Delivering climate-friendly transport by shifting to cycling

ECF position on the European Commission's forthcoming Communication on the Decarbonisation of Transport

European Cyclists' Federation
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1. Summary

The EU has set itself a very ambitious target: reducing Greenhouse Gas (GHG) emissions from the transport sector by 60 % compared to 1990. However, since 1990 transport GHG emissions have increased by about 20 %. In order to achieve that 60 % objective, the EU has introduced a number of legislation, notably on CO2 emission standards for cars and vans as well as the Fuel-Quality Directive. The results of these policies are at best mixed for the time being.

While the 2011 Transport White Paper introduced a modal-shift objective for the freight sector for trips longer than 300 km, no similar target had been proposed for short-to-medium distance passenger trips.

However, if the EU is to achieve its objective on decarbonizing transport, it needs to be a stronger proponent for a modal shift in passenger transport too! Shift policies aiming at increasing the level of cycling have proven to work and to be very cost-effective. If all Europeans would cycle by 2050 at Danish levels, between 63 and 142 million tonnes of CO2e could be saved annually, representing 12 to 26% of the target reduction set for the transport sector.

The potential for shifting and thereby saving CO2 emissions is high: in Germany, 28 % of all CO2 emissions from passenger transport occur on trips shorter than 15 km; in Austria, 43 % of all car trips are under 5 km. Short-distance car trips are the most polluting ones, not only in terms of CO2 but also of air pollutants. Yet EU modelling on how to achieve the transport decarbonisation objective has largely overlooked cycling so far.

Shift enablers are increasingly out there: about 6.5 million electric bicycles currently populate EU's roads (state: end 2015), more than 1.3 million units were sold in 2015 alone. New types of infrastructure (cycle highways), vehicles (cargo bikes) but also a behavioural change among EU citizens add to the picture.

Numerous towns and cities, regions and Member States have adopted ambitious cycling strategies over the past 10-15 years. By adopting the 'Declaration of Luxembourg on cycling as a climate friendly mode of transport' during the Luxembourg EU Presidency, national transport ministers have recommended the EU to develop a 'EU level strategic document on cycling' as well.

ECF strongly recommends that the Communication on the Decarbonisation of Transport will

1. Include modal shift through cycling in transport GHG emission modelling and
2. Introduce an action point as regards the development and adoption of a 'EU level strategic document on cycling' at the latest by the end of 2017.

Content:

2. The challenge – decarbonizing transport

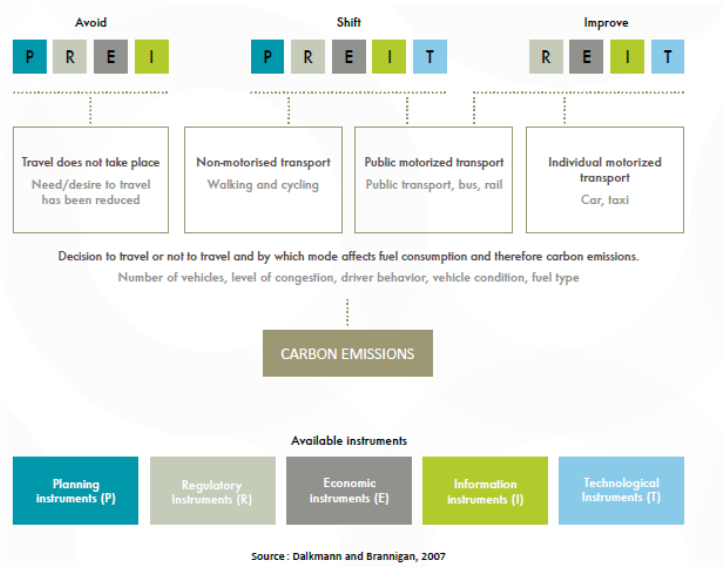
The 2011 Transport White Paper[1] formulated two related objectives:

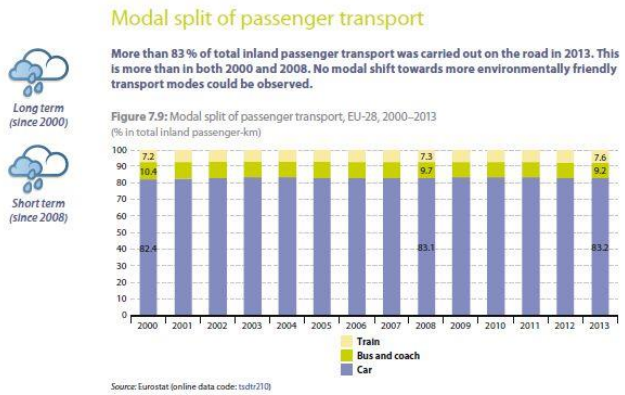
- **Reduce GHG emissions of transport sector by 60 % by 2050 (compared to 1990)**;
- On urban mobility, halve the use of 'conventionally-fuelled' cars in urban transport by 2030; phase them out in cities by 2050; **achieve essentially CO2-free city logistics in major urban centres by 2030**.

