

PTV Group

SUSTAINABLE MOBILITY

white paper



Umovity
Mobility for Humanity

“If you make more roads, you will have more traffic.”

Jan Gehl

Danish architect and urban planner

INTRODUCTION

By signing the Paris Agreement in December 2015, the international community has committed itself to limiting global warming, by radically reducing greenhouse gas emissions. Traffic significantly contributes to these harmful emissions. Finding and implementing environmentally friendly modes of transportation is therefore becoming a priority for officials as well as urban and transportation planners.

OUR EXPERTS

This guide includes information from numerous studies, reports, field work by PTV Group and interviews with the following experts:



Michael Replogle

is the Deputy Commissioner for Policy at the New York City Department of Transportation. He develops strategies and advises the Commissioner and City Hall on transportation issues to advance the OneNYC sustainability agenda.



Prof. Dr.-Ing. Johannes Schlaich

specialises in mobility and transport at Beuth University of Applied Sciences in Berlin. He deals with the analysis and optimisation of urban mobility and examines how future technologies will affect traffic behaviour.



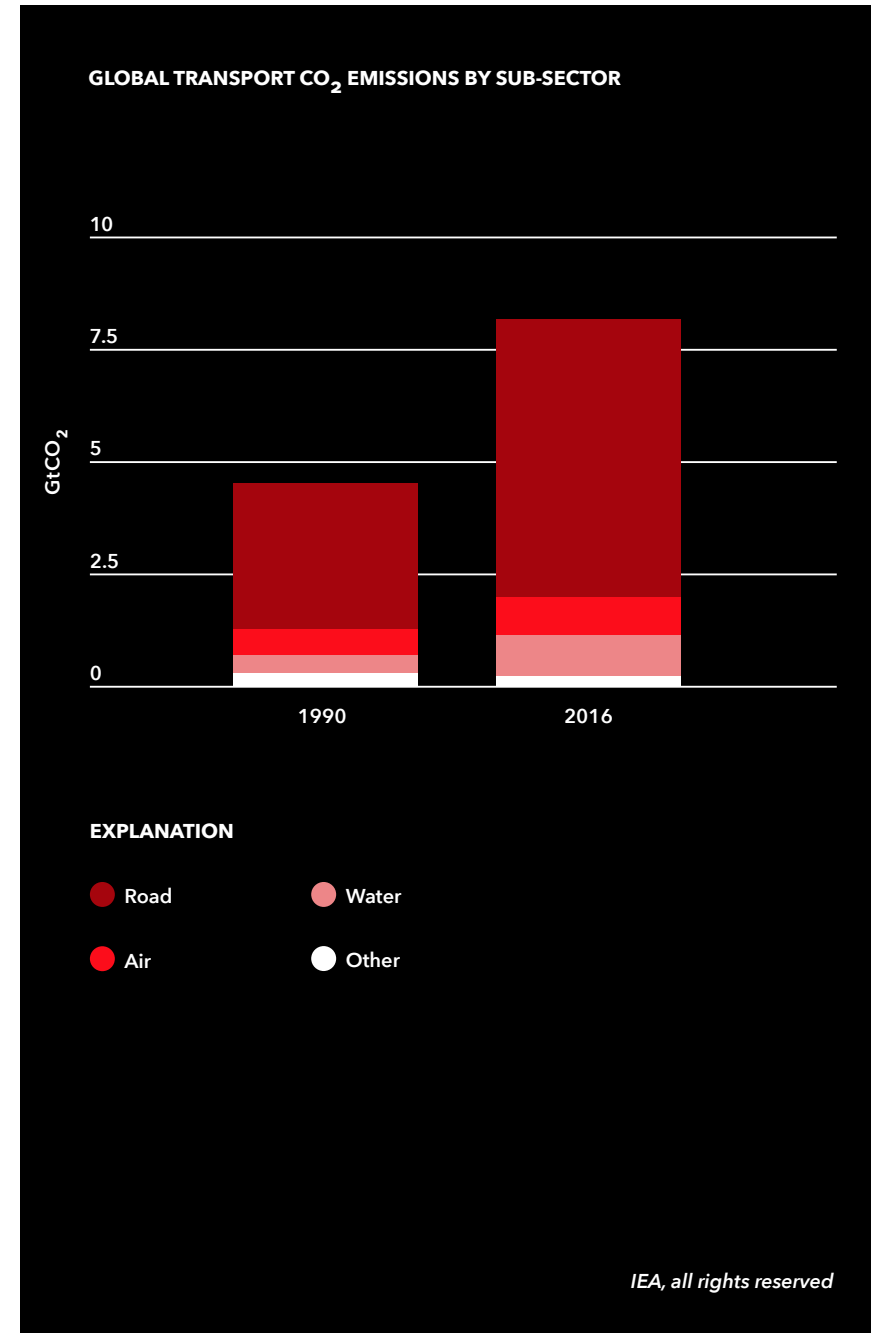
Elmar Wagner

is responsible for projects in the business development division of the electricity provider Pfalzwerke Netz AG. His goal is to make e-mobility simple and cost-effective for users.

If the international community wants to stop global warming, it must halve greenhouse gas emissions by 2030 and reduce them to zero by 2050.

With a share of 23%, traffic significantly contributes to harmful CO₂ emissions worldwide and is therefore given special attention in the climate protection debate. If nothing changes in our current mobility behaviour, its share will continue to rise. As the demand for mobility is continuously growing, experts estimate that the number of private cars will double by 2050, with transport accounting for 33% of global greenhouse gas emissions if there is no rethink.¹

