns the majority of district heating assets and CHP plants. Municipalities own some of the distribution infrastructure and boiler houses. One area of current debate concerns the desirability of transferring these assets from LE to the municipalities.

- Hungary’s electricity sector is, together with Poland, the most vertically disintegrated industrial structure among the CEE economies and the one where privatisation has gone furthest. In 1992, the former Hungarian Electrical Works Trust was transformed into a joint stock company, MVM. This was initially organised as a holding company with 15 subsidiaries: 8 for power generation, 6 for distribution, and one National Transmission Company (OVITRt). The 1962 Electricity Act was modified to encourage privatisation, by ending the requirement of a State monopoly of electricity production and distribution. Since December 1995, strategic stakes in all 6 DCs and 4 thermal power stations have been sold to private (foreign) bidders, mainly continental European power companies. In addition, the State Privatisation Agency is still endeavouring to find purchasers of strategic stakes in the other 3 thermal generating companies. MVM, though, which remains 100%
state-owned, retains ownership of the transmission grid and dispatch as well as of some generation viz. the Paks nuclear station.

- In the Czech Republic, there is one main electricity utility the Czech Power Company (CEZ) which owns and controls over 80% of the power generating plants as well as the high voltage transmission networks of 440kV and 220kV. A small proportion of generation capacity belongs to industries producing electricity for their own consumption and selling the surplus to the system. There are 8 regional power distribution companies. Both CEZ and the distribution companies were 30% voucher privatised in 1992. Bulk supply prices for sales from CEZ to the distribution companies are agreed (with great difficulty) by negotiations between both parties under the supervision of the Ministry of Industry and Trade.

Table 6.1 below summarises the industrial structure of the CEE power companies

<table>
<thead>
<tr>
<th>Industry Structure of Electricity Industry in CEE Economies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Industry Structure</strong></td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td>Czech Republic</td>
</tr>
<tr>
<td>Hungary</td>
</tr>
<tr>
<td>Poland</td>
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<tr>
<td>Slovak Republic</td>
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<tr>
<td>Estonia</td>
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<tr>
<td>Latvia</td>
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<tr>
<td>Lithuania</td>
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<tr>
<td>Bulgaria</td>
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<tr>
<td>Romania</td>
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<tr>
<td>Slovenia</td>
</tr>
</tbody>
</table>

Notes:

GC: Generation Company
RD: Regional Distribution Company
TC: Transmission Company

Table 6.1 shows that separate distribution companies are in place throughout the CEFTA countries, but, beyond them, only in Latvia. Only Hungary and Poland have so far separated generation from transmission and established separate generating companies. In July 1997, the government of the Czech Republic issued a long term policy statement which, inter alia, repeated its intention of separating the transmission grid out from CEZ.
With the exception of the Hungarian distribution companies and 4 of its generation companies, state ownership remains the norm across the range of CEE countries, with some limited (partial) voucher privatisation.

The final column of Table 6.1 lists the degree of importance of independent power producers (IPPs). In Asia and elsewhere, IPPs have developed rapidly and played an important role both in developing competition in generation and in introducing private capital to the power industry. The 1996 EBRD Transition Report only records concluded IPP projects in Hungary and the Czech Republic. The table counts countries with separate generators as having IPPs. There has also been some limited development of sales of surplus power from co-generation and CHP plants in a number of countries, usually selling into low voltage local networks, which accounts for many countries being listed as “marginal” in this column of the table.

The industrial structure in the main CIS economies is frequently apparently more disaggregated. Thus, in the Ukraine, separate generation and distribution companies have been set up. But, the organisation responsible for transmission and dispatch is MinTopEnergo, i.e. the old line ministry. Similarly, in Russia, UES holds large share stakes in most of the supposedly independent generators and frequently seems to act as if it were the old line ministry.

6.2. The Trading Structure of the Electricity Industry in CEE Economies

Although the industry structure of CEE electricity industries has been more or less unbundled in various countries, the trading (or contract) structure remains totally integrated. Thus, the only (limited) development of competition has been in competition for the market, not competition in the market. Among the EU 10 countries, as yet, there is virtually no competition in generation or in supply, let alone in areas like the provision of ancillary (transmission) services.

Hungary and Poland are the countries where one might expect moves to wholesale competition following the industry restructuring shown in Table 6.1 above. In both countries, the transmission company (MVM and PSE respectively) not only retain full control of all wires functions and dispatch, but they also retain the monopsony over bulk purchase from generators and the monopoly on sales to distribution companies. MVM retains major generation interests through its ownership of the Paks nuclear station; PSE does not have generation interests.40

More importantly, neither in Hungary nor in Poland can either large industrial consumers or distribution companies buy power directly from generators. Distribution companies have to buy power exclusively from MVM and PSE. (They can and do purchase some power from small-scale embedded generation (e.g. from co-generation and CHP plants).

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40 MVM appears to continue to have aspirations for a role in generation, even though its current transmission licence prohibits it from taking on any further generation beyond Paks and it is supposed to be divesting Paks. PSE appears to want to become and remain only a transmission company, on the model of NGC (National Grid Company), the England and Wales transmission company.
which is leading to the emergence of some competition in local energy markets.) Large industrial consumers have to purchase directly from their local distribution company unless they are auto-producers.

