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The competitiveness of the refining industry in Romania and the EU

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During the evolution of the Romanian oil industry, the refining sector emerged at the end of the 19th century by way of a massive import of foreign capital and advanced technology. In 1895 the construction of Steaua Română refinery started in Câmpina, one of the largest in Europe of that time, with capital of Deutsche Bank. In 1904, Standard Oil founded the Romanian-American Company and Deutsche Bank commissioned in Ploieşti the Vega refinery. A year later, Rotschild banking group founded the French-Romanian Aquila Company, which upgraded the Plopeni refinery. In 1908, Royal Dutch Shell founded Astra Company, which in 1911 merged with Regatul Român Company under the name of Astra Română. In 1910, the Orion refinery was built with British capital, and the French-Romanian Aquila opened the Columbia refinery in Ploieşti.

During the interwar period and in the decades of socialist economy, new refining units were built: in 1934, the Petrobrazi refinery, in Ploieşti; in 1949, the Dărmăneşti refinery (Bacău County); in 1966, Rafo Oneşti; in 1969, Suplacu de Barcău (Bihor County); in 1975, Petromidia (Năvodari). Thus, after 1989 as many as 10 refineries were operational and they continued to work based on the demand of oil and petro-chemical products from the traditional markets and from the energy-intensive industrial sectors. Gradually, though, a big part of the refining units were closed as the demand of oil products diminished and the international competition became tougher.

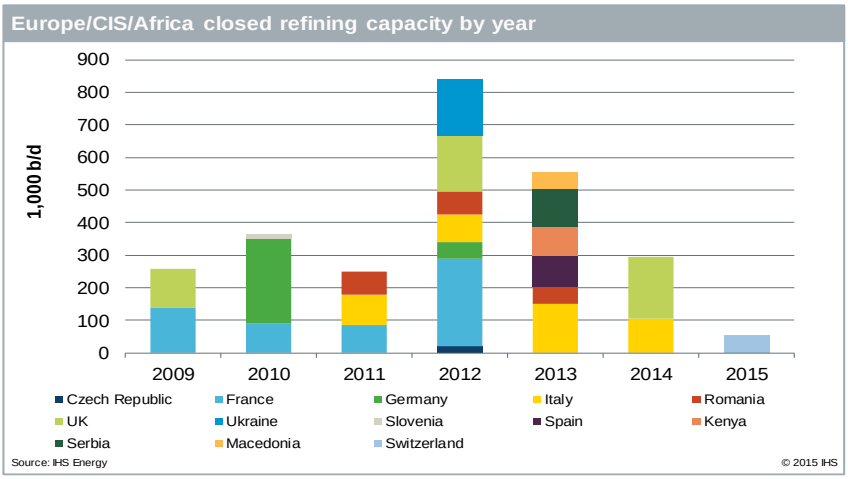
At present, there are four operational refineries in Romania, three of which produce transport fuels. They belong to international vertically integrated oil consortia. Ranked by refining capacity, they are the following: Petromidia (Năvodari), property of Kazakh company KazMunayGas (KMG), operated by Rompetrol Refining, with a processing capacity of 5 million tons (mt) annually – capacity increased in 2012 as a result of an investment program of €300 million; Petrobrazi (Ploieşti), owned and operated by OMV Petrom, with an annual capacity of 4.5 mt, following a wide-scale investment program of €600 million; Petrotel (Ploieşti), owned and operated by the Russian Lukoil, with an annual capacity of 2.4 mt. Vega refinery (Ploieşti) is also operational and owned by KMG, and specializes in the processing of naphtha, fuel oil and other oil fractions for the production of solvents and other special petroleum products.

Closing refining capacities as well as streamlining the operational ones also meant cutting a significant number of jobs in the industry – high skilled and well remunerated. The

labor force in the oil processing branch decreased from 12,600 to only 2,800 people between 1998 and 2013, according to Trade Register data.

In order to grasp the inherent causes of this contraction, we must look at the European trends in the refining industry. As a result of investments of roughly €4.5 billion/year during the past 25 years,[1] European refineries have become the most energy efficient in the world, operating under the toughest environmental standards. However, an IHS Energy report shows that from 2009 to date, 26 refineries were closed and some transformed into storage or blending units, with an aggregated 1.8 million barrels/day (mb/d) less throughput, i.e. 8% of the total EU28 refining capacity. Figure 1 shows both the main states affected by refineries shutdowns, as well as the total reduction of EU capacity.