The countries aware of this danger have established national climate protection plans. In total, it is necessary to reduce carbon dioxide by approximately 40 billion tonnes.





WHAT CITIES CAN DO

Various instruments are available to policy makers to achieve the climate protection goals. The motto is “Demand and Encourage”. For example, they can set efficiency standards for cars and trucks, introduce speed limits on motorways or impose toll charges per kilometre driven. However, when it comes to strengthening eco-mobility and creating climate-friendly mobility in everyday life, cities and municipali-

CO₂ REDUCTION

By 2030, the international community aims to reduce CO₂ emissions by 40 billion tons. If you wanted to put that weight on a scale, you would need:

743,494

TITANICS

71.4
MILLION

AIRBUS A380 PLANES

28.5
BILLION

VOLKSWAGEN GOLF CARS

IT PAYS TO PAY

In 2018, think tank Agora Verkehrswende examined the effects of various instruments on greenhouse gas emissions in Germany.²

THREE EXAMPLES:

1

A passenger car toll of 2 cents per kilometre on the motorway will lead to a reduction in traffic of 2% and thus to a reduction in greenhouse gas emissions of 1.8 million tonnes by 2030. A toll charge of 4 cent on all roads will reduce emissions by 12.8 million tonnes.

2

A speed limit of 120 km/h on motorways will cut fuel consumption of cars and thus greenhouse gas emissions by 2 to 3.5 million tonnes by 2030.

3

Cities that opt for climate-friendly mobility measures, such as a speed limit of 30 km/h, parking space management and access restrictions for conventional cars, will reduce car mileage by 5% – 20% and greenhouse gas emissions by 1 to 3.5 million tonnes by 2030.



ties need to act. But which measures are promising and lead to the desired outcomes?

“Traffic is a by-product of our daily pursuits,” says Dr. Johannes Schlaich, Professor of Mobility and Transport at Beuth University of Applied Sciences in Berlin. “We are on the road because we want to pursue activities of our everyday lives - be it work, shopping or training at the gym.”