Neither in Hungary or in Poland (or any other CEE economy) are there yet any explicit prices for use of the transmission system nor any third party access. Indeed, MVM has consistently refused requests to negotiate terms for transmission access. MVM appears to want to retain a contractual structure based on limited access and liberalisation and with power purchased on long-term contracts derived from tenders for new capacity. They are supported in this by the strategic foreign investors in the distribution and generation companies, who are concerned about potential stranded asset problems from liberalisation.

Polish attitudes are different. PSE (and the Ministry of Economy) have issued discussion papers making it clear that they wish to move to wholesale competition with open access as well as with a pool and settlement system on the lines of England and Wales post-1989. Indeed, PSE has been trying hard to set up an embryonic spot market and pool and has so far not been able to do so. However, neither generation companies nor distribution companies appear to be strongly supporting these liberalising aspirations. Given the sizeable volume of spare generating capacity in Poland (over 10% at peak winter load), generation companies are understandably nervous over the impact of competition on prices (which could be driven down to SRMC). Distribution companies are also concerned about losing profitable industrial customers. PSE has carried out some tenders for rehabilitated generation, but, to make these bankable, they have had to be issued as long-term power purchase contracts. Hence, there is no sign of emerging merchant generators or intermediary power traders in Poland (or in Hungary).

The interesting point is that monopoly trading arrangements remain in place both in Hungary and in Poland even though MVM and PSE (and the respective Ministries) appear to have strongly differing views as to the desirability of liberalisation. This is not a coincidence. This is a direct consequence of the fact that industrial consumers cross-subsidise household consumers so that any liberalisation of wholesale power markets (eg on the lines of the EU Electricity Liberalisation Directive) threatens the financial viability of distribution companies and inefficient generators.

It is the position of the distribution companies that is critical as no liberalisation will take place which threatens supply to small customers - and at prices acceptable to governments. In Section 4, we argued that the most important reform priority was to raise household prices so that sales both to household and industrial consumers at least covered the operating costs of supply. The single main reason why we take this view is that it is difficult to see how market and price liberalisation (and the opening of network access) can take place unless and until household prices have been raised sufficiently for companies to be able to supply power both to household and industrial consumers at prices that at least fully cover operational costs. As we will discuss further below, the elimination of the cross-subsidy from industry to households is also critical for the prospects of the CEE applicants to the EU being able to meet the terms of the EU Directive.
It can be argued that the argument above is exaggerated. For instance, the position of distribution entities could be protected in various ways.\textsuperscript{41} One option would be to assign some low-cost, long term generation contracts to distribution companies to back their obligations to the small customer franchise market (analogously to the transitional contract arrangements for coal powered plant in England and Wales for 1989-92). An alternative would be for specific levies to be raised to continue the subsidy to households, eg via a supplement to transmission charges.

These arguments are correct but they would also greatly limit the potential scope for developing competition in generation. In particular, although they would allow competition in generation for the small percentage of very large industrial consumers, it is difficult to see how such arrangements could allow competition in supply to distribution companies or a full wholesale market with pool and settlement system as proposed for Poland. Where distribution companies (or monopoly purchasers) are buying power in day-ahead bidding markets, some is bought at SMP (system marginal price). SMP fluctuations can be very large, so that market fluctuations with fixed end-user prices embodying cross-subsidies impose major financial risks on bulk power purchasers. They are likely to be unable as well as unwilling to take on these risks. Thus, the proposals for an embryonic pool in Poland have incorporated a bidding proposal that would cap pool prices at some level below the existing average retail price and at a level that will be below SMP, possibly substantially below, at some periods.

The potential threat to the financial position of distribution companies is shown by the vigour with which Dedasz distribution company in Hungary has fought the 1997 ruling of the Hungarian Energy Office that Dunaferr, a small power plant on an industrial site, be allowed to supply other industrial consumers on the site. (To add spice, Dedasz has a large share stake owned by Bayernwerk, while El Paso Power own a stake in Dunaferr.)

In other CEE countries, these debates have not gone so far. They have emerged in the Czech Republic, but largely in the context of whether CEZ can retain control both of transmission and dispatch as well as its dominance in generation. Not surprisingly, CEZ is arguing vigorously for minimal liberalisation and is a strong supporter of the Single Buyer option of the EU Electricity Liberalisation Directive. The Czech Ministry of Industry and Trade 1997 energy policy statement, however, rejected the single buyer proposal and committed the government to the more competitive negotiated third party access model. In Romania, RENEL are well aware of the serious threats from market liberalisation without major price rebalancing. The Baltic states are almost certainly individually too small to be able to support wholesale competition.

In Western Europe and elsewhere, it has been large industrial consumers who have been the strongest force pushing for competition in generation and open access to networks. They have been able to reduce the cost of power to industry by doing so. In addition, the introduction of effective competition has done much to erode the sustainability of cross-subsidies within the industry or outside (eg to domestic coal producers). This pressure has

\textsuperscript{41} We are grateful to Nathan Francis for alerting us to these possibilities.
not yet emerged on a large scale in CEE economies, possibly because industrial power prices still remain lower than in neighbouring EU economies. The forces for liberalisation may therefore be weak until industrial users become active in pushing for the right to choose their own power supplier. We would expect this to emerge when other pressures (e.g., expansion investment requirements) start pushing prices close to levels in neighbouring EU countries.

