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A PLANNER'S GUIDE TO THE SHARED MOBILITY GALAXY



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*Imagine no possessions
I wonder if you can
No need for greed or hunger
A brotherhood of man.*

John Lennon

10 Golden Rules of Shared Mobility

- 1** Shared mobility is a means to decrease car dependency, to reduce greenhouse gas emissions and to increase the quality of life.
➤ **Chapter 2**
- 2** Shared mobility fosters a shift away from car use and car ownership to multimodality. It enhances the use of zero emission transport modes like walking, cycling and public transport.
➤ **Chapter 3**
- 3** Shared mobility allows for densification of urban areas, while liberating urban space from parked cars and strengthening value of urban green areas, thus increasing the resilience and biodiversity of cities.
➤ **Chapter 4.2**
- 4** Some shared mobility modes develop slowly and have a strong positive impact on reducing car ownership and greenhouse gas emissions. Other modes develop rapidly, fostered by multinational corporations with investment power and have a more doubtful impact on reducing car ownership and greenhouse gas emissions. The latter modes have a strong appeal to people and get many people on board of shared mobility.
➤ **Chapter 8**
- 5** The more modes of shared mobility that come to exist in an area, the bigger the synergy effects and the highest chance that it provides a more attractive transport alternative to people than the privately-owned car.
➤ **Chapter 6.2**
- 6** Shared mobility works best in dense areas with governmental support and policies that support the various modes.
➤ **Chapters 8 & 9**
- 7** In less dense areas, more guidance is needed to make shared mobility blossom. Multinational corporations are not interested in these areas. The main drivers are local cooperation and synergies with the local business sector.
➤ **Chapters 8 & 9**
- 8** Without proper policy frameworks, shared mobility cannot rock. Local governments have to create the essential conditions, while tackling negative aspects in a proactive way.
➤ **Chapter 9**
- 9** Physical integration with mobihubs is essential to make shared mobility visible. Digital integration with MaaS helps to make shared mobility connective and gives it a strong appeal.
➤ **Chapter 6.3 & 6.4**
- 10** Car ownership is rooted deep in our society. It takes time and effort to raise awareness about new forms of transport. Shared mobility needs clever, consistent communication and marketing over a long period of time.
➤ **Chapter 7**

Shared Mobility Definitions

Bikesharing

A system in which bicycles are made available for shared use to individuals on a short-term basis.

Carsharing

A system that allows people to use locally available cars at any time and for any duration, reducing reliance on private ownership.

Car replacement factor

The number of private cars per shared car, that are sold or not purchased, because of the uptake of shared mobility services.

Communities

Closed user groups, e.g. neighbours or apartment owners.

Ecosystem services

The ecosystem in and around a city. From meadowland, woods and wilderness to wasteland, gardens and parks. Ecosystem services are the many and varied benefits to humans gifted by the natural environment and from healthy ecosystems, i.e. the free benefits people obtain from ecosystems.

Free-floating Service

Where vehicles don't have to be returned to the place where they were picked up.

Homezone-based

Residential zone within which shared vehicles can be picked up or dropped off.

Mobihubs

A transport hub on neighbourhood level, where different sustainable and shared transport modes are linked with each other. Preferably, a mobihub includes carsharing.

Mobility as a Service (MaaS)

A system in which a comprehensive range of mobility services is provided to customers by mobility service providers.

On-demand ride service

A spontaneous, commercial ride service where the driver does not share a destination with the passenger(s), but serves only as a chauffeur.

Operational area

Predefined zone in which shared vehicles can be dropped off.

Peer-to-Peer

The sharing of private vehicles that are temporarily made available via web-based communities.

Public transport

A system of vehicles such as buses, trams and trains that operate at regular times on fixed routes and are used by the public.

Real-time ridesharing

Service that use GPS-enabled cars and smartphone apps to match users in real-time at the moment of demand with nearby commuters and share the cost of driving to a shared destination. Rides are one-time transactions with network services that handle payments to the driver.

Ride-splitting

A form of ridesourcing where different riders with similar origins and destinations are matched to the same driver and vehicle in real time. The ride and costs are split among users.

Ridesharing

The sharing of car rides by persons to reduce costs and environmental impact.

Ridesourcing

A transport service managed by an online platform that connects passengers with drivers who use personal, non-commercial vehicles.

Roundtrip

A service where shared vehicles have to be returned to the same parking spot or zone from which they were picked up.

Shared micromobility

A system for the shared use of small vehicles that are human or electrically powered, like e-scooters, mopeds, e-skateboards and Segways. (Electric) bikesharing is often included in micromobility. For practical reasons, bikesharing is excluded from this definition in this guide.

Shared mobility

A strategy to make better use of vehicles and space. Shared mobility also is seen as a transport mode in itself. Shared mobility is the conversion of private modes or trips to shared use for more sustainable and convenient outcomes.

Share Mobility Action Plan (SMAP)

A plan that defines goals, strategies and measures for shared mobility.

Sustainable Urban Mobility Plan (SUMP)

A strategic plan designed to assess transport issues for the movement of people and goods in cities and urban regions.

Shared space

An urban design approach that minimises the segregation between modes of road user. By creating a greater sense of uncertainty and making it unclear who has priority, car drivers will reduce their speed, in turn reducing the dominance of vehicles, reducing road casualty rates, and improving safety for other road users. In this guide, the focus is not on urban design but on a more equitable use of street space by people.

Station-based

Service where shared vehicles must be picked up and dropped off at fixed locations.

Vanpooling

Transport in groups



1

**DON'T
PANIC**

We Will, We Will Rock You

Queen

1. Don't Panic

Are you struggling to make heads or tails of the complex galaxy of shared mobility? Still questioning what all the talk of shared mobility is all about? Or are you already at rocking pace with shared mobility and see opportunities to support the shift from ownership to use in your community? Is your city growing and do you lack space for any more cars? Or are you struggling to make your small town more accessible, while public transport is declining? Perhaps you are facing challenges with shared e-scooters and bikes.

If you have answered YES to just one of these questions, this guide is for you. We'll answer the following questions for you and help you make shared mobility rock in order to create a more sustainable community:

- What is shared mobility?
- What are shared mobility options and how do they differ from each other?
- What are the impacts and how do shared mobility options interact with each other?
- What should you do as a public authority, no matter if you are a big city or a small town?
- How does shared mobility fit into an integrated transport plan?

Working on shared mobility is still new and challenging for many municipalities. This guide provides supporting arguments for municipalities and regions seeking to implement shared mobility.

The document is a result of the SHARE-North project, which is funded by the European Union through the Interreg North Sea Region. In this project, a thrilling vibe popped up. Working on shared mobility is fun and exciting, the main driver of the team being to give access to vehicles a higher value than vehicle ownership. The title of this guide reflects the exchanges during the project: rockin'!

For many years, the City of Bremen, Germany has been a lighthouse for shared mobility development. Our strategies with regards to carsharing and mobihub development (in German, we call them mobil.punkte) have inspired many cities around the world already. Our Sustainable Urban Mobility Plan – which of course includes shared mobility – was honoured with the European SUMP Award in 2015 and our policies for free-floating bike-sharing and e-scooter sharing have set a precedent for micromobility policies throughout Germany. This guide helps to spread this light even further.

Working in the frontline of shared mobility, the project partners are constantly keen on gathering state-of-the-art knowledge from leading research. The guide provides detailed insights on the world of shared mobility, inspiring case studies not only from the City of Bremen but from across the North Sea Region and recommendations for policy making.

In many of the project's living labs, this knowledge and experience has been brought into practice. From policy making and creating new mobility options to the marketing and promotion of shared mobility. This is reflected in the selection of case studies, which are organised by topic. When videos are available, they may be found in the SHARE-North channel on YouTube.

