

# Modeling contact

When the Stockholm congestion charging trial was being designed, a critical point of consideration was the accurate forecasting of both travel demand and traveler response to such a scheme. Expert advice was therefore sought

**T**he congestion charging trial in Stockholm, Sweden took place between January and July 2006. As part of the design process, Emme travel demand forecasting software was used to test and evaluate various tolling schemes. The trial was followed by a referendum in September 2006. Following an overall 'yes' vote, a permanent congestion tax was implemented in August 2007.

The goal of the charging scheme was to reduce congestion in and around the city center, thereby improving accessibility and emissions in the most densely populated areas of Stockholm. The congestion charging system is designed as a cordon-based pricing scheme, similar to the London Congestion Charge, except that trips within the cordon area are not charged.

Congestion charging alleviates congestion within cordoned areas, but risks increasing traffic elsewhere, unless sufficient alternative modes and routes are provided. Policy changes of this magnitude can cause unforeseen disruptive impacts on the transportation system. Swedish national transport authorities were able to make use of the Sampers national transportation modeling framework – previously developed by consulting firm WSP Sweden – to study the impacts of various congestion charging schemes and public transport improvements. New bus lines from the suburbs to the city center were included in the design to provide travelers with more choice.

An integral part of the congestion pricing design process involved decision analysis of transportation forecasts to inform various project stakeholders of the Stockholm trial, including Stockholm Transport (SL). The transportation forecasts were developed with Emme travel forecasting software as part of the Sampers framework. Sampers models trip frequency, destination choice, and modal split for all personal trips in Sweden, segmented by trip purpose, age, gender, income and various other criteria.



Routes, volumes, and travels times for trips can be determined using Emme forecasting software

Emme determines the routes, volumes, and travel times for trips through the road network and the public transport system.

## TRIAL RESULTS

January 2006 marked the beginning of Stockholm's trial. A congestion tax was levied between 06:30 and 18:29. The tax per entry to the charging area was SEK10, SEK15 or SEK20, varying over the day according to the congestion levels, with a maximum daily charge of SEK60 per vehicle. Evenings, weekends, public holidays, or the day before a public holiday are free.

Traffic crossing the congestion-charge cordon was reduced by 22%, or roughly 100,000 cordon crossings during the congestion-charge period, which was in line with the predicted 25% reduction. The traffic volume on Essingeleden increased from 4% to 5%, again consistent with the predicted increase. These changes in traffic flows stabilized quickly after the introduction

of charges, and resettled near original levels soon after the trial ended.

Model forecast results are illustrated. Blue stars show tolled entry points into the cordon area, yellow and green links show roads with reduced traffic flow due to congestion charging, while red links show increased traffic flow in response to diversion from tolled roads (i.e. Essingeleden). Darker grid values are spatially aggregated results for increased traffic flow due to diversion under the toll scenario, and a table shows flow reductions on tolled roads into the cordon.

After the referendum in September 2006, Parliament approved the permanent congestion tax in June 2007, for reintroduction on 1 August 2007. The income is directed partly toward financing a new bypass road. ■

For further information about Sampers, please contact Stehn Svalgård by emailing [Stehn.Svalgard@wsp-group.se](mailto:Stehn.Svalgard@wsp-group.se), or to find out more about Emme software, please log on to [www.inro.ca/emme](http://www.inro.ca/emme)