6.2.1. Trading structure issues in the Ukraine

The Ukraine is the major example of a post-Communist economy that has not only unbundled the industrial structure of its electricity industry but has also seriously tried to liberalise its trading structure. It can be thought of as an attempt at an amazingly radical reform. Alternatively, it could be argued that it is not at all radical since all the entities involved remain state-owned. Further, the whole reform programme has been carried out by Presidential decree so that, in legal terms, it is readily reversible.

In terms of trading structure, there is competition in generation and an England and Wales-type power pool with day-ahead bidding. However, there is as yet no operative computerised settlement system associated with the pool. Further, only the thermal (non-CHP) generators (who account for around 50% of generation capacity) are dispatched on the basis of this process. The nuclear and hydro plants remain outside it.

The reforms that have been instituted are much less radical than was originally proposed, but even the current reform package has run into very serious problems. The problems seem to have two main causes:

(i) the arrears and bad debt problems that are endemic in the Ukraine (and which we discussed in Section 5.2); and

(ii) the absence of effective revenue collection and settlement mechanisms.

Both of these suggest that liberalisation and unbundling of electricity trading structures is highly unwise in the context of the disorderly market systems and lack of financial enforcement disciplines that still, unfortunately, characterise most CIS countries. It also seems highly unwise to incorporate reforms with complex transaction systems that require considerable specialist expertise to design and run them. There is also the issue of whether the market-related risks from early liberalisation of power generation is consistent with attracting large-scale foreign investment at an acceptable cost of capital. For investment environments that are, in general, as risky as most CIS economies, we would suggest that there may well be serious problems in reconciling them.

The other issue that we would briefly like to discuss is whether the reform could have been successful even in the absence of these wider contextual problems. Our answer is that it would almost certainly have faced overwhelming difficulties unless the Ukrainian
government had been willing to set and enforce much more in the way of significant price reform and rebalancing.

The reform programme ran into crisis in early 1997. One of the main causes of the crisis was the decision by the Ukrainian government to impose a cap of 3.2 cents/kWh on pool price bids. That meant, firstly, that there was no longer enough revenue to support all market participants; and, secondly, that the pool and bidding system were not setting actual revenues but only determining relative receipts between competing generators.

Some power sector reform participants have argued that one of the virtues of introducing competitive markets early is to force governments to introduce price increases and abolish cross-subsidies. The Ukrainian case suggests very strongly that this strategy does not work in practice. The alternative view, that price reform has to precede liberalisation, seems much more convincing in the light of experience both in CEE economies and in the Ukraine and other CIS economies. As we suggested in Sections 3 and 4, that, in practice, means waiting for the pressure from large-scale investments that are essential to maintain a continuous and reliable supply of power to final customers.
7. REGULATORY REFORM OF THE ELECTRICITY INDUSTRIES IN CEE ECONOMIES

Stern (1994) presented a survey of the development of formal and independent economic regulation in CEE economies - or, to be more precise, a survey and exploration of the very limited progress that had been made in its development. At that time, Hungary was the only country that had passed laws that provided for economic regulation. The Czech Republic was debating it as was the Slovak Republic, Latvia, Bulgaria and some other CEE economies.

The picture is little different three years later. In Hungary, there is a relatively independent electricity and gas regulator, the Hungarian Energy Office (HEO) whose powers and duties are established by parliamentary statute. In Latvia, there is also an energy sector regulatory agency which has been developed out of the Anti-Monopoly Committee and Lithuania has set up an Energy Pricing Council. Neither of them are set up by parliamentary statute. The Czech Republic passed an Electricity Law in 1994, but this law left issues of economic regulation to the Ministry of Finance to cover under the generic Prices Law. Recent years have seen renewed and, to date, inconclusive debate about amending the Czech Electricity and Gas Laws to include economic regulation.

There is no sign, or any early expectation, of laws to provide for economic regulation of the energy sector in the Slovak Republic or Bulgaria, where price regulation remains under the control of the Ministries of Finance. However, the major new development since 1994 is that, early in 1997, Poland passed a new Energy Law which will set up the Energy Regulatory Authority (ERA) to start work at the beginning of 1998.

What is even clearer now than in 1994 is that the regulatory authorities that have been set up are all advisory, particularly on regulation of prices, which is the core regulatory issue in CEE economies. Thus, in Hungary, the HEO advises the Ministry of Industry on price rises. The Electricity Law requires that regulated electricity companies are allowed an 8% rate of return on capital. It does not, though, specify or define the base to which the 8% should be applied. In 1996, the HEO carried out a tariff review under which it recommended price increases that would have significantly raised prices in real terms. The Ministry sent this for review. The review reduced the costs in the rate base sufficiently for the 8% rate of return not to give a real-terms price increase to final consumers.42

In Latvia and Lithuania, the regulatory bodies are advisory. The intention is that they are to be bodies whose advice will carry weight i.e., the intention is that their recommendations will be accepted unless there are good reasons not to do so. Nevertheless, the lack of any formal legal powers or financial independence plus the high political profile of energy prices, particularly to households, means that they do not have any effective independence. In Poland, ERA advises the Ministry of Finance on energy price changes for the first two years, before becoming the regulatory decision-maker in 2000.

