

# Changes on motor fuels market

F. Rešćec

REVIEW

For several decades during the last century, the changes in production of motor fuels and their specification affected mainly motor gasoline. One of key requirements was to increase octane number, but at the same time the use of lead additives was restricted. Refineries started to introduce new process technologies and new organic additives in order to increase octane number. Therefore manufacturing of motor gasoline became more expensive than diesel, and consequently prices of gasoline went up. Cheaper diesel fuel and improved efficiency of diesel engines stimulated the development of cars with diesel engines and boosted their sale.

The first European motor fuel standard was introduced in 1989, and after that in intervals of few years new standards for motor gasoline and diesel fuel were enforced. New quality specifications have been more stringent for diesel fuels because of higher sulfur content. The costs of sulfur recovery increased overall production cost of diesel fuel.

While in the 1990s the prices of motor gasoline were significantly higher than prices of diesel fuel, in the current decade the price difference decreased. In the middle of this decade diesel fuel became more expensive than motor gasoline in the European wholesale market. There are two reasons for this: higher production cost and overgrowth of diesel fuel consumption compared with motor gasoline, which disrupted the balance between demand for diesel and capabilities for its supply. In Croatia, the motor fuels price ratio change appeared with some delay because the taxes on motor gasoline have been significantly higher than the taxes on diesel fuel, which should be corrected. A minor increase of excise tax on diesel fuel would contribute to bringing into balance consumption of gasoline and diesel fuel, and at the same time an increase of excise tax of only 40 lipa/l would bring more than half billion kunas to the state budget.

In the situation when fuel prices are administratively restricted, as was the case in Croatia, disturbances in the market should also be mitigated by administrative measures, at least partly, in order to create conditions that resemble free market.

The process of correction of disturbed relationship between demand and production capabilities of various motor fuels will protrude for several years in Croatia because the structure of car fleet must be changed first, therefore it is a serious failure that the above problems have not been identified and resolved. The decisions should be made immediately and then efficiently implemented.

*Key words:* motor fuel, motor gasoline, diesel fuel, market, price, excise tax

## 1. MOTOR FUEL PRODUCTION AND RETAIL PRICES

During the first forty years of the second half of the last century the changes in motor fuels requirements and characteristics referred mainly to motor gasoline. Conversion units were constructed in refineries in order to meet these requirements: the first catalytic cracking (FCC) was put into operation at the Sisak Refinery in 1956, catalytic reformer (platformer) was completed in the Sisak Refinery in 1964 and in Rijeka in 1965; the first light gasoline isomerization was put into operation in Rijeka in 1973, and FCC unit in 1981. Gradually, the new requirements for higher octane number were put forth, but in order to protect the environment the use of some fuel additives was restricted. Allowed content of lead additive was gradually decreased until it was completely banned, as well as the use of all metal additives. These additives were replaced with organic ones i.e. various oxygenates. The above mentioned new processes and additives (but with restriction on quantities used) were primarily focused on increase of gasoline octane number, while FCC units ensured also improved yield of gasoline. Conversion units enhanced gasoline production, but at the same time increased production costs. Therefore gasoline production costs

recorded continuous growth during the observed period and were permanently higher than diesel fuel prices.

The shift began in the late 1980s. Then the first European standard for diesel fuel was introduced which prescribed lower sulfur content (Table 1). Consequently, new sulfur recovery processing units had to be constructed for the removal of sulfur by hydrogen treatment of all diesel components, apart from light gas oils obtained by distillation of low sulfur crude oils.

The volume ratio of produced gasoline and light gas oils depends on type of crude oil and availability of conversion units and their operation. The existing plants of the time did not offer possibilities for bigger change in the share of the two main motor fuels – gasoline and diesel fuel. The upper limit ratio in production of middle distillates toward gasoline is about 1.6 to 1. In case of significant change in consumption of gasoline and diesel, a disturbance in market supply could occur. Apart from sharp increase of prices in case of short supply of any product, markets can be faced with shortages, particularly if neighboring markets are also struck by disparity in supply of some products, and this was the case in recent years.

