EU CYCLING STRATEGY

Recommendations for Delivering Green Growth and an Effective Mobility System in 2030

June 2017

RESPONSIBLE EDITOR
European Cyclists' Federation (ECF) asbl
Rue Franklin 28
B-1000 Brussels
www.cyclingstrategy.eu
#eucyclingstrategy

CONTRIBUTORS
See list of expert group members in the introduction.

PHOTO CREDITS:
Front and back cover: www.istockphoto.com

June 2017

„These EU Cycling Strategy Expert group members fully endorse the process, proposals, and recommendations contained in this document and agree that supporting this document forms an excellent basis for getting a EU Cycling Strategy into the Commission's 2018 Work Plan or subsequent initiatives."

Confederation of European Bicycle Industries (CONEBI)
CROW, Netherlands
Cycling Embassy of Denmark
Department of Transport – Ministry of Sustainable Development and Infrastructure of Luxembourg - Permanent Representation of Luxembourg to the EU
European Cyclists' Federation (ECF)
European Public Health Alliance (EPHA)
Federal Ministry of Agriculture, Forestry, Environment and Water Management, Austria
Green Budget Europe (GBE)
Leuven Mobility Research Center, Belgium
Ministry of National Development, Cycling Coordination Department, Hungary
Polis
Transport for London, United Kingdom (TfL)
Union Cycliste Internationale (UCI)

„These EU Cycling Strategy Expert group members and other stakeholders fully endorse the process, and agree that supporting this document forms an excellent basis for getting a EU Cycling Strategy into the Commission's 2018 Work Plan or subsequent initiatives."

European Transport Safety Council (ETSC)
EUROCITIES

ECF gratefully acknowledges financial support from both the Life Programme of the European Union and from the cycling industry via Cycling Industries Europe.

EU CYCLING STRATEGY

ECF
EUROPEAN CYCLISTS' FEDERATION

epha european public health alliance

CONEBI
Confederation of the European Bicycle Industry
Colbi Colped
Since 1960 Representing the European Bicycle Industry

TRANSPORT FOR LONDON
SUPPORTED BY
MAYOR OF LONDON

L-mob
Leuven Mobility Research Centre

MOBILITÉ DOUCE
cellule

kennisplatform CROW

UCI UNION CYCLISTE INTERNATIONALE

GreenBudgetEurope

Cycling Embassy of Denmark

ETSC
European Transport Safety Council

klimaaktiv
mobil

MINISTERIUM FÜR EIN LEBENSWERTES ÖSTERREICH

EUROCITIES

POLIS

MINISTRY OF NATIONAL DEVELOPMENT

Forewords

Ever since the European Cyclists' Federation was founded in 1983, our mission has been to get more people to cycle more often for its many co-benefits. This document is the first systematic review of all EU policies related to cycling, directly or indirectly. It clearly demonstrates that targeted action at European level will bring about a better result compared to action solely at the national, regional and local level.

This is a wake-up call to the European Union. I want to give a big thank you to the many partners who joined us in this campaign for a EU Cycling Strategy.

Manfred Neun
President of the European Cyclists' Federation

The economic recovery in Europe, at last, is in full swing. I am proud to say that our sector, the European Bicycle Industry, is not standing on the sidelines: On the contrary, today we employ 90,000 people in 800 SMEs, 25% more than 5 years ago. With the immense success of the electric bicycle, the prospect of accelerated growth over the next decade is looking extremely promising. We will create new jobs and provide an efficient mobility tool for millions of Europeans at the same time.

The European Bicycle Industry is ready to invest. We look forward to working with European decision-makers to create the right framework conditions. The EU Cycling Strategy is a good way to do this.

René Takens
President of the Confederation of the European Bicycle Industry

No two cities are alike. Being diverse, we share similar challenges and desires: to build a great city where people are happy to live and businesses thrive. This requires high-quality public spaces, good accessibility to services, less congestion, better air quality. Île-de-France Region, for instance, adopted last May an ambitious cycling plan aimed at tripling the number of cycling trips by 2021 by co-funding local Initiatives that cater for safer and more efficient cycling.

