TRENDS AND INDICATORS FOR SUSTAINABLE MOBILITY IN HUNGARY

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Transport is the lifeblood of all developed economies, but at the same time, it is also one of the most polluting sectors. In the wake of the economic crisis and the looming threat of climate change, a number of solutions have been developed to create a transport sector for the 21st century, with varied success. This article aims to improve our understanding of the different trends in the transport sector by analyzing time series of indicators for different aspects of sustainable mobility in Hungary and Europe. Specific indicators have been developed from a variety of data sources to describe the driving forces shaping the present and the future of the European transport sector, with a view on the different medium and long-term objectives set out on national and European levels, such as the White Paper on Transport, the Climate and Energy Package, or the National Energy Strategy of Hungary.

Keywords: transportation, sustainability, trends, policies, indicators

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Introduction

As climate protection and control over the emission of greenhouse gases became a crucial issue, it became clear that the transport sector was not only one of the key players, but also slow to respond to policy action, as reflected by the goals set out in the Decarbonization Plan of the EU (considering GHG emissions from transport in 2030 between +20 and -9% based on 1990 levels). This seeming inertia is due in part to the steady expansion of motorization, while the renewal of the vehicle fleet and the role of other modes are also important factors. Sustainable mobility is an important and integral part of regional sustainability (Szlávik & Csete, 2012), and is one of the focus areas of technological and policy development. Through the following paragraphs and figures, we will present the current state of the sector in Hungary and Europe, with an outlook on policy goals and future development. Hungary will have to develop and implement its transport policy together with the rest of the EU, requiring a comprehensive vision in transport development (Szendrő, 2011). The areas covered include modal split and tonnage changes, the renewal of the vehicle stock, passenger transport performance, as well as differences between Member States.

During the recent history of climate and transport policy, a whole range of different strategies and goals have been established in several policy documents. Before going forward with the analysis of the current state of the art, it is useful to take a brief look at them to see what the goals are for this sector (the list is not exhaustive):

1. EU Climate and Energy Package (EC, 2007):
   - A reduction in EU greenhouse gas emissions of at least 20% below 1990 levels
   - 20% of EU energy consumption to come from renewable resources
   - A 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency.
2. EU Decarbonization Plan: decreasing transport GHG emissions on 1990 levels by 54-67% by 2050.
3. White Paper on Transport (DG Mobility, 2011):
   - Halve the use of 'conventionally fuelled' cars in urban transport by 2030; phase them out in cities completely by 2050
   - Low-carbon sustainable fuels in aviation to reach 40 % by 2050
   - 30% of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030, and more than 50 % by 2050
   - By 2050, complete a European high-speed rail network. Triple the length of the existing high-speed rail network by 2030 and maintain a dense railway network in all Member States. By 2050 the majority of medium-distance passenger transport should go by rail.
   - A fully functional and EU-wide multimodal TEN-T 'core network' by 2030, with a high-quality and capacity network by 2050
   - Achieve a 60% reduction in CO_2 emissions by 2050
4. Hungarian National Energy Strategy (NFM, 2012):
   - Electrification of road transport
   - Decreasing import dependence and CO_2 intensity
   - Increasing to role of rail in passenger and freight transport
   - Supporting alternative fuels and propulsion systems
   - Preparing for the structural changes brought about by peak oil

The objectives and time frames of these policy documents are different, and there is no single, unified set of goals and deadlines, which makes it very challenging to implement coordinated efforts in this area on a national, let alone European scale.

Current Status of the Sector

In the following paragraphs, we will investigate key indicators of the Hungarian transport sector. For the sake of perspective, Hungarian data sets will in most cases be compared to 4 countries, 2 of them more developed that could in many cases serve as an example to follow (Austria, Germany), and 2 from the region of Central Europe, having similar characteristics and issues as Hungary (Slovakia, Czech Republic).

One of the key indicators of the Hungarian transport sector is the number of new vehicle registrations. This figure is important because it affects the renewal rate of the vehicle fleet, and through it, the time it takes for new policies to take effect.