Compact cities get rid of the boundaries between living, working, education, shopping and recreation. This urban planning concept relies on mixed-use development and allows its inhabitants to avoid traffic by shortening their travel distances without restricting their mobility needs. It facilitates walkable neighbourhoods and attractive living spaces: Instead of being overwhelmed by moving and parking car bodies, its cityscape is characterised by comfortable footpaths and cycle paths, urban greenery and active, mobile people. This makes it quieter and keeps the air cleaner. With less traffic, people have more space, feel safer and more comfortable.

Vienna, Vancouver, Melbourne and Copenhagen are among the cities approaching this vision. For years they have ranked among the top liveable cities in the world. Two of them sought advice from Danish architect and urban planner Jan Gehl. When asked what mayors of exhaust polluted metropolises should do, his answer is based on two

well-documented findings: "First we shape our cities, then they shape us." And: "More and wider roads inevitably lead to more traffic in cities. Fewer streets and fewer parking spaces, on the other hand, create space for cyclists, pedestrians, cafés and squares, in short: for life."³

SHIFT TRAFFIC

Where traffic cannot be avoided, it must be shifted to more environmentally friendly means of transport. Worldwide transport demand has reached a new high. A US American, for example, travels an average of 58 passenger kilometres a day.⁴ In Europe, the average distance covered per person varies between 25⁵ and 41⁶ passenger kilometres per day. What all countries have in common is that cars clearly dominate people's daily mobility routine.

That perspective, however, could soon change. In many countries, the older population is increasingly resorting to the automobile, while the younger population is shifting to other means of transport. More and more younger people are now combining different transport modes. How can this idea be expanded?

"If we want to promote a modal shift towards eco-friendly transport modes, we will have to look at mobility as a whole," explains Schlaich. "We can only identify the measures that offer the greatest potential, if we analyse the

KILLER NOISE

Air pollutants are not the only problem:



AROUND 210 MILLION EUROPEANS

are currently exposed to regular road noise levels of over 55 decibels, approximately 35 million to a similar level of noise from rail transport.



CONTINUOUS EXPOSURE TO 65 – 70 DECIBELS

means that people carry a 20% higher risk of heart disease in comparison to people who live in a quiet neighbourhood.

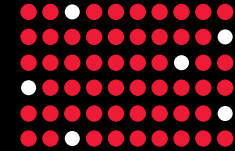


APPROX. 50,000 PEOPLE IN THE EU

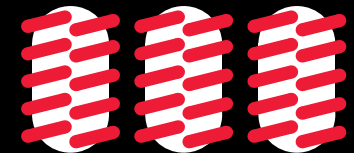
die prematurely of a heart attack caused by constant exposure to traffic noise. It is estimated that another 200,000 people suffer from cardiovascular diseases.⁷

RETHINKING PARKING POLICY

The think tank Agora Verkehrswende has investigated the parking situation in Germany.⁸



In Berlin, there is 10 times more space for parking than for playgrounds.



Where currently 1 car is parked, there could be 10 bicycles.



Munich charges EUR30 per year for a parking lot. That's 8 cents a day. A fruit seller pays EUR18 per day for a stand of the same size at the weekly market.



mobility needs throughout the entire network as well as the demand from the origin to the destination.”

At one location, for example, the expansion of fast cycle paths can have the desired effect, while elsewhere a shift to cycling can hardly be achieved because there are no safe cycle paths in the access and exit areas. There is no blanket solution. However, modal shift strategies usually follow a push-and-pull principle that is based on an integrated approach towards traffic and urban planning.

“Pull measures aim to make eco-mobility more attractive – be it by promoting pedestrian and cycle traffic, increasing the frequency of public transport services or offering cheaper fares for buses and trains,” says Schlaich. Push measures, on the other hand, are designed to make motorised private transport less attractive. Appropriate strategies include large-scale traffic calming, parking space management or redistribution of road space.

