

THE PERSPECTIVES OF THE ENERGETIC COMPETITIVENESS IN THE EU AND THE ICT

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Abstract

Information and communication technology (ICT) consumes energy, but in the same time those technologies help us to conserve energy. It did so by enhancing the performance of systems and processes in industry and commerce. Nowadays, ICT must also play a critical role in offering valid solutions for the energy sector towards a more sustainable production of electricity. The new “smart” technologies from the computing domain are now emerging, offering further possibilities to reduce the growing energy consumption both in the residential sector and in the industrial area.

Keywords: energy competitiveness, energy conservation, green energy, information and communication technology.

Over the last few years, we have seen major changes in the field of energy, the preservation of some balance as regards the climate and the improvement of the competitiveness of the energy sector worldwide.

Information and communication technology (ICT) is one of the main pillars of today's society. It not only has a major effect on our professional and private life, it has also become one of the most important drivers of economic growth. In the past, economic development was based on a solid increase in productivity, consumption, and mobility which mean an increasing usage of natural resources.

ICT with its fortunate effect on the economy is certainly an important indirect cause for the overall use of natural resources and energy, the total energy consumption of ICT itself being difficult to estimate.

Nowadays high hopes also rest upon ICT to reduce resource and energy consumption in the economic sectors, and thus to reduce global warming. This could mean to improve with the help of ICT the energy efficiency in production and consumption, and to enable by ICT new concepts to generate, allocate, distribute, share, and use energy in a resource-efficient and environmentally-friendly way.²

As regards the increasing dependence of the EU for the energy supply and the prices' volatility in this sector, four essential issues are expected in order to change this field's policy at the level of the EU:

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² Friedemann Mattern, Thorsten Staake, and Markus Weiss, ICT for Green - How Computers Can Help Us to Conserve Energy!, Proceedings of e-Energy 2010. Passau, Germany, April 2010

1. Considerable investment is needed over the next 10 years to modernize the energy generation and transport (around €1,000 billion³). This approach requires a stable and long-term policy framework that would provide stable and affordable prices at individual and industrial levels.
2. Deepening the interdependence among Member States. The European energy market needs an optimal energy mix, including the rapid development of renewable energy, safe supply routes and competitive prices.
3. The risk of the European market to lose leadership in the development of new technologies.
4. The need to increase the central role of energy production and consumption together with the need to reduce emissions of greenhouse gases at regional and global level.

The supply problems and the economic crisis have reminded us how important the relative energy independence is at national and regional levels. The three targets of the EU energy policy - security of supply, competitiveness and sustainability - are now set in the European legislation. These issues and the recognition by each Member State of the next challenge offer a unique opportunity to achieve what the founding fathers of European integration have thought.

How can the European Union overall and each Member State in particular to improve their competitiveness in the energy field? Five lines of action are to be mentioned in this respect:

1. Reduction of consumption

According to the estimates of the International Energy Agency, the demand for primary energy is projected to increase by more than 30% by the year 2035. Unfortunately, however, increased demand in developing countries can cause a redirection of energy supply from sources increasingly distant from Europe. Worldwide demand is also continuously increasing. China is expected to use 20% of the energy available worldwide by 2035. A fierce global competition for energy resources will be expected and in the absence of proper supplies, conflicts are expected to arise.

Even if these war scenarios do not come true, the fact is that over a medium term we should expect a strong increase in energy prices. On the one hand, rising energy prices will reduce the prosperity and quality of life, because almost all of us are consumers of energy. On the other hand, rising energy prices are a serious threat to Europe's industrial competitiveness. To reverse this trend, energy consumption should be optimized. Increasing the share of renewable energies in the total production is a good way to achieve the objectives for 2020. However, in terms of energy efficiency, the EU is seriously lagging behind. By 2020 we will reach only half the objective if we continue at the current rate.