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42 See the relevant issues of the Financial Times East European Energy Report 1996-97 for fuller details and blow-by-blow reports of this fascinating saga.
Dependence for funding on Ministries and/or the imposition of civil service pay scales for regulatory staff is another way in which governments limit the effective autonomy of regulatory agencies. The HEO is limited by this and these issues were one of the major battlegrounds in the Polish Energy Law, but one on which the Polish proponents of independent regulatory bodies were more successful.

Other areas where regulatory practice is little developed in CEE economies are:

- **Appeals.** There are typically no formal legal appeal rights against regulatory decisions by Ministries. Appeals against regulatory decisions by regulatory bodies (on price or non-price issues) tend to go initially to the Ministry of Industry or equivalent and not to the courts. In Hungary, Poland and elsewhere there are, though, the conventional administrative law appeal rights under Continental Law;

- **Obligations to Publish and Justify.** For Ministerial regulators, there are understandably no obligations to publish, explain or give reasons for their decisions. Unfortunately, the same is true for the advisory regulatory agencies. HEO in Hungary has developed into a more open institution, but, in general, the development of regulatory procedures is, as yet, relatively under-developed relative to the UK.

Table 7.1 below summarises the current position on regulatory institutions in the EU 10.
### Table 0.1
**Regulation of Electricity in CEE Economies**

<table>
<thead>
<tr>
<th>Country</th>
<th>Independent Economic Regulation</th>
<th>Regulatory Institution</th>
<th>Stage of Regulatory Development</th>
<th>Powers of Independent Regulator Concerning Prices</th>
<th>Price regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Czech Republic</td>
<td>No</td>
<td>MOIT; MoF</td>
<td>♦</td>
<td>N/A</td>
<td>Cost oriented but politically influenced</td>
</tr>
<tr>
<td>Hungary</td>
<td>Yes</td>
<td>MIT, Hungarian Energy Office (HEO)</td>
<td>♣</td>
<td>Advisory</td>
<td>Price Cap 01/97</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>No</td>
<td>MoF, MoE, Energy Inspection Office</td>
<td>♦</td>
<td>N/A</td>
<td>Administrative prices by MoF</td>
</tr>
<tr>
<td>Estonia</td>
<td>No</td>
<td>Energy Market Inspectorate; MoE.</td>
<td>●</td>
<td>N/A</td>
<td>Regulation No.7 (1996) of MoE.</td>
</tr>
<tr>
<td>Latvia</td>
<td>Developing</td>
<td>Energy Council, Anti-Monopoly Committee</td>
<td>♣</td>
<td>Advisory</td>
<td>Average Cost-based.</td>
</tr>
<tr>
<td>Lithuania</td>
<td>Embryonic</td>
<td>Energy Agency and Energy Pricing Council</td>
<td>●</td>
<td>Advisory</td>
<td>Average cost based, Government on EPC recommendations</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>No</td>
<td>MoF</td>
<td>♦</td>
<td>N/A</td>
<td>Administrative prices, MoF</td>
</tr>
<tr>
<td>Romania</td>
<td>No</td>
<td>MoF, MoE</td>
<td>♦</td>
<td>N/A</td>
<td>MoF &amp; RENEL Administrative prices</td>
</tr>
<tr>
<td>Slovenia</td>
<td>No</td>
<td></td>
<td>♦</td>
<td>N/A</td>
<td>Administrative prices</td>
</tr>
</tbody>
</table>

MoE: Ministry of Economy (or Economic Affairs)
MoF: Ministry of Finance
MIT: Ministry of Industry & Trade

♦ The regulatory function is integrated with the ownership function
♣ Regulatory system is being established in connection with increased private participation, privatisation or liberalisation.

Sources: Various.
In the CIS, there are some embryonic electricity regulatory institutions in Russia, Ukraine and Kazakhstan (e.g., the Federal Energy Commission in Russia and the National Energy Regulatory Commission in the Ukraine). However, none of them seems yet to have achieved any real degree of autonomy de facto and none is as yet been assigned powers and duties by parliamentary statute. Political influences appear still to be dominant viz the 1997 price and trading structure interventions by Deputy Prime Minister Nemstov.

7.1. Regulation of Electricity Prices

The criteria by which electricity and other energy sector prices are to be regulated are probably the single most difficult issue for price regulation. The Hungarian Law uses the term “justified costs”. Other CEE countries refer to “objectively determined” or to “rationalised” costs. These are nowhere defined in primary legislation and the new regulatory agencies have not been given the authority to do so. In Poland, the first major task for price regulation will be to conclude the secondary legislation on prices and, in particular, to define the basis of, and criteria for, price regulation. ERA can expect to be involved in this process - possibly intensively. Nevertheless, the legal responsibility for formulating and enacting this secondary legislation has been given to the Ministry of Finance and the Ministry of Economy.

Thus far, as discussed in Sections 3 and 4, no CEE government has yet been prepared to accept capital costs based on the replacement cost of assets should be the basis for “justified” or “objectively determined” costs. No regulatory agency has yet achieved the legal powers or general influence to do so, whether the regulatory agencies discussed above or the Ministerial regulators in the other CEE economies.

Stern (1994) argued that the development of effective economic regulation in energy would need to await the emergence of the need for large-scale investment. The need for such investment in telecommunications was also the main reason why more progress had been made on developing effective economic regulation there. Those arguments remain convincing. Indeed, the very limited progress on energy sector regulation since 1994 supports those arguments.

