

## Results of SRMT

This research programme developed comprehensive strategies for the Randstad based on integrated scientific approaches for land-use, location choices, multimodal transport network design, travel behaviour and transport policy. These enable the estimation and evaluation of performance and impact of different transition paths to more sustainable mobility and improved accessibility. Innovative models describe the propensity to travel by (a combination of) environmentally friendly transport modes as function of accessibility, quality of transport service, attractiveness, cost and purpose of travel. This programme provides an integrated approach for transport, land use and transition processes based on a balanced modelling of unimodal and multimodal trips including intermodal feedback from capacity constraints.

The models allow to assess the effects of (a) increased density of housing, business, education, public services around public transport stops and railway stations, (b) higher speed, frequency and reliability of bus, tram and railway services, (c) transport infrastructure extensions and capacity management on transport demand, modal share, network traffic flows, capacity use and environment. The focus of transport modelling is put on a consistent estimation and validation of accessibility and transfer resistances within multimodal transport chains. New modelling approaches have been presented in the fields of dynamic multimodal transport and traffic modelling and optimisation of multimodal transport network designs. The developed knowledge helps to improve the sustainability, reliability and connectivity of individual and public transport modes within and from/to the Randstad and presents clearly the trade-offs between objectives.

The focus on transitions provides insights in the processes that result in the radical change that is needed for attaining sustainable mobility. Based upon this it can be concluded that policy makers need to take account the complexity of the processes resulting in change, be aware of their role in this and possibly even using this to their advantage. More important than the actions of policy makers are the changing practices of households and firms and niche actors (in the form of new interest or societal groups) that create pressure for and legitimise change. Moreover, an approach to interactively develop transition strategies towards transit-oriented integrated spatial and transport network planning in metropolitan areas using the insights about the transition process is proposed.

The developed land-use, multimodal transport and traffic models have been applied in a case study for the north wing of the Randstad area. The models were used to test and assess the impact of a number of transport policy and network design options for 2040 on accessibility, sustainability, robustness and modal split. The impact of a range of economic, demographic and land-use scenarios and multimodal transport network design options has been tested and evaluated together with a number of professional stakeholders on e.g. the total travel time spent, use of urban space, operating ratio of public transport lines and total CO<sub>2</sub> emissions in the north wing of the Randstad.

Important conclusion from the results of the case study is that improvements to the public transport network on their own (to promote multimodal trip making) like new train stations, new bus lines, higher frequencies or new park & ride facilities can only marginally contribute to various multiple sustainability goals. A significant leap forward to better accessibility of the Randstad and sustainability of transport would require a more rigorous mix of push & pull policy measures, like the implementation of dynamic road user charging, as well as more substantial investments to increase the main railway and public transport network infrastructure capacity in the Randstad combined with a more seamless and comfortable transfer to/from extended bicycle links and efficient park & ride, and bike & ride facilities at railway, metro, tram and bus stops.