GLOBALIZATION AND THE NEW ENERGY CHALLENGES

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A New Global Energy Economy is emerging, in which energy demand and supply will make regions of the world much more dependent upon each other. International extensive energetic interdependence on energy resources and networks grows in the global economy. Some $22 trillion of investment in supply infrastructure is needed to meet projected global demand until 2030. Mobilizing all this investment will be challenging. Adherence to these policies will ensure that the global energy investments materialize, the necessary infrastructure is built, and the lengthening worldwide energy supply chain operates in security. Strong global energy policy is needed to move the world into a more sustainable energy path.

Keywords: energy security, extensive energetic interdependency, global energy consumption, supply infrastructure.

Motto: Welcome to the New Global Energy Economy!

"The next ten years will be crucial for all countries, including China and India, because of the rapid expansion of energy-supply infrastructure. We need to act now to bring about a radical shift in investment in favor of cleaner, more efficient and more secure energy technologies."

(Nobuo Tanaka, Executive Director of the International Energy Agency (IEA))

Evolutions and Trends of the Global Energy Market

The energy problem became very sensitive today in the entire world and will turn into sharp in the coming years.

The decline of the fossil fuel global reserves, the peak oil prices, the energy security, represent issues of concern, marking the actual global scene. Covering the worldwide energy demand, while protecting the natural environment together with fulfillment of restrictions of economic and social nature, represent some of the great challenges addressed to the worldwide governments now.

The recent 10 years have been marked by major structural changes, generated by the dynamic evolutions of the contemporary era. In a globalized economy the energy policy of a country is developed within the context of the evolutions and changes registered by the international market. A global approach of the energy sector is aimed, thus emerging a New Global Energy Economy.

Some of the main determinants of the New Global Energy Economy are:

- The global economic and commercial system, with the three pillars: The European Union, The United States of America and Japan, superpowers generating regionalism and development.
- The emerging of the new giants of the world economy, such as China and India, registering an important economic and demografic growth; both put considerable pressure on the primary fossil resources and determine important growth of the fossil fuel prices.
- The inclination of the Russian Federation to become a new center of reference of the fuel prices on the international market, pursuing „energetic pressure" over the consumers of the Russian fossil fuels, especially over those from Europe. The objective envisaged by Russia, is to sign an agreement which will allow access of the Russian companies on the European markets as a trade off for recognition by Russia of the international economic principles – trade liberalisation, and access of foreign investors on the internal Russian energy market.
- The need of a sustainable economic development, as a major priority, for limiting and solving the miss-functionalities generated by the „ecologic pressures" turned more and more severe. The recent studies show that new basis of the development to prevent a global ecological collapse are needed, as may affect all the worldwide regions, with serious consequences for their economies and ecosystems. According to the Intergovernmental Committee for Climate Changes (IPCC), the

greenhouse gas emissions have already determined an increase of the temperature at global level with 0.6 degrees. If corrective measures are not going to be taken, the increase will reach between 1.4 and 5.8 degrees for the end of this century.

- The understanding of the reality that the primary energy resources are limited and, as a result, the countries - especially those countries relying on imports of energy - redefine their energy policies, consider the renewables and the improvement of energy efficiency.

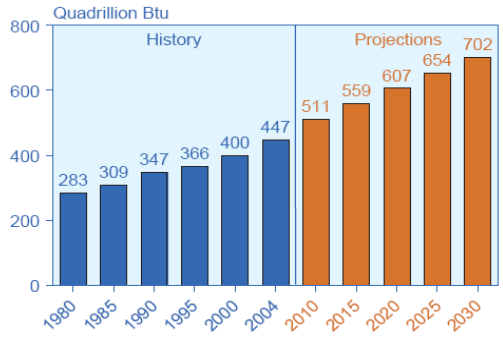
The Trends in the World Energy Market Consumption and Supply projected to 2030

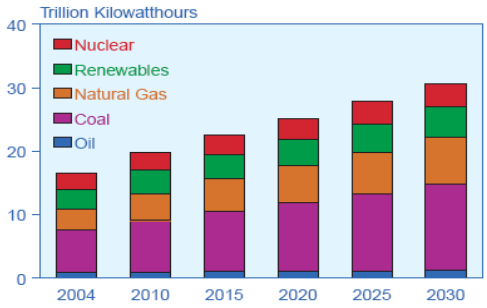
The structure of the world energy consumption has changed in the last years**,** thus developing countries have increased their share in the total global primary energy use, from 22 percent, share in the total consumption in 1970, to 39 percent in 2003, 46 percent in 2004, projections indicating that for 2030 the world consumption will be dominated by these developing countries at about 57 percent of the total.