7.1.1. Prices and investment

One of the main features of economic regulation as practised in the UK and elsewhere is that price regulation is combined with some regulatory oversight of costs. In the US, there has been explicit prior approval of investments; in the UK the regulatory offices evaluate the business plans of regulated businesses. Indeed, the bringing together of regulatory oversight on investment and pricing is seen as being at the heart of economic regulation.

In CEE countries, electricity regulation, the responsibilities for price regulation and investment approval/regulation are typically divided. Thus, in the Czech and Slovak Republics, the Ministry of Finance is responsible for price regulation and the Ministry of Industry and Trade (the Ministry of Economy in the Slovak Republic) is responsible for all
electricity investment issues. Indeed, the latter are responsible for licensing and all issues of technical regulation. The same is true in Romania and other CEE economies.

In Hungary, the HEO has to consider investment programmes when carrying out its duties on price regulation and it has to prepare system-wide development plans. It is, though, the Ministry of Industry and Trade that is responsible for investment approvals, the HEO has no formal legal role and, particularly where foreign investment proposals are concerned, appears to play little part. In Poland, ERA is to be given the duty to regulate development plans of regulated companies. However, the content and form of this regulation is yet to be determined in secondary legislation to be prepared by the Ministry of Economy.

As yet, tender processes for investment are not greatly developed, nor are authorisation procedures. (See Section 8 below on EU requirements in this area.)

7.2. Regulation of Electricity Industry Competition and Structure

Within many CEE countries, the notion is regularly put forward that regulation is merely a temporary phenomenon until competition has been established eg by Prime Minister Klaus in the Czech Republic. In the UK, this was the original Littlechild view used to justify RPI-X price controls.

However, regulatory practice has shown that competition and general competition policy cannot replace regulation until:

(i) there are enough competitors and potential new entrants to the competitive parts of the industry (generation and supply for electricity) to ensure that there is no serious risk of abuse of market power; and

(ii) it is possible to duplicate networks.

While competition depends on access to monopoly network facilities, economic regulation is required to ensure that network access and pricing support competition. This can clearly be very difficult where transmission and generation are combined, but remains a significant issue even when they are separate - and similarly for distribution and supply. Indeed, the need for and difficulty of regulation can increase as competition over networks is increased. The nature of regulation changes considerably but the need for it does not.

For electricity, there is no sign as yet of competing high voltage transmission or low voltage transmission networks. This is in contrast to telecommunications, where radio telephony and internet telephony offer competition and it can be economic to build competing fixed link networks. Even in gas, given sufficient demand growth, it can be economic to build competing high pressure pipeline networks. That is not the case in electricity.

Access issues, access pricing and competition issues have become important in Hungary and a concern to HEO. The main problem is that the Hungarian electricity law does not
impose any obligations on MVM to supply access. In Poland, the energy law requires third part access - at least for Polish companies.

In other countries, the issue has not yet been greatly addressed, not least because neither competition in generation nor the construction of new IPP plants has yet become a serious concern. In general, these competition and access issues tend to be confounded with (unresolved) debates over the structure of the industry, as in the Czech Republic. It is likely that the regulatory dimensions will only be tackled seriously when the debates on the industry and trading structure have been concluded.

These discussions on competition, the industrial and the trading structures and the regulatory arrangements for the electricity industries in CEE economies have become increasingly embroiled in the discussions of the implications of the EU Electricity Liberalisation Directive, which we discuss in Section 8 below.
8. THE EU ELECTRICITY LIBERALISATION DIRECTIVE AND CEE COUNTRIES

There are many aspects of the EU Electricity Liberalisation Directive that could be discussed under this heading. We will concentrate here on those aspects that most affect the electricity reform concerns in the EU 10 as discussed in previous sections.

The Directive comes into force within the EU in January 1999.

8.1. Key Features of the Directive

The main relevant features of the Directive as they affect CEE applicants are:

(i) **Mandatory market liberalisation.**

Initially 22% of the market, including all large industrial consumers taking over 100 GWh per year, must be able to conclude purchase contracts for power with any EU supplier, including national or other EU generators. This proportion rises to 33% after 6 years. Those able to purchase power in this way are deemed to be “eligible consumers”;

(ii) **Mandatory access to transmission networks.**

This must be available on the basis of objective, transparent and non-discriminatory prices for use-of-system. (The latter, in turn, requires the unbundling of transmission services and their being priced in an objective, transparent and non-discriminatory manner.);

(iii) **Mandatory unbundling of functions.**

Vertically integrated power companies must at least set up separate accounts for their generation, transmission and distribution activities. The separate accounts must be subject to the scrutiny of a public or independent entity.

In addition, a Transmission systems Operator (TSO) must be designated. The TSO must be independent in management terms from generation and distribution activities. Where the power company also acts as the Single Buyer, the bulk purchase and sales function must be operated separately from any generation or distribution activities.

(iv) **Mandatory establishment of defined procedures for commissioning new generation capacity.**

Two options are available under the Directive. The first is by *authorisation*; the second is by *tender*. Each must be based on objective, transparent and non-discriminatory criteria. For countries that opt for the tender option, the tenders
must: (a) be organised and decided by a fully independent authority; and, (b) the
countries must be able to provide an appeals mechanism against tender malfunction
or malpractice. In addition, countries opting for the tender process must provide an
authorisation process under the criteria above for auto-generators and for IPPs.

