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Transportation Research Procedia 12 (2016) 584 – 597

Transportation Research Procedia

www.elsevier.com/locate/procedia

The 9th International Conference on City Logistics, Tenerife, Canary Islands (Spain), 17-19 June 2015

Impacts of planning and policy strategies on freight flows in urban areas

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Abstract

This contribution focuses on policy and planning strategies to reduce air pollution caused by heavy goods vehicle traffic. It examines the impacts of the implementation of the autobahn toll for heavy goods vehicles (HGVs) in Germany and the significance of environmental zoning in Berlin, Germany, for improving air quality, by using the conceptual framework of planning analysis.

Peer-review under responsibility of the organising committee of the 9th International Conference on City Logistics

Keywords: regulations; policy impact; logistics; freight flows; autobahn toll; environmental zoning

1. Introduction

In Germany, freight transport is one of the major sources of climate relevant pollutions and of negative impacts on the liveability of cities. Because of this, policy and planning authorities in Germany have aimed to reduce the externalities of lorry traffic for decades. However, only a small range of restrictive measures targeting commercial traffic were realised by planning authorities in Germany so far. Two of these few measures that were actually implemented is the introduction of the autobahn toll for HGVs (> 12 tonnes) and environmental zoning, which is now effective in status 3 in more than 40 big cities and three regions (as of February 2015). With these measures based on the most recent environmental regulations at EU and national levels, it is hoped that commercial traffic

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Peer-review under responsibility of the organising committee of the 9th International Conference on City Logistics
doi:10.1016/j.trpro.2016.02.013

will be optimised and the impact of traffic will be reduced, in order to improve the liveability in urban areas in Germany and to combat climate change.

The goal of this research is to identify environmental benefits provided through changes in freight flows by introducing planning and policy strategies, and to derive lessons for further implementation processes. For so doing, this contribution examines the implementation processes of these two policies in Germany by using the planning analysis framework, in order to identify the substantive outcome on commercial traffic and the environment as well as to derive lessons learned that might be considered to be useful elsewhere. The hypothesis of this research is that steering by environmental standards and by regulation (such as the autobahn toll) tends to be more effective than implementing measures addressing only a particular segment of traffic in local action plans or to set incentives for the transport companies. The analysis is conducted by using the planning analysis framework (Flämig 2004). Because of space constraints this contribution presents only parts of the results of the planning analysis. It concentrates on a brief description of the research methodology and the discussion of the substantial outcome of the implemented measures: the reduction of air pollution and factors influencing this pollution, e.g. changes in the spatial distribution of lorry flow in urban areas expressed by differences in vehicle kilometres travelled by vehicles of less and more 3.5 tonnes. For this purpose, empirical and statistic data are evaluated.

This contribution is based on an earlier paper (Flämig 2013) on the related topic and was updated for this purpose. The update was realised by analysing more recent data, using the Transport Emission Model (TREMOD) ran by the German Umweltbundesamt, and considering other new sources of data and information.

In the following, the target, action and outcome system will be traced for the implementation of the autobahn toll for HGVs in Germany and the environmental zone in the city of Berlin. Besides the description of the measure, the results of the measure outcome analysis (analysis of the target achievement) and the action outcome analysis (a review of the deviation from the targets) are being presented. This paper concludes with a critical reflection of the implementation process of these two measures and lessons learned for German and other cities.

2. Methodology

In order to assess the implementation processes of the two different sets of policies in Germany as named above, the so-called planning analysis framework (Flämig 2004) has been applied (see Fig. 1). This framework was developed to identify success factors and obstacles from the very first idea until its actual implementation to derive lessons learned for future implementation processes. It was initially established on the basis of a triangulation of policy analysis as outlined by von Prittwitz (1994), and organisational theory following Kosiol (1962). The framework of the planning analysis includes investigating the initial conditions, the outputs and the outcomes/impacts of action on several dimensions. Following policy analysis and organisational theory, the planning analysis is divided into the analysis of the actors' "arena", the institutional framework (polity) and the organisation of physical processes and the preceding decision making (politics). The integration of the stakeholder point of view helps to identify soft factors of the implementation process. By integrating organisational theory, organisational requirements and barriers can be identified. The visualisation of processes helps to discuss the procedures with the stakeholder and to develop measures for improvement.

Based on this research approach the planning analysis consists of a systemic consideration of the system of target, of actions undertaken and the system of impacts. This leads to the assumption of five different layers of analysis (Flämig 2004). Fig. 1 gives an overview of the interaction and the interrelationship of the various phases of analysis.

The situation analysis provides an overview of the subject matter of the planning, the initial point and the structural characteristics of the planning process. The target analysis provides the associated orientations of the practices involved. The measures analysis includes the various measures, approached or concepts as unbiased as possible for a systematically description of any interventions into the system. The impact analysis evaluates the impact of actions from actors of companies, planning or policy actors to analyse the target achievement (measure-outcome analysis) and to review differences between the targets and the target achievement based on actions (action-outcome analysis). For this purpose the analysis is explicitly divided in measure-oriented and action-oriented parts. The determinants analysis investigates the structural and process related organisation, the political arena and the decision-making processes, by taking into account the existing external framework conditions. In so doing, it is able to reconstruct the initial setting and the framework conditions for action. Also, the obstacles and success factors