

FACT SHEET NO.: 6/1 PERFORMED BY: PRO

A GENERAL INFORMATION		
A 1	Category	Transport planning
A 2	Subcategory	Mobility strategies and plans
A 3	Transport policy measure (TPM)	Promoting car sharing / car clubs
A 4	Description of TPM	Promoting the instalment and extension of car sharing / car club organisation in European cities. Support of national / regional governments (financially and legally) to extend car sharing. Car sharing is car rental for short periods of time, charging by time and distance combined. Other than rental cars, the cars can be rented for short time periods (per hour). On the one hand, car sharing can be a substitute for a privately owned car, on the other hand it offers mobility possibilities for people and who don't want to or can't afford to own a car. Assumption here: Substitution of privately owned car. Car sharing also offers the opportunity to avoid purchasing a company car for (small) businesses.
A 5	Implementation examples	- Mobility services for urban sustainability (MOSES) [1] [10] - Momo Car-Sharing project (more options for energy efficient mobility through Car-Sharing) [2] - CIVITAS - CARAVEL (Promotion car sharing, among other measures, in Genoa) [11] - Collaboration of car share companies and the city of Düsseldorf [14]
A 6	Objectives of TPM	- Reduce dependence on private cars without restricting mobility [1] - More rational use of the car and, altogether, reduction of car use in cities.
A 7	Key changes concerning:	
A 7.1	- Choice of transport mode / Multimodality:	Overall a modal shift away from road occurs due to a reduced motorization rate. But there is a difference in participants with and without car before: On average a modal shift from road to public transport and slow modes occurs for former car owners, while a slight increase in car usage occurs for car sharing participants without a car before. [6]
A 7.2	- Origin and/or destination of trip:	No change
A 7.3	- Trip frequency:	Reduction of car trips. (Reduced car ownership and thus modal shift to public transport and slow modes.) [6]
A 7.4	- Choice of route:	No change
A 7.5	- Timing (day, hour):	No change
A 7.6	- Occupancy rate / Loading factor:	Increase in the hours per day a vehicle is used (a privately owned car is used on average less than an hour per day). A shared car replaces several privately owned cars, e.g. in Bremen the replacement number was 4-10 cars per shared car. [10] A North-American study shows that the average number of vehicles per household participating in car sharing drops from 0.47 to 0.24. [13]
A 7.7	- Energy efficiency / Energy usage:	Adequate vehicle choice concerning e.g. capacity and performance when using a shared car. When buying a car, often the choice is influenced by peak demands and thus most of the time exceeds the needed capacity. [7] This results in reduced energy usage as smaller cars are usually used by
A 8	Main source	[6] [7] [8]

B IMPACTS																					
B 1	OVERVIEW ON IMPACTS	AFFECTED SEGMENTS												Geographical level		Source					
		Passengers					Transport operators							1st level	2nd level	Source of assessment	Spatial level of source				
		Road	Rail	Air	Public transport	Slow modes	Road	Rail	IWW	Air	Maritime	Public transport	Employees in transport	Residents	Economy	Public bodies	Society				
B 1.1	Summary																				
B 1.2	Summary: Income groups	- Positive effect on people with a low income, as the occasional use of a car becomes affordable. [7]																			
B 1.3	Summary: Age groups																				
B 1.4	Summary: Disabled people	- Under the condition that specially equipped cars are provided, people with disabilities have access to this car sharing system and thus increase their mobility options. [11]																			
B 1.5	Summary: Gender groups																				
B 1.6	Summary: Ethnic groups																				

B 2 TRAFFIC IMPACTS		AFFECTED SEGMENTS												Geographical level		Source					
		Passengers					Transport operators							1st level	2nd level	Source of assessment	Spatial level of source				
		Road	Rail	Air	Public transport	Slow modes	Road	Rail	IWW	Air	Maritime	Public transport	Employees in transport	Residents	Economy	Public bodies	Society				
B 2.1	Travel or transport time	↘																			
B 2.2	Risk of congestion	→																			
B 2.3	Vehicle mileage	↘			↗	↗															
B 2.4	Service and comfort	↘																			
B 2.I	Overall impacts on social groups																				
B 2.II	Implementation phase																				
B 2.III	Operation phase																				
B 2.IV	Summary / comments concerning the main impacts	- Mode change to public transportation, walking and cycling for former car owners. Previously carless customers use car sharing mostly as a substitute for car rental, taxis and other car-centered modes, but a slight increase in vehicle-km travelled by car occur in this group. [6] - There is also a positive effect on comfort and service as the car-sharer is not responsible for the maintenance of the car. [4] and the increasing level of comfort by a shift from public transport to car sharing. Nevertheless comfort is reduced as the car is not as easily and not as spontaneously available as a privately owned car. - The travel time increases, if the car has to be picked up at a specific parking spot, often in a longer distance from home compared to privately owned vehicles. Hence the additional (walking) distance and overall transport time increase. Nevertheless, it is less likely, that shift occurs from public transport to carsharing, thus the total traveling time will decrease. - A congestion reduction is not quantifiable [8], as the modal shift effects are relatively small.																			
B 2.V	Quantification of impacts	- Percent of vehicle kilometres reduced due to car sharing in Europe: 28 to 45% [3]. - Mainly the vehicle miles are reduced by people who owned a car before and participated in car sharing, e.g. the average reduction of vehicle miles travelled determined by several studies is 44% [6].																			