Many experts say that there is huge potential to save, but there is no clear path to achieve it. In coming years, energy efficiency must be integrated as goal in other Community policies. As actual measures, the first option would be to establish mandatory criteria for energy

³ Council Conclusions On Energy 2020: A Strategy For Competitive, Sustainable And Secure Energy 3072th Transport, Telecommunications And Energy Council Meeting Brussels, 28 February 2011

efficiency in public procurement. Another option would be to set mandatory objectives for energy efficiency in certain sectors, especially for public buildings and public transport.

Beyond the public sector, there is a need to create a European market for energy efficiency. With joint standards, specific incentives and obligations, the issue of energy costs would not become a reason of every autumn, being, at the same time, a catalyst for creating a dynamic market for new skills, jobs and business.

It is expected, in coming years, for the Member States to prepare ambitious national plans to increase energy efficiency nationwide.

Those plans will provide new ways for optimal production management and possibility for offering new products on the electricity market, focusing on the development of the free energy market in EU and providing a successful participation of the players in this market.

Many renewable energy sources are inferior to conventional power stations so it is important to plan and control the energy generation. For example new alternative energy production systems offer today a non-stable environment with many fluctuations. Such fluctuations sometimes even lead to negative energy prices. This phenomenon can be controlled by ICT smart devices that consume or store energy when excess power is available, leading to a better balancing of supply and demand.

2. A market seen as an integrated system

After more than half a century of European integration, we expect to find the same level of integration as well as in the field of communication and transport systems. However, the area remains highly fragmented.

A significant example is the gas crisis in January 2009. If the internal market had been integrated through appropriate legislation and transport infrastructure, gas could have been delivered where needed and no one should have borne the cold.

Table 1 - Energy dependence at the level of the EU 27 (%)

	1999	2005	2006	2007	2008	2010
EU-27	45.1	52.5	53.7	53.0	54.7	53.9
<i>Belgium</i>	77.0	80.1	79.7	77.1	79.9	74.2
<i>Bulgaria</i>	48.7	47.5	46.2	51.3	52.1	45.3
<i>The Czech Republic</i>	25.3	28.3	27.8	25.0	27.6	26.9
<i>Denmark</i>	- 16.6	- 50.9	- 35.9	- 24.7	- 21.7	- 18.8
<i>Germany</i>	59.3	61.4	61.3	58.7	60.9	61.6
<i>Estonia</i>	34.8	25.4	28.5	23.8	24.0	21.2
<i>Ireland</i>	84.5	89.6	90.7	88.2	89.9	88.0
<i>Greece</i>	66.1	68.6	71.8	71.2	73.3	67.8
<i>Spain</i>	76.6	81.5	81.2	79.7	81.2	79.4
<i>France</i>	51.6	51.7	51.3	50.3	51.0	51.3
<i>Italy</i>	83.0	84.4	86.8	85.2	85.2	82.9
<i>Cyprus</i>	101.9	100.7	102.5	95.9	97.6	97.3
<i>Latvia</i>	55.3	63.0	65.7	61.5	57.9	58.8

