THE IMPORTANCE OF OLTENIA'S COAL

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ABSTRACT: *The aim of this paper is to show the full coverage of the internal consumption of electricity and heat energy, in the context of the increasing of country's energy security, sustainable development and ensuring an adequate level of competitiveness.*

KEYWORDS: *lignite, energy strategy, Oltenia mining perimeter*

1. INTRODUCTION

The percentage of coal consumption will be increasingly higher from year to year and, if there are no changes in energy policies, coal will catch up oil in less than a decade.

Coal is a cheaper alternative to petroleum, which, as resource threatened with exhaustion, has an increasingly price higher. All this in spite of efforts to reduce pollution arising from the use of coal.

Coal will dethrone oil until 2017 and will become the main energy resource of mankind, according to the International Energy Association (IEA).

As regards the coal reserves worldwide at the end of 2013 were about 900 billion tons, of which 470 billion tons superior coal - anthracite and hard coal - and 420 billion tons and rough coal - lignite and brown coal. After State Department of Energy of USA, world coal reserves consist of 53% anthracite and hard coal, 30% brown coal and 17% lignite. According to the international classification of coal, the heat of 5700 kcal / kg or 23.9 GJ / ton coal is the separation between the upper and rough coal.

As a primary conclusion, we can say that the large volume of existing coal reserves in the world makes this raw material to be considered as an important resource and sustainable energy future that could make possible:

- long-term planning to use coal in the future that its use over several generations;
- capital recovery for entrepreneurs in: the thermal and electrical power plants, metallurgical factory, transport infrastructure, logistics, etc. and achieving long-term profits;
- conducting research on the use of coal resources, not only in the area of interest in applied sciences, but also in the fundamental sciences.

The coal deposits are spread in over 100 countries around the world and therefore the geographical locations of large coal deposits in different continents and regions of the world land protects importers and users of coal to monopolize any provision of this raw material.

One of the major challenges for the European Union refers to the way in which energy security can provide with competitive and "clean" energy, according to climate change, escalating global energy demand and the uncertain future of access to energy resources.

Vision of energy policy today corresponds to the concept of sustainable development and covers the following aspects: consumer access to affordable energy sources to accessible and stable prices, sustainable production, transport and consumption of energy, security of energy supply and reducing emissions greenhouse gas emissions.

EU develop an ambitious energy policy, which covers all energy sources from fossil fuels (oil, gas and coal) to nuclear and renewable energy (solar, wind, geothermal, hydroelectric, etc.) in an attempt to trigger a new industrial revolution, leading to a low-energy economy and mitigating climate change by ensuring that the energy it is consumed will be cleaner, safer, more competitive and sustainable.

Given that renewable energies are not sufficient to meet the needs of the Old Continent, European countries are turning to the oldest fuel and most profitable, although it pollutes the most.

Coal as energy resource is vital for Europe.

Accounting for almost 5% of global reserves of coal, it can be said that Europe has enough coal to cover the main needs.

Many EU countries have so superior coal reserves - anthracite and hard coal - and rough coal reserves - brown coal and lignite. In the European Union the superior coal is produced in the Czech Republic, Germany, Poland, Romania, Spain, and Great Britain.

With a total demand of about 750 million tons equivalent coal , Europe including Russia is the third

largest consumer of coal in the world after North America and China. From the data available to us that Europe has the over 15% of global consumption of coal. In the EU-27 countries is hoped that in the future, coal will account for a fifth of primary energy need.

Poland and Germany are leading the EU in terms of coal production. Together accomplishes two thirds of the European Union's production. Czech Republic, Greece, Spain and Great Britain also give high productions of coal in the European Union.

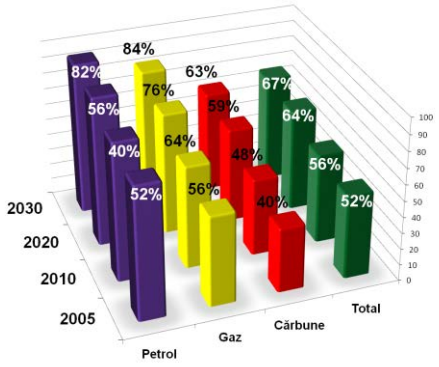

Fig 1 Estimation of energy import for energy production

It also reduces the vulnerability of Europe's coal energy crisis due to their coal reserves and the proper functioning of the global market for this raw material.

Today, more than 90% of lignite and 67% of the coal are used in power plants in the European Union to produce heat and electricity.

Future demand for electricity in the European Union is certainly growing.

There are many countries in the European Union with a strong material base for the production of electricity from coal, which contributes to security of supply, competitiveness, including stable energy prices in Europe.

EU expected in the coming decades will require all energy resources available. This gives **coal** a role in the production of electricity and heat.

The overall objective of the Romanian energy sector development in the period 2014 - 2030, is the total coverage of domestic consumption of electricity and heat, in the context of increasing energy security, sustainable development and to ensure an appropriate level of competitiveness.

About 70% of the country's primary energy needs is ensured from domestic resources.

Romania joined the European Union in 2007 and one of the first duties as the new member of the European Union has to produce energy as efficiently as possible.

