
Abstract of the Bachelorthesis

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Title: Effects of low emission zones

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Over the last few years the European Community implemented several directives to improve the air quality for the protection of human health. In Germany, these directives were transposed in the Federal Immission Control Act (BImSchG) and in the 22. and 33. Federal Immission Control Ordinance (BImSchV). Since 2005, the annual amount of particular matter is limited to $40 \mu\text{g}/\text{m}^3$ and it is allowed to surpass the daily average of $50 \mu\text{g}/\text{m}^3$ 35 times. Since 01.01.2010 the limit for nitrogen dioxide is $40 \mu\text{g}/\text{m}^3$. The 35. Federal Immission Control Ordinance (35. BImSchV), labelling motor vehicles that emit harmful substances, is applying since 2007. Once limits are exceeding it is necessary to generate a clean air plan or a action plan containing measures against polluters to maintain within the statutory limits.

A low emission zone is a possibility to improve the air quality in urban areas. Only special vehicle categories, depending on their pollutant emission, are permitted to drive into a predefined area. Before creating a low emission zone, it is necessary to carry out a cause analysis giving an overview of all air polluting sources. The percentage of the amount of traffic is important to estimate the effect of a low emission zone. Examined will be how the air quality will evolve in the future and which effects this could have in a low emission zone. The enforcement of a low emission zone is useful when there is a positive outcome in the improvement of the air quality in the area. Traffic restrictions will gradually be introduced. The zones are marked off by traffic signs that also inform about the permitted pollutant category allowed into the district. In Germany there are at present 30 low emission zones.

The effects of low emission zones are being examined in this thesis. The results are especially noticed by examining the air quality and the environment, road users, traffic volume and urban and spatial planning. One part of the information written in the thesis is composed of forecasts and the other part consists of experiences until now.

The effects on air quality are subject to several factors. One of these factors is the arrangement of the particular zone. The forecast proclaims a high reduction of the particular matter emissions on condition that the vehicle fleet will be restructured and that the emission category until 3 will be excluded. Even though the gradual introduction will likely result in less reduction. One of the first low emission zones was created in Berlin. In the area an improvement of the air quality can be measured due to the first steps taken in one year.

Examinations considering weather influence show that there is a difference in results. One result was that there is no difference of the air quality between the cities situated closely, although one of these already introduces a low emission zone. On the contrary, a reduction was noticed with the help of another measuring method.

Emission values can by parts be considerably improved by converting vehicles, although the improvements refer only to the emission caused by engines. The percentage of tyre abrasion and whirled up dust is also an important factor, which eventually could be reduced by fewer traffic volume.

All vehicles inside the zone have to be labelled with special stickers in compliance with 35. BImSchV. There are certificates of exemption for those that do not receive a sticker. The ordinance states general exceptions and there are more exceptions determined per city. All the remaining vehicles should be converted in, or replaced by low-emission models. This will cause a rise in expenses, which can be solved with state funding. Nevertheless, it might become a financial problem for private individuals and for business enterprises. The access to companies inside the zone is limited, which creates a disadvantage in comparison to other businesses situated outside the zone. In contrast, private individuals have the possibility to use public transport instead of using their own car.

Traffic volume will most likely increase over the next few years. Even though according to forecasts the traffic volume inside the low emission zones will at first decrease depending on the percentage of excluded vehicles and the rate of conversion. When introducing a low emission zone, only a few vehicles will be excluded at first. At the end, especially commercial vehicles will be affected by the more strict restrictions. Compared to regular vehicles the emission values of trucks are much worse. The traffic volume will eventually reach the original level.

Climate change also influences urban and spatial planning. The measure of creating a low emission zone can be supported by other measures of planning. The different measurements needed to improve the air quality should be coordinated strictly. Regarding the regulations involving low emission zones, the cooperation between cities has to be intensified. The low emission zones ought to be introduced quickly to maintain the standards that are in place at the moment. The existing horizons of planning as always should be reduced.

There are plans to introduce a low emission zone in Offenbach am Main. The effects of low emission zones will be examined more precisely on the hand of this case study. Firstly there will be a description of the initial situation. Offenbach is characterized by its special location in the Rhein-Main-Gebiet. On several locations in the urban area the limits of particulate matter and nitrogen dioxide were exceeded. A high percentage of the emission concentration comes from general traffic, especially trucks. The borders of the zone are defined to examine the effect. A high percentage of regular vehicles and heavy goods traffic will be excluded from the zone. Traffic volume and emission concentration will probably decrease, which makes it possible to stay within the limits. The restrictions, especially for trucks, are a burden to enterprises, since there is no possibility to bypass the defined area. The emission and immission values can be considerably reduced while traffic is the main cause of the environmental issue.

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