In addition, in October 2014, EU leaders decided that sectors outside the EU ETS, of which transport is the largest, will have to reduce their GHG emissions by 30% in 2030 compared with 2005. At the moment, transport GHG emissions exceed 1990 levels by about 20 %.

3. Policies to decarbonize transport: Avoid – shift – improve approaches

A whole jigsaw of policies are available to local, regional, national and European policy-makers to reduce the carbon-intensity of the transport sector (see chart below). EU legislation as regards passenger travel focuses exclusively on the 'improve' side[2]. There is no shift-legislation in place, although the European Commission has developed respective policies, including as regards Sustainable Urban Mobility Planning.





In the latest EEA 2015 TERM report the agency acknowledges: "Despite certain EU policies designed to encourage greater use of environmentally friendly transport modes, no substantial overall changes in modal shares have been observed."[3] According to its own projections, the 2011 White Paper on Transport's decarbonisation targets will not be met unless more ambitious measures are implemented.

[1] WHITE PAPER Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system COM/2011/0144 final.
[2] E.g. CO2 emission targets for new cars and vans [Regulation (EC) No 433/2009, Regulation (EU) No 510/2011], Fuel Quality Directive [Directive 98/70/EC amended by 2009/30/EC] and Deployment of Alternative Fuels Infrastructure Directive [2014/94/EU]
[3] EEA TERM Report 2015, *Evaluating 15 years of transport and environmental policy integration*, p. 17.

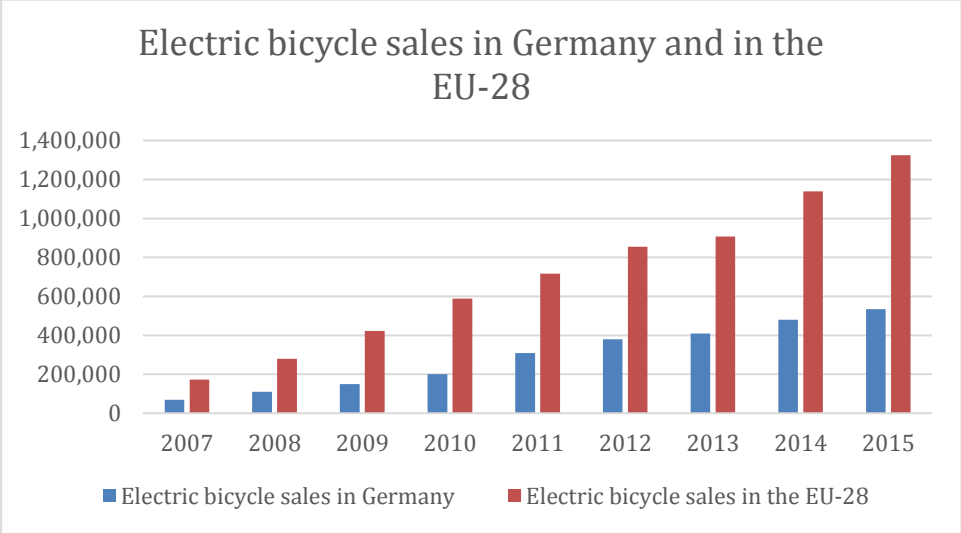
Cycling is basically overlooked in EU transport GHG emission modelling. For example, the publication "EU Energy, Transport and GHG Emissions: Trends to 2050. Reference Scenario 2013." [4] does not mention cycling at all.

4. European trends in cycling

The past years have seen a number of successful trends in the cycling world, in particular as regards bike-sharing, the use of cargo bike for city logistics, the market uptake of electric bicycles and the development of high-quality cycle infrastructure in the form of cycle highways/ fast cycling routes.

i) Electric bicycles: Pedelecs and Speed pedelecs

By the end of 2015, there were about 6.5 million electric bicycles on the road in the EU-28, the vast majority of them being pedelecs[5]. Germany and the Netherlands are the two largest single markets for electric bicycles, accounting for about 2/3 of all sales in the EU. By the end of 2015, there were about 2.65m electric bicycles on German roads. In other mature markets such as Belgium and the Netherlands, about 1 in 4 to 5 sold bicycles is an electric bicycle, while in Germany that ratio was 1 in 8 in 2015. A ratio of 1 in 4 to 5 across the EU as in the 'low countries' would result in the sales of about 4-5 million electric bicycles annually.[6]



For trips beyond 15 km, speed pedelecs (power support up to 45 km/h) might become a viable option. In the Netherlands, about 5,700 speed pedelecs were registered by October 2015.[7] A research project at the University of KU Leuven, Belgium, currently looks into the "Quantification of technical performances, cyclist experience and safety of speed pedelecs for commuter use".[8]

[4] Ibd. EU Energy, Transport and GHG Emissions: Trends to 2050. Reference Scenario 2013. https://ec.europa.eu/energy/sites/ener/files/documents/trends_to_2050_update_2013.pdf

[5] Pedelecs: Pedal Electric Cycles. They are regulated by the European Standards Organisation CEN and through the Machinery Directive: They have a continuous power of 250 Watts, they have pedals and a progressive motor that gradually cuts off as 25 kph approaches. For power support the cyclist has to pedal.