The Reference Scenario in the World Energy Outlook 2007, published by the International Energy Agency, which provides a baseline vision of how energy markets are likely to evolve without new government measures to alter underlying energy trends, shows that:

- The global primary energy demand increases by approx. 55 percent between 2005 and 2030, with an annual average rate of 1.8 percent per year; the demand will reach 17.7 billion toe in 2030, as compared to 11.4 billion toe in 2005; 45 percent of this increase accounts for China and India together;
- Fossil fuels (petroleum, natural gas and coal) are expected to continue to remain the dominant source of primary energy, accounting for 84 percent of the overall increase in demand between 2005 and 2030;
- Oil demand share in global primary energy demand falls from 35 percent in 2005 to 32 percent in 2030; despite these terms, the oil demand will reach 118 million bpd at the level of 2030 growing from 83 million bpd at the level of year 2004; for 2015 oil demand is projected at 97 million bpd;
- Coal demand sees the biggest increase in demand in absolute terms, jumping by 76 percent between 2004 and 2030, and pushing its share in total energy demand up from 25 percent to 28 percent in 2030; the coal demand will raise from 113.4 quadrillion (10^{15}) Btu in 2004 to 199.9 quadrillion (10^{15}) Btu in 2030;
- The share of natural gas in global primary energy demand increases modestly, from 21 percent to 22 percent. If in 2004 the demand for natural gas was at 98.9 trillion (10^{12}) cubic feet, in 2030 it will reach 163.3 trillion (10^{12}) cubic feet;
- The electricity use shall double, its share of final energy consumption rising from 17 percent to 22 percent;
- To meet the global energy demand projected up to the level of the 2030 year, some 22 trillion (10^{12}) USD are estimated to be needed as investments in the global supply infrastructure.

Further on, the World Marketed Energy Consumption during 1980 and 2030 (in quadrillion (10^{15}) Btu) and the evolution of the World Electricity Generation by Fuel during 2004 and 2030 (in trillion kWh) are presented:





***Sources:** Energy Information Administration (EIA), International Energy Annual 2004 (May-July 2006), web site www.eia.doe.gov/iea. Projections: EIA, System for the Analysis of Global Energy Markets (2007).*

The Interdependency between World Energy Production and the Trends of the World Oil Prices

The fossil fuel prices are extremely sensitive. Different events emerging in any part of the world, mainly in countries which are important producers and exporters of petroleum resources, influence the oil reference price. In the last years we were witness to the shock of the oil price growth due to unstable regime in suppy countries such as Iraq or Iran (the nuclear threaten) combined with the increase in demand and with the decline of the petroleum global output.

Fluctuations and the peak oil prices are notorious. The oil price is volatile and hard predictable.

Control over the energy resources means control over fuel prices. The international suppliers have organized in:

- The Organization of the Petroleum Exporting Countries (OPEC), administrating the quantities produced by the member states, and
- The parallel markets (NYMEX – New York Mercantile Exchange, SIMEX – Singapore Exchange, IPE – International Petroleum Exchange, London), to be part in the decisions taken in fixing the world crude oil prices. The parallel markets can influence the international oil price and can counterbalance the OPEC decisions.

So, the 12 member states of OPEC decide over the price strategy by producing a greater or a smaller quantity of oil as compared to the quantity needed in the market. The petroleum ministers of the Member States meet periodically to discuss the prices and starting with 1982 to establish the quotas for the production of crude oil as well. As long as the oil price is maintained within the established reasonable limits, OPEC does not intervene.

In the last years, the OPEC policy could not keep the pace with the robust growth of the price of the oil barrel, and the decisions related to the output quotas are regarded with scepticism. Some of the analysts are estimating an increase of the oil barrel up to some 150 dollars, in which case the effects towards the global economy should be catastrophic.