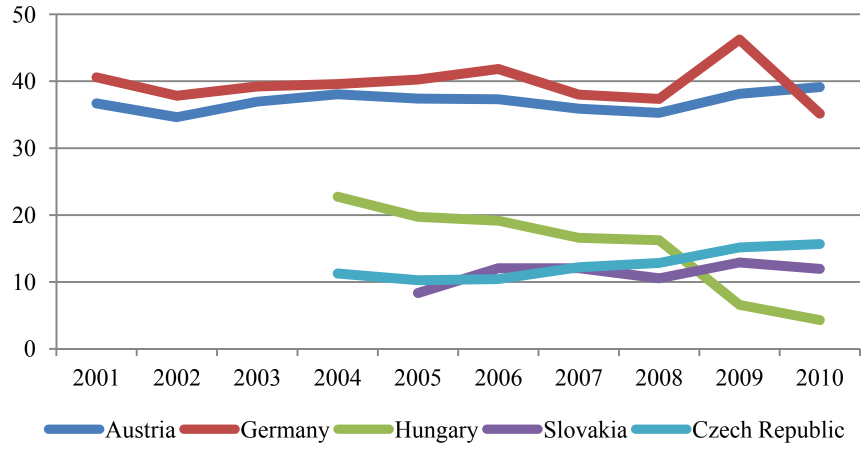
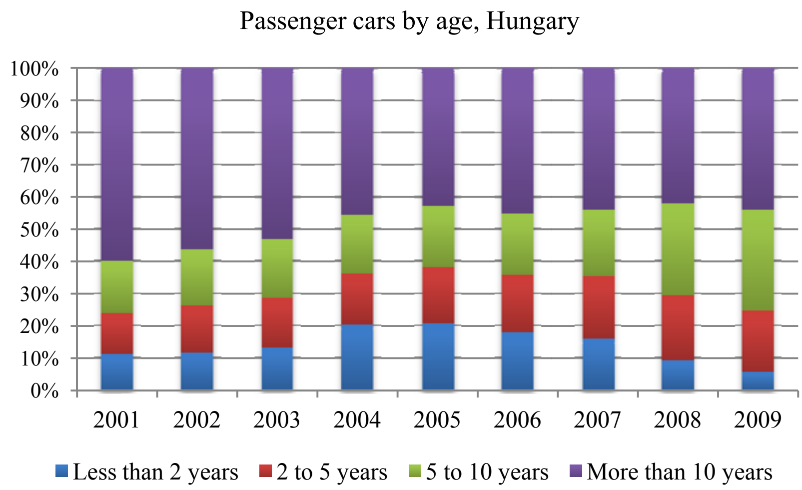


Figure 1. New vehicle registrations (1000 inbabitants). Own compilation based on Eurostat data.

The number of new vehicle registrations (an indication of the renewal rate of the vehicle fleet) have been average in Hungary for the first part of the decade, but have dropped sharply as a result of the financial crisis by about 80% compared to 2004, when passenger car sales were driven by the availability of cheap credit. The bubble burst with the rapid increase in the exchange rate of the Swiss Franc (and, to a smaller extent, the Japanese Yen), creating a considerable amount of bad loans. The ultimate effect was that, since the crisis, the majority of new vehicle sales are driven by company fleets, and the number of registrations is among the lowest in the region, dropping to just over 4/1000 inhabitants in 2010. Motorization has started with a delay in Hungary, and while it more or less follows European trends, the overall magnitude remains less than the average. The motorization rate (the number of vehicles per 1000 inhabitants) is around 300, while for most of the EU-15 countries, this indicator is around or over 400. It is therefore likely that without strong policy intervention, the vehicle fleet will continue to expand, even after EU-15 countries have stabilized.

The second key indicator is the age composition of the vehicle fleet. This gives general information about the current state, but when observed over a time period, it also shows the reaction to external effects, such as the economic crisis. The point of reference in this case will be Austria:



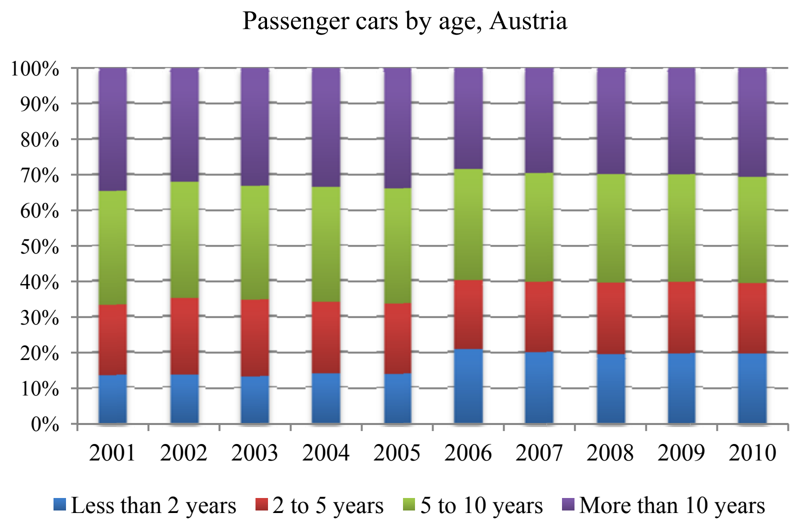


Figure 2. Vehicle age distribution. Own compilation based on Eurostat data.

It is interesting to note how in some other countries (e.g. Austria), the crisis had no discernible effect on the age distribution of vehicles. The low amount of new vehicles in Hungary (along with low scrappage numbers) means that the age distribution moves in an unfavorable direction, and that policies (such as the electrification of road transport, advocated not only by the White Paper, but also Hungary's own Energy Strategy) that require the use of new technologies will need a long time to take effect, possibly resulting in the inability to reach climate and energy targets set out, such as the ones in the Climate and Energy Package.

The importance of cooperation between manufacturers and policy makers is undeniable. Passenger car manufacturers are sometimes criticized for their lack of commitment to innovation that could decrease the impact of their products on the environment, and that efforts on their part will only be made if ever more strict vehicle emission standards force them to act. Today, the majority of passenger cars on the road still use the internal combustion engine, a technology developed in the late 1800s.

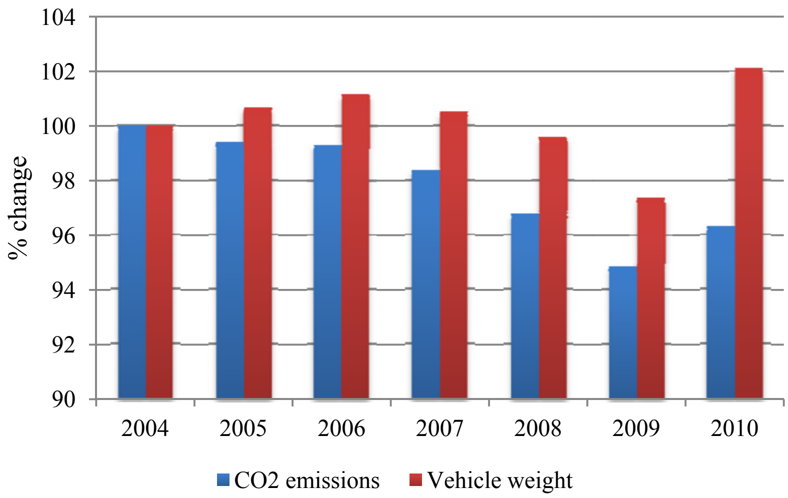


Figure 3. Weight and emissions. Own compilation based on Eurostat data.

Note. EU-27 average, 2004=100%. Data for EU-25 before 2007.

However, this does not mean that there has not been any development. From a very simplistic perspective, a vehicle has 3 areas of possible development: performance, weight and emissions. For example, the Ford T-Model weighed 540 kg, had 20 horsepower and a 72 km/h maximum speed. The reality is that there has been tremendous development since then, but emissions aren't improving fast enough because the majority of gains had to be used in the other two areas due to consumer preferences: weight and performance, both of which have an adverse effect on emissions.

As the graph above shows, the average weight of new vehicles was on a steep upward slope from 2004 onwards, reaching its peak in 2007. The correlation of this statistic with the state of the economy is also shown by the progression as the crisis unfolded: after a slight decrease from 2007 to 2008, the crisis induced a sharp drop in 2009, after which the graph has rebounded somewhat (in the meantime, vehicle emission standards have become more strict, arriving at 140 gCO_2/km in 2010). There also seems to be a disconnect (or decoupling) between emissions and weight. The latter is unregulated, and has in recent years decreased less and grown more than emissions. Apparently, larger vehicles (such as SUVs) have become popular shortly after the first "shock effects" of the crisis in 2008. It is worth noting that not all countries followed this trajectory – in Hungary, for example, remaining vehicle sales are mostly limited to company fleets with different priorities and preferences, and the changes in weight have not been as significant as Figure 3 shows.

The next area to examine is the performance of the passenger transport sector in terms of absolute volume, changes over time and mode choice.