A part of motor fuel components is produced in atmospheric distillation units, and the other part in

conversion units. Processing of the domestic Moslavina type crude in atmospheric distillation rendered the following products: 31.5% gasoline, 1.8% heavy gasoline, 33.3% light gas oil and 25.3% residuals, but from Russian crude (REB), we can have only 20.3% gasoline, 1.3% heavy gasoline, 25 % light gas oil and even 43.3% residuals.

Conversion processing can change the share of extracted products, but only to a certain extent. The first state-of-the-art conversion process unit was put into operation in the Sisak refinery in 1956. It was the FCC for heavy gas oil which enabled significant increase of gasoline share in products output. Thanks to relatively high gasoline prices at that time, refinery revenues went up but operating costs were also higher because the gasoline processed in this unit contains more impurities than the one from distillation unit and needs additional treatment.

In new conversion units, catalytic gasoline reforming (UOP's process is called platforming) converts paraffinic hydrocarbons in aromatics, which have high octane number and low sulphur content. Namely, in order to protect platformer reactor platinum catalyst from impurities, raw gasoline first enters cleaning section (unifiner) where it is purified with hydrogen rich gas coming from platformer reactors. The gasoline from platformer is an excellent motor gasoline component, but according to new European standards the use of aromatic hydrocarbons is limited to maximum 35% vol., and benzene content only up to 1%. In any case, platformate is one of the most expensive motor gasoline components.

The introduction of the above mentioned processing units increased gasoline production costs compared with diesel fuel production. However, an important switch took place twenty years ago. European standards (Table 1) required significant decrease of sulfur content in fuels, and due to the fact that components of diesel fuel in early processing stage have much higher sulfur content, removal of sulfur in HDS units increases production costs of diesel fuel.

Until enforcement of the first European motor fuel standard at the end of the 1980s, the allowed diesel fuel

sulfur content was five to ten times higher than for motor gasoline. In the past, a large portion of light gas oil produced from low sulfur crude oil types did not need desulphurization because it had sulfur content lower than allowed. For example, light gas oil distillate extracted from our domestic crude type Moslavina has the sulphur content of only 2 300 mg/kg, Slavonija type only 3 000 mg/kg, but Russian REB has sulfur content of over 10 000 mg/kg. Already in the mid 1960s INA's refineries started hydrodesulphurization of a large portion of gasoline cut (platforming units in Sisak and Rijeka), but not for the purpose of decreasing sulfur content in gasoline but to protect catalyst in catalytic reforming. The catalytic reforming is an expensive process and therefore gasoline production costs were significantly higher than diesel production costs, consequently its market price was higher.

Since 1992 (particularly from 1996 onwards) even light gas oils from atmospheric distillation with lower sulfur content had to be hydrogen treated, which resulted in higher diesel production costs, particularly since allowed sulfur content for diesel must be equal to the one in gasoline, because the consumption of hydrogen in treatment of gas oils is much higher than in case of gasoline.

In the mid 1990s the price of motor gasoline was considerably higher in Croatia compared to diesel fuel, although the allowed sulfur content was the same for both motor fuels (Table 1 and 2).

In 1997 a new gas oil HC/HDS units were put into operation in the Rijeka Refinery which enabled INA to partly produce fuels in compliance with effective European standards. Although the diesel fuel production costs increased in comparison with gasoline, the price ratio did not change. INA raised DM 120 million for investment in the new units, but in 1998 fuel prices did not increase in the Croatian market (Table 2.). Due to high loan repayment obligations and higher production costs, this production improvement brought about financial problems. Several years our refineries generated losses.

In the early 2000s the Sisak refinery made some revamps on older plants which enabled it to produce cer-

**Table 1. The highest allowed sulfur content in motor fuels (mg/kg)**

Valid	Before Euro norm	From 1. 1. 1989	From 1.7.1992	From 1.1. 1996	From 1.1. 2000	From 1.1. 2005	From 1.1. 2009
Standard				Euro 2	Euro 3	Euro 4	Euro 5
Motor gasoline	1 000		500	500	150	50	10
Diesel fuel	5 000	3 000	2 000	500	350	50	10