It is also worth noting what the Directive does not require (but which countries may wish to
institute). There are two main points.

(i) **The Directive does not require countries to set up a specific regulatory body.**

This is in contrast to the equivalent telecommunications Directive which imposes a
mandatory autonomous regulatory body. Nevertheless, the tender process and
appeals requirements plus the monitoring and enforcement of access under the
access price criteria would need something approaching an autonomous regulator.

(ii) **The Directive does not require distribution entities/companies to be deemed as
eligible consumers.**

Liberalisation of purchases for sale by distribution entities to large industrial
consumers who are “eligible” customers is mandatory. Purchases of power for all
other consumers need not be liberalised, unless countries wish to do so. Hence,
countries can retain fixed long-term generation contracts that are backed by the
monopoly franchise obligations to small consumers.

It is also worth noting that requirements of the Directive can be enforced via the local courts
of member countries, with the European Court in Strasbourg as the final adjudicatory body.

8.1.1. Choice of electricity structural model

Much of the discussion of the Directive has concentrated on the choice between the ‘Single
Buyer’ model and the open access model. This choice is undoubtedly important, but it is
worth noting that the Directive is explicit that the two are intended to produce
“economically equivalent results”. Thus, various conditions are imposed in the Directive on
the Single Buyer model in terms of unbundling and separation of activities, as well as
restrictions on information flows between activities (particularly those involving the bulk
purchase entity).

In terms of economic regulation, a vertically disintegrated, open access regime can be
thought of as regulation by structure; whereas the vertically integrated single buyer model
can be thought of as regulation by conduct.\(^{43}\) Many of the concerns about the degree to which
the single buyer model will, in fact, support competition and liberalisation derive from

\(^{43}\) It is possible for countries to have a single buyer but to make it part of the transmission company (as in Northern
Ireland or as has been proposed in Hungary). Alternatively, the single buyer could be a stand-alone company.
The driving force for the single buyer model has, however, been the vertically integrated utilities in Continental
Europe and, in CEE countries, the governments and/or power companies who wish to combine generation and
transmission interests.
concerns over the degree of difficulty in regulating this structure. These concerns must be greater in countries with little regulatory experience - including the CEE economies. Clearly, collecting, monitoring and enforcing the conditions of the Directive on powerful, integrated incumbent utilities is unlikely to be a straightforward or undemanding task.

At one end of the spectrum available under the Directive is the single buyer model with “buyback”. At the other end, as in Norway, is full retail competition. Wholesale competition, as in England and Wales post-1989 and including distribution company power purchases, is clearly one of the more competitive options available.

The single buyer model with buyback is relevant for countries with a dominant electricity company (or regional monopolies) that includes distribution as well as generation, transmission and bulk purchase. Under this option, eligible consumers with power purchase contracts from other suppliers obtain their power from the single buyer at the generation price under the alternative power purchase contract plus the transmission charges that the single buyer would charge its own generating entity. The single buyer buys the generation from the other generator and uses it to supply its own customers. Hence, “buyback”. The intended outcome is that the eligible consumer can buy the power at the same price as with open access, but via the single buyer.

This option is clearly the one to which the countries and power companies least sympathetic to liberalisation will be attracted. Regulating it according to the requirements of the Directive also looks formidable. Nevertheless, it is by no means obvious that powerful incumbent power companies in the EU or the CEE will necessarily conclude that this option is the one that maximises their commercial return.

### 8.2. Implications of the Directive for Electricity Reform in CEE Countries

There are a number of direct implications of the EU Electricity Liberalisation Directive for the CEE countries that wish to join the EU - assuming that they are either (a) not proposing to apply for; and/or (b) are unable to negotiate extended transitional arrangements under Article 24 of the Directive. (Of existing EU members, Belgium and Ireland have been granted a one year grace period and Greece two years.)

The first set of implications is on the organisational, management and accounting structure of the power companies.

Apart from Poland and Hungary, all the EU 10 have power companies that combine generation, transmission and dispatch and power purchase, but many have (or are developing) separate distribution companies. Apart from Hungary and Poland, all of the others will have to develop commercial and accounting separation for the different activities. In particular, there is a requirement to establish a Transmission System Operator, who must be independent, at least in management terms, from generation and distribution activities (Article 7).
None of the EU 10 has yet established separate transmission or ancillary service prices nor arrangements for access to transmission and distribution networks. These will need to be developed according to the EU criteria of objectivity, transparency and non-discrimination. They will need to be published, either to be used as the basis for direct access or as an indication of the likely terms (in the case of negotiated access.)

The second set of implications concerns the arrangements for commissioning new generation capacity.

No CEE country yet has either tender arrangements or authorisation procedures (mandatory for IPPs and auto-generators) that would meet the requirements of the Directive. These have to be based on clear, objective and non-discriminatory criteria which must be published. Similarly, no CEE country has yet set up either the required fully independent body to carry out tenders or the required appeals procedures.

The third - and, in economic terms, much the most important set of implications - arises from the Directive’s requirements to liberalise the bulk power market and to allow large industrial consumers direct access to independent generators (even if under the ‘buyback’ procedure).