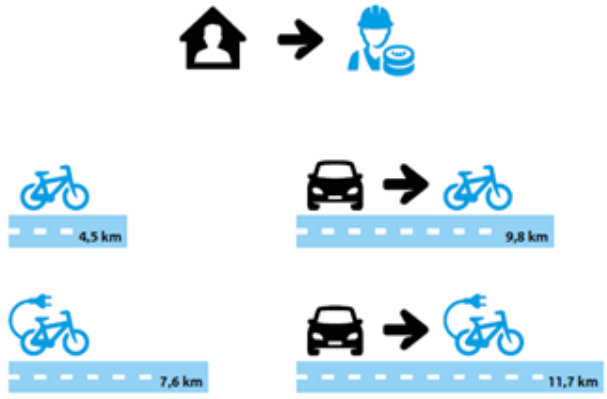
[6] 20.2 million bicycles were sold in the EU in 2014. Conebi, *European Bicycle market, 2015 edition.* http://www.conebi.eu/?page_id=154

[7] https://www.rvo.nl/sites/default/files/2015/11/Special%20E-tweewielers%20en%20Speed%20pedelecs%20oktober%202015.pdf

[8] http://www.researchportal.be/en/project/quantification-of-technical-performances-cyclist-experience-and-safetyof-speed-pedelecs-for-commuter-use-(KUL_3E140643)/#tabs

ii) Fast cycling routes

Fast cycling routes[9] are "high standard bicycle paths reserved for cyclists for fast and direct commuting over long distances." Fast cycling routes projects at this moment can mostly be found in Northern European countries.[10] At city level, London and Copenhagen are the examples best known. As for the Netherlands, the construction of 675km of 'Fietssnelwegen' (Fast cycle routes) across the country by 2025 is envisioned. Approximately one third is already in place. In Germany, a Ruhr fast cycle route over 100 km is under development at an estimated cost of €187m. A feasibility study estimated that as much as 400,000 daily car-km could be shifted to cycling if this cycle highway will be completed.[11]



Average home-work distance for cyclists (left) and for cyclists who exchanged the car for the bike for commuting purposes (right)
Source: Fietsberaad

As more electric bicycles are available in combination with better infrastructure, it can be expected that this will further increase demand for cycling.

This is supported by findings from the Netherlands which concluded that the average commuter distance on an electric bicycle is 7.6km compared to 4.5km on a regular bike. In cases where a bicycle substitutes a car trip, this is 11.7km on an electric bicycle vs. 9.8km on a regular bike.

iii) Cycling and public transport

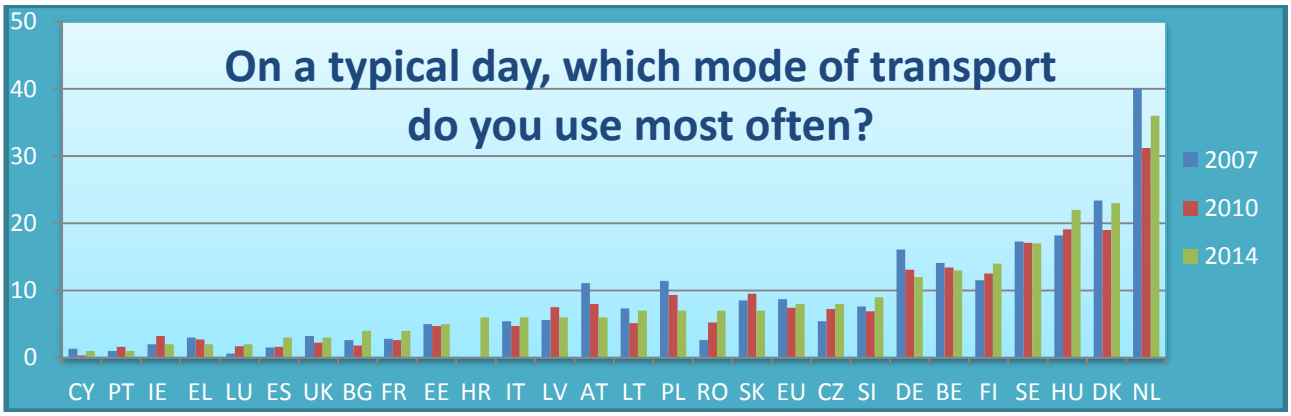
Another high potential is a better combination of bicycles with public transport. In the Netherlands, about 40 % of all train users arrive by bicycle at the station, 10 % of train users uses the bicycle at the point of destination. This requires attractive and safe bicycle parking facilities in sufficient numbers, something the Netherlands excels at.[12] From 2013 to 2014, cycle use here increased by 13 %. For the first time ever, the average Dutch person cycled more than 1,000km/year [1,018km in 2014 vs. 902km in 2013].[13]

