Delivering climate-friendly transport by shifting to cycling

ECF position on the European Commission's public consultation 'Future climate and energy policy - a Strategy for long-term EU greenhouse gas emissions reductions'

European Cyclists' Federation
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1. Summary

Transport is the biggest climate problem. While the 2011 Transport White Paper set the target to reduce Greenhouse Gas (GHG) emissions from the transport sector by 60 % compared to 1990, transport GHG emissions today are still about 20 % above 1990 levels. Yet understanding grows that keeping global warming well below 2°c requires EU transport not just to reduce by 60 % but to be zero emissions by 2050.

The European Cyclists' Federation argues that a holistic approach is needed to deliver that target. Solely relying on technological advancements will not suffice. All authorities – from local to European – need to set the framework where the most energy-efficient mode of transport, the bicycle, can thrive. This applies to a whole set of measures, including infrastructure investments, fiscal and financial incentives, vehicle design and equipment, etc.

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. Yet shift policies aiming at increasing the level of cycling have proven to work and to be very cost-effective. **If cycle use across the EU increased by 300 % by 2050 and achieved today's Dutch level of cycling, an accumulative 550 m tons of CO2 could be saved.**

The potential for shifting short and medium-distance car trips to cycling 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. The electric bicycle is a game-changer as it removes many barriers of conventional cycling. About 10 million electric bicycles currently populate EU's roads (state: end 2017), approximately 2 million units were sold in 2017 alone. If growth continues until 2030 the way it did over the past 3 years, 2030 sales will rise to 12 million units, bringing total stock to 62 million. Electrification of the bicycle fleet is also entering the freight sector, using cargo bikes for first and last mile delivery. Other mega-trends include new types of infrastructure (cycle highways) and services ([free-floating] bicycle-sharing).

Numerous towns and cities, regions and Member States have adopted ambitious cycling strategies over the past 10-15 years. As recent as September 2018, France adopted a national Plan Vèlo, herby committing to triple cycle use by 2024 to 9 % of the transport modal split, up from 3 % today.[1]

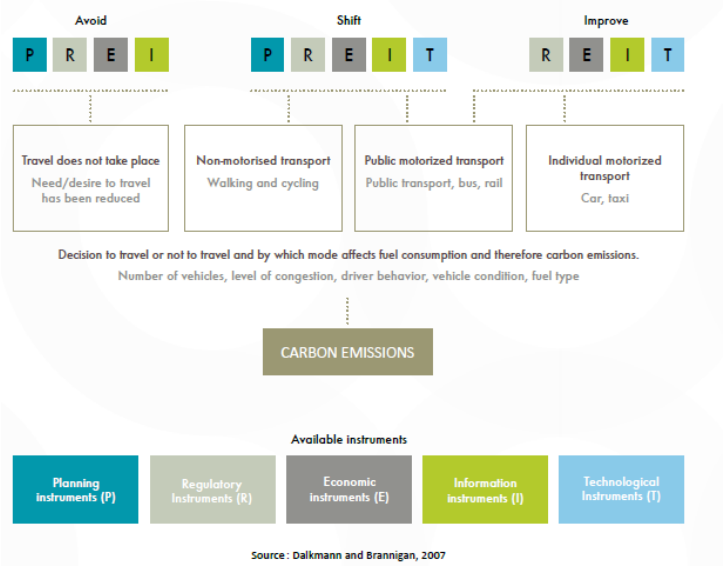
The proposal for a EU Cycling Strategy clearly illustrates that the EU has competence to grow cycling.[2] We continue to call upon the Commission to follow the recommendation of the 'Declaration of Luxembourg on cycling as a climate friendly mode of transport' adopted during the Luxembourg EU Presidency in October 2015, to develop a 'EU level strategic document on cycling'.[3]

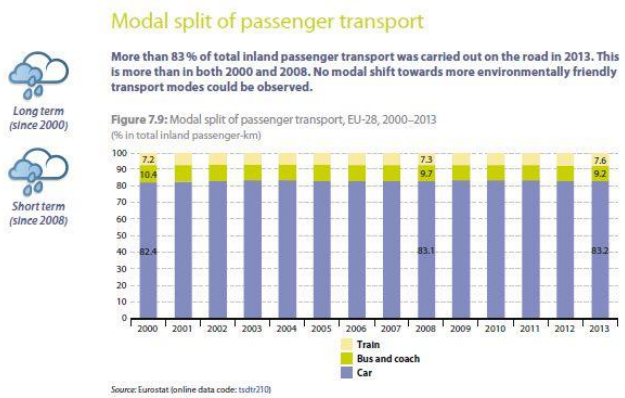
ECF key recommendations

1. Integrate modal shift from individual motorized transport to cycling in transport GHG emission modelling;
2. Introduce a EU-wide transport modal split objective, both for passenger and freight transport, in the forthcoming European Commission strategy to decarbonise the economy in line with the Paris Climate Agreement;
3. Develop a genuine EU Cycling Strategy based on the 2017 blueprint document 'EU Cycling Strategy. Recommendations for Delivering Green Growth and an Effective Mobility in 2030'.