**Table 2. Domestic motor fuel retail prices (HRK/liter)**

Year → Fuel ↓	1995	1996	1997	1998	1999
Motor gasoline 95	3.80	3.80 – 4.08	4.00 – 4.12	3.86 – 3.98	4.03
Diesel fuel	3.40	3.40 – 3.74	3.66 – 3.74	3.42 – 3.66	3.50

Source: Energy Institute Hrvoje Požar<sup>3</sup>

**Table 3. Domestic production, import, export and domestic motor gasoline consumption (kt/year)**

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Production	1158	1209	1330	1210	1209	1261	1126	1168	1083	1202
Import	70	57	9	42	77	89	137	257	307	255
Export	456	533	525	556	468	631	610	706	680	717
Consumption	737	782	784	754	759	757	724	710	711	725

Source: Energy Institute Hrvoje Požar<sup>3</sup>**Table 4. Domestic production, import, export and diesel fuel domestic consumption (kt/year)**

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Production	967	1020	1064	1052	1055	1325	1192	1081	1125	1286
Import	118	105	58	126	329	180	423	503	616	653
Export	279	340	233	278	274	337	367	254	282	403
Consumption	772	808	864	925	996	1146	1222	1312	1427	1544

Source: Energy Institute Hrvoje Požar<sup>3</sup>**Table 5. Annual consumption growth (%) of diesel fuel compared with previous year**

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007
Growth	4.77	6.84	7.13	7.60	15.07	6.64	7.34	8.80	8.21

Source: Energy Institute Hrvoje Požar<sup>3</sup>**Table 6. Annual consumption ratio between diesel fuel plus extra light fuel oil and motor gasoline**

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
(Df+ELfo):Mot. gasoline	1.64	1.68	1.71	1.86	1.96	2.21	2.37	2.51	2.56	2.59

Source: Energy Institute Hrvoje Požar<sup>3</sup>

tain volumes of motor fuels in accordance with Euro standards.

Within the scope of refinery modernization project, hydro cracking units (HC) are to be constructed in both INA's refineries. The units will also produce feedstock for diesel production and will be linked with HDS unit where all components of diesel fuel will be treated, including the feedstock for FCC. In these new units the working pressure is above hundred sixty bars, while in the same units built in the Rijeka refinery in 1979, the pressure was much lower (about 80 bar).

Higher production costs of diesel fuel are the main reason why in recent years in many countries and on international markets prices of diesel exceeded prices of motor gasoline.

The above tables and other sources indicate that motor gasoline consumption started to grow in 1994, came to a peak in 2000 and after that started to stagnate or gradually decline, although the consumption of all fuels recorded steady growth. Thus, the balance of gasoline and diesel consumption was disturbed and this problem needs to be addressed as soon as possible. As there is no gasoline pyrolysis plant in Croatia which would produce

feedstock for petrochemical industry, gasoline is only used as motor fuel. Therefore the customers should be stimulated to purchase gasoline engine vehicles through more favorable price of gasoline, which would also result in higher demand.

In case when retail prices are administratively restricted, all the same, they should be in correlation with feedstock and production costs, but also with international prices, and there should be no discrimination of any good technology or good products. In the free market economy taxes and other charges should not favor or discriminate any entity.

Croatia is among small number of European countries with such unfavorable ratio between middle distillates and gasoline. The reason is that we do not have gasoline pyrolysis and production of feedstock for petrochemical industry but all gasoline is used only as motor fuel.

Exceptionally fast growth of diesel fuel consumption, which began in 2000, surpassed GDP growth rate. The sharp growth of diesel fuel consumption in 2003 was a strong warning signal for addressing the problem of disparity in fuels demand in the Croatian market. The problem should have been tackled back in 2004 when urgent

**Table 7. Annual average retail fuel prices in Croatia**

Year	2000	2001	2002	2003	2004	2005	2006	2007
Mot. gasoline	5.76	6.32	6.40	6.44	6.94	7.40	7.88	7.92
Diesel fuel	4.76	5.20	5.36	5.44	6.00	6.96	7.26	7.40

Source: Energy Institute Hrvoje Požar<sup>3</sup>

measures should have been taken. Nevertheless, another thing happened that made the situation even worse. Namely, new excise taxes were imposed on individual fuels in the manner that the excise tax for motor gasoline was HRK1.90/litre, and for diesel fuel only HRK1.00/litre. At the end of 2007 a minor correction of excise taxes was introduced, but with little effect.

