Chair of Urban Structure and Transport Planning Department of Civil, Geo and Environmental Engineering Technical University of Munich



Carbon-based accessibility instruments: visual tools for low carbon mobility options

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The challenge

Evolution of CO_2 emissions in the EU by sector (1990-2016).

Source: European Parliament. 2019. CO2 emissions from cars: facts and figures (infographics) [Online]. Available: https://www.europarl.europa.eu/news/en/headlines/society /20190313STO31218/co2-emissions-from-cars-facts-andfigures-infographics [Accessed March 14 2020].





Accessibility planning



https://www.accessibilityplanning.eu/

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TUM Accessibility Atlas	StationsRadar	GOAT	ATI - From Accessibility to the Land Development Potential	MARS – Metropolitan Activity Relocation Simulator	IMaFa - Isochrone Maps to Facilities
The TUM Accessibility Atlas is a multi-modal GIS- based instrument spectically developed for decision-mailing in the Munich Metropolitan Region. Hence, thematic datasets and measures ling. – More.	StationsRadar is an open web-based planning support tool internets to support integrated land use and transport intrology-making, with a geographical focus on railway stations and their area More	GOAT stands for Geo Open Accessibility Teol. This web-instrument is meant to be open accessib- tenzanches, Reinba and usaft for accessibility glanning. It is under development at the Ona More	The proposel instrument defines the accessibility to technical infrastructure at the strategic level of spatial planning. Accessibility to technical infrastructure is in the first stage de., More	The main insecution in MARS is that the different reaction speeds of the two systems (passarger framport system and land use system) are taken into consideration. These different speeds g More	One of the main motivations of the Maria accestibility instrument is to assess the level of service of public transport when accessing shopping ontres in the MetroGur influence area. Horee More in
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SoSINeTI - Social Spatial Changes because of New Transport Infrastructure	SNAPTA - Spatial Network Analysis of Public Transport Accessibility	ACCALC - Database suite for calculation of UK accessibility statistics	PST – Place Syntax Tool	TRACC	European Rail Accessibility Model
The instrument measures different types of accessibility. First travel times between municipalities are measured. Also these travel times are compared over years to have an overall view. A., More	Spatial Network Analysis of Public Transport Accessibility (SNAPTA) is a GS - based accessibility instrument that relies on a package of different measures to quantify spatial accessibilit. More	The basic concepts in ACCALC are that it is a interiorial database helping planners to manage lenge and complex data sets and to nulport meaningful accessibility indicators (DHT 2011). Versia, More	Pace Syntax Tool (PST) is an application for the desistor software Maplich Pace synta introduces the pessibility to conduct descriptions and analysis of accessibility from a the-works. More	A multi-model travel accessibility tent that allows editing of network data to produce what. If semarios and utilities detailed demographic data, Over 800 uses workleide from local to sent More	The European Rail Accessibility Model developed at the Onia's of Urban Development. Technical University of Munich tracks and projects dranges of accessibility induced by the development cit, More
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Carbon-based accessibility instruments

LAND USE COMPONENT

Enable decision-making related to land use policies and/or location choices SPATIAL DIMENSION

Contain a model of the characteristics of the land use and transport system

SCENARIO BUILDING CAPABILITIES

Respond to policy interventions in the land use and/or transport system COMMUNICABILITY

Feature easily understandable outputs and transparent workings











Transport interventions

Carbon-based accessibility by car within 750 grams of CO_{2e}



Kinigadner, J., B. Büttner, G. Wulfhorst and D. Vale. 2020. Planning for low carbon mobility: Impacts of transport interventions and location on carbon-based accessibility. Journal of Transport Geography 87.



Firm locations

Carbon-based accessibility by transit



Kinigadner, J., B. Büttner and G. Wulfhorst. 2019. Beer versus bits: CO₂-based accessibility analysis of firms' location choices and implications for low carbon workplace development. Applied Mobilities 4 (2): 200-218.



Car and transit accessibility on the metropolitan level



Kinigadner, J., D. Vale, B. Büttner and G. Wulfhorst. 2020, in press. Shifting perspectives: a comparison of travel-time-based and carbon-based accessibility landscapes. Journal of Transport and Land Use.



Application potential

IDENTIFICATION

- Options or needs for interventions in the land use system
- Options or needs for interventions in the transport system
- Spatial impacts of emission budgets and emission reduction targets

ASSESSMENT

- Impacts of interventions in the land use system
- Impacts of interventions in the transport system

COMMUNICATION

- Interdisciplinary communication
- Political decision-makers
- Private decision-makers

PRICING

- Individual impacts of carbon pricing strategies
- Land taxes based on emission impacts

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Contributions to low carbon mobility planning

Focusing on emission impacts

Integrating land use and transport

Addressing decision-makers

Image sources: Stefan Redel / Fotolia; Frederik Buchleitner / flickr; THANANIT / Fotolia









Thank you!

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