If you lack time, please start with the golden rules and follow the references if you need more information.



Dr. Maike Schaefer,
Minister for Climate Protection, the Environment,
Mobility, Urban and Housing Development

2

WE NEED TO ROCK

*Cars are cars
All over the world
Cars are cars
All over the world
Similarly made
Similarly sold
In a motorcade
Abandoned when they're old*

Queen

2. We Need to Rock

GOLDEN RULE 1

Shared mobility is a means to decrease car dependency, to reduce greenhouse gas emissions and to increase the quality of life.

2.1 Introduction

Rocking is fun and sharing is caring. Shared mobility is about new ways of travelling. It is all about using all kinds of mobility without the need to own vehicles. This results in more freedom of choice for users, makes cities nicer places to be and live and makes the countryside more accessible for everyone. Our planet and our transport systems benefit hugely from this transformation.

The fun part about shared mobility is something you should discover yourself. Besides this, there is also a more urgent part. Therefore, it is not only fun to rock, it's also necessary. Basically, three levels of needs can be distinguished:

1. Global: the climate threat and pollution;
2. Regional: accessibility and congestion;
3. Local: scarcity of space in cities and social inclusion in rural areas.

This chapter dives into these needs. Next, an underlying issue is described that impacts all three levels. We'll conclude with an explanation why shared mobility provides smart and sustainable solutions. In other words: we need to rock and sharing mobility is the way.

2.2 Global Needs: Climate Threats and Emissions

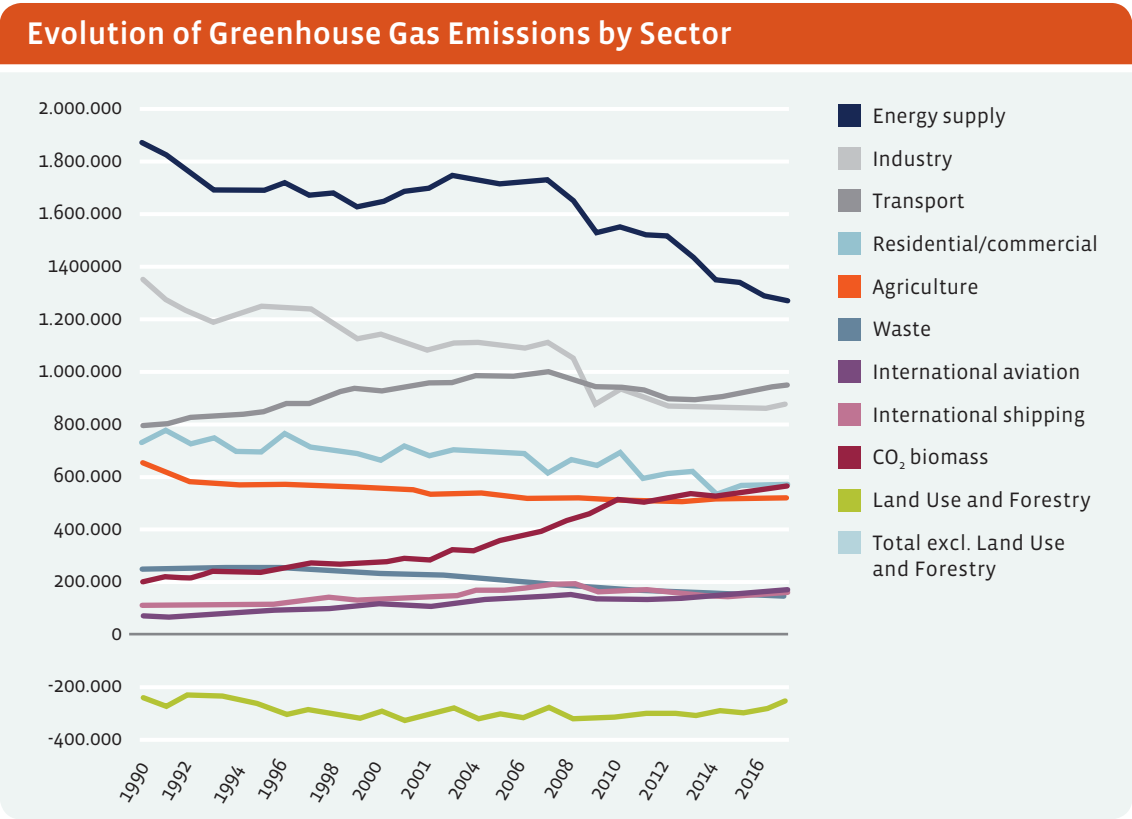
Climate Threats

The 'urban environmental ethics and policy



paradox' states that we are aware of environmental problems and suitable solutions. However, we fail to act on this knowledge [1]. Throughout human evolution, humans have been faced with immediate threats like attacks from bears, raiding clans, running out of food and water rather than face starvation. For the first time in human development, a threat has been discovered that is not felt with an immediate cause. Verified by scientific research, we know climate change will gradually impact us over the next 20, 50, 100 years. We as human beings can also have a positive impact and can prevent this development, but this level of abstraction is difficult for our minds to deal with. Therefore, it is easily put off in light of other priorities.

The effects and threats of climate change are indisputable and the transportation sector contributes significantly. Therefore, there is a need for changing the political framework towards post-fossil fuel mobility. In 2011, the European Union published Roadmap 2050 [2] for transitioning to a low-carbon economy, establishing the target of reducing CO₂ emissions, a major contributor to climate change, by 80% by 2050 (against the 1990 level). In this target complex, transport-related CO₂ emissions must decrease by 60%. As of 2016, transport-related CO₂ emissions within the EU28 were still about 20% above the reference level, with transport achieving worse than other sectors.



Evolution of greenhouse gas emissions by sector (1990=100), EU28. Source: EEA [3].

Pollution

Somewhat less abstract are the risks that transport-related emissions and noise pose to public health, especially in urban areas. According to the World Health Organisation (WHO), on average, 3.7 million people die per year worldwide due to the negative impacts of transportation.

Air pollution-related deaths and illness are closely related to exposures to small particulate matter (PM₁₀). According to WHO [4], road transport is responsible for up to 30% of particulate matter in European cities.

In addition to this, dependence on (imported) oil, traffic congestion, the cluttering of cities with parked vehicles, and an unfair distribution of urban space leading to negative impacts on quality of life are common challenges for urban areas. Questions of demographic trends and maintenance of accessibility independent of age, gender and income are common

aspects as well. The overall trends of increasingly overweight and obese children and adults are also related to the quality (or lack thereof) of urban transport systems.

2.3 Regional Needs: Accessibility

Most urban regions in Europe are facing problems with accessibility and congestion. Time spent in single occupancy vehicles by commuters is not only detrimental to the environment, it is also detrimental to human health, physical and mental well-being but also costly in an economic sense. According to data from the ‘External Costs of transport update study’, congestion of road traffic in only 17 of the European Union States adds up to 268 billion Euros (per year) simply due to lost time [5].

Time spent in congestion limits the accessibility of a city or region and its attractiveness as a place of employment and business. However, road congestion is also a product of a

dense urban environment and can serve as a deterrent for car use and can encourage public transport, ridesharing and cycling instead. Finding more efficient ways of using existing infrastructure and moving people and goods is essential for ensuring the economic resilience of a city in a regional context.

2.4 Local Needs in Urban and Rural Areas

Urban areas

A growing number of European citizens are living in cities. Forecasts by the United Nations show that in 2050, the level of urbanisation in Europe is 84% [6]. Many cities are not designed for the current level of car use that is common in European cities, nor should they be. Both car ownership and use create a huge pressure on the urban space and the liveability and sustainability of cities.