Throughout this decade, until recently, due to excessively high excise tax, retail price of motor gasoline (BMB 95) was much higher in Croatia than retail price of diesel fuel. The problem was in the way how the maximum allowed price of fuels was calculated. The difference in excise tax amount pushed up wholesale price of gasoline, but during the last few years the share of wholesale price in retail price, due to lower excise tax of diesel fuel, frequently decreased the difference in prices among different fuels, sometimes even annulled the difference.

At the beginning of this decade the difference between gasoline and diesel prices was the highest, more than twenty percent. Beside the fact that diesel engines consume less fuel for the same distance, excessively high motor gasoline price stimulated demand for diesel engine cars. Only in 2008 did the diesel fuel price increase so that it surpassed motor gasoline price, but without any visible effect on consumption, at least in Croatia.

Since the beginning of steady growth of diesel fuel consumption in 1993, the average annual growth rate reached 8 percent (Tables 4 and 5). The reason was low price of diesel compared with motor gasoline, fast increase in number of cars with diesel engine (lower price and smaller specific consumption per km), and sharp increase of road transport compared with rail and water transport. New modern highway network (and low diesel fuel prices) supported growth of road transport so that its share in total transport has been significantly higher than in majority of other countries. But trucks have higher specific energy consumption and cause higher pollution than trains and ships. Railway network in Croatia was mainly constructed in the second half of the 19th century and does not meet today's requirements. Modernization of railway network can be expected somewhere in the future. Good example is a special train for transport of heavy trucks between Spačva and northern Austria. Other similar projects could be organized. The future new fast railroad from Rijeka to Zagreb, with extension to Budapest would provide advantages for transport of heavy loads. In addition, the future canal connecting the Sava river and the Danube could improve river transportation. However, these are long-term projects and their implementation will take time. Therefore, the second reason (beside higher production cost) for increase of diesel fuel prices in respect of gasoline is to curb growing demand for diesel fuel.

## 2. MOTOR FUEL PRICES AND TAX DUTIES

Already in 2005, the average monthly diesel fuel price on the Mediterranean market (which ranged from US\$/bbl 58.75 to 84.73) was on higher level than gasoline price (which ranged from US\$ 53.17 to 88.35) for ten months.<sup>5</sup> In Croatia, the diesel fuel price surpassed gasoline price for the first time at the end of 2007, when the excise tax for gasoline decreased from 1.90 HRK/l to 1.65.

This several-year disparity of prices in Croatian market (compared with movements in international market) was caused by different excise tax rates for these two motor fuels. In 2004 the excise tax for unleaded gasoline was HRK 2.49/l, and for diesel fuel HRK 1.60/l. In 2006 excise tax for gasoline was HRK 1.90/l, and for diesel fuel HRK1.00/l. Despite lower spot price of gasoline included in the price formula, retail prices of gasoline were higher as a result of high excise tax. This caused further uncontrolled growth of diesel fuel demand and small decrease of gasoline demand. The number of diesel engine cars grew very fast.

The tables 8, 9 and 10 indicate that motor fuel prices and differences among them differ considerably in various European countries. The differences also appear in timing of price increases and decreases. During the observed period, in majority of countries diesel was more expensive than gasoline in 2008 and 2009. But there are several exceptions, as for example the Netherlands where gasoline is continually significantly more expensive than diesel fuel. The reason is huge consumption of virgin naphtha for production of ethylene and other products. In the Netherlands the consumption of virgin naphtha is higher than diesel fuel consumption, and in Serbia, where a relatively small naphtha cracker (capacity 200 kt/y of ethylene) consumes about 600 thousand tons of gasoline, which is close to the total consumption of motor gasoline in Croatia. Moreover, in Croatia the price difference between diesel fuel and gasoline according to Euro specification is constantly too small (occasionally gasoline is more expensive), while diesel fuel price should be higher by 6 to 10 cents, similarly to the price difference in Switzerland or Great Britain (10.7 cents and respectively 10.9 cents). In February this year, after more than a year, the price of motor gasoline was again higher than diesel fuel. In the ten European countries quoted in the table above, diesel fuel price was higher than gasoline, despite the fact that these countries have a more favorable ratio of gasoline and diesel consumption.