Figure 1: Reduction of refining capacity in Europe/CIS/Africa, 2008-2014



Source: IHS Energy, 2015

Thus, since 2008, France closed capacities of 585,000 b/d, Great Britain about 560,000 b/d, Germany 310,000 b/d and Italy 435,000 b/d (IHS Energy, 2015). During the same period, the European consumption of refined products dropped by about 2,000 b/d. Therefore, despite output shrinking, European refining still shows an overcapacity.

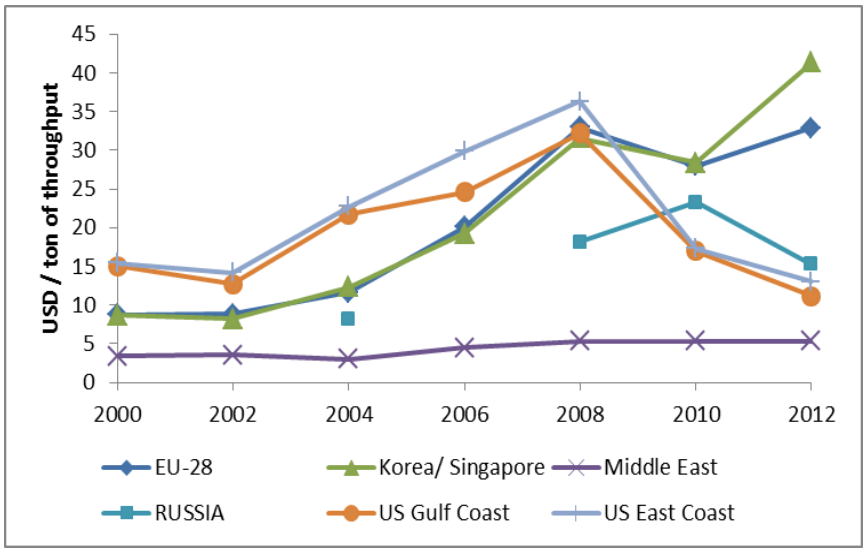
Three decisive factors have contributed to the loss of competitiveness for the European refining industry. I will outline them as follows and then assess their relative importance.

1. High cost of energy in EU

One factor significantly affecting the competitive position of European refining industry is the high cost of energy compared to that in competitor regions. Figure 2 shows the average costs of energy for throughput on the main global markets. EU's unfavorable position is obvious.

[1] http://www.ceep.be/eu-refining-contributor-energy-security/

Figure 2: Average cost of energy for the processing of one tone of crude oil, 2000-2012 ($/bbl processed crude oil)



Source: Joint Research Center (JRC 2015)

This translates into higher operating costs in the European refining industry. As compared to 2000, the energy cost per unit of refining product increased 3.5 times in 2012. Against this backdrop, the profit margin witnessed a fall of $2.1/processed barrel compared to the average profitability of the competitors during the same period (JRC 2015).

The Joint Research Centre, the internal scientific service of the European Commission (EC) made another relevant finding: the performance gap between the top 25% and bottom 25% EU refineries has widened during the 2000-2012, period from 2.1 to USD 4.8/bbl, which shows that the less technologically advanced refineries and/or with a less favorable geographic location are more pressured by global competition.

