

Environmental trends in the automotive industry

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Introduction

In this issue of the Monthly of EU Events, we will return to the topic of the automotive industry, which we wrote about in the June issue. Not only is the automotive industry driven by the numbers of sold and registered vehicles, but certain trends towards increasing environmental friendliness are also apparent. The elimination of dependency on oil, reduction of greenhouse gases and vehicle noise and improving the quality of gasoline and diesel fuel are among the steps that vehicle manufacturers and the automotive industry as a whole will have to focus on.

Making production more environmentally friendly

In terms of mobility, Europe is very dependent on oil. As the European Commission stated in its report (Clean Sources of Energy for Transport: European Strategy for Alternative Fuels), oil made of 94% of the energy consumed for transport in 2010. Since 84% of oil is imported and up to 1 billion euros daily was spend for oil in 2011, it is necessary to find alternatives an reduce dependency on this resource.

The strategy for the transport sector with the aim of gradually replacing oil with alternative sources and building essential infrastructure could bring savings of 4.2 billion euros per year for oil importation in 2020, which would grow to 9.3 billion euros per year in 2030 and would save 1 billion euros annually thanks to limitation on price increases.

The use of alternative fuels and investments into infrastructure could also positively affect the labour market and create new jobs. According to a survey conducted by the European Foundation for Climate Issues, making vehicles more environmentally friendly could create approximately 700,000 new jobs by 2025. Innovation in the area of alternative energy sources should also lead to increasing the EU's competitiveness in relation to other economies.

Certain planned or anticipated changes will occur in the mid-term or long-term horizon. The soonest available measures are related to reduction of carbon dioxide emissions from vehicles.

In the White Book from 2011 (Plan for the Single European Transport Space - Creation of Competitiveness of the Transport System Effectively Using resources) it is stated that in the transport sector, which is an important and growing source of greenhouse gases, it is necessary to reduce greenhouse gas emissions by at least 60% compared to 1990.

The goal will be by 2030 to reduce greenhouse gas emissions in the sector by approximately 20% to below the level of 2008. Some of the objectives (set in the White Book regarding Transport), not only how to achieve 60% reduction of greenhouse gases, will also affect the automotive industry:

- Reduction of the use of "conventionally propelled" automobiles in urban transport by 2030 to half; gradually eliminate them from use in cities by 2050; by 2030 achieve in large cities implementation of urban logistics basically without carbon dioxide..
- A total of 30% of roadway transport of freight above 300 km should be transferred by 2030 to other forms of transport, such as rail and boat transport, and by 2050 the figure should be more than 50%. This should be aided by effective and green corridors for freight transport. The fulfilment of this objective also requires implementation of appropriate infrastructure.
- Reduction by 2050 of the number of deaths on roadways to nearly zero. In accordance with this objective, the EU aims to reduce traffic accidents by half by 2020. Ensuring the leading position of the EU in the area of safety and traffic protection in all of its types.

Stormy debates are currently under way regarding reduction of CO₂ emissions. Individual member states and MEPs are discussing new draft legislation regarding reduction of carbon dioxide emissions produced by automobiles. Due to Germany's strong position on the automobile market, it appears that the discussion of these measures will be delayed until after the German federal elections which will take place in September.

Another aspect of automobile traffic, which the European Parliament recently discussed, is traffic. The approved regulations have set new stricter limits on vehicle noise. These new limits will be implemented within six (for new vehicles) and eight (for all vehicles introduced onto the market) years after the rules take effect.

The limits will be reduced from the current 74 dB to 68 dB. For more powerful vehicles the limits will be 2 (or 6) dB higher. For trucks weighing above 12 tonnes, the interim value would remain at the current 81 dB.

Electromobility

A clear path to making use of vehicles environmentally friendly is the use of electric vehicles as a replacement for vehicles with combustion engines. Especially for large cities, the transition to electric vehicles would represent freedom from exhaust fumes and a major step towards reducing noise.