Inadequate proportion of excise taxes for various types of gasoline poses additional problem. At least one third of all drivers with gasoline engines in Croatia use Euro quality gasoline, although regular super 95 is more appropriate for their cars. This is mainly due to small price

**Table 8. Motor gasoline retail prices (Euro/liter) in European countries**

Country → Date ↓	Austria	Bosnia&Herz.	Bulgaria	Croatia	Czech Repub.	France	Great Britain
20.8.08	1.286	1.130	0.162	1.194	1.285	1.430	1.423
1.10.	1.260	1.084	1.121	1.182	1.230	1.402	1.391
3.11.	1.105	0.990	0.993	1.124	1.139	1.252	1.234
1.12.08	0.999	0.929	0.912	0.934	1.063	1.156	1.107
6.1.09	0.909	0.925	0.859	0.883	0.916	1.073	0.909
2.2.	0.956	0.767	0.864	0.882	0.841	1.144	0.943
2.3.	0.943	0.767	0.889	0.900	0.942	1.159	1.012
1.4.	0.948	0.767	0.889	0.925	0.968	1.180	0.996
1.5.09.	1.018	0.767	0.930	0.954	0.983	1.185	1.071

Country → Date ↓	Greece	Hungary	Macedonia	Netherlands	Serbia	Slovenia	Switzerland
20.8.08	1.192	1.271	1.117	1.595	1.378	1.129	1.178
1.10.	1.165	1.267	1.061	1.555	1.227	1.114	1.174
3.11.	1.006	1.148	0.917	1.361	1.124	0.984	1.091
1.12.08	0.905	1.042	0.821	1.289	1.124	0.827	0.967
6.01.09	0.830	0.862	0.756	1.248	0.894	0.827	0.879
2.2.	0.864	0.911	0.756	1.313	0.945	0.941	0.942
2.3.09	0.864	0.937	0.855	1.325	0.962	0.960	0.931
1.4.	0.880	0.993	0.896	1.351	0.967	0.970	0.931
1.5.09.	0.933	0.923	0.896	1.361	0.967	1.008	0.961

Source: TCS<sup>10</sup>**Table 9. Eurodiesel retail prices**

Country → Date ↓	Austria	Bosnia& Herz.	Bulgaria	Croatia	Czech Repub.	France	Great Britain
20.8.08	1.323	1.268	1.248	1.284	1.380	1.330	1.573
1.10.	1.243	1.171	1.156	1.200	1.270	1.301	1.539
3.11.	1.136	1.046	1.065	1.171	1.222	1.163	1.393
1.12.08	1.072	1.015	1.004	1.021	1.122	1.085	1.291
6.01.09	0.950	1.011	0.930	0.936	1.002	0.966	1.037
2.2.	0.964	0.859	0.869	0.909	0.912	1.088	1.058
2.3.	0.925	0.859	0.859	0.897	0.927	1.050	1.121
1.4.	0.897	0.859	0.854	0.862	0.949	1.084	1.083
1.5.09.	0.953	0.859	0.884	0.982	0.964	1.067	1.149

Country → Date ↓	Greece	Hungary	Macedonia	Netherlands	Serbia	Slovenia	Switzerland
20.8.08	1.298	1.320	1.228	1.343	1.320	1.191	1.327
1.10.	1.256	1.309	0.997	1.324	1.133	1.136	1.308
3.11.	1.141	1.250	0.868	1.100	1.003	1.044	1.254
1.12.08	1.073	1.165	0.813	1.097	1.003	0.914	1.149
6.1.09	0.978	0.934	0.649	1.017	0.760	0.914	1.032
2.2.	0.963	0.841	0.649	1.027	0.841	0.948	1.076
2.3.	0.953	0.956	0.707	1.003	0.844	0.947	1.038
1.4.	0.912	0.976	0.723	1.025	0.851	0.956	1.004
1.5.09.	0.936	0.889	0.732	1.025	0.851	0.989	1.014