Rural areas

In rural areas, threats are rather different. They may include population decline, a pressure on the livelihood of people and a vital economy. When public transport facilities disappear, dependency on cars becomes even stronger. This form of mobility is not affordable for everyone, which has an immediate impact on the accessibility of jobs and the ability of rural residents to earn an income.

2.5 Underlying Problem: Car Dependency

Behind these needs there is a large underlying issue: in order to live their lives, many households depend on car mobility. The stronger this dependency is, the stronger the need to own one or more cars.

Car dependency exists on three levels [7]:

1. Macro: cities, places and even societies being dependent on cars;
2. Meso: trips, activities or circumstances that require a car;
3. Micro: individuals that depend on cars or are attached to car use.

When people are offered a means of becoming less dependent on car use, the need to own one or more vehicles will reduce. Shared mobility is a crucial element in this transition. Transport and mobility are areas of high political sensitivity. There is no silver bullet for solving these problems. However, some radical changes in daily transport modes and strategies are required. A re-thinking is needed of what 'transport' entails. A shift from thinking of transport planning as building more road transport infrastructure to a broader notion of providing 'accessibility'. This requires a huge behaviour change from the side of populations who are raised with strong notions about car ownership.

Accessibility means that citizens are able to meet their daily social, health, personal and economic needs safely, comfortably and



Too many parked cars in public street space impede pedestrians and municipal services.

conveniently. A combination of technical measures like alternatively fuelled vehicles and measures that incite a change in behaviour are required. Technical solutions alone will not be sufficient.

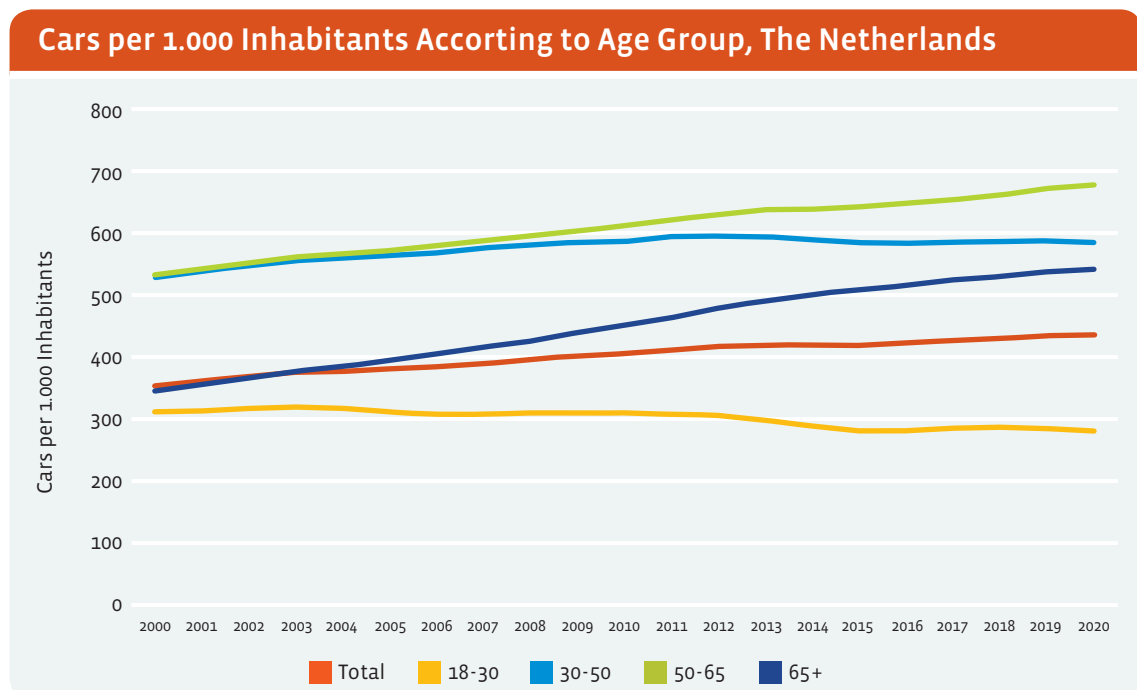
2.6 Use It, Don't Own It – The Transition from Ownership to Use

In many sectors, a shift can be seen from ownership to access and use. The music industry, for example, has seen a shift from owning CDs to digital music with access from platforms like Spotify. To many consumers, having access to all music is more valuable than owning a couple of CDs. Access to music sharing platforms also frees up space at home, as there is no longer a need to own and store bulky CDs when music can be accessed digitally. This digital access also allows use anytime, anywhere, giving a whole new sense of freedom to the music lover. This explains the popularity of Spotify and other music platforms.

This trend is also occurring in the area of mobility, though the pace may be somewhat

slower. In several Western European countries, car ownership is no longer growing. This development could be observed even before the economic crisis of 2007 began [8]. Young people tend to forgo the purchase of a car or postpone this decision until a later stage when a car becomes necessary. At the same time, a cycling revolution is taking place in many cities in Europe and around the world.

The concept of sharing offers new opportunities to increase the efficiency of the transport system and significantly improve accessibility. By combining new technological options with new societal trends of sharing, the need for low-carbon accessibility strategies at the local and regional level can be better met. Shared transport modes have a high potential to supplement the traditional sustainable urban transport modes like walking, cycling and public transport. In that way, shared mobility increases the efficiency of the overall transport system. Local governments have enormous potential for innovative transport strategies. Effort is needed to fully exploit this potential.



Cars per 1,000 inhabitants by age group, The Netherlands. Source: CBS [9].



3

DEFINING SHARED MOBILITY

*Lucky me swimmin' in my ability
Dancin' down on life with agility
Come and drink it up from my fertility
Blessed with a bucket of lucky mobility*

Red Hot Chili Peppers

3. Defining Shared Mobility

GOLDEN RULE 2

Shared mobility fosters a shift away from car use and car ownership to multimodality. It enhances the use of zero emission transport modes like walking, cycling and public transport.

3.1 Introduction

Shared mobility is an umbrella for a myriad of transport options. This chapter defines this umbrella, explains how shared mobility affects its users in their daily mobility decisions and demonstrates how this results in a shift towards a more sustainable mobility mix. The chapter ends with an exploration of the sheer endless list of shared mobility applications.

3.2 Definition

Shared mobility is a strategy to make better use of vehicles and space. Shared mobility is also seen as a transport mode in itself. Shared mobility gives users the opportunity to have access to cars and bicycles and other vehicles at the moment when they want to use them. It is the alternative to ownership, converting private modes or trips to shared use for more sustainable outcomes. It is similar to renting, but the user experience and patterns of usage are different: short-term usage and seamless transactions.

Shared mobility includes carsharing, bike-sharing, shared micromobility, ridesharing and on-demand ride services. Traditional transport modes like public transport and taxi services are also ways to share the use of vehicles. In this guide, however, we have not included them in the in-depth exploration of shared mobility.

Shared mobility has a key focus on the under-use of vehicle and available seats in them. It is about the unused potential of assets when they are not in use. Cars are not in use 95% of the time [10]. During this idle time, they are consuming street space or require expensive indoor garages, in both cases space that could be used for other purposes. Car occupancy, mainly for commuting and business trips is rather low: on average, fewer than two persons per car and trip. Filling empty seats in cars already on the road is a cost-efficient strategy to reduce congestion.

3.3 How Shared Mobility Affects Our Behaviour

In order to understand how shared mobility works, one has to understand how ownership works first.

Cars

Ownership results in usage. This statement is the most fitting when applied to the privately owned car. If a person owns a car which is parked in front of his/her residence, it will be used very readily and easily. It is accessible 24 hours a day and the cost of using it, in particular the cost of each individual trip, is virtually invisible (sunk costs). For new car owners, the car quickly becomes the default transport option.