However, electric vehicles take a long time to recharge, have a short distance per single charge, are expensive to acquire and have a small number of available charging stations, factors which do not enable massive expansion of electric vehicles. In 2012 according to data from the Union of Automobile Importers, only a total of 89 electric vehicles were newly registered in the Czech Republic.

However, environmentally friendly operation is not the only plus. Low operating costs can make up over time for the high acquisition costs of electric vehicles, especially given increasing oil prices.

Support for expansion of electric vehicle use can include subsidies, which are used by many countries already. This support can take the form of discounts on registration or sales tax, one-time incentives or other forms of financial support. According to the European Commission, it is the aim of EU member states for 8 to 9 million electric vehicles to be in use by 2020.

Something important for further development will be the creation of joint rules and specifications used by member states for electric vehicles and charging stations. Indeed, a missing agreement regarding a "plug" for the single European market is considered one of the main obstacles to the expansion of electric vehicle use.

Automobiles based on used fuels

As far as used fuels are concerned, in the Czech Republic in 2005 gasoline fuel use prevailed over diesel fuels for personal vehicles. Of the total of 127,000 newly registered vehicles, more than 70% of them had gasoline engines. Electric vehicles and hybrids did not appear until later. The first five electric vehicles were registered in the Czech Republic in 2009, and by 2012 there were 89 electric vehicles registered in the Czech Republic.

Registration of new personal vehicles in the CR in 2005 based on fuel

	Gasoline		Diesel		Uncategorised		Total vehicles
	vehicles	share	vehicles	share	vehicles	share	
Total	89 701	70.42 %	35 320	27.73 %	2 355	1.85 %	127 376

Source: Union of Automobile Importers

In later years, the share of vehicles with gasoline engines gradually decreased, and also due to the development of fuel prices, the share of personal vehicles with diesel engines increased. The number of vehicles with alternative fuels, such as pressurised natural gas (CNG), LPG and others, has also been increasing.

Registration of new personal vehicles in the CR in 2009 based on fuel

	Gasoline	Diesel	CNG	LPG	E85	Electric	Others	Total
Vehicles	104 885	51 364	103	19	32	5	5 251	161 659
Share	64.88 %	31.77 %	0.06 %	0.01 %	0.02 %	0 %	3.25 %	100 %

Source: Union of Automobile Importers

In 2012 a total of 174,009 personal vehicles were newly registered in the Czech Republic. The share of personal vehicles with gasoline engines fell to 55.8%, and the share of vehicles with diesel engines grew to 41.4%. Newly registered vehicles with alternative fuels are already counted in hundreds, and their number will rise in the years to come.

Registration of new personal vehicles in the CR in 2012 based on fuel

	Gasoline	Diesel	CNG	LPG	E85	Electric	Hybrid	Others	Total
Vehicles	97 067	72 012	470	514	588	89	362	2 907	174 009
Share	55.8 %	41.4 %	0.27 %	0.3 %	0.34 %	0.05 %	0.21 %	1.67 %	100 %

Source: Union of Automobile Importers

The report of the European Parliament's Commission from this June also focuses on used fuels. In that report (regarding quality of gasoline and diesel fuel used in vehicle operation in the EU, the tenth annual report) for 2011, reports from individual member states are summarised based on Directive 98/70/EC, which include specifications for gasoline and diesel fuel sold in the EU.

The quality of gasoline and diesel fuel used in roadway transport is undoubtedly important from an environmental point of view, because it has a direct effect on emissions of pollutants resulting from operation, which affect air quality.

It is apparent from this report from the Commission that the volume of sold fuels in the EU has been changing over time. The volume of sold diesel fuel is increasing, and the volume of sold gasoline is decreasing.

For example, in 2005, the volume of sold gasoline was 147.344 billion litres, and 219.693 billion litres of diesel fuel were sold. According to the most recent data, the volume of sold gasoline fell from 2005 to 2011 by more than 20% to 116.893 billion litres, and the amount of diesel fuel sold increased by 12% to 245.227 billion litres.

Many vehicle manufacturers see in new technology and alternative fuels an opportunity to expand the range of offered vehicles and maintain the latest trends. The disadvantages of some of these alternatives are high acquisition costs and a shortage of fuel filling and charging stations.

