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**INVESTMENTS ISSUES IN THE ELECTRICITY
SECTOR OF THE ECONOMIES IN
TRANSITION IN THE UNECE REGION**

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CURRENT SITUATION IN THE ENERGY SECTOR IN THE TRANSITION ECONOMIES

- (i) GDP/capita values are *relatively* low. If adjusted by the purchasing power parity (PPP) GDP looks more favourable. The *relatively* low GDP is a result of several factors, among them distorted industry structure (too much heavy industry, low share of “high-tech” industries), poorly developed services, low level of employment, inadequate economic efficiency;
- (ii) The share of energy intensive (heavy) industries is *relatively* high;
- (iii) Energy intensity is *relatively* high i.e. 2-3-4 times more energy is required to produce one unit of GDP than in the Western countries. This figure becomes more favourable if the intensity is adjusted by PPP. At the same time energy use per capita is generally lower in transition economies than in the EU;
- (iv) Energy efficiency is *relatively* low (e.g. heating or generation specific values are much higher);
- (v) Emission values (CO₂/GDP) are *relatively* high, and
- (vi) Energy prices are *relatively* low (or very low in the case of households).

Energy Intensity^a, Specific Energy and Electricity

Consumption in Selected Countries

Country (2001 data)	GDP per Capita^b (000 95 US\$/capita)	Energy Intensity (toe/000 95 US\$)	Energy Intensity PPP adjusted (toe/000 95 US\$)	Energy Use and Electricity Use per Capita (toe/capita) and (kWh/capita)
Czech Republ.	5,31	0,74	0,30	3,93 / 5867
Poland	4,23	0,55	0,26	2,33 / 4243
Hungary	5,40	0,46	0,22	2,47 / 3427
Russia Federation	2,45	1,72	0,55	4,22 / 5319
Austria	32,92	0,11	0,15	3,52 / 7498
Germany^c	32,69	0,13	0,18	4,13 / 6806
Portugal	12,92	0,19	0,15	2,46 / 3227

^a Energy intensity = total energy use / GDP (in this instance the energy required to produce 1,000 US\$ in tonnes of oil equivalent (toe))

^b Nominal GDP. If adjusted by PPP the difference is reduced 2-3 times

^c Approximately represents the EU average

PARTICULARITIES OF THE ENERGY SECTOR IN THE ECONOMIES IN TRANSITION

- (i) A well-developed energy sector with high capacity reserves.
- (ii) The electricity coverage is very high (usually 99 % of the households are connected to the grid).
- (iii) Nuclear energy represents a high percentage of the total energy mix.
- (iv) Availability of a high number of well-qualified and competent energy experts.
- (v) Many of the countries are net exporters of electricity.
- (vi) Due to the collapse of heavy industry after the transition period commenced, the primary energy as well as the electricity demand in many of these countries is about the same or less than it was 15 years ago. There is often excess capacity.

CEE transition economies also share a number of negative aspects:

- (i) Their electricity systems are often very old, obsolete and operate at low efficiency levels. Therefore even in the case of stable demand, a *high level of replacement and modernisation investment is necessary*.
- (ii) Energy tariffs and prices are often very low (in particular for households), reflecting only 10-90 % of the long run marginal costs.
- (iii) Metering and billing are often missing, the rate of payment of electricity bills is low to very low
- (iv) There are many subsidies and cross-subsidies, mainly for household energies (electricity and gas).
- (v) As a consequence of the previous points the majority of the energy companies are unprofitable, the *energy infrastructure is in a poor condition, the necessary maintenance and development are often missing*.

CURRENT DEVELOPMENTS IN CEE TRANSITION ECONOMIES

- (i) Basic data of the 10 EU candidate countries: 140 million inhabitants, 110 TW power generation capacity, producing 625 TWh per annum.
- (ii) There is a limited level of privatisation (from formal privatisation – where in the background the state is the real owner to foreign professional or financial investors).
- (iii) The “unbundling” of the large monopolistic state-owned electricity utilities has in many cases happened, but it is often only an administrative/financial separation of the different units.
- (iv) Liberalisation has commenced almost everywhere, but in most instances only a relatively small share of the market is actually open. For the main part only large industrial customers may enter the liberalised market, with households not yet eligible.
- (v) For the 10 EU candidate countries, EU directives related to the power sector are increasingly beginning to dominate energy policy.