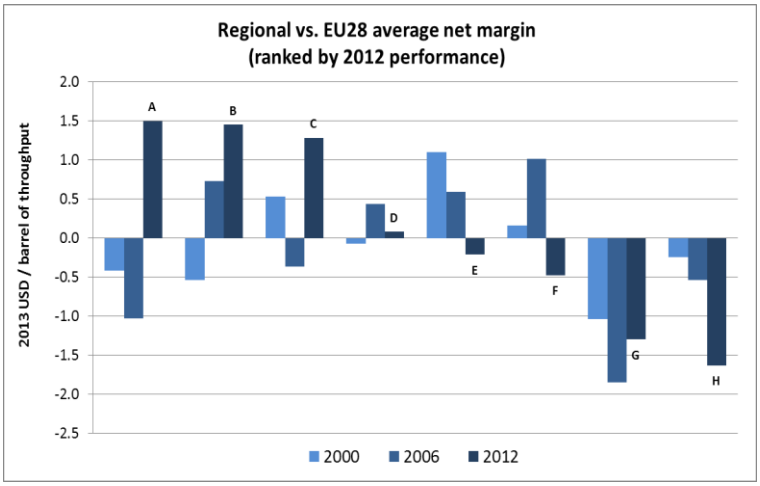
The performance of the first 20 EU refineries, their technological complexity (more precisely, their secondary conversion capacity), the processing capacity and the share of medium distillates are significantly higher than those of the last 20 refineries. The Nelson complexity index (encoding the complexity and cost of each refining equipment unit) is of 8.1 for the top performers and of 7.9 for the bottom performers; the average processing capacity of the first is of 204.000 bbl/d, compared to only 124.000 bbl/d for the latter; the medium distillates share is 56% for the first and of 46% for the latter (JRC 2015). JRC also noticed a regional profitability difference of the European refining industry, as illustrated in figure 4.

The difference between the profit margins of the refineries in the Iberian Peninsula and the Great Britain on one side, and those in Italy and Greece on the other side is of $3.1/bbl of throughput. The refineries of Eastern Europe rank below the average, with a profit margin deficit of $0.5/bbl of throughput.

Figure 3: Profit margins per barrel of throughput for the 25% best performers, respectively, the 25% worst performers, compared to average (2000-2012)

Source: JRC (2015)

Figure 4: Regional distribution of profit margins in European refining

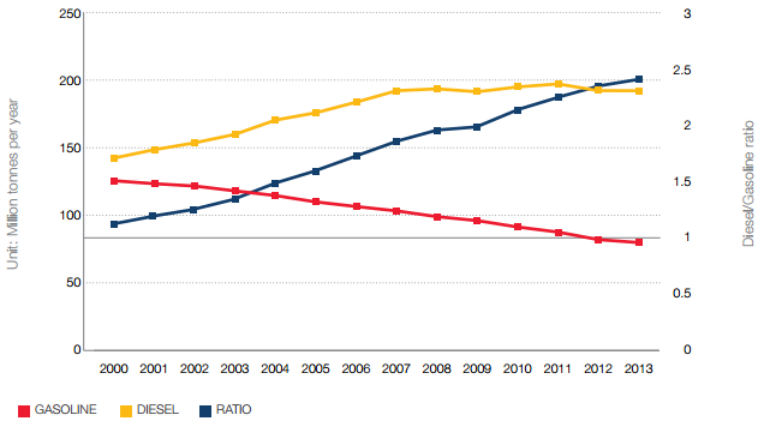


Source: JRC (2015)

2. European fuel market imbalance

In the 2000s witnessed Europe underwent a process of "Dieselization" in the transport sector, against the backdrop of a more favorable fiscal treatment of diesel compared to gasoline. The fuels consumption structure shifted at a rate of over 2.5 between diesel and gasoline demand by the end of 2014 (figure 5).

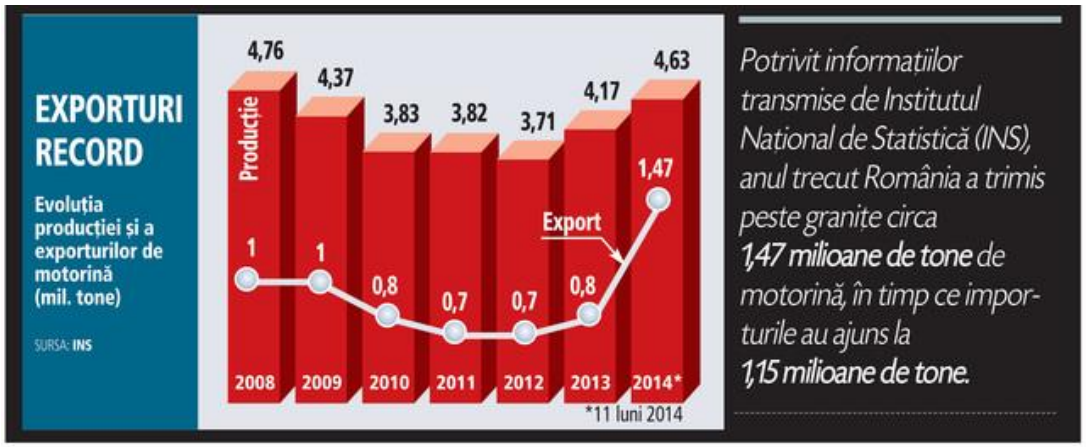
Figure 5: Fuels demand in EU, 2000-2014



Source: Wood Mackenzie (2014)