At the beginning of 2013, the European Commission proposed a directive with an obligatory number of charging stations for electric vehicles, which European union's member states are supposed to achieve by the year 2020. This is part of the strategy intended to reduction european dependency on oil. The use of alternative fuels could then lead to reduction of emissions and oil consumption.

The most electric vehicles were sold in 2011 in the United States (19,860) and Japan (7,671), and the most vehicles in Europe were sold in Germany (1,858) and France (1,796).

In the EU, the most public charging stations in 2011 were in Germany (1,937), the Netherlands (1,700) and France (1,600).

According to the European Commission, based on national plans, the number of electric and hybrid vehicles is expected to increase; in the United States, there are expected to be 1 million of these vehicles in 2015, along with 5 million vehicles and 10 million charging stations in China. An overview for individual countries is shown by the following table.

Sale of fuel in EU in 2011 according to type in mil. of litres

	Gasoline	Diesel
Belgium	1 760	8 738
Bulgaria	805	2 184
CR	2 411	4 820
Denmark	1 988	3 249
Estonia	407	678
Finland	2 162	2 872
France	10 385	40 327
Ireland	1 856	2 675
Italy	11 678	30 231
Cyprus	511	391
Lithuania	343	1 225
Latvia	334	807
Luxembourg	470	2 054
Hungary	1 693	3 293
Malta	99	105
Germany	26 538	39 417
The Netherlands	5 696	7 783
Poland	5 376	14 905
Portugal	1 677	5 505
Austria	2 378	7 248
Romania	1 909	4 149
Greece	4 501	2 628
Slovakia	718	1 263
Slovenia	736	1 580
UK	18 920	25 064
Spain	7 167	26 712
Sweden	4 375	5 324
Total	116 893	245 227

Source: European Commission

Sale of electric vehicles in selected states in 2011

Country	Vehicles	Country	Vehicles
USA	19 860	Switzerland	456
Japan	7 761	The Netherlands	435
Germany	1 858	Spain	288
France	1 796	Italy	202
China	1 560	Portugal	193
Norway	1 547	Belgium	187
UK	1 170	Korea	156
Austria	614	Australia	59
India	585	Other european states	155
Denmark	552		

Source: OECD, Market Development for Green Cars

As far as other fuels are concerned, the European Commission states in its report that the use of hydrogen is not currently very widespread. There are only a few hundred such vehicles and a limited number of fuel stations catering to them in operation (about 200 in the world in 2011, of which 120 are in the EU).

Currently, the gases most used as fuels for vehicles are propane, butane and natural gas, as compressed natural gas (CNG) and on a very small scale also liquefied natural gas (LNG).

In 2011 there were 15.2 million vehicles in the world operated with compressed natural gas (about 1 million in the EU), which represents 1.2% of the total number of vehicles.

In the Czech Republic, according to web portal www.cngplus.cz there are 47 fuel stations for and over 5,500 vehicles using CNG. In comparison with the 2020 target this is very insufficient outcome.

Public charging stations and electric vehicles in EU

	PCHS in 2011	PCHS proposed for 2020	EI. vehicles planned in 2020
Germany	1 937	150 000	1 000 000
Netherlands	1 700	32 000	200 000
France	1 600	97 000	2 000 000
Spain	1 356	82 000	2 500 000
Italy	1 350	125 000	130 000 ^{*)}
Portugal	1 350	12 000	200 000
UK	703	122 000	1 550 000
Ireland	640	2 000	350 000
Austria	489	12 000	250 000
Denmark	280	5 000	200 000
Belgium	188	21 000	-
Slovenia	80	3 000	14 000
Poland	27	46 000	-
CR	23	13 000	-
Hungary	7	7 000	-
Luxembourg	7	1 000	40 000
Greece	3	13 000	-
Slovakia	3	4 000	-
Estonia	2	1 000	-
Bulgaria	1	7 000	-
Finland	1	7 000	-
Latvia	1	2 000	-
Romania	1	10 000	-
Cyprus	-	2 000	-
Lithuania	-	4 000	-
Malta	-	1 000	-
Sweden	-	14 000	600 000

Source: European Commission, *) in year 2015

Automobiles based on used engines

Interest has been increasing in Europe in recent years in vehicles with diesel engines and all-wheel-drive vehicles. This trend is very apparent from the graph for the old EU member states (EU-15), according to which from 2000 the share of vehicles with diesel engines grew from 32.8% (compared to 10% less five years previously) to 55.6%.