On the other hand, one of the objectives of the Russian policy is to gain the capability to have a word to say in fuel price forming, as related to Russia share on the export market, by setting up the said OPEC of the Caspian Sea. Recently, a project of an OPEC of gas was launched as well, project that may include Russia, Iran, Algeria, Libya, Turkmenistan, Kazakhstan and Uzbekistan, which will have serious effects over the prices and the gas supply to Europe. The analysts anticipate that the price paid by the European consumers for gas might reach even 400 dollars per 1000 cubic meters until the end of the year 2009.

The increasing in energy demand, combined with geopolitical factors, especially those in the Middle East, determined the growth of the crude oil prices in the first decade of the 21st Century. Generally, the natural gas prices follow the crude oil prices with a 6 month delay (6 months lagged oil-gas price values).

Another determinant for the increased global price of the oil products was the deficit of refining capacities, a problem that needs to be identified medium and long term solutions.

The tendency of some states to supplement the stocks for crisis is adding to all these above.

All these determined the reorientation of the energy policies of all the countries, mainly of those countries importing energy, by considering the renewables and the energy efficiency.

The Top Global Energy Companies

For 2007, the Platts Top 250 Global Energy Company' Rankings, accomplished by the experts from Platts, the first 10 levels are covered only by oil and natural gas companies, with total revenues of *1.8 trillion (10^{12}) USD*.[112] The robust growth of energy prices during 2005-2008 has supported the gradual increase of profits which have reached huge levels for the entire global economy.

[112] As compared, all the oil and natural gas companies listed in the *Platts Top 250 Global Energy Company' Rankings* for 2004, registered a total revenue of *1.9 trillion USD.*

Item	Company	Country of origine	2007 Assets (billion USD)	2007 Revenues (billion USD)	2007 Profit (billion USD)	ROIC[113] (%)
1	ExxonMobil Corp.	SUA	219.015	335.086	39.500	31.8
2	BP plc.	Marea Britanie	217.601	265.906	22.025	22.8
3	Royal Dutch/Shell plc.	Marea Britanie	235.845	318.845	25.442	20.4
4	Chevron Corp.	SUA	132.628	204.892	17.138	22.3
5	Total S.A.	Franta	141.595	172.422	15.298	20.6
6	Petrochina Co. Ltd.	China	114.006	87.778	18.120	21.2
7	Statoil ASA	Norvegia	52.257	67.660	6.488	25.4
8	ENI Spa	Italia	118.839	111.888	11.977	18.3
9	Petroleo Brasileiro S.A.	Brazilia	108.886	74.357	12.179	17.2
10	ConocoPhilips	SUA	164.781	167.578	15.550	14.5
Total			***1,505.453***	***1,806.412***	***183.717***	

Note: Company data as of 9/11/07 provided by Standard & Poors;

Source: Platts Top 250 Global Energy Company' Rankings

Absence of the Russian companies from this top 10 is noted, probably one of the reasons being the limitation of the access of these companies to the western market. As a matter of fact, this is the issue for which actually Russia puts the "energetic pressure" over the European consumers of Russian energy resources into the so called "the Russian natural gas problem" towards Europe.

Companies as LUKOIL (12 ranking) and Gazprom OAO (17 ranking) are very active in Asia, Africa and in the Eastern Europe.

Consequently:

- The energetic industry tends to become less national in the conditions of liberalisation and integration of energy markets and the role of global energy companies and of the bilateral strategic alliances is growing rapidly.
- Thus, globalisation has brought into discussion the role of states-nations, meaning not to diminishing, but to transforming their functions and de-politicizing the national space for the energy sector.
- The liberalisation, as an immediate consequence of globalisation, necessarily implies a transfer of responsibility from the state to the private sector simultaneously with the corresponding transfer of the regulatory attributes to independent governmental regulatory authorities ("the regulation for competition").

Energy Security and the Energetic Disputes

Energy Security

In terms of risk, energy security means to produce the energy needed for the internal consumption and to maintain a minimum possible dependence of external imports of energy. The Energy Security envisages three dimensions:

- to ensure alternative sources of energy supply,
- to identify alternative energy routes and
- to secure existing sources of energy supply and routes of energy transportation.