2. 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 primarily on the 'improve' side[4]. There is no shift-legislation in place, although the European Commission has developed respective policies, including as regards Sustainable Urban Mobility Planning.





In its 2015 TERM report the European Environment 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."[5] According to its own projections, the 2011 White Paper on Transport's decarbonisation targets will not be met unless more ambitious measures are implemented.

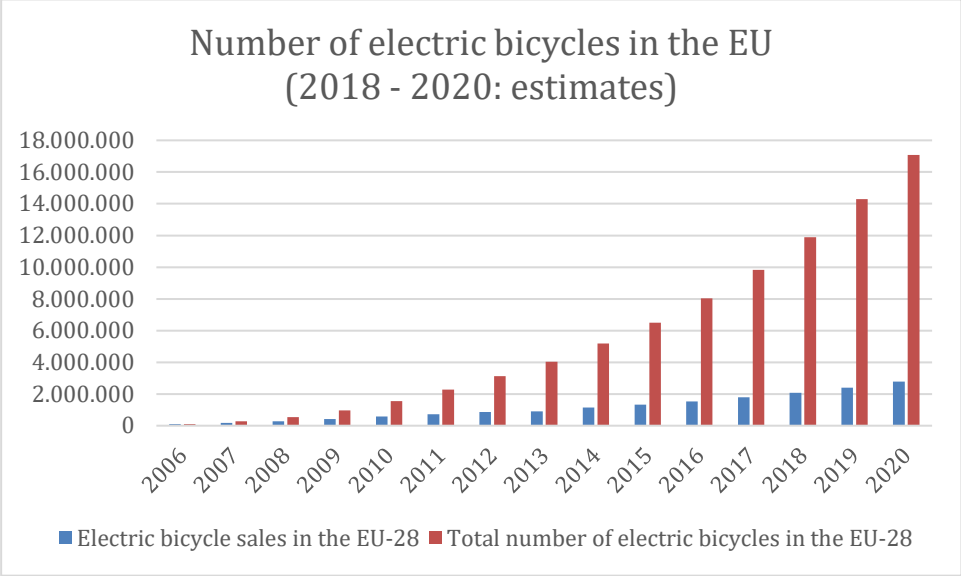
Shift scenario's – substituting individual motorised transportation through walking, cycling and public transport – is absent in EU transport GHG emission modelling. For example, the publication "EU Energy, Transport and GHG Emissions: Trends to 2050. Reference Scenario 2013." [6] does not mention cycling at all.

3. 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. Here we just focus on two:

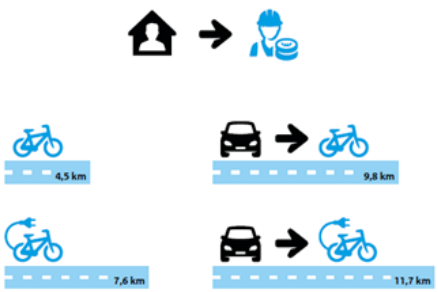
i) Electric bicycles

By the end of 2017, there were about 10 million electric bicycles on the road in the EU-28, the vast majority of them being pedelecs[7]. Germany, Belgium and the Netherlands are among the most mature markets for electric bicycles, accounting for about 2/3 of all sales in the EU. In Belgium, as much as 45 % of all bicycles sold on the market are e-bikes.[8]