[9] ECF factsheet on Fast Cycling Routes, 2014. https://ecf.com/what-we-do/urban-mobility/fast-cycling-routes
[10] An overview about cycle highways can be found at ECF website: https://ecf.com/what-we-do/urban-mobility/fast-cycling-routes
[11] Machbarkeitsstudie Radschnellweg Ruhr R1, 2014. http://www.rs1.ruhr/fileadmin/user_upload/RS1/pdf/RS1_Machbarkeitsstudie_web.pdf
[12] ECF briefing, 2013: Bike carriage on long-distance trains: 7 basic services that give cyclists a smile. https://ecf.com/sites/ecf.com/files/130418_Bike%20carriage%20on%20long%20distance%20trains_Good%20practice_Final%20ECF%20paper.pdf
[13] Kennisinstituut voor Mobileitsbeheer (Ministerie van Infrastructuur en Milieu), Fietsen en Lopen: de smeerolie van onze mobiliteit, 2015. http://www.kimnet.nl/sites/kimnet.nl/files/fietsen-en-lopen_de-smeerolie-van-onze-mobiliteit.pdf

5. The potential for more cycling

i) Current cycle use in Europe

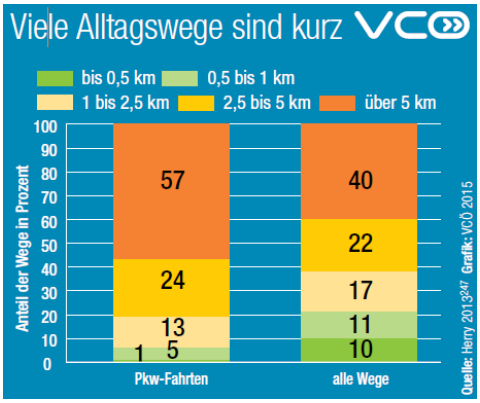
There is no EU-wide data on cycle use. However, results obtained from Eurobarometer surveys give a good indication. Eurobarometer 422 found that 8% of respondents mention cycling as the most important mode of transport on a typical day, with ranges from cycling rates of 1% or less in Cyprus, Malta, and Portugal to 36% in the Netherlands. At local level, the share of cycling can be as high as 60 % as in the Dutch city Groningen.[14]

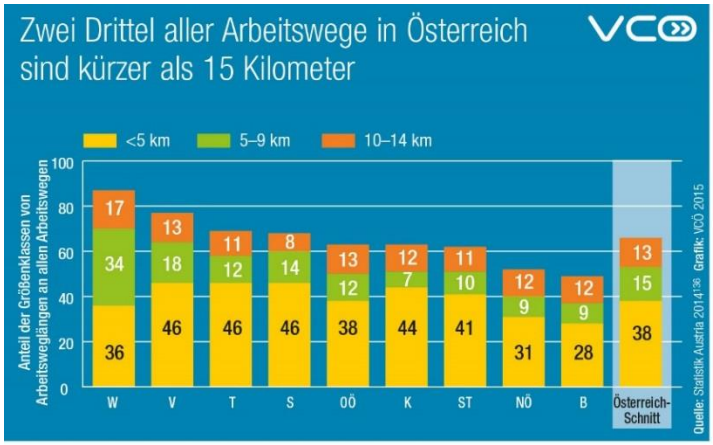


Source: Eurobarometer's from 2007, 2010, 2014.

ii) The potential

There are no studies that have estimated the potential of shifting to cycling on a European scale.[15] However, the latest trends in cycling, combined with the high number of short-distance car trips, suggests it is very high. In Austria, for example, 66 % of all commuter trips are shorter than 15 km. 19 % of all car trips are shorter than 2 km, 43 % are shorter than 5 km.



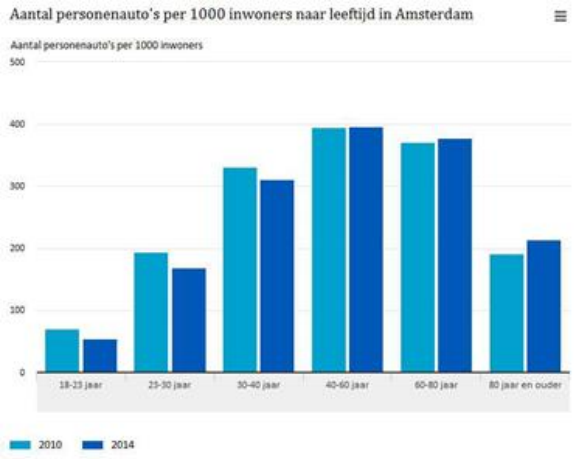


Source: VCOE, Klima und Energie, Potenziale im Verkehr, 2015.