The impact of the reform of the electricity supply industry on investment decisions

Before the reform:

- Adequate assets to be able to meet demand
- Security of electricity supply has been consistently high
- This approach has however also resulted *in over-investment and additional costs* to consumers.

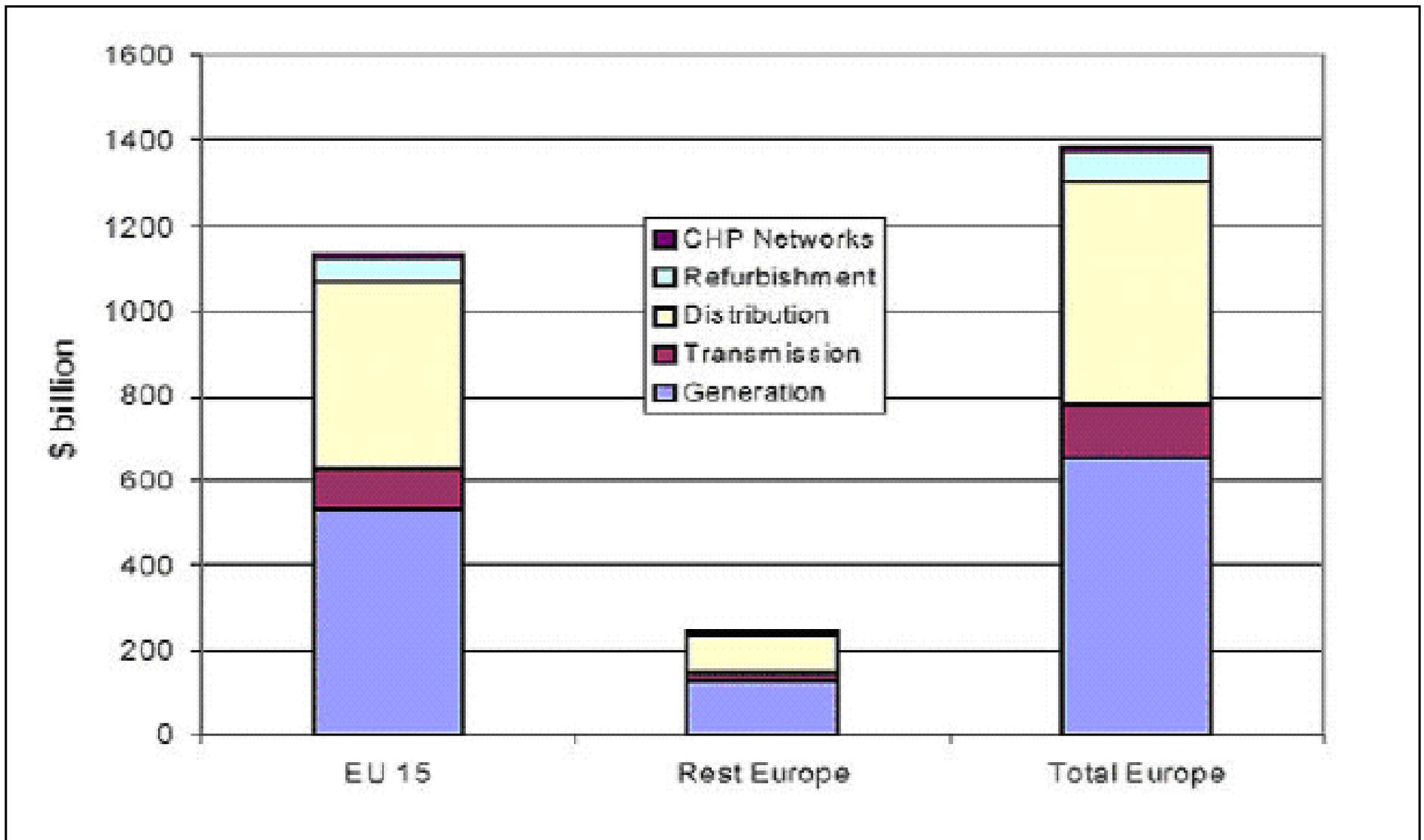
After the reform:

- Investment decisions are made by market players
- Costs and risks of decisions borne by market players \Rightarrow
- No incentives to *overinvest*
- Leaner, but still reliable, electricity system
- But sometimes: *Capacity shortages* during peak-demand periods.