With carsharing, things are quite different. Carsharers pay per trip and receive a regular invoice listing the real cost of each trip. They are fully aware of the operating costs for driving a car. They discover that in comparison to other transport modes, the cost of driving a car is quite expensive, while saving money with low usage and not having the fixed costs of ownership (such as depreciation costs, taxes, insurances and unforeseen repair costs).

Moreover, carsharing requires more active steps: the car has to be booked and picked up. Carsharing, therefore, fundamentally transforms driving from a fixed-cost activity into a variable-cost option [11]. As a result, carsharers use a car as little as possible, leading to an increase in walking and cycling and the use of public transport, ridesharing and taxi services [12].

Bikes

For bikesharing, the same rule about ownership applies in reverse: if one does not own a bike, one does not cycle. And if one doesn't cycle, why purchase a bike? Many cities that want to increase cycling are struggling with this dilemma. With bikesharing, it's possible to discover the benefits of cycling without having to invest in a bike of one's own. If convinced that cycling is a nice way to travel, the step to purchase a bike and to cycle even more is only a small one. Bikesharing serves as a 'gateway drug' to cycling for people who may never have tried it before. Bikesharing also broadens the palette of sustainable transport options. For example, if a city has

a bikesharing system, it's more attractive to travel to or in this city using public transport because bikesharing can help to solve 'last mile' transport issues. For example, OV-fiets, the bikeshare scheme run by the Dutch national railway company, is used mainly for the last portion of the trip to reach the final destination [13]. Bikesharing supports the integration of cycling into transportation systems and promotes the daily use of cycling [11].

3.4 Shifting towards a Sustainable Transport Mix

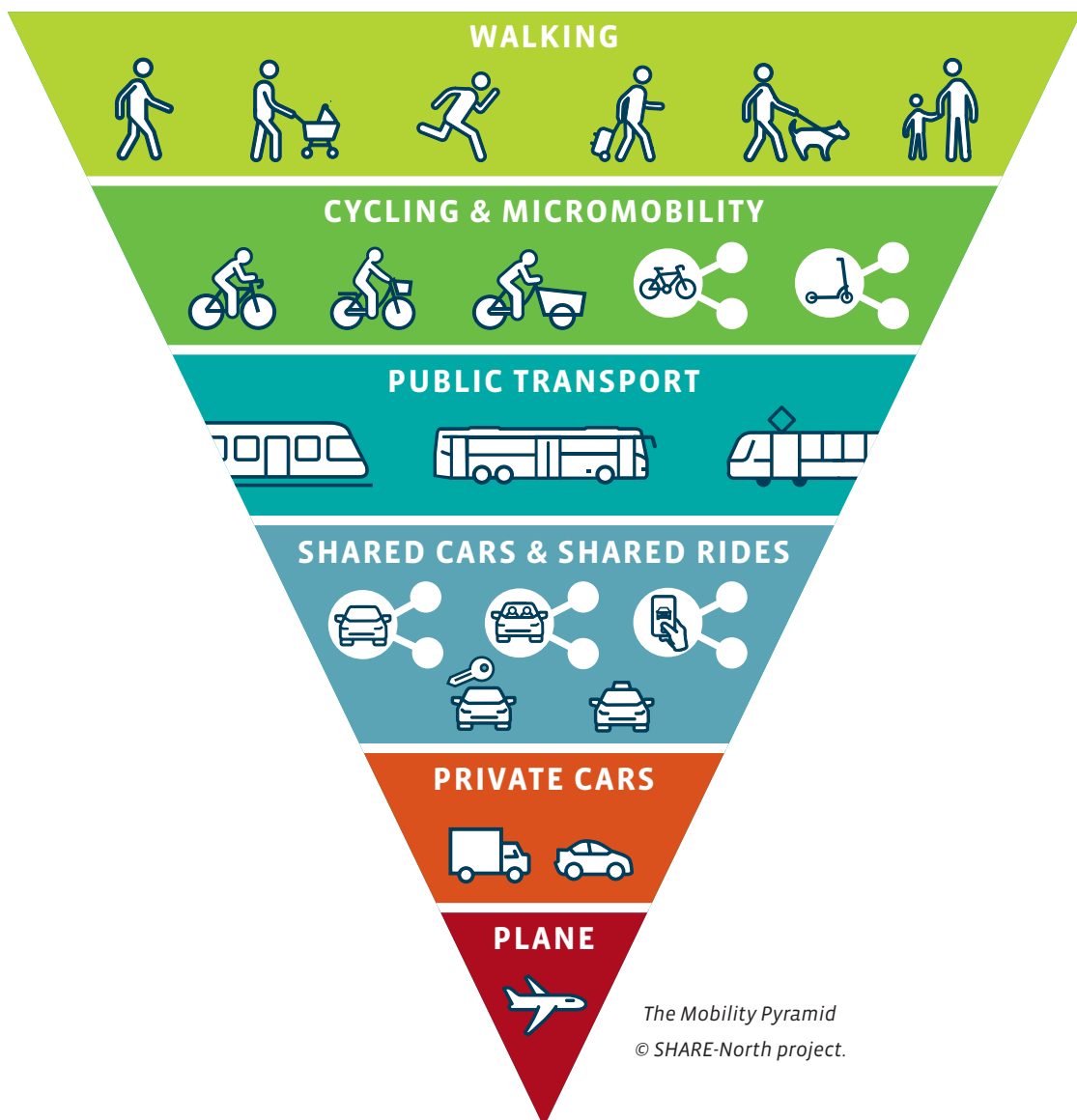
Shared mobility users travel with cars less frequently than average car owners. Instead, they walk more, cycle more and use public transport more frequently. This stimulates a large-scale shift away from car-dependent lifestyles. Carsharing is the missing link that can make car-free living as convenient as car ownership. This results in less space consumption of cars that move around or are parked in the streets, and therefore, adds to more liveable places.



Traditional transport planning emphasises car traffic as the main mode of transport, while walking, cycling and public transport are seen as ‘travel alternatives’. Integrated, sustainable transport planning turns it around. Walking and cycling may be seen as the main transport modes. In most European cities, most trips are shorter than 5 kilometres and

active transport modes are very suitable for this distance. Electric bikes even have a larger range, making cycling a sustainable transport option for longer trips, together with public transportation. Since our current society is strongly car dependent, however, a car may be necessary for some journeys if the other modes don’t work.

MOBILITY PYRAMID



The Mobility Pyramid
© SHARE-North project.



mobil.punkt

One of the biggest powers of shared mobility that it fosters the shift from car dependency towards sustainable transport. Therefore, shared mobility can be regarded as an equal pillar to the other sustainable transport modes of walking, cycling and public transport.

It makes sense to put shared mobility on the political agenda which seeks to increase the sustainability of communities. Without any governmental support, however, a sound development of shared mobility is rather unlikely. Therefore, municipalities and regions need to take action and integrate shared mobility into their policies, such as in Sustainable Urban Mobility Plans. A Shared Mobility Action Plan is also a proven strategy to reduce congestion and increase the use of shared sustainable modes. Chapter 9 explores how to develop policies for shared mobility.

3.5 The World of Shared Mobility

The shift from ownership to use is a gradual one and impacts the way we are dealing with vehicles and trips. Everything that can be owned can also be shared in many ways. This implies that there is a rather endless list of shared mobility modes. The best way to understand these modes is to put them in a spectrum from ownership to use. A distinction can be made between cars, bikes, public transport, micromobility and rides. Last but not least, there are a lot of vehicle types that may be shared too, from planes to prams and from campers to mobility scooters.