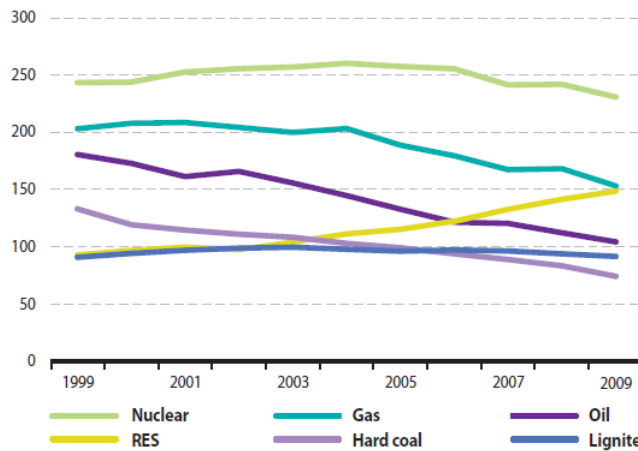
	1999	2005	2006	2007	2008	2010
<i>Lithuania</i>	53.9	57.9	63.4	62.3	59.2	51.2
<i>Luxembourg</i>	97.1	97.7	98.7	97.2	97.9	97.6
<i>Hungary</i>	53.8	63.2	62.7	61.3	63.4	58.8
<i>Malta</i>	109.5	100.0	100.0	100.0	100.0	101.8
<i>Holland</i>	29.9	38.4	37.4	38.9	34.4	36.5
<i>Austria</i>	65.4	71.3	72.2	68.7	68.8	65.0
<i>Poland</i>	9.8	17.6	20.1	25.7	30.6	31.7
<i>Portugal</i>	87.5	88.5	83.0	82.0	82.8	80.9
<i>Romania</i>	21.1	27.6	29.2	31.5	27.7	20.3
<i>Slovenia</i>	55.7	52.3	52.1	52.5	55.1	49.0
<i>Slovakia</i>	66.2	65.4	63.9	68.4	64.6	66.4
<i>Finland</i>	51.1	54.7	54.2	53.4	55.0	54.4
<i>Sweden</i>	35.0	37.7	37.8	36.3	37.9	37.4
<i>Great Britain</i>	- 20.4	13.5	21.2	20.0	26.0	26.6

Source: Eurostat

Primary energy production in the EU-27 represented 812 million tons of oil equivalent in 2010. This figure marked the downward trend in recent years of the EU-27, which meant an overall reduction of 14% from 1999 to 2010. The highest yearly decreasing rate of this period was recorded from 2008 to 2009 (- 4%).

Most important source of primary energy production in the EU-27 was nuclear energy (28% of the total in 2010), followed by solid fuel (20%), natural gas (19%), renewable energy sources (18%) and oil (13%).

Drawing 1 – Production of primary energy per type of fuel (mil. tons equivalent oil)

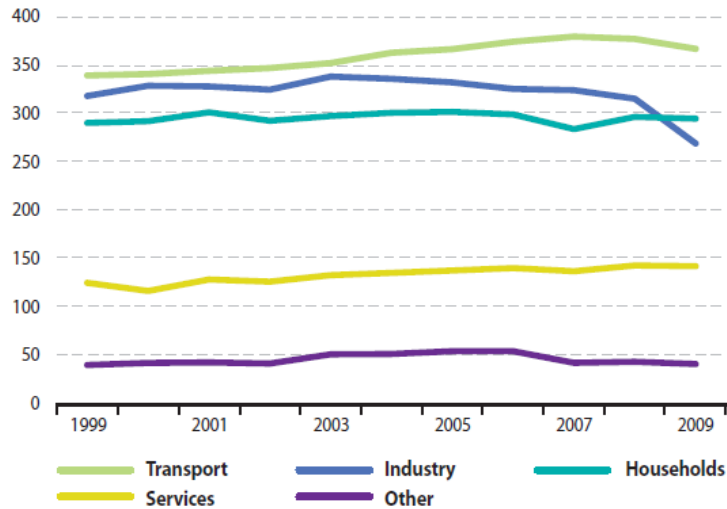


From a macroeconomic perspective, the European Union could reduce energy costs and this would make Europe a more competitive and attractive business location. Companies and households could benefit from the free choice of supplier for electricity and gas.

Sustainable production of renewable energy requires at least a market of the size of the one from the EU. Although it is important to reinforce positive developments, a new dimension is necessary to achieve long-term objectives. On large scale, the production of renewable energy

implies that it is often produced at a considerable distance from the areas of consumption (sometimes beyond the EU borders), this implying the need for better coordination between national systems.

Drawing 2 – Consumption of primary energy per categories (mil. tons equivalent oil)



Source: Eurostat 2010

A first step in achieving this objective lies in eliminating technical barriers still existing at national level. The second step is to implement the technical requirements necessary so that energy sources could be transferred with minimal costs.