[113] Return on Invested Capital

The realities of the last years have proved that great consumers should leave the utopia of energetic independence and accept the energetic interdependence. But the great players of the "energetic scene" have different perceptions over the energy security concept:

- For the Unites States, it represents first to diminish dependence from the energy resources from the Middle East.
- Europe can have energy security only if Russia is committing to supply the needed oil and natural gas and
- Russia at its turn, understands by that, access to the occidental markets.

The energy security theme is strongly debated during the G8 summits, while aiming to attain a common vision, especially in regard with the liberalisation of the Russian energy market. The objective aimed by Russia is to sign an agreement which to allow access of the Russian energy companies on the occidental markets; and this, in the exchange of Russia to recognize the international economic principles of trade liberalisation and guarantee access of foreign investors on the internal energy market of Russia.

The North Atlantic Treaty Organisation (OTAN), at its turn, has included the energy security theme on the Alliance's Agenda. The OTAN's strategic concept provides for protection of the supply routes as being one of the critical issues for the security of the members of the organization. Consequently, the energy security is no longer only an economic problem and becomes a more thoughtful and profound global issue, with large politico-military implications.

The energy security theme must take into account the energy challenges brought by the globalisation process, any miss-functioning or vulnerability from one side of the world being capable to affect the worldwide consumers. For example, if a country which is a great energy consumer (such as China or India) will have an event to determine the government of the respective country to buy more oil, this will lead to pushing higher the international oil price and, implicitly of the petroleum products in United States.

Since 1970 and until today, numerous energy crisis have emerged, having their origins in reasons of that nature:

- The oil crisis in 1973-1974, caused by the embargo imposed to OPEC by majority of Arab states oil producers, as an answer to the support provided to Israel by the western countries during the Yom Kippur War.
- The energy crisis in 1979, following the Iranian Revolution;
- The explosion of the oil prices in 1990, caused by the Golf War, when Iraq invaded Kuwait.
- The crisis of fossil fuels prices – the current huge increase of prices for energy resources (2001-2008), while maintaining the worldwide oil production at the same level, correlated with increased global demand of the United States, China and India.

The consequence of this crisis of fossil fuels prices consists in the occurrence of a transnational system of resources with numerous ramifications – infrastructure development and networking.

The great consumers try to consolidate their position in the regions reach in energy resources:

- the United States launched the project for the democratization of the Middle East,
- the European Union promotes, within a common external energy policy, the extended neighborhood policy, and
- China and India base their policy on special agreements and partnerships.

Networks and Pipelines for Transportation of the Fossil Fuels

Certainly a tight connection exists between the holding, the demand, the supply and use of the energy resources, their geographical distribution and access to such resources.

Control over the energy resources – oil, natural and liquefied natural gas (LNG), other fossil fuels – has become the main objective not only for the major players of the global market (United States, European Union, Russia Federation), but also for the new emerging powers (China and India).

It is considered that the East is supplier of energy resources while the West is provider of security and economical assistance. To have access to energy resources from the East, is necessary to develop an adequate infrastructure: the shortest distance from the source to the end user, pipe capacity for transportation, low production costs, low transportation costs, transiting stable areas, port facilities, maritime and river shipping, etc.

According to the Simdex[114] statistics, March 2008 data update, 534 Future Pipeline Projects are under evidence, with a total length of approx. 266,717 km, out of which 168 are in North America, 47 in Latin America, 80 in Europe, 28 in Africa, 97 in Middle East, 101 in Asia and 13 in Australasia. Other 44 New Future Pipeline Projects are on the track, with a total length of 14, 809 km, out of which 20 are in North America, 7 in Europe, 4 in Africa, 7 in the Middle East, 5 in Asia and 1 in Australasia.

The goal is extremely of major importance for all interested states and parties (producers, consumers, companies and countries of transit as well) and different interests and involvements are revealed each and every day.

The Energetic Pressures- The Crisis of the Russian Natural Gas

„The Energetic Pressures" brought by Russia against Europe, has generated a reorientation of the main European consumers of the Russian fossil fuels. The refusal of Ukraine, in January 2006, to pay the price of 250 USD per cubic meter requested by the Russian companies instead of that one of 60 USD per cubic meter (the price used by Russia on the domestic market) and the interruption of natural gas supply to Europe has triggered an entire international debate upon this matter.