B 3 ECONOMIC IMPACTS		AFFECTED SEGMENTS												Geographical level		Source					
		Passengers					Transport operators							1st level	2nd level	Source of assessment	Spatial level of source				
		Road	Rail	Air	Public transport	Slow modes	Road	Rail	IWW	Air	Maritime	Public transport	Employees in transport	Residents	Economy	Public bodies	Society				
B 3.1	Transport costs	↘																			
B 3.2	Private income / commercial turn over																				
B 3.3	Revenues in the transport sector																				
B 3.4	Sectoral competitiveness				↘							→									
B 3.5	Spatial competitiveness																				
B 3.6	Housing expenditures													→							
B 3.7	Insurance costs																				
B 3.8	Health service costs																				
B 3.9	Public authorities & adm. burdens on businesses																				
B 3.10	Public income (e.g.: taxes, charges)																				
B 3.11	Third countries and international relations																				
B 3.I	Overall impacts on social groups																				
B 3.II	Implementation phase																				
B 3.III	Operation phase	- Missing legislation (parking space) lead to system distortion (example Germany)																			
B 3.IV	Summary / comments concerning the main impacts	- A private car has smaller variable costs, but high fixed costs. In several cities parking costs for a privately owned car have to be added. - User of car sharing systems are not faced with unexpected costs (repair bills). [7] - The decrease in transport costs does not hold in general, but for car users who have a low vehicle mileage or use their car only sporadically. The age of the alternatively owned private car is also an important factor when comparing the costs. [4] - Slight decrease in cost saving for housing development and thus housing expenditures, as less parking spaces are necessary. [8] - System subsidies affect an increase of public expenditures. Dependent on operating model: private / public - 3rd level impact: If car sharing is evolving rapidly and the number car sharing options will increase substantially, then this could negatively affect the competitiveness of public transport (assuming that people who are currently using public transport can change to car sharing).																			
B 3.V	Quantification of impacts	Switzerland: Cost for parking = 10% and thus a slight decrease in costs for housing development occurs (-0.02%). [8]																			

B 4	SOCIAL IMPACTS	AFFECTED SEGMENTS													Geographical level		Source			
		Passengers					Transport operators					Employees in transport	Residents	Economy	Public bodies	Society	1st level	2nd level	Source of assessment	Spatial level of source
		Road	Rail	Air	Public transport	Slow modes	Road	Rail	IWW	Air	Maritime									
B 4.1	Health (incl. well-being)																			
B 4.2	Safety																			
B 4.3	Crime, terrorism and security																			
B 4.4	Accessibility of transport systems	↗																		
B 4.5	Social inclusion, equality & opportunities	↗																		
B 4.6	Standards and rights (related to job quality)																			
B 4.7	Employment and labour markets																			
B 4.8	Cultural heritage / culture																			
B 4.I	Overall impacts on social groups	- For low income people the occasional use of a car becomes affordable.																		
B 4.II	Implementation phase																			
B 4.III	Operation phase																			
B 4.IV	Summary / comments concerning the main impacts	- People who don't own a car benefit a lot from being able to use one, and thus have a better access to the transport system road. [7] However, studies indicate that the average user of car sharing earns above average. [9] - Experts state, that car sharing is particularly important for households / users with more than one private car, that means that car sharing can decrease the rate of 2nd car ownership. [EE] - Even car owners benefit from the option value of having the possibility to use car sharing in case of emergencies. [7] - It is possible to equip some of the cars specially for the disabled and thus increase their mobility options. [11] (Genoa)																		
B 4.V	Quantification of impacts	- Positive effect on people with a low income, as the occasional use of a car becomes affordable. [7]																		