Source: TCS<sup>10</sup>



**Table 10. Price differences between Euro diesel and Euro super in Eur cents per liter (+ diesel fuel more expensive than gasoline, - diesel fuel cheaper than gasoline)**

Date → Country ↓	20.8. 2008	1.10.	3.11.	1.12.2008	6.1. 2009	2.2.	2.3.	1.4.	1.5.2009
Austria	3.8	-1.7	3.1	7.3	4.1	0.8	-1.8	-5.0	-5.5
Belgium	-20.3	-40.2	-16.2	-15.6	-17.1	22.0	22.0	26.0	-29.7
Bosnia & Herz	13.8	8.7	5.6	8.6	8.6	9.2	9.2	9.2	9.2
Bulgaria	8.6	4.5	7.2	9.6	7.2	0.5	-3.0	-3.0	-4.6
Croatia	9.0	1.8	4.7	7.7	5.3	2.7	-0.3	-6.0	-6.2
Czech Rep.	5.9	4.0	8.3	5.9	8.6	7.1	-1.5	-2.0	-1.9
Estonia	12.4	8.0	8.9	13.7	12.2	9.6	9.6	4.5	4.5
Finland	-14.6	-17.8	-17.8	-12.3	-14.8	-19.0	-25.0	-28.0	-30.0
France	-10.0	-10.0	-8.9	-7.0	-10.7	-5.6	-11.0	-12.0	-12.0
Germany	-9.7	-9.0	-0.2	0.2	-8.0	-11.0	-16.0	-7.1	-20.1
Great Britain	15.0	14.8	15.9	18.4	12.8	11.5	10.9	8.7	7.8
Greece	10.6	9.1	13.5	16.8	14.8	8.9	8.9	3.2	0.3
Hungary	5.9	5.2	10.2	10.3	7.2	3.0	1.9	-1.8	-3.4
Ireland	10.3	6.0	6.0	0.7	0.6	-0.2	-4.4	-4.4	-6.5
Italy	4.5	1.9	-15.0	-3.4	1.5	-0.9	-4.0	-7.0	-7.2
Lithuania	9.2	2.9	4.6	9.8	8.3	-2.0	-7.4	-11.0	-10.8
Macedonia	11.1	-6.4	-4.9	-0.8	-10.7	-12.0	-15.0	-17.0	-16.4
Netherlands	-25.2	-23.1	-18.4	-19.2	-23.1	-29.0	-32	-34.0	-35.6
Russia	-0.7	-1.4	-1.6	-3.3	-2.8	-2.2	-2.2	-2.0	-2.7
Serbia	-5.8	-9.4	12.0	-12.0	-12.5	-10.0	-1.8	-12.0	-11.6
Slovenia	6.8	10.5	6.0	8.7	8.7	0.7	-1.3	-1.4	-2.0
Spain	8.0	7.0	2.0	7.0	1.0	1.0	1.0	-8.0	-8.0
Sweden	9.5	7.4	9.9	8.1	5.6	0.0	-2.8	-3.7	-5.7
Switzerland	14.9	13.4	16.3	18.2	14.3	13.4	10.7	+7.3	+5.3

Source: TCS<sup>10</sup>

difference between different types of gasoline and lack of information. It could also be resolved by decreasing excise tax for super 95 gasoline, in relation to Eurosuper, by approximately 20 lipas/liter.

In order to stabilize the domestic market of motor fuels it is necessary to change the relationship between gasoline and diesel fuel prices with the aim to boost buyers' interest for cars with gasoline engines. The simplest way is to change the relationship between excise tax for various fuels. At the time of fastest growth of diesel fuel consumption in the middle of this decade, the excise tax per liter of motor gasoline was HRK 2.40/l, and for diesel fuel

only HRK 1.60/l. After that the total amount of excise tax was decreased, but the unfavorable difference between gasoline and diesel fuel was increased from 50 to 90 %. Later in 2007 the difference was decreased to 65 %, which was good, but not sufficient.