Critics have long objected to the fact that car parking has a special status in many countries, where a disproportionately large amount of public space is allocated to parking space. Moreover, it is prioritised for financial support compared to other transport modes and options. Studies indicate that almost one third of the total area of both the United States and Europe is reserved for parking.⁹

Paris, for example, has given the right signal in terms of parking facilities. Here, the mayor decided to drastically reduce the number of parking spaces, whilst expanding the cycle network - from 282 kilometres to 738 kilometres. This way, Paris has gradually cut its number of private cars from 750,000 private cars in 2003 to 613,000 in 2014. So 14% less parking space resulted in 18% fewer private cars.

PUSH & PULL STRATEGY

New York is another good example of how to implement measures effectively. With its OneNYC 2050¹⁰ strategy designed to ensure a sustainable future for the city, the US metropolis has initiated a long-term plan that is actively being implemented. At the same time New York is growing: for the first time, the population in the five boroughs reached more than 8.6 million in 2016; half a million more than in 2010. The number of jobs increased by the same amount within only five years. And tourism has hit record highs: In 2010, 48.8 million people came to visit the cosmopolitan city, the current figure is 65.2 million.

“The strong growth is putting strains on our transportation system,” says Michael Replogle, Deputy Commissioner for Policy at the New York City Department of





Transportation (DOT). “Sidewalks are crowded, buses have been slowed by the rapid growth of for-hire-vehicles and truck deliveries, and subways continue to be challenged by near-record ridership.”

In order to make urban mobility safer and more environmentally friendly, DOT is now strengthening eco-mobility: By 2020 there should be twice as many active cyclists on the road as in 2013. Between 2006 and 2013, New York already made this leap within the same period.¹¹ “In the coming years, we will expand our cycling network. Our station-based CitiBike sharing system, with 12,000 bikes handled 17.6 million trips in 2018. By 2023, we will grow this fleet to 40,000 and double the service area,” states Replogle. DOT expanded its cycle track network by 20.4 miles (33 kilometres) of protected cycle paths in 2018, double its committed target, and provided 66 lane miles (106 kilometres) of new cycle paths.

A suite of strategies will help manage core area congestion. In partnership with the Metropolitan Transportation Authority, the City will introduce Central Business District Toll Pricing in Manhattan from 2021 onwards. “Congestion pricing will reduce traffic, improve safety and air quality, and provide vital revenue to support public transportation,” says Replogle. “DOT

and its agency partners will manage excessive cruising by app-based for-hire vehicles in the downtown core. DOT is pledged to boost bus speeds by 25% by the end of 2020. A shift to license-plate based parking administration will curb abuse of parking permits and improve efficiency of enforcement. And by shifting more truck traffic to off-hour deliveries and encouraging more use of pedal-assist cargo cycles, the City will manage congestion related to growing residential freight deliveries.”

Have its measures and regular communication been successful? “By many measures, yes,” confirms Replogle. “In the past decade, bicycle traffic has increased by 150%. The share of trips in New York City by walking, cycling, and public transport has grown from 60% to 67% in the past 20 years, the highest share in the United States. We aspire to reach 80% by 2050.” He adds: “Our Vision Zero policy not only makes cycling and walking more attractive, it cuts our greenhouse gas emissions and makes it safer as well.”

IMPROVE TRAFFIC

Traffic, that can neither be avoided nor shifted, needs to be improved. For example, intelligent transport systems can help increase transport network efficiency and optimise the flow of





traffic. In addition, it is important to develop low-emission and energy-saving vehicles and use alternative fuels and drives.

In early 2019, 5.6 million electric cars were used worldwide. An increase of 64% compared to the previous year. The undisputed market driver is China with 2.6 million electrically powered vehicles. The USA holds rank 2 with 1.1 million cars followed by Norway with almost 300,000 vehicles.¹² The Scandinavian country thus has the highest number of electrically powered vehicles per capita in the world.

What is stopping people elsewhere from switching to e-mobility?