The importance of this is that, as we have seen, all the EU 10 currently impose full vertical integration in trading terms so as to support the cross-subsidy from industrial to household consumers. Even in Hungary and Poland, (a) the distribution companies are obliged (with minor exceptions) to purchase all bulk power from the transmission company that acts as the monopoly/monopsony purchaser of generation; and, (b) all consumers, including large industrial consumers, are obliged to purchase their power from their local distribution company. This enables the maintenance of financial viability both for the bulk power purchaser and for the distribution companies/entities where there are substantial cross-subsidies from industrial to household consumers plus considerable variation in the relative shares of the two groups of consumers between distribution franchise area.

Not surprisingly, it is this area that has caused most concern to governments and power companies within CEE countries who wish to become early EU members. One approach is to hope that appeals to public service obligations or potential stranded asset problems will allow long exemptions from the liberalisation requirements. Another is to try to devise mechanisms via allocation of low-cost contracts or levies on transmission to raise funds to convert the cross-subsidy into a direct subsidy, on the lines discussed in Section 6.2. However, both of these would also significantly impede the development of competition in generation and power market liberalisation.

For various reasons, including reducing the political and economic power of electricity companies and the energy sector, several CEE governments are keen to reduce the power of the large electricity companies and to introduce more competition. The Czech Republic is an obvious example, but there are similar echoes in the Baltic States and, recently, in Romania. The problem is that the governments also are very unwilling to grasp the nettle of
higher electricity prices to households - even though household electricity consumption is rising fast, not least because the price has been held down in real terms.44

In this context, the EU Directive gives a new set of arguments to the reformers. The pressures to rebalance prices between household and industrial consumers arising directly from the Directive are clear if less obviously pressing than from pressures (eventually) to finance large-scale new investments. Nevertheless, they are not negligible.

It has been suggested by Sapir and others that the goal of EU membership has played an important role in encouraging liberalisation of trade policy and in preventing reversion to protectionist policies. For the electricity industry, the Directive may well act in the same way, providing additional and significant arguments for further structural reform of the sector and, in particular, for the price rebalancing that is necessary to allow trading structure liberalisation. The suggestions that we put forward in Section 4.3 for a household price transition approaching full LRMC prices via a “super-lifeline” were intended to help foster such an approach.

The EU may or may not decide to make electricity and the implementation of the Directive a sticking point in membership negotiations. It almost certainly would if it were a question of continuing low power prices to industrial consumers, but although these remain on average around 30% lower in CEE countries than in EU countries, the Directive per se will make little difference to this disparity. There is, though, the issue of trade in electricity per se where current trading arrangements in the CEE countries reduce the scope for sales and foreign investment by EU power companies - unless they can purchase monopoly franchise distribution companies or generators and ensure themselves sufficient ‘stranded asset’ protection against the introduction of liberalisation from the Directive or any other source. This is the strategy that current and prospective foreign investors in Hungary appear to be trying to adopt and it could be a serious impediment to further liberalising reform.

In the Introduction to this paper, we defined economic reform of the electricity industry in CEE (and CIS) economies as follows:

- the main consumer groups pay the full economic costs of the production and distribution of the electricity that they consume; and

- the establishment of commercially viable electricity companies that can finance their investment requirements without recourse to subsidies or other financial assistance from the state.

Thus far, the reformers have been unable to mobilise sufficient pressure to achieve these changes. The EU Directive gives an additional set of arguments, at least if the anti-competitive pressures from existing incumbent utilities and from some foreign investors do not prevail.

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44 See Table 4.1.
9. SUMMARY AND CONCLUSIONS

This paper has discussed the very slow progress that has been made in the economic reform of the electricity industries in the countries of Central and Eastern Europe.

We defined economic reform as:

- the main consumer groups paying the full economic costs of the production and distribution of the electricity that they consume; and

- the establishment of commercially viable electricity companies that can finance their investment requirements without recourse to subsidies or other financial assistance from the state.

The latter has clearly not been achieved in the CEE countries having Association Agreements with the EU 10 since, with the possible exceptions of Poland and Estonia, industrial consumers are still directly cross-subsidising household consumers. This, in turn, is a major reason why the degree of commercialisation of power companies is limited.

Investment is being financed without recourse to the state budget. However, this can only be done at current power prices because investment is being held to the minimum necessary in circumstances of spare capacity.

The standard economic reform agenda for CEE electricity industries of the early 1990s (eg of the World Bank) encompassed:

- raising prices to LRMC levels and rebalancing them between industry and households;
- achieving commercialised power companies, with management autonomy and freed from the tutelage of sponsoring Ministries;
- the establishment of independent economic regulation;
- privatisation; and
- the introduction of competition in generation and, where appropriate, wholesale competition.

Among CEE countries, the second of these has been largely achieved (but not in CIS economies). Only Hungary and (from 1998) Poland have statutorily-established independent regulators, and their powers are limited, particularly on prices. Only Hungary has made any substantial progress on privatisation and no CEE country has yet introduced competition in generation or any liberalisation of bulk power markets. In particular, the trading structure still operates in all the CEE electricity industries as if they were vertically integrated. Similarly, in no CEE country are there yet any transmission prices or access to transmission networks.
We have argued in this paper that the main reason for the lack of progress is the unwillingness of CEE governments to raise household electricity prices. This unwillingness has been economically sustainable because, currently, the unavoidable investment needs in CEE electricity industries are not particularly great, given the volume of spare capacity.