In the Netherlands, 61% of the Dutch employees lives within a distance of 15 km from their workplace.[16] In Belgium, 78 % of all trips are shorter than 15 km.[17]

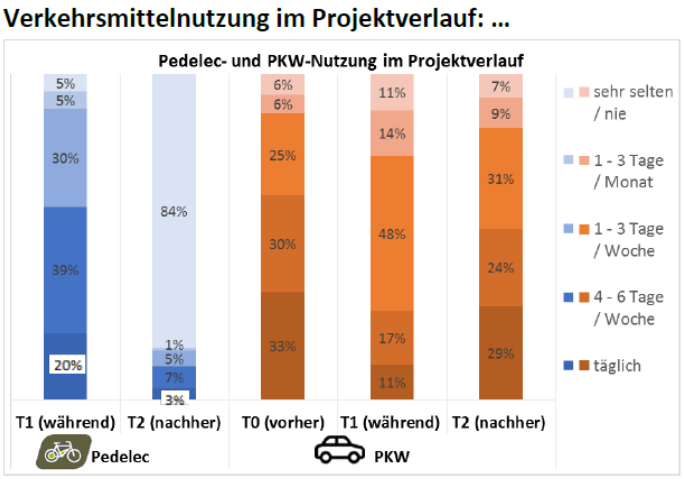
[14] http://groningenfietsstad.nl/
[15] http://eutransportghg2050.eu/cms/assets/EU-Transport-GHG-2050-Paper-5-Modal-split-and-decoupling-options-22-12-09-FINAL.pdf, p. 22
[16] Artgineering (In Opdracht van het college van Rijksadviseurs), *Nederland Fietsland*, 2014. http://artgineering.nl/pdf/141112_Fietsland_AG.pdf
[17] Beldam, Belgian Daily Mobility 2012. http://mobilit.belgium.be/sites/default/files/downloads/2012-12-19_BELDAM_verslag.pdf

Behaviour, in particular among young urban dwellers in Western European cities, is changing rapidly. In Amsterdam, for example, car ownership in the age group 18 – 23 fell by 21 % from 2010 – 2014, while it increased by 11.5 % among people in the age group 80+. At a national level, car ownership by 18 to 25 year-olds has been decreasing since 2011 in the Netherlands.[18]



Graph: No of passenger cars per 1000 inhabitants according to age in Amsterdam.
Source: CBS

Case study: E-Bike Pendeln (E-Bike Commuting)



During a 2-year pilot project in Berlin, a total of 324 employees of participating companies received each for about 2 months a pedelec to commute by bike to work. While 33 % used the car for commuting before the project, that number fell to 11 % during the project. 20 % of the participants used the pedelec daily, another 40 % at least 4 times a week.
http://www.stadtentwicklung.berlin.de/verkehr/planung/e_mobilitaet/download/EBikePendeln_Endergebnisse_Auswahl.pdf

Freight

As regards freight transport, CycleLogistics, an EU Intelligent Energy funded project, estimated that 50 % of all motorized city trips related to goods could be shifted to cycling, as many of the deliveries are goods/quantities that can easily be transported on (cargo) bikes.[19]

[18] Statistics Netherlands, *Transport and Mobility 2015*. http://download.cbs.nl/pdf/2015-transport-and-mobility.pdf
[19] Cyclelogistics, *Potential to shift goods transport from cars to bicycles in European cities*, 2014. http://www.cyclelogistics.eu/docs/111/CycleLogistics_Baseline_Study_external.pdf

6. Saving transport CO2 by shifting to cycling

At EU level, urban transport (passenger and freight) is responsible for about 23% of total CO2 emissions from transport, thereof 16 % by cars, followed by buses (0.5%), motorcycles (0.5%) and freight vans (6%). Cycling and walking account for 13% of urban pkm with no emissions.[20]

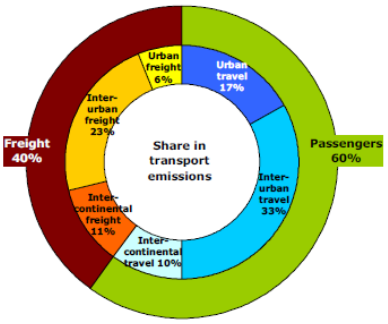


Figure 2: Shares in EU Transport greenhouse gas emissions in 2008 (estimates).

28 % of CO2 emissions in Germany in passenger transport are on trips shorter than 15 km. As outlined above, with the growing popularity in electric bicycles, there is growing potential to shift from car use to cycling for this distance. For trips longer than 15 km, speed pedelecs as well as a better combination of bike and public transport, in particular trains, add to the CO2 savings potential of 'more people cycling more often'.

Trip length in passenger transport	% share in trips	Share in transport CO2 emissions	Accumulated share in transport CO2 emissions
≤ 2km	37 %	0.6 %	0.6 %
2 – 5 km	30 %	5 %	5.6 %
5 – 15 km	17 %	22 %	28.2 %
≥ 15km	16 %	71.8 %	100 %