Therefore, a good part of the diesel consumed in EU – but also kerosene and heating oil – has been imported from Russia, USA or the Middle East, while the gasoline surplus has been exported, mainly on the American market. This trend has created an obvious imbalance on the European market. However, for Romania in particular, it is has not become unfavorable, as the country's refining industry turned in 2014 into a net Diesel exporter (figure 6).

Figure 6: Romanian export of Diesel oil, 2008-2014



Source: Ziarul Financiar (March 13, 2015)

The imbalance between the types of fuels produced by European refineries also results in an energy security risk, much less discussed and acknowledged than that of access to the global crude oil market. Crude oil is a commodity of unequaled "liquidity" and therefore, if any supply disruption occurs in case of geopolitical standoff, political instability, military conflict or natural disaster, there are plenty of global alternative sources to replace the impaired deliveries. This is why in Romania, for example, a dependence on crude oil imports

in 2015 of approximately 60% did not arouse the same concern for energy security as reliance on less than 5% natural gas imports – a market much less liquid in Southeast Europe than the oil market. Therefore, European refineries are able to process a variety of types of crude oil, which differ in sulfur content and relative density.

On the other hand, the petroleum products market is not as liquid as the crude market. European regulations, rigorous in terms of fuel quality, restrict the number of suppliers able to deliver at EU standards. Most diesel is imported from the Russian Federation and kerosene is especially imported from the Middle East. Gasoline surplus is exported to the North-American market, which is on a path towards self-sufficiency, given the record oil production in the U.S. and Canada. Thus, European gasoline exports are becoming more and more difficult. Increased reliance on imports of petroleum products from producing countries with a history of using energy as a political instrument and more difficult access on foreign markets increase trading costs and, most of all, constitute a problem of energy security for the EU.

In a separate development, the so-called Dieselgate scandal of this fall, in which Volkwagen admitted to rigged emissions testing software, will possibly result in a more severe regulatory and fiscal environment for diesel, with likely long-term effects toward rebalancing the diesel and gasoline demands in Europe. However, it is also probable that, on the longer run, internal combustion engines altogether become more and more stringently regulated, with consequences upon the aggregated fuel demand. Accordingly, in collaboration with the automotive sector, the refining industry will be pressed, for its part, to innovate so as to improve the formulas of its fuel products so as to better accommodate those more demanding standards.

3. The impact of environmental regulations

The EU has set in place the most stringent regulatory environment in the world in terms of environmental protection and combating climate change. Numerous such regulations concern the refining sector. FuelsEurope, which represents European companies in the refining industry to EU institutions, presents in the report for 2014 (published in the spring of 2015) the provisions of these regulations and their impact on the development of the sector (FuelsEurope 2015). Let us discuss them in turn.

The Fuel Quality Directive (FQD) (2009/30/EC) establishes a 6% reduction of greenhouse gas (GHG) intensity in fuels used in transport in 2020 compared to 2010. From 1 January 2015, the Euro 6 standard entered into force for newly manufactured vehicles, and new cars registrations with the Euro 5 standard were allowed only until the end of August. Thus, new vehicles cannot exceed a level of GHG emissions of 130g CO_2/km. By 2021, this level must be lowered to 95g CO_2/km, which is a major challenge for the refining industry. Obviously, such a requirement favors electric cars, but things will get complicated as soon as

the carbon emissions that occur in the generation of electricity used in such vehicles will have to be themselves regulated.

Article 7a of FQD, which sets the computation methodology for GHG intensity per life cycle of refined fuels, has been the focus of intense debate. In October 2014 the EC decided to set average reference values for various oil benchmarks and establish an obligation for refineries to report the origin of crude.