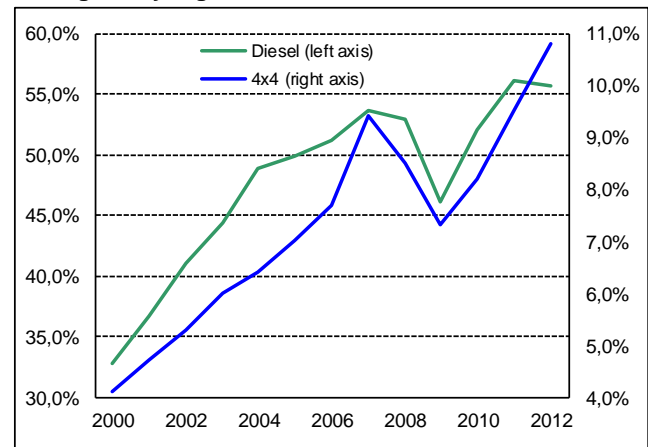
The situation is similar for all-wheel-drive vehicles, the share of which was nearly 11% in 2012. Practically the same course can be registered in the trend of increasing output of engines for newly registered vehicles.

These curves had a common course and a local peak in 2007, followed by a sharp decline caused by the economic crisis.

Not only did the number of manufactured and newly registered vehicles decrease, but consumers also began giving priority to vehicles with engines other than diesel engines and mainly to engines with lower performance and volume due to their desire for less consumption and lower operating costs.

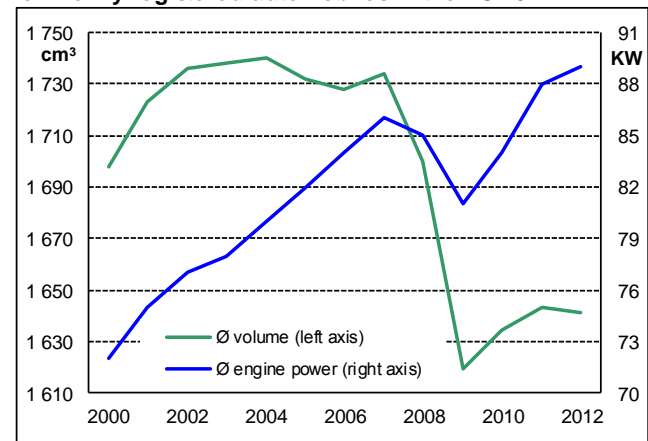
However, after 2010 a growing trend was registered again in relation to the mentioned characteristics, and newly registered vehicles rose above the numbers from the the period before the crisis. A certain exception is the lowering volume of cylinders. Vehicle manufacturers have been aiming for increased performance for lower or the same volume of cylinders.

Share of vehicles with diesel engines and 4x4 vehicles among newly registered vehicles in the EU 15



Source: ACEA

Average volume of cylinders and average engine output for newly registered automobiles in the EU 15



Source: ACEA

Conclusion

Europe is very dependent on the automotive industry, and keeping up with the latest trends will be very important for it, especially given the fast developments in Asia. We can examine the process of making the automotive industry more environmentally friendly from various perspectives.

For example, we can look at the new direction that automobile manufacturers will take in order to increase their competitiveness and succeed in also appealing to new potential customers and thereby increasing the number of jobs. The effort to eliminate negative environmental impacts of the automotive industry is certainly also important. The path leading to new alternative fuels, reduction of consumption and increasing of engine quality will certainly be long, but it is the right path to take given the number of registered vehicles in the world.