ECF studies

i) Cycle more often 2 cool down the planet: Quantifying CO2 savings of cycling

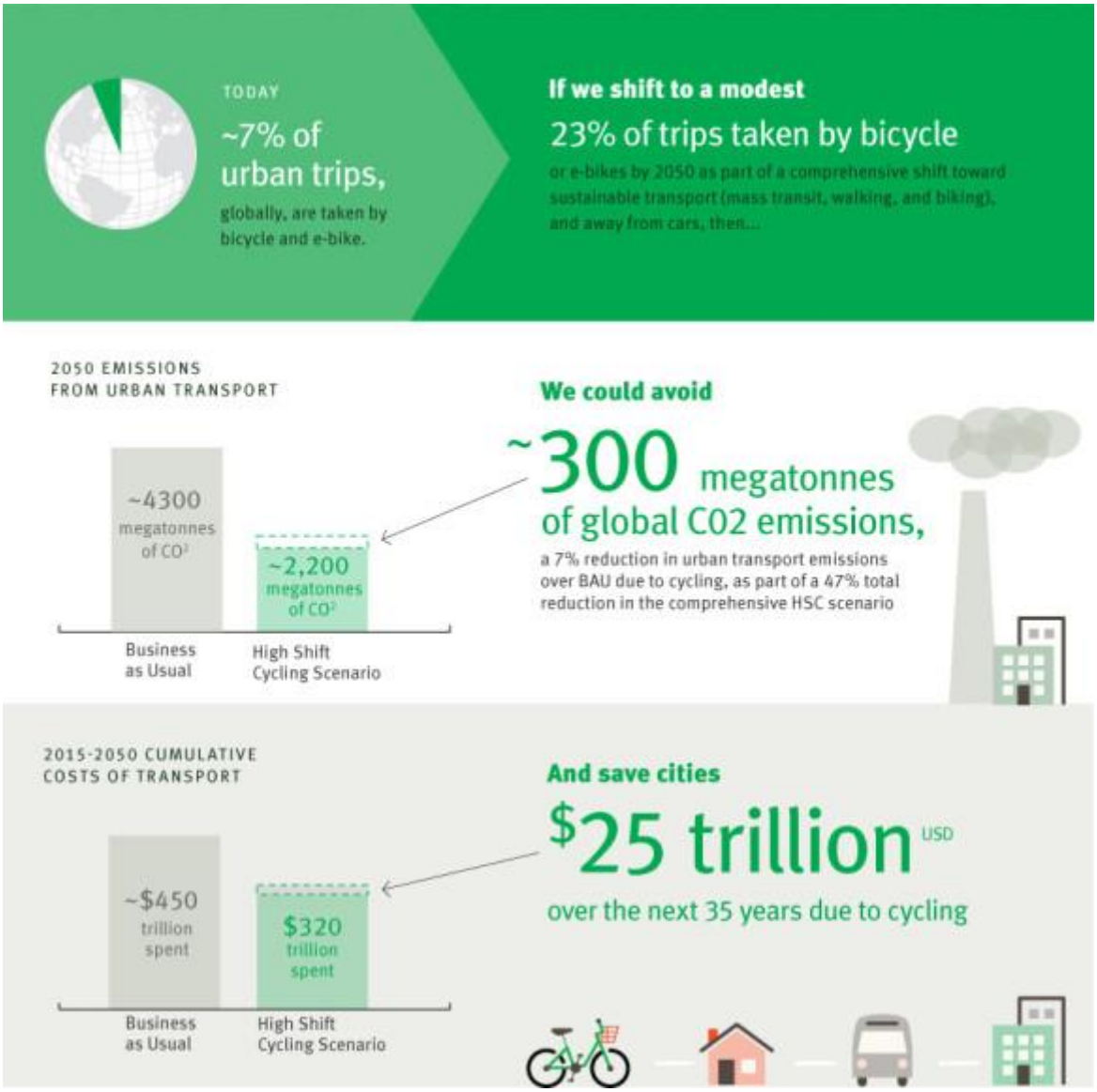
This 2011 study estimated the EU population to cycle **94 billion kilometres per year.** Assuming all the bicycle trips would otherwise be done by car, these bicycle trips would save **24 millions of tonnes of CO2e**. In practice however, this would not be the case. Therefore, when using the following ratios: bus 42%, car 32% and walking 26%: bicycle trips save **11 millions of tonnes CO2e**.

Under the assumption that by 2020, if the EU cycling modal share was to reach in the same levels seen in Denmark in 2000, this would mean 481 billion of km cycled per year, and between 55 and 120 million tonnes of CO2e saved annually. If the EU level of cycling was to reach Danish levels by 2050, this would represent 490 billion kilometres per year, or savings between 63 and 142 million tonnes of CO2e per year, representing **12 to 26% of the target reduction set for the transport sector**.[21]

[20] COMMISSION STAFF WORKING DOCUMENT final [SEC(2011) 39] Accompanying the White Paper - Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system, 2011.
[21] ECF, *Cycle more often 2 cool down the planet: Quantifying CO2 savings of cycling*, 2011. https://ecf.com/sites/ecf.com/files/co2%20study.pdf

ii) A global high-shift cycling scenario

An academic study carried out by the Institute for Transportation and Development Policies (ITDP) and the University UC Davis[22], shows that cycling and e-biking can cut energy use and CO2 emissions of urban transport by 7% by 2050 compared to a business-as-usual scenario, while saving society trillions of dollars, primarily due to reduced health costs. According to the study, the right mix of investments and public policies can bring bikes and e-bikes to cover up to 14% of urban kilometers by 2050 - ranging from about 25% in the Netherlands and China to about 7% in the U.S. and Canada.