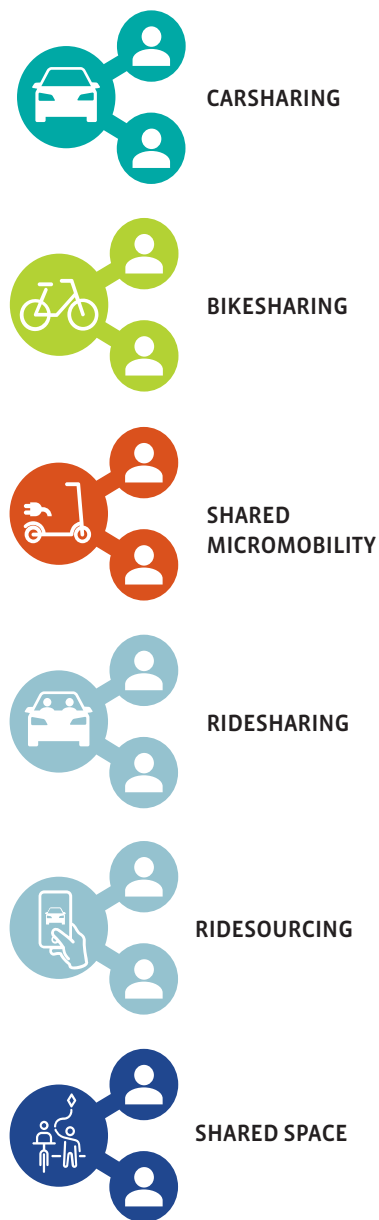
Many models can be distinguished, for example, roundtrip carsharing and bikesharing versus free-floating services and vehicles owned by a provider versus Peer-to-Peer platforms that connect owners with users.



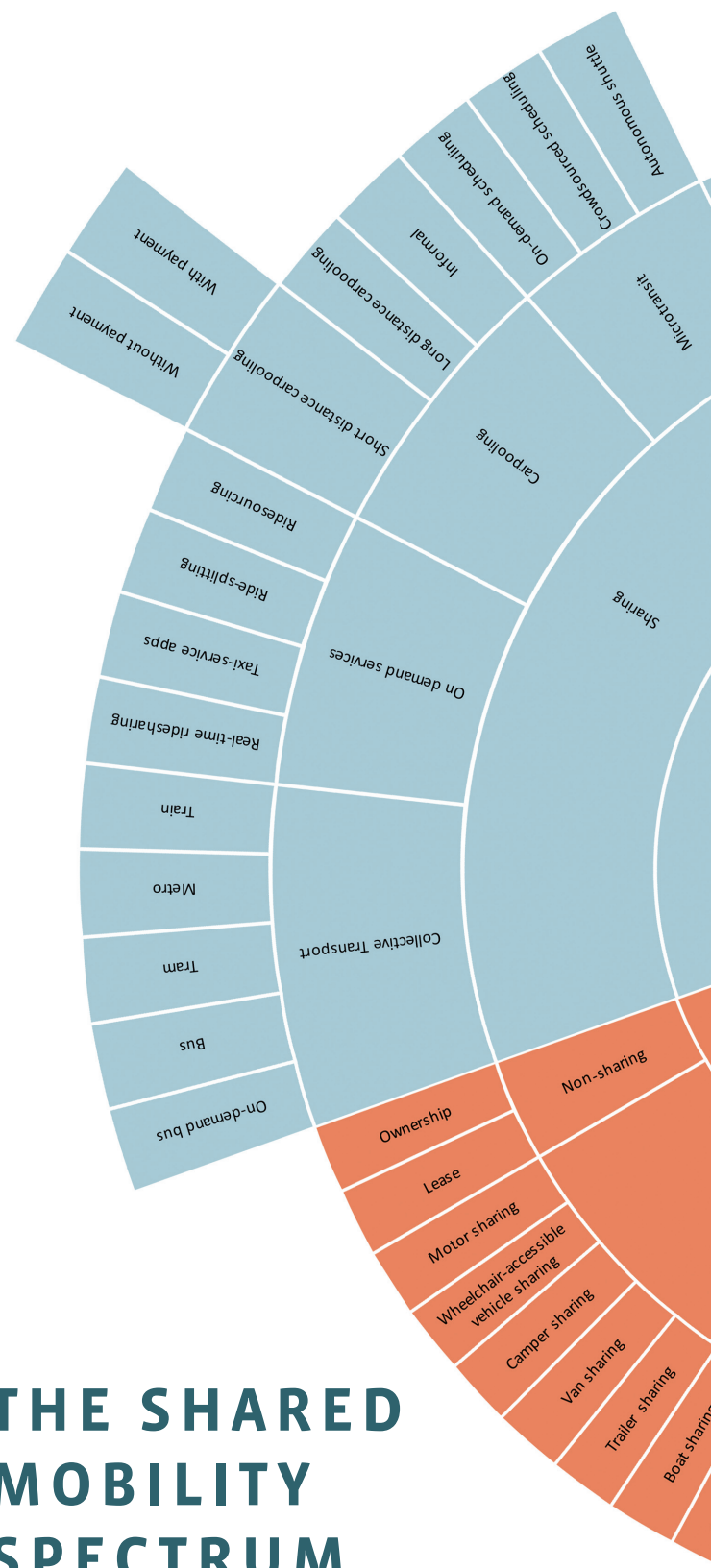
In many cases, boundaries between these modes are blurring: traditional car and bike rental services are introducing technology to make vehicles accessible 24 hours a day. Shared mobility modes are also being mixed in order to create dedicated services for specific target groups: for example, riding together (ridesharing) in a taxi or an on-demand ride service.