The Renewable Energy Directive (RED) (2009/29/EC) requires a 10% share of renewable energy in the fuel mix for transport. It actually imposes a quota of biofuels. But biofuels are usually produced from plant crops that either substitute agricultural crops, or introduced in the agricultural circuit areas for pastures and forages – a phenomenon known as *indirect land use change* (ILUC). ILUC reduces or even cancels the contribution of biofuels to the reduction of GHG emissions, because forests and pastures absorb CO2 from the atmosphere. Therefore, on April 28th 2015, the European Parliament (EP) adopted a resolution of the European Council which caps the amount of first generation biofuels (produced from agricultural areas) to no more than 7% of the energy consumed in the transport sector by 2020. After 2020, the Member States will be able to grant subsidies only for the production of second and third generation biofuels, produced from municipal waste, algae etc.

Directive on sulfur content of marine fuels (2012/33/EU) of the EP and the Council, of November 2012, established that from January 1st 2015 "Member States shall ensure that gas oils are not to be used within their territory if their sulfur content exceeds 0.10% by mass."[2] FuelsEurope (2015) expresses concern about the capacity of European refineries to comply with this fuel conversion in due time.

On 23 October 2014, the European Council adopted the **2030 climate and energy framework**, presented in communication COM(2014) 15 final/2 of the EC in February 2014 on climate and energy for 2020-2030. The set targets are the mandatory reduction of GHG emissions by 40% by 2030 compared to 1990; achieving a 27% share EU-wide for renewables in the energy mix; and an increase of at least 27% in energy efficiency.

For the refining industry, which is energy-intensive, the aggregate target of reducing carbon emissions by 40% translates into mandatory reductions by 43% in 2030 compared to 2005 – which means, linearized, an annual reduction of 2.2%. This is an objective that the refining industry considers unachievable from a technological and economic point of view. It would require capital expenditure that would make European refining utterly uncompetitive at global level. Thus, even the most efficient European refineries would incur additional costs after 2020. Either the industry will have to buy CO2 emission allowances; or close industrial capacities, with the likely effect of "carbon leakage."

[2] 2012/33/EU, November 21st 2012, eur-lex.europa.eu/legal-content/RO/TXT/PDF/?uri=CELEX:32012L0033&from=EN, L 327/6

Carbon leakage describes the phenomenon accompanying the delocalization of the European refining industry and its relocation or substitution in more lenient jurisdictions in terms of environmental regulations. Hence, carbon leakage entails decreased economic capacity in Europe, loss of jobs and diminished energy security. At the same time, just as importantly, carbon leakage undermines the European effort to reduce GHG emissions by utilizing refining capacities less energy efficient and with greater carbon emissions. Indeed, carbon leakage is a real threat to the EU refining industry, since the average European refinery is less carbon intensive than the non-EU average – 0.21 tCO2/ton of product vs. 0.29 tCO2/ton of product. This, in turn, entails that for every ton of CO2 that would be emitted in in the average EU refinery will be replaced on the global market by 1.35 tons of CO2 emitted elsewhere in the world.

The EU's approach to counteract the process of "carbon leakage" is to allocate free emission allowances to the industrial sectors at risk. In October 2014, the number of industrial sectors partially exempt from the obligation to purchase emission allowances was increased from 164 to 172 – a list reviewed every five years. But the concern of the refining industry is that failure to reach the target of emission reduction by 43% will lead to cuts in EUAs allocations (*EU allowances*), which will directly hit the refining competitiveness in Europe. It is therefore important that protection for the European refining industry continues until competitors on international markets introduce policies to control CO2 emissions of comparable stringency. The industry's proposal is that the best performing refineries underpin the establishment of realistic benchmarks and good practices, based on which to make free allocations of emission allowances.

The 2030 climate and energy framework also includes the reform of the **EU ETS** (*Emissions Trading Scheme*). EU ETS started with a carbon price of EUR 30/ton in 2005, a price that fell to EUR 6/ton in 2012. Allowances accumulated in the second phase (2008-2012) were transferred in the third phase (2013-2020), which exerted further downward pressure on prices – aggravated by the weak economic situation in the EU. Thus, contrary to expectations, the EU ETS has not become an effective instrument for stimulating the substitution of coal in the energy mix with cleaner energy sources.

