Analysis of sustainable urban transport and land use - Modelling tools and appraisal frameworks

**Bedömning av långsiktiga effekter av ekonomiska styrmedel i transport**

**Funding:** National (Sweden)
**Duration:** Jul 2007 - Dec 2008
**Status:** Complete with results

**Background & policy context:**
Sustainable development and climate change is high on the agenda for most cities around the world today. Urban transport is at the heart of these changes. Increasingly, it is recognised that not only is the emission of pollutants and greenhouse gases a problem, but also the detrimental effects of congestion and social exclusion.

In order to address these issues, it will be necessary for cities to make strategic long term decisions regarding the future infrastructure and land use, not only in terms of what will be built, but also on measures that affect how these systems are used.

**Objectives:**
The project aims to study the effects of a variety of financial incentives in the transport system, such as changes in taxation and deductions for travel expenses.

To assess how well the various measures fulfil the goals needed a structured way to compare them. The method used in this project is based on back casting principle, i.e. situations will be assumed which meet the goals, and looking in a structured way for possible routes to get there.

A newly developed model of the interaction between transport and localization patterns is the basis for the analysis of policy instruments impact on the system. It is developed for the Stockholm region.

**Methodology:**
The project's first part is a direct and relatively uncomplicated continuation of two previous projects. One is the study of Robert & Jonsson (2006), assessing the potential of various measures. The second project is a model development project, co-funded by Vinnova and the Swedish Road Administration, which aimed to develop a new integrated transport and land use model landscapes.

By combining the framework of the former with the model from the latter project it is obtained a powerful tool to study the long term effects of transport policy measures on society.

The second part deals with the problem of model use in Sweden. The country traditionally has been very urban-oriented, especially focused on Stockholm. By implementing a shift and recalibration of landscapes to a sparsely populated region, it is possible in a direct and consistent way to compare how the instruments are affecting the two different types of region. It is especially interesting because it can be imagined that some types of economic instruments, such as changes in the tax deduction for commuting could have very different consequences in areas that differ in how well the public transport system can replace car trips.

**Parent Programmes:**

**Institute type:** Public institution
**Institute name:** The Swedish Road Administration (Vägverket)
**Funding type:** Public (national/regional/local)

**Partners:**
Sweden:
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Key Results:

This thesis is focused on the decision support tools that we need in order to make well informed decisions. Models that predict the performance of future scenarios, and appraisal frameworks that help evaluate whether these outcomes are desirable or not.

The first two papers experiment with different ways of bringing some aspects of sustainability into the appraisal frameworks used to analyse long term strategies. Paper I addresses intergenerational fairness and Paper II focuses on the emission of greenhouse gases. Paper III develops a model, that can help us to better understand the daily travel behaviour, through an activity based approach. By explicitly modelling space-time constraints, and travel time uncertainty in a microeconomic framework, we can get a better understanding of how people can respond to, and value, changes in the transport system. Papers IV and V describe a new integrated land use and transport model.

The policy implications from the studies in Papers I, II, and V are that it will be very difficult for Stockholm to reduce its emissions of CO2. Particularly, predicted economic and population growth will inevitably lead to more transport. It is likely that a range of different transport policies will be necessary to solve that problem. At the same time, we must not forget that decreasing CO2 emissions, although important, is not the only objective Stockholm has. To cope with the increasing travel demand from a growing population, it may well be necessary to build new infrastructure as well. This thesis does not prescribe any such relative valuation between conflicting objectives. It only helps bring them to the fore.

STRIA Roadmaps: Smart mobility and services
Transport mode: Multimodal transport
Transport sectors: Passenger transport, Freight transport
Transport policies: Environmental/Emissions aspects
Geo-spatial type: Urban