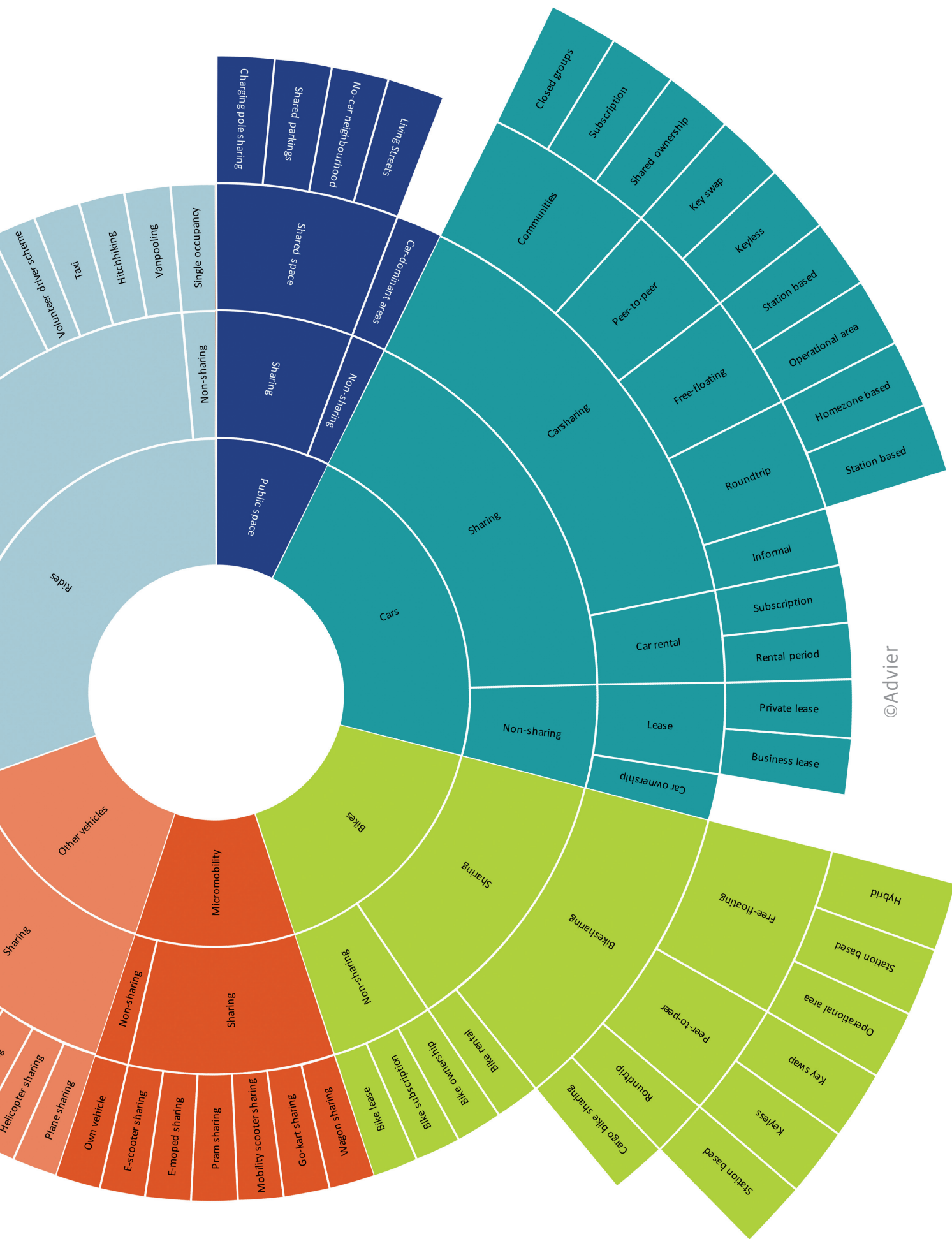
Some shared mobility modes have large societal benefits. For other modes, these benefits are more controversial. All modes, however, contribute to a shift from ownership to access. This influences people's mobility behaviour. Owning cars results in reflexive car usage. People who do not own a car make more conscious decisions when selecting a transport mode for each specific journey. With a shift from car ownership to car use (though carsharing, for example), the decision to use a car for a specific journey becomes rational rather than automatic. There is evidence from all over the world that carsharers start to cycle more and make more use of collective transport more than the average car owner. Sharing systems even reinforce other modes of sharing. A bikesharing system makes people aware of shared mobility and makes them less car dependent. This can benefit the market introduction of carsharing [14]. With the co-existence of different types of carsharing in a city, the same spill-over effects are visible.

A set of shared mobility icons has been developed in the SHARE-North project. These icons help to increase the recognition of shared mobility and its main forms. They may be used in signage, at mobihubs, on websites and in information packages. The icons are free for sharing and have been made available in Noun Project, a free icon gallery (www.thenounproject.com). The icons are on their way to becoming the European standard for shared mobility.



The SHARE-North icon gallery of shared mobility is open source and free to use.





©Advier

4

SHARED MOBILITY MODES

*I want to ride my bicycle
I want to ride my bike
I want to ride my bicycle
I want to ride it where I like.*

Queen

4. Shared Mobility Modes

4.1 Introduction

As mentioned in chapter 3, the following types of shared mobility can be distinguished from one another:

Sharing vehicles:

- Carsharing;
- Bikesharing;
- Shared micromobility;
- Sharing of other vehicles.

Sharing rides:

- Ridesharing;
- On-demand ride services;
- Public transport.

Sharing space:

- Shared use of street space.

For every shared mobility type, several categories exist. Within the category of shared vehicles, the following distinctions can be made:

Vehicle e.g. Car, bike, micromobility, other	Type of Trip e.g. roundtrip or free-floating
	Parking station-based vs. operational area
	Fleet/Business Model e.g. operator-owned, Peer-to-Peer, community-owned

As the market for shared mobility is developing rapidly, new forms pop up continuously and existing modes blur into new ones. The distinctions made in this guide are mainly meant to give an increased understanding about the way in which shared mobility works.

This chapter explores the several modes of shared mobility deeper. In Annex 1, more detailed descriptions may be found about the most relevant types.

4.2 Sharing Space

GOLDEN RULE 3

Shared mobility allows for densification of urban areas, while liberating urban space from parked cars and strengthening value of urban green areas, thus increasing the resilience and biodiversity of cities.



Streets are meant for the transportation of goods and people. They keep cities and regions connected. Streets and squares have also been the places where people meet. This has always been the case. Since the rise of car ownership and use in the Sixties of the past century, however, things changed. Older generations of people often remember that they just could play on the streets as children and that a car passed by on occasion.

Cars consume a lot of space, whether they are in motion or stationary. The significant growth of car use and ownership in the last six decades has put things out of balance, creating many negative side effects. Car dominance results in an unfair use of limited urban space [15] and in an increase of car dependency. The effect is further growing car use.