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

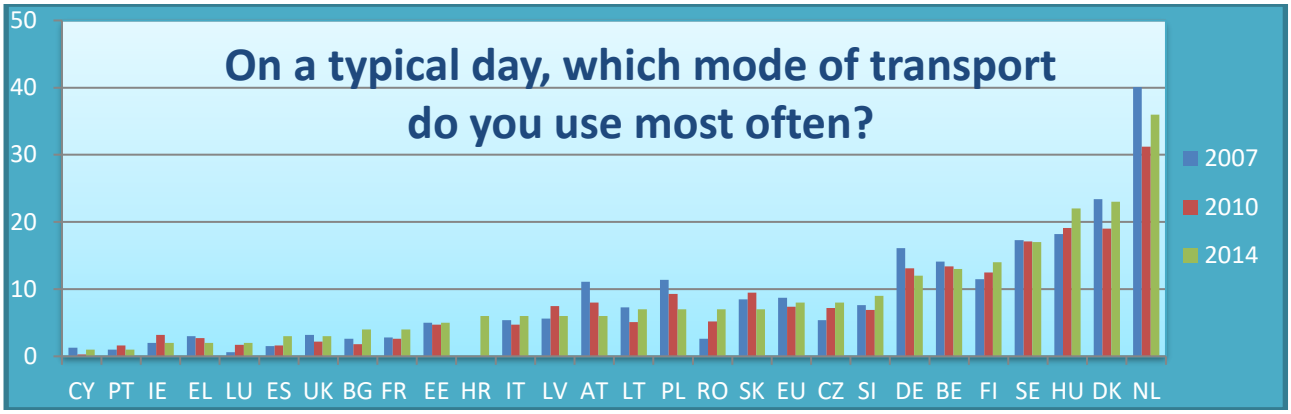
As more electric bicycles are available in combination with better infrastructure, it can be expected that this will further increase demand for cycling.

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.

4. The potential for more cycling

i) Current cycle use in Europe

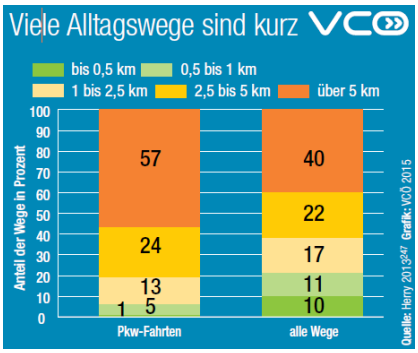
There is no EU-wide data on cycle use. However, results obtained from Eurobarometer surveys give a good indication. Eurobarometer 422 found that 8% of respondents mention cycling as the most important mode of transport on a typical day, with ranges from cycling rates of 1% or less in Cyprus, Malta, and 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.[12]



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

ii) The potential for shifting

There are no studies that have estimated the potential of shifting to cycling on a European scale.[13] 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.[14] In Belgium, 78 % of all trips are shorter than 15 km.[15]

iii) Freight transport

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.[16]

5. 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.[17]

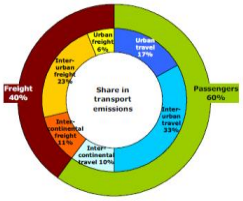


Figure 2: Shares in EU Transport greenhouse gas emissions in 2008 (estimates).

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 %

EU-wide scenario's

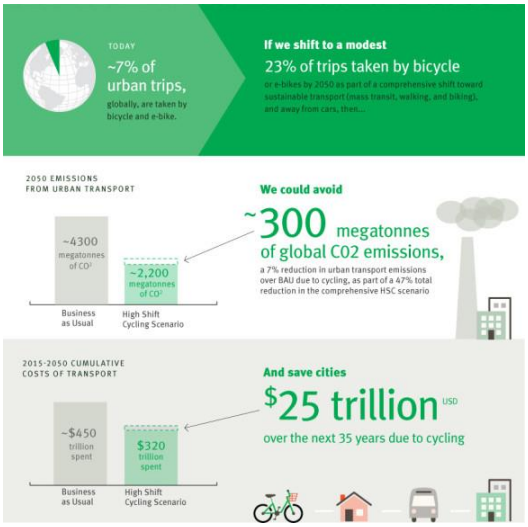
i) WHO HEAT for Cycling tool

The WHO Health Economic Assessment Tool (HEAT) for Cycling traditionally has been used to calculate the socio-economic benefits of investments in cycling. Recently the WHO expanded its tool with GHG emissions savings potential through shifting to cycling. If cycling increased by 300 % by 2050, an accumulative 555 million tons of CO2 could be saved.[18]

Year	Increase of cycling compared to 2018	Reduced CO2 emissions per year (t of CO2 equivalents)	Reduced CO2 emissions over the whole period (t of CO2 equivalents)	Economic value per year	Economic value over the whole period (discounted to 2018 value at an annual discount rate of 5%)
	50%	3.391.481	44.089.258	481.000.000 €	4.710.000.000 €
2030	100%	6.782.963	88.178.516	963.000.000 €	9.410.000.000 €
	50%	3.076.697	70.764.038	530.000.000 €	7.310.000.000 €
	100%	6.153.395	141.528.076	1.060.000.000 €	14.600.000.000 €
	150%	9.230.092	212.292.113	1.590.000.000 €	21.900.000.000 €
2040	200%	12.306.789	283.056.151	2.120.000.000 €	29.200.000.000 €
	50%	2.802.572	92.484.886	562.000.000 €	9.040.000.000 €
	100%	5.605.145	184.969.771	1.120.000.000 €	18.100.000.000 €
	150%	8.407.717	277.454.657	1.680.000.000 €	27.100.000.000 €
	200%	11.210.289	369.939.542	2.250.000.000 €	36.200.000.000 €
	250%	14.012.861	462.424.428	2.810.000.000 €	45.200.000.000 €
2050	300%	16.815.434	554.909.314	3.370.000.000 €	54.200.000.000 €

ii) A global high-shift cycling scenario

A report carried out by the Institute for Transportation and Development Policies (ITDP) and the University UC Davis[19], 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.