The EU currently imports almost half of power generation resources.

The European Commission estimates that, over the next 20 to 30 years importing raw materials for energy will increase by almost 70% in total, up to 80% for natural gas and up to 95% for oil. So, **fossil fuels** will continue in the coming decades to energy supply basis of united Europe, (Figure 1).

Romanian energy strategy until 2020 contains important provisions as follows: the privatization of the energy sector; reducing imports of oil and coal and imposing restrictions on gas consumption; completed construction of two new units of 700 MW each at the nuclear power plant in Cernavoda; extending the use of unconventional energy resources and further modernization of power plants and gas pipelines network expansion.

An accurate assessment of possible coverage of primary energy needs in the future must be based on the current situation of proven reserves, coupled with a realistic estimate of potential resources and in close correlation with resource consumption forecasts determined by final energy demand.

According to the latest data contained in the Energy Strategy of Romania for the period 2011-2035, the reserves of conventional oil and gas are sufficient for about 15 years considering the proved reserves and annual production rate of fossil fuel. It follows that the coverage increased demand for primary energy in Romania will be possible by increasing the use of renewable energy resources and imports of primary energy, gas, oil, coal, nuclear fuel. On the analyzed horizon, Romania will remain dependent on imports of primary energy. Nowhere is mentioned and possibly unconventional gas potential of Romania although experts said that was huge and already the first foreign investors have begun to take steps to exploit this resource.

2. FOSSIL FUEL ON NATIONAL WIDE

Resumed on fossil fuels, we can specify that in 2013 Romania's energy production was based on them. An accurate assessment of possible coverage of primary energy needs in the future must be based on the current situation of proven reserves, coupled with a realistic estimate of potential resources and in close correlation with resource consumption forecasts determined by final energy demand. From this point of view at the moment can be made the following estimates

Table 1. Situation of primary energy resources

Resource of primary energy	Rezerve						Estimated production per year	Estimated time of insurance		
	Reserve		Exploitable leasehold		In new perimeters			Geologi-cal reserves	Explotable leasehold reserves **	New perimeters
	mil. tonne *	mil. tep	mil. tonne	mil. tep	mil. tonne	mil. tep	mil. tonne *	years	years	years
Lignite	1.490	276	445	82,4	1045	133	32	47	14	33 ***
Hard coal	755	422	105	38,8			2,5	229		
Oil	74	72					5,2	14		
Natural gas	185	159					11,5	16		

** - only natural gas, bilion. m^3;*
** * - leasehold time for at least 2 years;*
** * * - depending of the European Comision.*

3. ENERGY PRODUCED BY COAL

Coal is the most abundant energy resource available to Romania, lignite reserves are available for approximately 50 years, and hard coal for more than 220 years. Lignite resources in Romania are estimated at 1,490 million tons, of which 445 million tons of exploitable in premises leased. Resources located in the perimeters new concessional are 1045 million tons.

Lignite reserves can ensure their effective exploitation still about 50 years at a production level of about 30 million tons/year. In the extraction of lignite level of state intervention is reduced, the summary of grants only to operate underground, subsidies will be eliminated over time.

As of national primary energy resources (Table 1) it is obvious that except renewable energy sources, lignite is the only domestic primary energy carrier in terms of resources, can contribute significantly to consumer demand for electricity over the next 4 - 5 decades. Regarding coal, it recorded a peak in 2007, the trend for the future is slightly decreasing and 2020 hovering at around 34%.

4. FOSSIL FUEL ON REGION WIDE

Although mining in Romania has a long tradition, due to the size of deposits of useful minerals we have in our country, we have not had, nor have, at present, only small production units at most mining environments where to practice a small-scale mining, with some negative consequences on the environment.

In Romania, the last 55 years were opened and put into operation by the surface working, the lignite deposits from the following basin: Rovinari, Motru, Husnicioara, Berbeşti-Alunu, Jilţ and Baraolt-Căpeni.

Over 90% of the total coal reserves of Romania is confined in the Oltenia region, which is why this area is given special attention to ensure the country's coal resources. Approximately 90% of annual production, is extracted from the 17 pits, functioning in: Rovinari, Motru, Jilţ, Mehedinţi and Berbeşti-Alunu (Figure 2)

5. OPORTUNITY OF ROUGH COAL

Given the characteristics of coal extracted in Romania (*energy coal with calorific value of 3650 kcal / kg coal with calorific value between 1650-1950 kcal / kg*) it can be only used in power plants equipped for this type of fuel and located close to the coal suppliers.

In case of rough coal, it is justified to be used in power plants at a distance of up to 150 km from the place of exploitation.

The main beneficiaries of extracted lignite from Oltenia are Rovinari power plants (with a distance of coal transportation from the place of extraction of about 4 km), Turceni (with a distance of transport of coal from the extraction site 38 km),Işalniţa, Craiova II, Halânga, Govora, Arad, Oradea, Timişoara and Braşov. (Most of the lignite extracted by the National Society of Coal Ploiesti is delivered to power plants in Bacau, Braşov, Doiceşti, Oradea and Zalău, Figure 3).