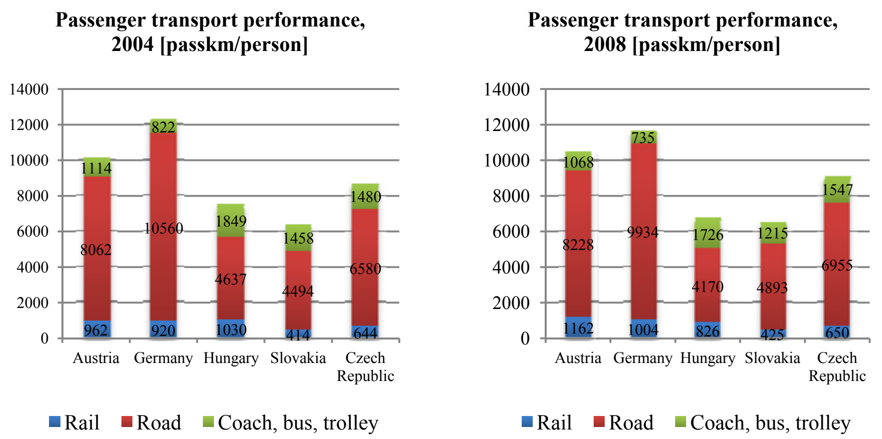


Figure 4. Distance traveled. Own compilation based on Eurostat data.

The evolution of different countries has been divergent in this respect. Both Austria and Germany have seen a slight increase in rail and a slight decrease in public transport over road. The total passenger-km in Germany has dropped, mainly because of the decreasing share of individual road transport.

In Hungary, not only did the overall performance decrease (in part as a result of the crisis), but also road transport has continued to increase its share and replace the other two modes – the exact opposite of policy goals. Increasing motorization rate can also be observed in Slovakia and the Czech Republic, with no significant change in total transport performance.

The final aspect of the transport system to be analyzed is the state of railway infrastructure. Traditionally, Hungary was in a favorable position in this respect owing as much to its geographical location as the density of the railway network. However, since 1989, the railway sector has been in decline, an ever increasing share of rail freght and passenger transport shifted to road, and the infrastructure is obsolete, although the density is still quite high on a European scale:

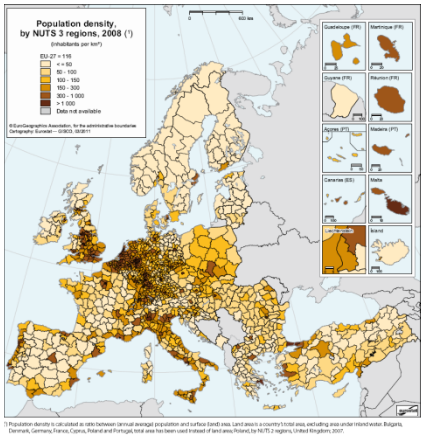


Figure 5: Population density

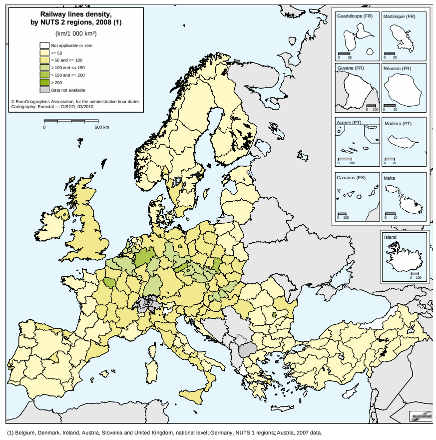


Figure 6: Railway line density

Note. Own compilation based on Eurostat data.

It is clear that Hungary is in a good position with respect to its railway network density. However, the obsolete state and quality of infrastructure (upgrades to 130 km/h are in progress) is a significant obstacle and it is possible that a population density like this is simply not sufficient to sustain a railway network that is among the most dense in Europe. The result is line closures and attempts to eliminate parallel bus services, which may result in a decreased service level, while financial sense is questionable, given the large share of fixed costs (infrastructure maintenance) in the railway industry.

Conclusion

The current state of affairs in the transport sector and the economy in Hungary make the chances of successfully reaching the targets set out in various strategy documents questionable at best. An enormous effort will be required to move toward a more sustainable transport system, and it is not yet clear where associated funds or consumer motivation will come from.

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