The standards for the implementation of smart networks should be undertaken before the end of next year. This will be a huge challenge, given that after nearly seven years after its expansion, some countries in the Central and Eastern Europe are still largely dependent on suppliers outside the EU or rely on one source of supply.

In this context the European Union is concerned to identify and implement strategic priorities and projects around the five existing critical energy axes: the South-West Europe with respect to electrical interconnections; the North/South axis and the Southern corridor of natural gas transport; the Central and South-East Europe as regards the electricity transport connections and the connection with the North Sea.

At the same time, we need greater transparency in the decision-making process and simplified procedures for market licensing and operation. It is simply unacceptable for authorization procedures for new operators to require, on average, about 10 years before starting to actually work.

However, it is not enough for the EU to focus only on the internal infrastructure. The Southern Gas Corridor is essential to give access to the resources of the Caspian Sea. The plans for the interconnection of electricity generation capacities between North Africa and the

EU are equally important for the development of the region and supplement the future European projects on the recovery of energy from renewable sources.

Table 2 – Capacity implemented at the level of the EU27 (GW)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total	683	695	704	712	728	739	751	772	788	810	834
Thermo	400	407	410	412	423	428	434	446	451	459	465
Nuclear	138	137	137	138	137	136	135	134	133	133	132
Hydro	136	136	137	138	137	138	139	140	142	142	144
Other types	10	14	19	25	30	36	44	52	62	76	92

Source: Eurostat 2010

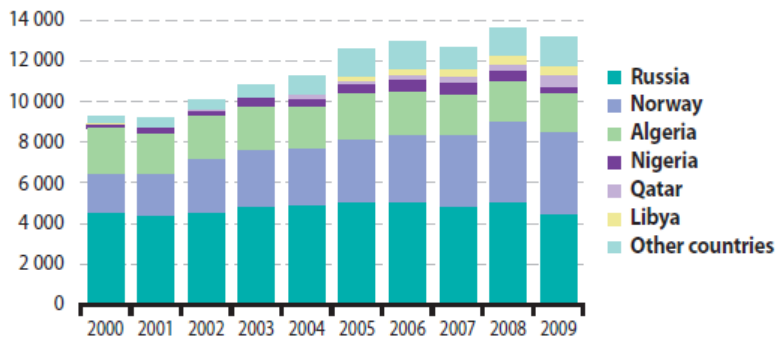
3. The external dimension of the energy market

In the future, we should highlight the strengths of the European energy market as being the largest regional market of the world.

This mainly means a closer collaboration with our neighbors, to expand the domestic market beyond the Eastern border of the Union, but also to the South.

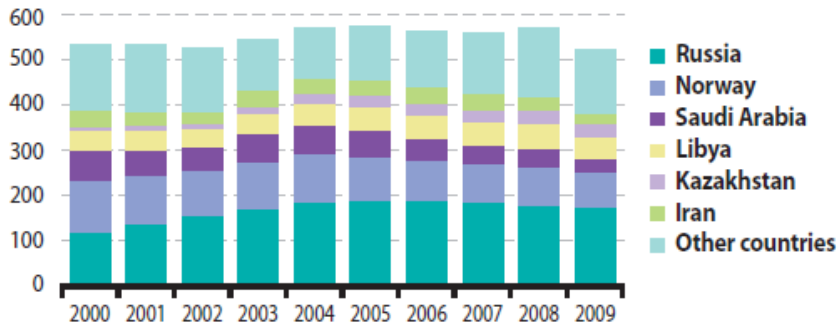
Our diplomatic history that connects us with the countries of Eastern and Southeastern Europe, including Ukraine, should be both strengthened and capitalized in particular as regards the Southern states of the Mediterranean.