It is necessary to change excise taxes, preferably in two stages so that motorists have sufficient time to switch to another type of engine. Interestingly, at the end of 2008 one neighboring country increased excise taxes for motor fuels, but on expense of lower refining price as international crude prices declined, so that retail prices re-

**Table 11. Proposed changes of excise taxes (HRK/l)**

Motor fuel	Present level	Proposal of new excise tax	Possible new proposal
Euro super 95	1.65	1.50	1.50
Super 95	1.65	1.30	1.30
Euro diesel	1.00	1.30	1.50
Diesel	1.00	1.10	1.20

mained unchanged. This was a good timing for excise tax modification.

If Croatian government increased excise tax for Eurodiesel by only HRK 0.40/l, the state budget revenues would increase by more than HRK 0.5 billion. The prices of diesel fuel would be in the range of average European prices, and everything would be in compliance with EU regulations. Already in the first year of implementation, import of diesel fuel to Croatia would decrease by dozen million dollars, later even hundreds million dollars.

This is only one of possible scenarios. When crude oil prices on international market are low, including motor fuel prices on European markets, then excise tax amounts could be increased even more than indicated in Table 11. For example, excise tax for Eurograde fuels could be increased to HRK 1.80/l, and for non-Euro grades to HRK 1.50/l. In such a case state budget revenues would increase by more than HRK one billion.

If such a proposal or something similar was accepted, demand for gasoline cars would go up.

With the proposed changes in excise tax relations, about one million owners of cars with gasoline engines in Croatia would not be penalized with higher prices, while at the same time they would have equal level of obligations toward the budget as the owners of cars with diesel engines, motor boats and luxury yachts, including all foreign visitors during tourist season. It is unfair that only gasoline buyers in Croatia pay higher taxes for fuel so that buses and trucks can compete with railway transportation, and on the other hand, Croatian railways are incurring losses from year to year, which are covered by all tax payers. It should not be forgotten that decrease of road transport in favor of railways would be beneficial considering overall energy savings. If Croatian transportation companies, the owners of buses and trucks, cannot pay the proposed excise tax difference, then other possible solutions could be considered, such as compensation through lower registration fee.

In case none of the proposed measures is introduced, the above described process will gradually evolve even in Croatia, but it will be much slower than it should be, and it will remain as a problem until proper solutions are found and until a balance of demand and supply of individual motor fuels is established in Europe. Particularly, the current situation puts into unfavorable position Croatian motor fuel producer in relation to foreign competitors and other local distributors that do not have refineries.

### 3. CONCLUSIONS

1. It is necessary to stop fast growth of diesel fuel consumption and on the other hand, to stimulate gasoline consumption. Purchase of new diesel engine vehicles should be slowed down while purchase of gasoline engine cars should be boosted.
2. The simplest way to achieve this goal is to increase diesel fuel excise tax so as to diminish the difference between tax levels for diesel and gasoline and eventually to set equal level of excise tax for both fuels. This will make diesel engine cars less attractive and buyers will switch to gasoline engine cars gradually. The effects could be visible already in the first year of application, while within three years the situation on motor fuel market could be much better. At the time when the motor fuel prices are low, the VAT from fuel sales is also low, then the excise taxes could be increased, and vice versa. All measures proposed here are in accordance with European practice, they are applied by several countries, and are fully in compliance with EU regulations. If the proposed changes of excise rates for various motor fuels were implemented, the following results would be achieved:
  - diesel fuel consumption would decrease and consequently, import of this fuel would also decrease,
  - motor gasoline consumption would start increasing, particularly Super 95 (domestic production can cover our needs) which would result in decreased import of Euro Super and lower export of low grade gasoline at much lower prices.
3. If balancing of excise tax for diesel fuel and gasoline would not render satisfactory effects, then the excise tax for diesel should be further increased, including consideration of additional measures. The goal is to reach the consumption ratio between middle distillates (diesel fuel, „blue diesel“, extra light fuel oil) and gasoline as close as possible to 1.6 to 1 ratio. Postponement of relevant decisions could result in further, unnecessary losses expressed in tens of millions of dollars.
4. If it is established that Croatian transportation companies (with a fleet of buses and/or trucks) cannot endure higher excise tax for diesel fuel (although higher excise tax is more conspicuous when prices are lower) then they could be compensated through lower annual registration fees.

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Author:

**Fedor Reščec**, grad mech. eng