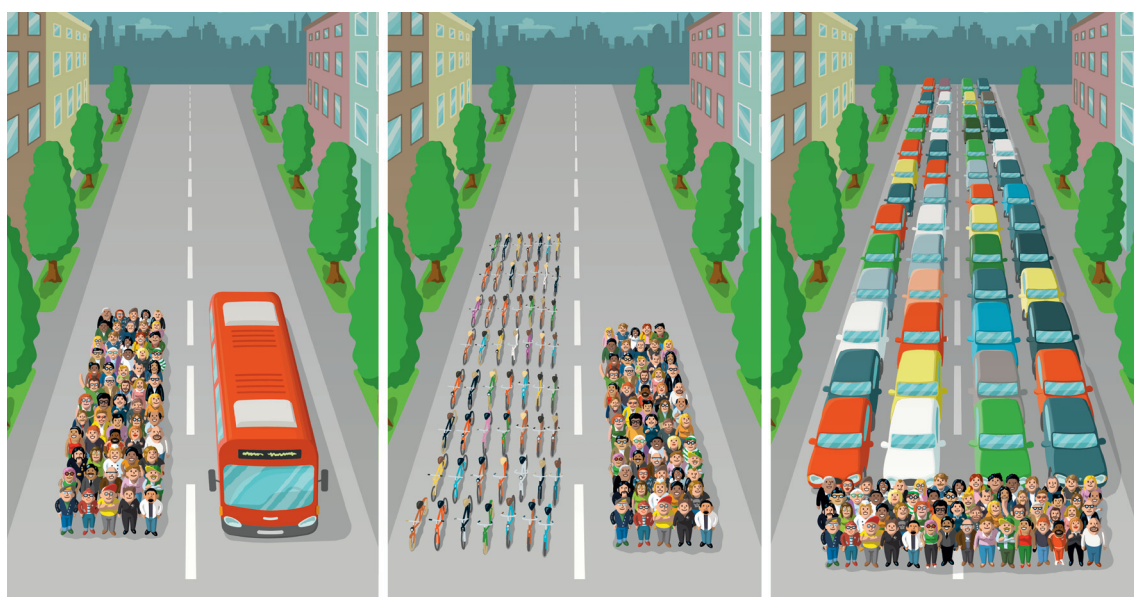
Neither fair nor smart use of space



More fair and shared use of space

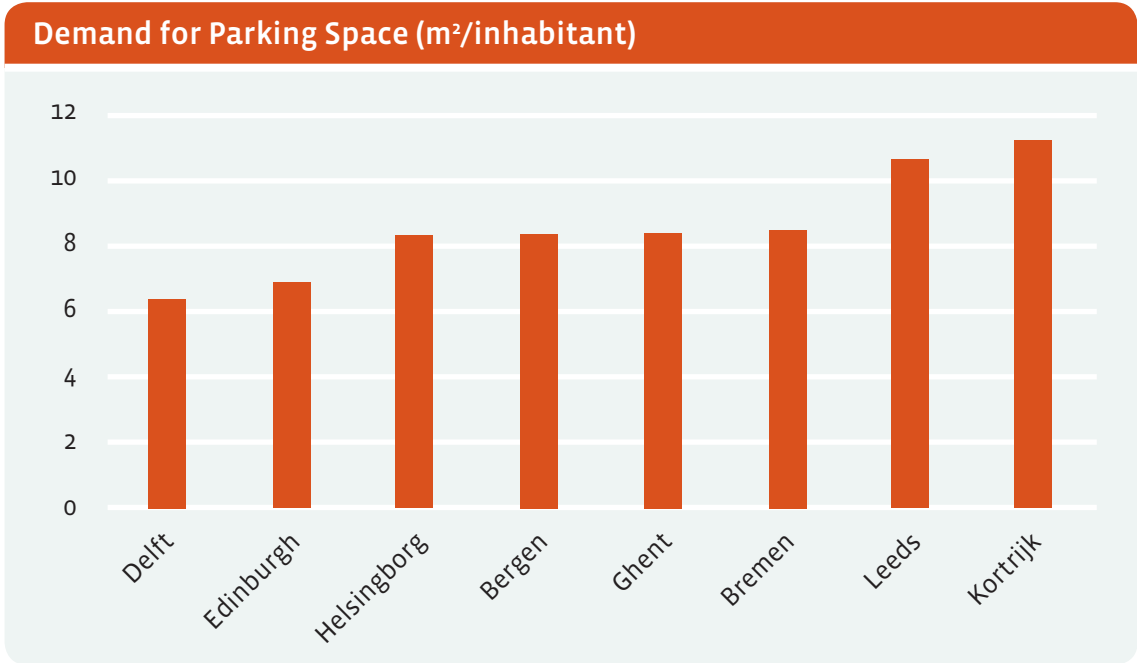
A quick glance at the TomTom Traffic Index [16] gives the impression that car orientated cities have much congestion, while cycling cities are dealing far better. This might sound illogical, since cars are meant for long distances and bikes are just for short distances. The point is that in car-oriented cities, cars are used for short distances. In people-oriented cities, many of these trips are carried out by walking, cycling or public transport. This allows for a more efficient use of space.

Shared mobility modes help to lower car dependency. This results in less car use and lower ownership rates. 90% of road vehicles in cities can be replaced, if collective modes have high capacity and on-demand shared modes are widely available [17]. Shared mobility supports the urgent needs to distribute public space in a more even way. By doing so, more scarce space can be returned to people. These cities will become more liveable, more attractive and even better accessible. Shared mobility creates win-win situations for everyone.



Space consumption of travel modes.

Illustration: Maura Kalusky Inspired by: Cycling promotion foundation



Demand for parking space in SHARE-North cities. A parked car uses 20 m² of space.

Due to urbanisation, many European cities will see an increase in population. This will result in more dense use of space with more inhabitants per square kilometre. In dense cities, car dependency is lower, resulting in lower transport emissions and less required space for parking. Green areas around cities may remain open, which absorbs emissions from e.g. transportation. In cities, more space for ecosystem services and urban green space can be created [18].

Streets and parking can take up a third of urban land use. The figure below shows that huge differences exist between European cities. If they are designed for car traffic during peak hours, this has a significant impact for the liveability and the economy.

Urbanisation and densification provide opportunities to decrease car ownership and to protect the urban ecosystem services. But

still, car ownership is an issue and parking places require lots of space. It is possible to calculate this space requirement in terms of the number of football stadiums or the length in kilometres if all these cars are placed in one line. Electric cars have many environmental benefits over conventionally fuelled vehicles. However, they take a lot of urban space too. The figure below illustrates the increasing demand for the City of Helsingborg.

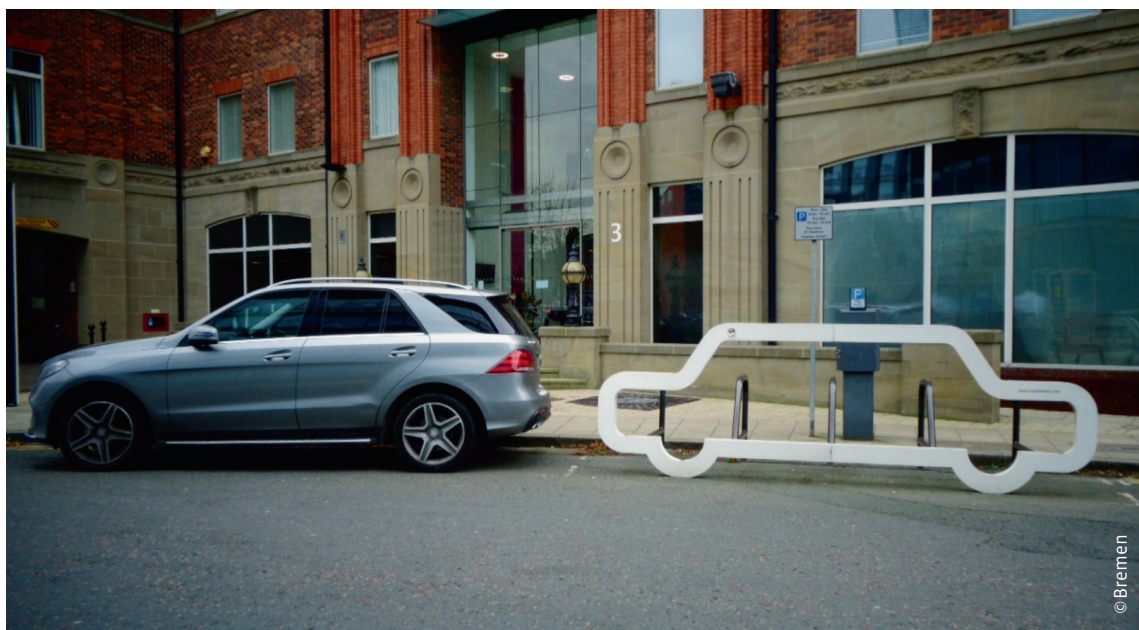
It's also possible to predict the future space required, based on population forecasts and to calculate the impact of shared mobility strategies. The City of Helsingborg is predicted to grow by 40,000 inhabitants until 2040 (see case study). An additional parking area of 36 hectares would be required for parking facilities to correlate with the resulting growth of parking demand. When implementing carsharing and reducing the parking area for private cars, 24 hectares can be saved. This equals

Helsingborg, Sweden	2002	2019	Growth
Passenger cars	50,900	64,557	3,640 (+ 13%)
Parking space required, measured in the number of football fields	142	180	38
Length of queue (km)			
- Volvo V70	240	228	304
- Nissan Leaf	289	64	61

Source: Lund University [18].

33 football stadiums of saved urban space. Urban vegetation has an absorption capacity in this case of 18 tonnes of CO₂ per hectare (data for Lund municipality, Sweden). One hectare of spruce forest has, for example an absorption capacity of 30-45 tonnes of particulate matter (PM₁₀) per year. For the City of Helsingborg, the carsharing strategy would result in 185 tonnes of CO₂ absorption of urban green areas due to reduced car-ownership.

Public parks are more than just expensive lawns and gardens to maintain. They are the important grounds for neighbourhoods, as the places where people come together and provide a quality of life of which the value is difficult to quantify. When public space not only incorporates green infrastructure, but also becomes well used and attractive, people can live happier and more sustainable lifestyles, and by that, take better care of their environment. As a result, these places gain added value.