Drawing 2 – Imports of natural gas at the Community level per countries of origin (picojoules)



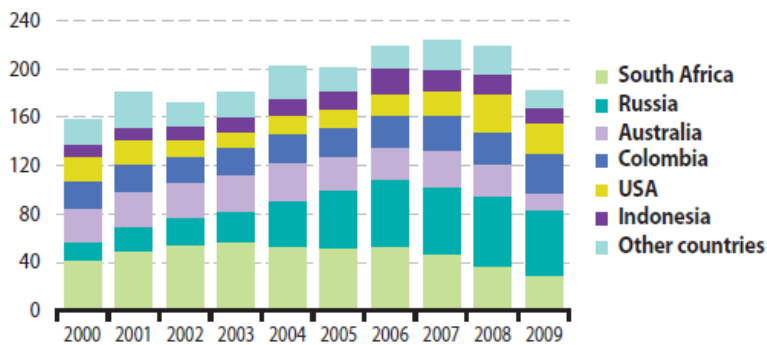
Source: Eurostat 2010

Drawing 3 – Imports of raw oil at the Community level per countries of origin (MT-metric tons)



Source: Eurostat 2010

Drawing 3 – Imports of coal at the Community level per countries of origin (MT-metric tons)



Source: Eurostat 2010

At the same time, we need bilateral agreements concluded by Member States and partner countries, such as Russia, but they will be in accordance with common rules in force at the Community level. When speaking of strategic "corridors", such as the Southern Mediterranean corridor of natural gas or the Mediterranean ring of electricity from renewable sources, we will consider the formal negotiating mandates at the EU level, which would represent all partner countries. In parallel, it is necessary to strengthen the cooperation of the Union with its strategic partners. The partnerships such as those with the Russian Federation, the United States of America, the Gulf countries and China should be completed with the objective of the Union to promote the regulatory convergence. The cooperation is mainly concerned with areas such as the market regulatory mechanisms, new technologies, energy efficiency and nuclear safety and security.

4. Implementation of a technological transfer at the Community level

Without a major change in the technological infrastructure, the EU will have difficulties regarding the goal of 2050. Future challenges focus on the increase of the quantity of

electricity obtained from alternative and renewable sources and on making costs more efficient as regards the energy consumed by transport fields. Considering the amount of time needed by energy technologies to develop and enter the market, the implementation of new and highly efficient technologies and reduced emissions of greenhouse gases on the European market is more urgent than ever before.

Beyond the priority funding of this sector, the Union's regulatory instruments should be better used to accelerate the implementation of innovative technologies on the market. Europe has the potential to set new global standards.

5. Offering a long term perspective: roadmap 2050

The energy strategy for 2020 is just a first step. In order to transform the European energy systems, we need a long term perspective. The so-called "Roadmap of energy 2050"⁴, new ways must be identified to meet the requirement for the reduction of the emissions of greenhouse gases (80-95% compared to 1990), as well as the supply of energy at competitive prices at the Community level.

Thus, the European Council will have to carry out the following in the near future:

1. To give a clear signal as regards the need to accelerate the efforts for energy efficiency, high responsibility of the public sector and an invitation for a greater plan of energy efficiency;
2. To fully implement the strategic plan for energy technologies;
3. To set a deadline for the removal of all technical barriers in order to complete the domestic market in this field and to interconnect all Member States;
4. To support a new approach in order to build rapidly the necessary networks;
5. To recognize the increasing dimension of the domestic market in order to substantiate a mechanism for the coordination of the national efforts and promotion of strategic corridors.

At national level, the sustainable economic and social development depends directly on the strategic energy sector, which records low performance because of the obsolete production and distribution infrastructure, thus leading to low energy efficiency throughout the entire chain, from production to the end user. There is a close link between energy policy initiatives, competitiveness and the environment. The need for new investment in generation capacity (especially in terms of environment) and transmission and to solve the shortcomings of gas and electricity markets is the real challenge. The plan of penalties for polluting emissions, which fights against global warming, has been revised so as not to disadvantage the Romanian and European industries compared to international competition.