National case study: Germany

Potenziale des Radverkehrs für den Klimaschutz
im Auftrag des Umweltbundesamtes

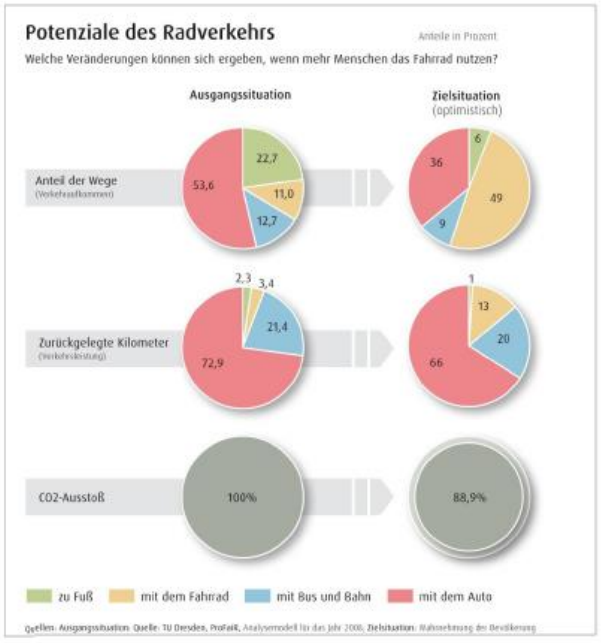


Bild3: Veränderungspotenziale bei tatsächlicher Nutzung des Fahrrades für alle mit dem Rad als gut erreichbar eingeschätzte Wege „Wahrnehmung des Rades als Option"

A German study[20] 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.

6. Implementing modal shift

i) It has a proven track record

'Shift'-policies have been embraced by many local[21], 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.[22] 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.[23]

The technology for electric bicycles has been successfully developed and tested over the past 10 - 20 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". [24] 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.[25]

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.[26]

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.[27]

Endnotes

[1] https://ecf.com/news-and-events/news/success-fub's-"parlons-vélo"-campaign-france-launches-ambitious-national
[2] www.cyclingstrategy.eu
[3] 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
[4] 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]
[5] EEA TERM Report 2015, *Evaluating 15 years of transport and environmental policy integration*, p. 17.
[6] 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
[7] 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.
[8] https://www.bike-eu.com/sales-trends/nieuws/2018/01/e-bikes-take-lead-in-belgian-market-10132617
[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] http://groningenfietsstad.nl/
[13] http://eutransportghg2050.eu/cms/assets/EU-Transport-GHG-2050-Paper-5-Modal-split-and-decoupling-options-22-12-09-FINAL.pdf, p. 22
[14] Artgineering (In Opdracht van het college van Rijksadviseurs), *Nederland Fietsland*, 2014. http://artgineering.nl/pdf/141112_Fietsland_AG.pdf
[15] Beldam, Belgian Daily Mobility 2012. http://mobilit.belgium.be/sites/default/files/downloads/2012-12-19_BELDAM_verslag.pdf
[16] 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
[17] 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.
[18] Assumptions: EU-28 population: 512,647,966 on 1 January 2018; km cycled per year in the EU-28: 146 bn km (Active modes data support study, 2017); Modes from which the shift to cycling comes: 50% from PT, 30% from driving, 20% from walking; Proportion of cycling for transport: 50% (vs. 50% for recreation); Traffic conditions: European average in urban areas; Default carbon value by country and year (value for Germany in 2018) 135.95 USD2014/tCO2e carbon_value_usd_2018
[19] 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
[20] 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
[21] 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
[22] There is an overview of national cycling policies on the ECF website: https://ecf.com/groups/national-cycling-strategies-europe
[23] http://www.nationaler-radverkehrsplan.de/neuigkeiten/news.php?id=4897
[24] 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
[25] City of Helsinki, *Helsinki Bicycle Account 2015*. https://issuu.com/helsinkisuunnittelee/docs/pyorailykatsaus_2015_en_issuu
[26] 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
[27] 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