The main elements and impacts of the reform of the electricity supply industry

- Privatisation (the state becomes regulator, not owner)
- Unbundling
- Liberalisation
- Right pricing -- *resulting*
- In a more efficient electricity sector
but often also
 - In *shrinking reserve capacities*
 - In *not enough investments into the electricity sector*

Investment Requirements in the European Electricity Market to 2030 (Source: IEA)



General investment problems in CEE transition economies – Key barriers to investment

- Political instability
- Absence of a sound and stable economic/financial policy and/or energy policy
- The local legal system
- Complicated and slow bureaucratic system
- Slow licensing procedures
- No cost-reflective electricity prices, cross-subsidization
- Rapidly changing economic and regulation environment

HOW TO FACILITATE INVESTMENT

Conditions for an optimal investment environment with minimised risks (1)

- Long-term contracts (Power Purchase Agreements (PPAs))
- Appropriate return on capital for investors
- Cost-reflective prices on producers' domestic markets
- A regulatory approach that encourages investments
- Market-based approach as opposed to government intervention – although this issue can be debated.

Conditions for an optimal investment environment with minimised risks (2)

- Appropriate treatment of *electricity from renewables* (i.e. the need for subsidies: feed- in tariffs, ‘green’ certificates – this issue is also still debatable).
- Transparency, particularly to avoid *cross subsidies* until unbundling is achieved and also financial and/or administrative *separation* of generation-transmission-distribution TSO
- Good *monitoring* of security of supply
- Developed and harmonized regional markets
- Reliable, stable and transparent *legal and regulatory framework*

The existence of all of the above factors can help to encourage professional as well as financial investors/banks to invest in the sector in this region.

- It is absolutely essential in the interest of security of supply to *minimise the risks* (political, financial, legal, administrative etc.) *for investments*.
- *However, it must be emphasised that in a market economy, investments will never fully be without risks.*

Key conditions for encouraging investments in the transition economies:

- Political-economic stability;
- Sound economic and energy policy;
- Legal system (e.g. abiding by the Energy Charter Treaty);
- Stable regulatory framework;
- Cost-reflective or liberalized energy prices; and
- Existence of long-term contracts – it is recognised, however, that this point is controversial.

When seeking a solution to the investment and risk problems, there are three potential models

- (a) Mitigation of Risks Model (Return of the “Stronger State” Model)
- (b) Strong Risk Taking Ability Model (The Oil Company Model)
- (c) The Hybrid Model – A Mix of Models (a) and (b)

(a) Mitigation of Risks Model (Return of the “Stronger State” Model)

- The *government* will have a *strong and direct role* in the supply of electricity and in the encouragement of investments;
- *Governments* may have to *guarantee* the return on investments to foreign investors by direct methods (e.g. long-term PPAs) or by indirect methods (e.g. lower taxation or a guaranteed return on the invested asset by price regulation)
- It may lead to a relatively *good situation in terms of security of supply*, but with all the *disadvantages* that were highlighted in the UNECE paper “Guidelines on Reforming Energy Prices and Subsidies” (lower ec. eff., wastage of en.)

(b) Strong Risk Taking Ability Model (The Oil Company Model) (1)

- *High risks* associated with investing in the electricity sector - hence, players are needed who are able to take these risks; only the *strongest players* are able to successfully compete in the market
- In the electricity sector, instead of the vertically integrated national model, a *partially vertically integrated international or horizontal model* might prevail (with generation-distribution-transmission TSO over several countries)

(b) Strong Risk Taking Ability Model (The Oil Company Model) (2)

- This model has a number of advantages: it offers a *market-friendly solution* and does *not require state subsidies*
- Difficulties may also occur with this model: the vested interests of the multinational power companies may *not necessarily lie in the construction of large reserve capacities*, which could affect security of supply and *lead to price spikes*.

Future work programme of the Ad Hoc Group of Experts on Electric Power ???

1. Emulating IEA activities on oil, e.g.:
 - collecting capacity, reserve, production, import-export data on electricity
 - collecting investments' unit cost (kWh/US\$) etc. data
2. Disseminating the collected information
3. Organising regular meetings
4. Sending messages/warnings to professional and governmental bodies etc. etc. and others