Thus, at the national level a new strategy is required, whose main objective should be to increase the country's competitive position in the macroeconomic context, to accompany, at the same time, the natural process of growth of direct foreign investment (DFI).

⁴ Council Conclusions On Energy 2020: A Strategy For Competitive, Sustainable And Secure Energy 3072th Transport, Telecommunications And Energy Council Meeting Brussels, 28 February 2011

Moreover, the strategy must realistically consider that Romania has become part of the global production channels and will develop less a sectorial specialization, but rather a sectorial specialization only in certain productive phases and its products will become difficult to recognize on the international market through a brand strategy. Thus, one of the ultimate objectives of the strategy will be to gradually change the position of the Romanian production, into the international division of productive activities, by increasing the domestic quality of processing. To achieve these objectives, it is necessary to increase the efficiency and sustainable development of the energy system as a factor of competitiveness, while addressing issues of energy efficiency to end users.

Future opportunities for major technological improvements and transition from competitive advantages related to low cost of labor will be strictly related to the requirements for the increase of the energy efficiency given that low energy consumption processes will require the implementation of advanced technologies and will end into the decrease of operation costs and full reorganization of companies.

A clean, safe, flexible and efficient energy infrastructure is a necessary prerequisite for the economic development, as it leads to the productivity's growth and, as a result, to the growth of the competitiveness. A more efficient production, transport and use of energy trigger both the reduction of consumption of primary energy and final energy. Thus, the end user will enjoy high quality and safety of the supply, resulting into the growth of productivity.

The energy intensity is the indicator where Romania records the highest gap compared to the EU average (the final and primary energy intensity were, in 2004, 3 times higher compared to the EU average). If it is not managed properly, such gap can represent a major hindrance for the competitiveness of the domestic economy on the Unique Market and the South-East Regional Market, taking into account the gradual increase in prices of energy towards the European levels⁵.

The International Monetary Fund (IMF), the World Bank (WB), the European Commission (EC), as well as foreign companies are now putting enormous pressure on the authorities in Bucharest for the liberalization of the electricity and gas market. Unfortunately, due to the market effect, these actions will generate an increase in prices, which translates into a negative social feedback. But if, at first glance, such an approach is equivalent to decreasing production and rising unemployment, a closer look might reveal that this could even be a chance for Romania.

The U.S. Ambassador, Mark Gitenstein said, during the European Energy Development Conference, which took place on 26th and 27th of October in Bucharest, that the liberalization of the energy market and the privatization of state companies would be the only ways in which the Romanian energy sector could attract foreign investment. Americans have great interest in this field in Romania, where giants Exxon and Chevron are preparing to extract hydrocarbons⁶.

⁵ Council Conclusions On Energy 2020: A Strategy For Competitive, Sustainable And Secure Energy 3072th Transport, Telecommunications And Energy Council Meeting Brussels, 28 February 2011

⁶ [Http://www.Wall-Street.Ro/Slideshow/Economie/111297/Agenda-De-Business-A-Saptamanii-Cele-Mai-Importante-Evenimente/11/Miercuri-Joi-European-Energy-Development.Html](http://www.wall-street.ro/Slideshow/Economie/111297/Agenda-De-Business-A-Saptamanii-Cele-Mai-Importante-Evenimente/11/Miercuri-Joi-European-Energy-Development.Html)

The European companies OMV, E.ON, Enel, CEZ and GDF Suez have been constantly demanding an increase in prices. Their demands have been taken over by the IMF, which has imposed them to the Government by means of the funding agreement.

Perhaps the greatest problem of the Romanian economy is the lack of competitiveness, also caused by an extensive and huge energy demand.