[22] ITDP and UC Davis, *A global high-shift cycling scenario. The potential for dramatically increasing bicycle and e-bike use in cities around the world, with estimated energy, CO2 and cost impacts*, 2015. Report commissioned by ECF and UCI. http://ecf.com/files/wp-content/uploads/A-Global-High-Shift-Cycling-Scenario_-Nov-2015.pdf

National case studies: Germany

A German study[23] estimated that 11.2 % of transport CO2 emissions could be saved if the cycling mode share in the transport modal split increased from 11 % to 49 %. The savings potential could be increased to 27.4 % in an integrated approach – i.e. strong promotion of walking, cycling, public transport, car-sharing/pooling, etc. – that would result in substantially lower car ownerships and hence less km driven by car.

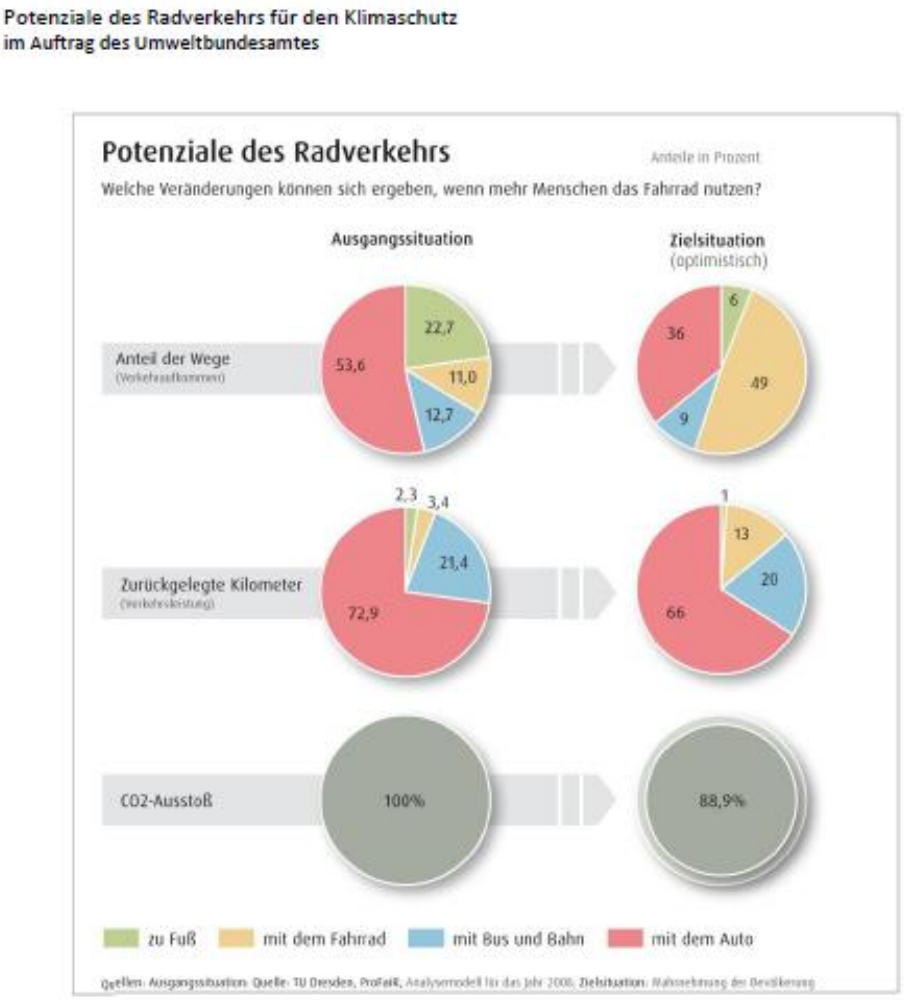


Bild3: Veränderungspotenziale bei tatsächlicher Nutzung des Fahrrades für alle mit dem Rad als gut erreichbar eingeschätzte Wege „Wahrnehmung des Rades als Option"

[23] Prof. Gerd-Axel Ahrens, Prof. Udo Becker, et al (Technische Universität Dresden), *Potenziale des Radverkehrs für den Klimaschutz*, 2013. Study commissioned by Federal Environment Agency (Bundesumweltamt). http://www.uba.de/uba-info-medien/4451.html

7. Implementing modal shift

i) It has a proven track record

'Shift'-policies have been embraced by many local[24], regional and national authorities over the past 10 - 15 years. Measures have been tested, designed to the local context, and improved over time. Many regional, national and European networks, programmes, conferences have been setup to exchange good practice. At national level, about half of all EU Member States have a current national cycling policy strategy in place.[25] The German Federal Environment Ministry has launched in 2016 the federal programme "Klimaschutz im Radverkehr" (Climate Protection in cycle traffic) with the specific objective of supporting cycle traffic in Germany as one of the measures to cut CO2 emissions.[26]

The technology for electric bicycles has been successfully developed and tested over the past 10 years. Sales figures demonstrate it is a mature technology with full customer acceptance.

ii) It is very cost-efficient

Providing for cycling is extremely cost-efficient. The UK Department for Transport put the average Benefit-to-Cost Ratio (BCR) of its cycling grants at 5.5:1 "which suggests that for every £1 of public money spent, the funded schemes provide £5.50 worth of social benefit". [27] Anything higher than 4:1 is considered as Very High Value for Money (=the highest category) in the DfT methodology.