10 bicycle parking spots fit in the same area as 1 car parking spot



sparebanken
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MODEL S

N

TESLAMOTORS.COM

Living Streets

LOCATION

Ghent, Belgium (260,000 inhabitants)



IMPLEMENTING BODIES

Initially Lab van Troje of Ghent
City of Ghent

SUPPORTING ORGANISATION(S) & INVOLVED STAKEHOLDER(S)

Network of citizens, entrepreneurs and supporting companies

DESCRIPTION

In a Living Street, neighbours test a different way of ‘organising’ their street, by temporarily removing all of the cars. The starting point is a conversation between neighbours about the future of their street, under the guidance of Trojan Lab and the City of Ghent. They talk about visions and concerns with the residents and then plot them on a map. Next, they try to find solutions for every challenge. If solutions have been found for every challenge, the ‘building’ of the Living Street can begin. The street decor is tested for two or three months. At the end, it is removed again.

A Living Street creates new meeting places on the street and gives a stronger sense of belonging within the neighbourhood. A lot can be learned about how citizens see the future of their street and their city and about how sustainable mobility can be part of the Living Streets.

CRITICAL SUCCESS FACTORS

1. A designated person is needed to lead the process. The importance of this role varies from street to street.
2. It’s necessary to create a good cooperation between citizens, the city and organisations. The process is neither top-down nor bottom-up.
3. The city and organisers must make time to listen to the residents and not judge them for their fears and or crazy/creative ideas.
4. The challenge is to involve all residents, also those who can’t identify themselves with the development.
5. Without a solution for car parking during the trial period, there can’t be a Living Street.



IMPACT

A Living Street strengthens the contact between neighbours. In 2012, the initiative started with two streets in Ghent. Within 5 years, 51 experiments took place in 30 streets in the city centre and in 19th and 20th century districts. The process results in a rethinking of what streets should be. Residents are asking for permanent street design and new neighbourhoods are inspired by the concept.

TYPE OF LOCATION

Urban



TARGET GROUP

Residents



LOCATION SCALE

Medium



Families with children



INVESTMENT SCALE

Medium



IS THE ACTION PART OF A SUMP OR SHARED MOBILITY ACTION PLAN?

No



COST-BENEFIT-RATIO

High



MORE INFORMATION

www.livingstreet.org

<https://tinyurl.com/SHARE-North-Videos>

‘Formerly, I felt like coming home when crossing my doorstep. Since the Living Streets project, I experience this feeling already when I enter the street’.

Resident of Ghent

Ecological Impacts of Carsharing



LOCATION

Helsingborg, Sweden (148,000 inhabitants)



IMPLEMENTING BODY

Lund University Campus Helsingborg, Environmental Strategy Department

DESCRIPTION

Lund University investigated the public value of carsharing in order to clarify the effects of urbanisation in a typical Swedish city [18]. The study reveals how strategic density planning affects the use of different transport modes, and the shift from private car ownership to shared car use. The study makes clear how sustainable mobility can be used as a useful strategy to reduce the negative effects of future car traffic in Helsingborg.

Just like most European cities, streets in Helsingborg are dominated by vehicles and have lost their primary purpose to attract people and make liveable city centres. Helsingborg's population is increasing. Within 20 years, the city will have 40,000 additional inhabitants.

Implementing shared mobility in especially new housing development areas, makes perfect sense for future spatial urban land use and for reducing negative environmental and climate impacts. This frees up valuable space for urban natural ecosystem services like vegetation as a filter for water and air pollution, recreational and tourism values, local carbon storage and carbon sinks, biodiversity and evaporation of rainwater.

Parking standard	Required surface for parking	Number of football stadiums	CO ₂ absorption of urban green
1,0	36 ha	50	
0,3 + carsharing	12 ha	17	
Difference = urban green space maintained	24 ha	33	475 tonnes

Source: Lund University [18].

Assumptions: 1 parking space = 20 m²; 1 football stadium field = 7140 m²; 1 shared car replaces 5 private cars in a Swedish context and occupies 1 parking space; car ownership of Helsingborg = 354 cars/1000 inhabitants.

The table below indicates both uptake and loss of organic carbon in urban land use in Helsingborg.

Accessible urban land infrastructure	Carbon sequestration uptake/ton (+)	Carbon sequestration loss/ton (-)
Green urban areas	34,600	0
Streets and roads	0	34,300
Parking	0	2,280

Uptake and loss of organic carbon in urban land use, Helsingborg, 2019. Source: Lund University [18].

Mobility management strategies can reduce the need for private vehicles. Working with local parking standards has shown to have a positive effect on future demand for parking space. The lower parking standard, the higher the need for carsharing, especially in new housing areas.

CRITICAL SUCCESS FACTORS

The study reveals that:

1. Ambitious environmental policies must be taken into consideration early in the planning process to reduce negative impact and loss of land and to affect the transportation system.
2. Sustainable mobility should include a local strategy for making space efficient land use in cities. Sustainable mobility can be used as a catalyst for making places attractive and accessible. This requires an interdisciplinary approach to sustainable mobility.
3. A policy shift is required in which the car is seen as a service instead of a product.
4. It's necessary to develop valuation methods for urban ecosystem services that help to understand the relevance of shared mobility in new housing development areas.

IMPACT

The following measures support the development of carsharing and sustainable mobility:

- Introduce a legal definition for carsharing, with which municipalities can make parking spaces accessible for carsharing vehicles.
- Reduce VAT for carsharing operations to give carsharing a competitive advantage.
- Integrate sustainable mobility services in urban planning, and especially in new housing developments. This saves space that can be used for meeting places or parks and serve as urban ecosystem services.
- Adapt flexible parking regulations that favour carsharing in new housing areas.
- Continue prioritising renewable fuels in sustainable mobility to stimulate local production (for example, biogas).
- Develop test-labs and local good examples to test, learn, adapt and inspire.

TYPE OF LOCATION

Urban



COST-BENEFIT-RATIO

High



LOCATION SCALE

Medium



TARGET GROUP

Policy makers



INVESTMENT SCALE

Medium



IS THE ACTION PART OF A SUMP OR SHARED MOBILITY ACTION PLAN?

No





4.3 Carsharing

»» Chapter 5.2 -> Impacts of Carsharing
Annex 1 -> Factsheets on Shared Mobility
Typology



Definition



Carsharing is a system that allows people to use locally available cars at any time and for any duration, reducing reliance on private ownership [19].

Different Models



There are different models of carsharing, each with its own characteristics:

- Roundtrip
- Free-floating
- Peer-to-Peer
- Community-based carsharing.

The various models differ in ways and purpose of use, business model, parking methods, vehicle and membership access, target groups and, of course, impact.

Variations on these four models can include:

- Company carsharing;
- Wheelchair accessible vehicle sharing;
- Van sharing;
- Motor sharing.

Also Called



- Car clubs (UK);
- Roundtrip carsharing: station-based or traditional carsharing;
- Free-floating: one-way carsharing;
- Peer-to-Peer: carsharing platform;
- Shared ownership: cost-based carsharing or fractional ownership.

Main Characteristics



Carsharing may look like a modest solution with a limited impact on urban mobility, however, the opposite is true: carsharing leads to more walking and cycling as well as higher usage of public transport, taxis and rental cars. Carsharing facilitates a shift from ownership to usage, resulting in a wide range of positive societal impacts (see also Chapter 5.2).

Carsharing, therefore, is a game changer. Carsharing works best in cities with dense, mixed use neighbourhoods and good availability of public transport and cycling, and lots of nearby facilities. In the countryside, carsharing may be a solution for the lack of public transport. Different formulas are required for successful carsharing services in rural areas than in cities, since the market is smaller. The focus should be on community-based solutions [14], with residents helping their neighbours. For companies, carsharing contributes to a more efficient use of fleets and helps to reduce carbon emissions.

Roundtrip Carsharing

Roundtrip carsharing has the longest history of all models of carsharing. With roundtrip carsharing, the car has to be picked up and returned to the same parking place, similar to the use of privately owned vehicles. Vehicles