Thus, according to Eurostat, the energy intensity was in 2009, in full crisis in Romania, 576.90 kilograms equivalent oil (kgep) per 1000 Euro, compared to 165.2 kgep/1000 Euro the EU27 average⁷. In the Euro zone, the energy intensity was 158.96 kgep/1000 Euro in Germany – 150.55 kgep/1000 Euro, in Italy – 140.12 kgep/1000 Euro and in Great Britain – 113.71 kgep/1000 Euro.

Table 3 – Energy intensity at the level of UE27

	(kg. equivalent petrol/1 000 EUR)			Index (2000 = 100)		
	1999	2004	2009	1999	2004	2009
EU-27	193	184	165	103.0	98.3	88.2
<i>Belgium</i>	242	221	206	103.2	94.0	87.6
<i>Bulgaria</i>	1 378	1 105	843	103.4	82.9	63.2
<i>The Czech Republic</i>	661	659	514	98.5	98.2	76.6
<i>Denmark</i>	121	112	1 07	106.3	98.5	93.6
<i>Germany</i>	171	166	151	102.6	99.7	90.4
<i>Estonia</i>	891	686	607	110.5	85.1	75.3
<i>Ireland</i>	144	118	109	106.1	87.0	80.8
<i>Greece</i>	204	187	168	99.6	91.5	81.9
<i>Spain</i>	197	198	168	100.0	100.6	85.5
<i>France</i>	184	179	164	102.8	100.3	91.9
<i>Italy</i>	150	150	140	101.8	101.4	94.9
<i>Cyprus</i>	233	218	212	98.2	92.0	89.1
<i>Latvia</i>	499	386	354	113.2	87.7	80.5
<i>Lithuania</i>	659	552	446	114.3	95.7	77.4
<i>Luxembourg</i>	169	187	152	104.0	115.0	93.2
<i>Hungary</i>	529	434	413	107.5	88.2	84.0
<i>Malta</i>		215	168		113.4	88.9
<i>Holland</i>	186	189	174	101.5	103.2	94.9
<i>Austria</i>	146	151	136	103.6	107.5	96.8
<i>Poland</i>	525	441	364	108.5	91.1	75.2
<i>Portugal</i>	204	203	186	103.3	102.9	94.3
<i>Romania</i>	924	767	577	102.0	84.6	63.7
<i>Slovenia</i>	313	290	252	104.4	96.8	84.2
<i>Slovakia</i>	818	708	497	100.3	86.9	60.9
<i>Finland</i>	265	257	222	106.7	103.6	89.3
<i>Sweden</i>	195	178	148	110.0	100.0	83.2
<i>Great Britain</i>	149	131	114	103.1	90.4	78.6

⁷ http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/publication?p_product_code=KS-DK-11-001

Source: Eurostat 2010

Transport almost leads Romania to bankruptcy. And this is not because of precarious infrastructure, resulting in numerous accidents (including fatalities), but also because it affects the same competitiveness. Trucks have an average speed of 27 to 28 km/h in Romania, so they can travel about 6000 km per month⁸. In the international transport, over 14,000 km per month can be travelled, given the average speed of about 70-80 km/h. In rail transport of goods, things are even worse: in Romania goods are transported with 16 km/h, compared to an average of 80-100 km/h in the West. Obviously, under such circumstances more fuel and more electricity are consumed and the competitiveness of the Romanian economy is reduced.

A source of increasing competitiveness in this context is to increase energy efficiency, reduce energy intensity. Therefore, if the price of electricity and natural gas rises, companies are required to invest in energy efficiency to remain on the market. Otherwise, they will go bankrupt. Hence, perhaps the most important decision that should be made by authorities refers to improving energy efficiency.

There is an option, however, which should not be neglected, given the effects of the current economic crisis. Such a liberalization of the energy market will increase the prices of electricity and natural gas, leading inevitably to higher prices of goods and services where they are used. In the absence of proper investment in infrastructure, a new threat is looming the national economy. Thus, because they will become more expensive, the Romanian products could exit not only the export markets, but also the domestic market, being replaced by cheaper imports. And here we speak of major macroeconomic imbalances.

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