According to a survey conducted by pollster Civey in Germany, also known as the nation of car enthusiasts, 49% of the population would consider driving an electric car in the future.¹³ However, there are currently three main aspects that prevent them from buying. "A third says the range of electric cars is too small," explains Elmar Wagner, e-mobility expert at Pfalzwerke Netz AG, a provider of electricity and electric services. "Approximately as many people cited the acquisition cost as hampering factor." Around 12% complain that there are no charging stations nearby. Many drivers also believe that charging is tedious

and complicated. But fast charging is no longer a problem today: "Thanks to DC charging systems, electric vehicles can now be charged really quickly," says Wagner.

The expert recommends that municipalities and local authorities thinking about public charging should focus on a good charging infrastructure concept, open charging standards and a simple payment system that works both with and without customer accounts. "Those who want to start small should offer their citizens information material on electric mobility," says Wagner. "There is currently no consistent communication policy." If people were better informed about the technology and use, they would be less concerned. E-mobility would gain momentum and improve traffic that cannot be avoided.

In order to stop global warming, mobility must change. But the turnaround will only succeed if people's behaviour changes, too: If people ride their bicycles more often, walk more frequently, or use public transport.





● — REFERENCES

1. The World Bank: Leaders Call for Global Action to Reduce Transport's Climate Footprint. May 2016
2. Agora Verkehrswende: Klimaschutz 2030 im Verkehr: Maßnahmen zur Erreichung des Sektorziels. August 2018
3. brand eins: Jan Gehl im Interview. Die Menschen in Bewegung setzen. 2014
4. U.S. Department of Transportation: Summary of Travel Trends. 2017 National Household Travel Survey. July 2018
5. ISFORT: 15° Rapporto sulla mobilità degli italiani. November 2018
6. Liikennevirasto, Finnish Transport Agency: Henkilöliikennetutkimus 2016 (National Travel Survey 2016). 2018
7. CE Delft: Traffic noise reduction in Europe. Health effects, social costs and technical and policy options to reduce road and rail traffic noise. August 2007
8. Agora Verkehrswende: Umparken - den öffentlichen Raum gerechter verteilen. Zahlen und Fakten zum Parkraummanagement. September 2018
9. Dorina Pojani: Freeing up the huge areas set aside for parking can transform our cities. October 2017
10. City of New York: OneNYC 2050. Building a strong and fair city
11. NYC DOT: Cycling in the City. Cycling Trends in NYC. 2018
12. ZSW: Bestand Elektro-Pkw weltweit. February 2019
13. Civey: Zukunft auf vier Rädern. Der Civey Automobilreport. February 2018

● — SOFTWARE SOLUTIONS FOR CITIES

Cities and municipalities around the world are looking for ways to promote more sustainable modes of transportation. To achieve this, they need to present alternatives that make eco-mobility more attractive. However, there is no one-size-fits-all solution as every city is unique. Factors such as a city's infrastructure, existing mobility services and mobility behaviour as well as socio-demographic structure need to be accounted for. Above that, innovation in the field of mobility is ongoing and business models are emerging regularly, making it difficult to know exactly what the movement of people and goods will look like in the future.

Software solutions for multimodal transport modelling, simulation and management give city officials and urban planners a tool to better understand their different options. They allow them to test scenarios in a virtual environment before they are turned into reality in order to analyse and evaluate the potential outcomes. Thereby, they give them the ability to identify the option that truly matches the DNA of their city and thus solves their own problems in the best possible way.

With 40 years of experience in the field of transport logistics and transportation, PTV Group provides market-leading software solutions for making the movement of people and goods more efficient, safe and sustainable. Visit our website and get in touch with our experts to find out how our software solutions could help you introduce sustainable-mobility solutions in your city.

sustainablemobility.ptvgroup.com



ABOUT PTV GROUP

Recognised as global market leader, PTV Group develops intelligent software solutions for transport logistics, traffic planning and traffic management. Thus cities, companies and people save time and money, enhance road safety and minimise the impact on the environment. PTV plans and optimises everything that moves people and goods in more than 2,500 cities worldwide - it's the central idea which has accompanied PTV since its foundation in 1979.