B 5	ENVIRONMENTAL IMPACTS	AFFECTED SEGMENTS													Geographical level		Source			
		Passengers					Transport operators					Employees in transport	Residents	Economy	Public bodies	Society	1st level	2nd level	Source of assessment	Spatial level of source
		Road	Rail	Air	Public transport	Slow modes	Road	Rail	IWW	Air	Maritime									
B 5.1	Air pollutants																			
B 5.2	Noise emissions																			
B 5.3	Visual quality of the landscape																			
B 5.4	Land use																			
B 5.5	Climate																			
B 5.6	Renewable or non-renewable resources																			
B 5.I	Overall impacts on social groups																			
B 5.II	Implementation phase																			
B 5.III	Operation phase																			
B 5.IV	Summary / comments concerning the main impacts	- The modal shift from road (own cars) to slow modes, public transportation and car sharing leads to a decrease of air pollutants and noise. On the other hand there can be a shift from public transport to road (car sharing) and thus the air pollutants will increase. - The structure of the car-sharing fleet consists of newer cars compared to the average age of private cars and emit thus less CO2. [12] [EE] Additionally, the fleet consists on average on smaller cars than the privately owned vehicles. [7] In some cities the car sharing fleet is complemented by e-vehicles. [3] - Car sharing leads to a reduction of car ownership (motorization rate), either that the current car is sold, 2nd car is substituted or no new car is bought. [EE] This reduction of cars in a city means that less parking spaces are needed.																		
B 5.V	Quantification of impacts	- North America GHG emission: Mean observed impact (changes in emissions that physically occur): -0.58 t GHG/year per household. Mean full impact (emissions that were avoided due to car sharing): -0.84 t GHG/year per household. [5] - The average CO ₂ emissions in 2005 from the "mobility" car sharing fleet in Switzerland has been 18 % lower than those of new cars on the road and 25 % lower than the average emissions of all private cars in Switzerland. [12] - The share of the "mobility" car-sharing fleet on the whole Swiss car fleet is 0.05%. This results in a reduced parking demand of -0.20% [8]																		

C REFERENCES

C 1	Other TPMs of this subcategory	
C 2	References	<p>International</p> <p>[1] Mobility Services for Urban Sustainability - A European project for the City of Tomorrow: http://polymorphing.server72.de/upload/Projekte/amoses/amoses_brochure_web.pdf (accessed 04.01.2012)</p> <p>[2] momo: memorandum, http://scp-knowledge.eu/sites/default/files/knowledge/attachments/memorandum.pdf (accessed 04.01.2012)</p> <p>[3] Shaheen, Cohen (2007): Worldwide carsharing growth: an international comparison, Transportation Research Record: Journal of the Transportation Research Board, volume=1992, p. 81-89</p> <p>[5] Martin, Shaheen (2011): Greenhouse Gas Emission Impacts of Carsharing in North America, IEEE Transactions on Intelligent Transportation Systems, volume: 12, issue:4</p> <p>[6] Cohen, Shaheen and McKenzie (2008): Carsharing: A Guide for Local Planners; Institute of Transportation Studies</p> <p>[7] Litman (1999): Evaluating Carsharing benefits; Victoria Transport Policy Institute</p> <p>[9] Millard-Ball, Murray, ter Schure, Fox, and Burkhardt (2005); Car-Sharing: Where and How it Succeeds; Transit Cooperative Research Program Report #108</p> <p>[11] CIVITAS CARAVEL (2009): Final Project Report, Burgos, Genoa, Krakow, Stuttgart</p> <p>[13] Martin, Shasheen, Lidicker (2010): Impact of Carsharing on Household Vehicle Holdings - Results from North American Shared-Use Vehicle Survey, Transportation Research Record: Journal of the Transportation Research Board, No. 2143, Transportation Research Board of the National Academies, Washington, D.C., 2010, pp. 150-158</p> <p>National</p> <p>[4] Bonsall, Jopson, Pridmore, Ryan and Firmin (2002): Car Share and Car Clubs: potential impacts, Institute for Transport Studies, University of Leeds. Report prepared for DTLR and Motorists' Forum</p> <p>[8] Ciari, Balmer and Axhausen (2008): Concepts for a large scale car-sharing system: Modeling and evaluation with an agent-based approach, Working Paper, 517, IVT, ETH Zürich, Zürich</p> <p>[12] Haefeli, Matti, Schreyer, Maibach (2006): Evaluation Car-Sharing, Schlussbericht, Im Auftrag des Bundesamtes für Energie, Bern</p> <p>Regional / Local</p> <p>[10] City of Bremen Germany: Integration of Car-Sharing - / moses project, http://www.managenergy.net/download/nr126.pdf (accessed 05.01.2012)</p> <p>[14] Landeshauptstadt Düsseldorf: car2go startet in Düsseldorf mit 300 Fahrzeugen - Neues Carsharing-Modell ab Frühjahr 2012 in der Landeshauptstadt, 2. Dezember 2011, pld – Pressedienst der Landeshauptstadt Düsseldorf</p>