The Helsinki Bicycle Account 2015 put the BCR of cycling investments at 8:1.[28]

A study from Lund University compared costs both to the individual and society for bicycle and car use Copenhagen considering air pollution, climate change, travel route, noise, road wear, health and congestion. The study concluded that cars have a greater negative impact on the economy than bicycles: If the costs to society and the costs to private individuals are added together, the impact of the car is EUR 0.50/km and the impact of the bicycle is EUR 0.08/km. Looking only at costs/benefits for society, one km by car costs EUR 0.15, whereas society earns EUR 0.16 on every km cycled.[29]

iii) It fits with societal mega-trends and challenges

Urbanization: Many European towns and cities are set to grow over the next decades. This will put additional pressure on a scarce resource – public space – making (urban) congestion worse. A simple electrification of the existing vehicle fleet will not solve this problem. At the same time, rural areas are depopulating, making public transport increasingly inefficient. Cycling can increase considerably the catchment area of public transport, or even be a viable substitute.

Another challenge is the high level of physical inactivity among the European population. The costs have been estimated to be €80.4bn a year in Europe.[30]

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[24] ECF/ World Cycling Alliance, *Cycling delivers on the global goals*, 2015. The brochure lists more than 70 cities and regions that have political targets in place to increase cycling. https://ecf.com/sites/ecf.com/files/The%20Global%20Goals_internet.pdf

[25] There is an overview of national cycling policies on the ECF website: https://ecf.com/groups/national-cycling-strategies-europe

[26] http://www.nationaler-radverkehrsplan.de/neuigkeiten/news.php?id=4897

[27] Department for Transport, *Value for Money Assessment for Cycling Grants*, 2014. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/348943/vfm-assessment-of-cycling-grants.pdf

[28] City of Helsinki, *Helsinki Bicycle Account 2015*. https://issuu.com/helsinkisuunnittelee/docs/pyorailykatsaus_2015_en_issuu

[29] Stefan Gössling and Andy S. Choi (University of Lund), *Transport transitions in Copenhagen: Comparing the cost of cars and bicycles*, 2015. http://www.sciencedirect.com/science/article/pii/S0921800915000907

[30] International Sports and Culture Association, The economic cost of physical inactivity in Europe, 2015. http://www.friendsofeurope.org/media/uploads/2015/06/The-Economic-Costs-of-Physical-Inactivity-in-Europe-June-2015.pdf

8. Cycling in the Communication of Decarbonisation of Transport

1. Include modal shift through cycling in transport GHG emission modelling

In all modelling for how the EU can achieve its transport emission reduction targets, modal shift from car use to cycling for short-medium distance trips has to be included. A detailed study for the potential for cycling in the European transport modal split by 2030/ 2050 has yet to be done.

2. A 'EU-level strategic document on cycling'

While many local, regional and national authorities have cycling strategies in place and even on the pan-European level a Master Plan on Cycling Promotion is in the making under the auspices of the WHO and UNECE, the EU has no integrated cycling strategy.

Yet, political support for such a strategy is strong: The European Parliament asked in its own-initiative report on the mid-term review of the 2011 Transport White Paper "for an EU roadmap for cycling to be included in the Commission Work Programme 2016."[31]

Under the Luxembourg EU Presidency, Transport Minister approved the "**Declaration of Luxembourg**"[32] at an informal Council meeting on October 7, 2015, dedicated solely to cycling. An action plan called, among other things, upon the European Commission to develop an 'EU level strategic document on cycling'.

The Declaration continues by stating:

> "This strategic document should (1) list all the goals within EU competence that would benefit from an increase in cycling's mode share, (2) identify EU policy and funding instruments that are already mobilized or that should be mobilized to increase cycling's mode share and to foster cycling related employment in the EU, and (3) include cycling in the above EU policies and funding instruments."

The forthcoming Communication on the Decarbonisation of Transport hence provides an ample opportunity of introducing an action point as regards the development and adoption of a 'EU level strategic document on cycling' at the latest by the end of 2017.

The Committee of Regions is currently developing its own-initiative report on "An EU Roadmap for Cycling", to be adopted by October 2016.

[31] 2015/2005(INI)

[32] Declaration on Cycling as a climate friendly Transport Mode, Informal meeting of EU minister for Transport, Luxembourg, October 7th, 2015. http://www.eu2015lu.eu/en/actualites/communiques/2015/10/07-info-transports-declaration-velo/07-Info-Transport-Declaration-of-Luxembourg-on-Cycling-as-a-climate-friendly-Transport-Mode---2015-10-06.pdf; Outcome of the 3414th Council meeting Transport, Telecommunications and Energy Transport, Oct 8, 2015: http://www.consilium.europa.eu/en/meetings/tte/2015/10/08/