6. CONCLUSIONS

- As oil reserves are exhausted, it is possible that the ultimate solution to the energy supply of mankind to be coal, given that coal combustion process pose serious challenges to the environment and air quality.
- *Over 90% of the total coal reserves of Romania is confined in the Oltenia region, which is why this area is given special attention to ensure the country's coal resources*. Approximately 90% of annual production, is extracted from the 17 pits, functioning in: Rovinari, Motru, Jilţ, Mehedinţi and Berbeşti-Alunu.
- Oportunity of rough coal - given the characteristics of coal extracted in Romania it can be only used in power plants equipped for this type of fuel and located close to the coal suppliers.

- In Romania there is a program of modernization of power plants, which involves closing old unprofitable power plants and will be fully implemented in the near future. It is hoped that the modernization of power plants will improve production indicators and foremost at a competitive price of electricity produced from coal. New energy group 500 MW with pulverized combustion boiler with supercritical parameters using lignite as fuel base on Rovinari site represents a sustainable development objective.
- Romania and Estonia are among EU countries but with the lowest degree of dependence on imported energy, higher only than that of Denmark.

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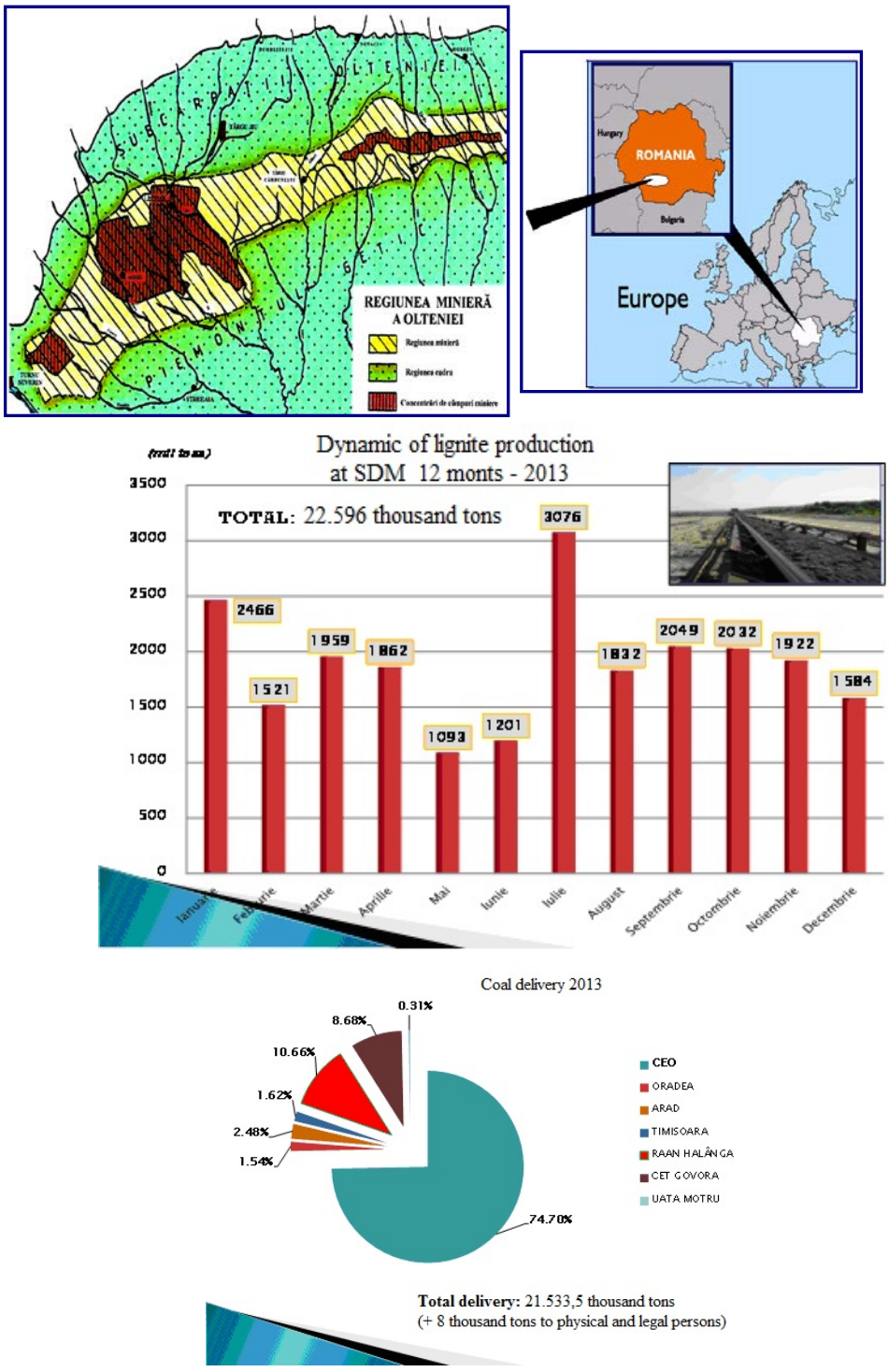

Fig. 3. Dynamic of lignite production and its delivery in 2013 year