In July 2015, the EP approved a plan to reform EU ETS, starting with 2019. A mechanism was introduced as of 31 December 2018, called the Market Stability Reserve (MSR). MRS will remove from the market hundreds of millions of EUAs, which will contribute to price recovery of allowances. At the same time, about 900 million EUAs that will not be put on the market in 2015 and 2016 – a measure called *back-loading* – will be placed in MSR, instead of being put on the market in 2019, as originally planned.

Free allocation of allowances for energy-intensive industries will take place until 2020. The legitimate concern of the refining industry refers to allocation rules after 2030. In order to avoid carbon leakage, it is necessary that it be correlated with the relevant global standards.

Another important European regulation is the **Industrial Emissions Directive** (IED), which regulates emissions of pollutants of industrial sites into air, water and soil. The directive establishes sets of "best available technologies" (BAT) for all the regulated industrial sectors, covering used equipment, design of industrial installations, operation, and maintenance and decommissioning. By reference to BAT, the national authorities set emission limit values (ELV) for specific industries.

The EC adopted on 9 October 2014 the BAT set for oil refining. These include the maximum permissible levels for metals and emissions suspended in water, emissions of NOx and SO2 in the air, and emissions standards for non-methane volatile organic compounds (VOC) and for benzene in storage and handling processes. The new standards imposed by the EC will likely prove extremely expensive and difficult for the refining industry.

EC Communication of December 2013, the **Program "Clean Air for Europe"** – COM (2013) 918 final – proposes new rules to limit emissions of six types of air pollutants: SO_2, NO_x, non-methane VOC, NH_3, primary PM (particulate matter) and CH_4. These rules will be stipulated in a **Directive on national emission ceilings**, with the 2030 horizon. Such a Directive should however avoid overregulation, adding, for example, new limitations to the Directive on industrial emissions.

Regulatory Impact Assessment

The EC started in October 2012 an assessment process of the coherence and impact of the whole set of regulations under which the European refining industry operates. This so-called *Fitness Check* has been undertaken by the Joint Research Centre, which announced in June 2015 the assessment results (JRC 2015).

JRC recognizes the importance of all three factors discussed above – fuel market imbalance, energy prices and the cost of regulation, but clearly prioritizes the cost of one unit of electricity and the gap between the best- and worst-performing EU refiners, as determinants for deteriorating the competitive position of European refineries globally. The aggregate cost of regulation is assessed at about $0.5/bbl of throughput, which comes down to only 20% of the total profit loss of $2.5/bbl at European level against the major non-European competitors. Most relevant in the JRC analysis are the complexity, size and location of the refineries.

However, the fitness test should also have taken into account that investments in increased complexity and processing capacity are largely contingent on the regulatory environment. The profitability of refineries depends on market factors, such as international prices, which the industry is adept at managing. At the same time, the rules by which EU institutions and Member States aim to achieve strategic long-term objectives put pressure on the competitiveness of an industry that plays in a global arena. The standards and norms they

set, as well as their stability, affect investors' motivation to continue to capitalize and technologically develop the refining industry.

The EU is spearheading an extensive process of reconfiguration of the global energy sector and its relationship with the environment and climate system. But in addition to consistency and clarity, European regulations must follow two vital criteria: realism and adaptability. They should allow the industry to develop at a reasonable pace and with affordable costs, whilst considering the regulations under which global competitors operate. Otherwise, apart from the costs to economic growth and energy security, there is a real risk of having refining capacities developed in jurisdictions with less restrictive environmental regulations. Carbon leakage will be an unintended consequence: the desire to impose stringent environmental standards might lead, through unsustainable costs on industrial activities, to higher carbon emissions.

The latter is not a call to compromise on EU's determination to curb GHG emissions, but rather a reminder that, with its limited level of energy-related carbon emissions globally (11%), the EU cannot effectively solve on its own the issue of global carbon emissions just by further increasing the regulatory burden on its energy-intensive industries in general, and the refining sector in particular. Instead, the EU should be more efficient in persuading other industrial regions to set comparably ambitious standards of decarbonization and implement market-based emission trading schemes. At the same time, the EU ought to vigorously assist the developing economies in transferring and financing low-carbon technologies. The upcoming COP21 summit in Paris is a major opportunity to act in this direction.