As a reaction to that, the European Union has adopted on the 8th of March 2006, a new project for a European Energy Strategy, A European Strategy for Sustainable, Competitive and Secure Energy.[115] The six priority areas envisaged by the European Union in order to balancing sustainable development, competitiveness and security of supply, are:

- The liberalisation and integration of the European electricity and gas markets, by adopting common rules and standards on issues that affect cross-border trade and by setting up the European grid with interconnections between the national ones;
- An Internal Energy Market that guarantees security of energy supply and solidarity between the Member States by rethinking the EU's approach to emergency national oil and gas stocks and preventing disruptions;
- • Diversification of energy sources towards a more sustainable, efficient and diverse energy mix;
- • An integrated approach to tackling climate change;
- • Encouraging innovation: a Strategic European Energy Technology Plan for energetic research and development of new technologies;
- • A coherent External Energy Policy, common for all the EU Member States, which would enable the Union, in effect, "to speak with the same voice". There must be clearly identified the EU's priorities for construction of new infrastructure necessary for the security of EU energy supplies, notably new gas and oil pipelines and liquefied natural gas (LNG) terminals, as well as application of transit and third party access to existing pipelines. An Energy Community Treaty and a new energy partnership EU-Russia are envisaged as well. A reaction instrument able to react quickly and in a fully co-ordinated manner to external energy crisis, to deal with emergency external supply events is also considered for the energy supply for Europe.

Conclusions

In the recent reports of the International Energy Agency (IEA) on the global energy outlook for the first three decades of the 21st century, caution is given to the global trends in energy demand, the increasing import dependency, coal use and greenhouse gas emissions projected to 2030. Economic growth is among the most important factors to be considered in projecting changes in the global energy consumption. The continuous increase has determined fuel global economic growth and put considerable pressure on energy suppliers, who experience different threats of geopolitical and other potentially disruptive nature. On the other hand, for the energy consumers, energy security and environment issues have led to changes in these countries' energy policies. These problems have been reflected in the energy market through high and volatile energy prices. But the global energy demand grows despite the high world oil and natural gas prices which are projected to persist further into the mid-term outlook. This is the actual research framework for the „New Global Energy Economy"!

[114] *The Simdex Future Pipeline Projects Worldwide Guide,* March 2008 data update , *www.simdex.com*

[115] European Commission*, A European Strategy for Sustainable, Competitive and Secure Energy,* 8th of March 2006, *http://e.europa.eu/energy/green-paper-energy/doc/2006_03_08_gp_document_en.pdf*

World leaders have pledged to act to change the energy future. Some new policies are in place. But China and India are the emerging giants of the world economy. The huge energy challenges facing China and India are global energy challenges and call for a global response. The IEA's imperatives for the governments can be summarized as follows: Governments must open the borders to international trade and investment, sustain competitiveness, rely on private enterprises and provide peaceful resolution of international disputes. The world is heading towards more energy interdependence. A world that meets its energy needs through extensive interdependence is a world that conforms to the tenets of globalization.

The energetic industry tends to become less national in the conditions of liberalisation and integration of energy markets and the role of global energy companies and of the bilateral strategic alliances is growing rapidly.

Thus, globalisation has brought into discussion the role of states-nations, meaning not to diminishing, but to transforming their functions and de-politicizing the national space for the energy sector.

The liberalisation, as an immediate consequence of globalisation, necessarily implies a transfer of responsibility from the state to the private sector simultaneously with the corresponding transfer of the regulatory attributes to independent governmental regulatory authorities ("the regulation for competition").

Great energy consumers should leave the utopia of energetic independence and accept the energetic interdependence, an extensive interdependence.

To conclude with, the uncertainties related both on the possible different economic growth patterns for the different world regions as well as on the availability of fossil fuel resources impose shifting the energy evaluations to long term scenarios based on high oil and gas prices. Improving the energy efficiency, increasing the share of renewables and diversifying the sources and the routs of energy supply represent the general priorities for countries importing energy.

Collective actions is needed to address global energy challenges, because in a global economy, energy can not subtract globalization and its effects, and „the main losers of today are not those who have exposed too much to globalization, but those that have remained out of it !"[116]

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