In Section 3, we demonstrated how CEE electricity production and import levels had fallen. They still appear to be at or below 1988 levels, as does aggregate electricity consumption. However, the consumption fall has entirely been concentrated on industrial electricity consumption. Comparing 1994 with 1988, household electricity consumption was 57% higher in the Czech and Slovak Republics, 20% higher in Hungary, 2% higher in Poland and 47% higher in Romania.

The switch from industrial to residential consumption increases the average costs of supply (eg because of the increased proportion of peak load, the additional distribution, billing and supply costs etc). However, as shown in Table 4.1, the price of household electricity remains at around one-third of the level in EU economies. Maintaining the prices at these levels therefore enhances the level and growth of demand and brings forward the date at which new capacity needs to be commissioned.

It is arguable that the current levels of spare capacity do not require prices to be set at full LRMC levels - at least for infra-marginal units. Prices at EU levels would generate large volumes of retained earnings (eg as depreciation), which causes problems for governments that have weak regulatory and ownership controls. This is particularly so given that there is little government debt on the balance sheets of the companies. However, maintaining energy prices below LRMC levels provides poor signals for energy-efficient investment, thereby potentially prolonging the energy-intensity of CEE economies.

In this context, we have argued in Section 4.3 for the following strategy:

(i) industrial consumers should be charged full LRMC prices (including a reasonable rate of return and full economic depreciation) as soon as possible - preferably immediately but certainly with a transition of no more than 1-2 years;

(ii) household consumers would be assigned a “super-lifeline” amount of power at prices that cover operating costs, but that they would pay full LRMC prices for units above the super-lifeline. The difference between the average prices paid by consumers should be reflected in the tariff structure by variations in the standing charge rather than in the volumetric element; and

(iii) the transitional arrangements would be supported by “back-to-back” contracts between generators and distribution companies to cover the transitional subsidised element of household consumption.
The price transition would then take place by progressively reducing the band of the super-lifeline (and/or introducing tranches with intermediate prices) until household consumers paid full LRMC prices on all units purchased above a small conventional lifeline amount, which may or may not be permanently retained.

This strategy is proposed because it would

- preserve economically efficient price signals on the purchase of marginal units;

- ensure that no power was sold for less than the costs of supply (in operating cost terms) to the relevant consumer group;

- concentrate economic subsidies on smaller household users and thereby make it at least more progressive in its incidence; and

- provide a way of transitioning straightforwardly into the required long-run price structure.

Thus, it would encourage allocative efficiency as well as commercialisation and dynamic efficiency gains within the power companies. It would also forestall major and rapid price hikes at the point in the future when major capacity expansion needs became unavoidable.

The other major reason for advocating this pricing policy is that the current structure of prices (and the commitment to it by CEE governments) has become a major, if not the major, impediment (a) to the development of independent regulation (which is necessary to support privatisation and/or large scale private investment); and, (b) any liberalisation of the electricity trading structure.

The alternative strategy of liberalising with an independent regulator with the hope that this will establish prices at the necessary level has been tried in the Ukraine. The Ukrainian case suggests very strongly that this strategy does not work in practice. The alternative view, that price reform has to precede liberalisation, seems much more convincing in the light of experience.

Wholesale competition may not be appropriate for all CEE countries (eg the small Baltic countries or Slovenia), and, as in the EU, not all CEE countries will wish to adopt it. But, Poland has shown considerable interest in doing so and there are liberalising lobbies in other countries. Any such liberalisation will face immense difficulties unless and until prices are rebalanced so that residential prices at the margin at least fully cover operational costs, if not full LRMC.

In this context, the EU Electricity Liberalisation Directive represents both an opportunity and a challenge. Its requirements on organisation require changes in separation of accounts, businesses and, in some cases, of management that will encourage commercialisation and which are a necessary pre-condition for liberalisation of wholesale markets. The same
applies to its requirements for (a) the development of access to transmission and distribution networks and, in consequence, of objective, transparent and non-discriminatory transmission prices; and, (b) of tender and authorisation procedures based on clear, published, objective and non-discriminatory criteria.

The critical issue, though, remains how the Visegrad and other CEE applicants to the EU will respond to the requirement to allow large industrial consumers, 22% of the market, to be able to purchase their power supplies from any EU supplier, including IPPs and generators in other EU countries (including other CEE EU members). For power companies and governments who wish to preserve some degree of monopoly power and wish to resist liberalisation, the market liberalisation proposals are clearly a significant threat. They will also, almost certainly bring higher power prices, particularly to households.

Conversely, for liberalisers, they represent a significant opportunity by which the power companies can concentrate on what ought to be their main task - meeting demand at lowest cost. To do this, the companies need price signals that accurately reflect in their commercial opportunities the social costs and returns on all investment activities, whether to increase efficiency, develop new services or markets, etc. Thus, the EU Electricity Liberalisation Directive provides an additional set of arguments for those who wish to unbundle the industrial and commercial structures of power companies and to embark sooner rather than later on the necessary price rebalancing to support such a reform programme. Whether or not they will prevail against the anti-competitive pressures from existing incumbent utilities and from some foreign investors remains to be seen.
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