I therefore highly welcome this initiative that calls for stronger leadership from the EU. Cities will remain in command of shaping urban mobility, however there are issues we cannot solve on our own, such as safer vehicles, the wide-scale deployment of Intelligent Transport Systems, fiscal incentives, and many more.

Let's make every city future-proof. Cycling is the future.

Stéphane Beaudet
Vice-President of the Île-de-France Region in charge of Transport

The list of challenges where cycling can make a cost-efficient impact at city, regional, national, European, and global level is long. In recognition of the many co-benefits of cycling, there are a growing number of public authorities that have placed cycling high on their political agenda as well as developing and implementing an integrated policy on cycling.

The European Union, however, is not yet a member of this group.

This document makes the case why, in addition to the EU having the competence to act, Union action has great added value in improving conditions to get more people cycling, compared to Member States' action at local, regional and national level alone. This will be discussed in **Chapter 1: Policy context, the benefits of cycling and the added value of EU action.**

Chapter 2 describes the current state of play of cycling in the EU, highlights opportunities, barriers and sketches three brief scenario's on how implementing the EU Cycling Strategy will impact cycling mobility by 2030. In this context, the Expert Group members formulated four objectives; the guiding principles for the policy recommendations that are made in Chapters 3 - 11. Four objectives are central for this documents' timeframe 2030:

i) Grow cycle use by 50 % at an average across the EU;
ii) Halve rates for killed and seriously injured cyclists (in km cycled);
iii) Invest EUR 3 billion in cycling in the period 2021 – 27, and EUR 6 billion from 2028 –34.
iv) At a qualitative level, it is strongly advised that cycling is treated as an equal partner in the mobility system.

To achieve these objectives, policy recommendations to the EU, national and regional/local level are formulated in the Chapter 3 – 11. Key recommendations to the EU include:

Chapter 3: Behavioural change
This chapter argues that successful European campaigns such as the European Mobility Week , but also the lessons learnt of many EU funded projects, should feed into the formulation of a coherent and integrated European behaviour change policy. In countries with low levels of cycling, the promotion of cycling for recreation, tourism and sports can be a gateway for daily cycling. It is recommended that a European active tourism platform will be created. To remove the main barrier to cycling – the perception of unsafety – it is argued that speed has to be properly managed, road users better educated and rules on drink driving fully enforced.

Chapter 4: Cycling-Friendly Infrastructure
Assesses in four sections how cycling-friendly infrastructure increases cycle use. By focusing on the establishment of EU guiding principles for cycling infrastructure, integration of EuroVelo, the European cycle route network, in the Trans-European Transport Networks, road safety legislation to include cyclists' needs, and the development of (electric) cycle parking facilities and multimodal hubs, this chapter aims that infrastructure accomodates cyclists' needs and make cycling convenient and safe.

Chapter 5: Vehicle Regulation
Builds upon the EU's competence on vehicle regulation in four sections to make recommendations aimed at safe cycling. The part on 'Vehicle Safety' focusses on the great opportunities brought about by innovative technologies to prevent collisions, such as through Automatic Emergency Breaking Systems that can detect cyclists or the mandatory fitting of all new passenger cars with overridable Intelligent Speed Assistance. Other sections discuss how to successfully and safely integrate the rising number of (speed) Electrically Power Assisted Cycles s onto the European roads and single market and how to establish a new harmonised framework for safe automated driving that takes cyclists into account.

Chapter 6: Multimodality and Intelligent Transport System
With the multitude of data and services provided by cycling and public bike sharing, only the EU can ensure it is included in the standardisation and harmonisation of multi -modal and real-time transport data. The upcoming Commission guidelines on urban logistics should recognise

the full potential of cargo bicycles in last-mile logistics deliveries. The EU Passenger Rights Regulation should improve the conditions for bicycle carriage on all modes.

Chapter 7: A Financial and Fiscal Level Playing Field for Cycling
The four sections make the case for equal treatment for cycling in these policy areas. Streamline cycling into all relevant EU funding streams and take electric bicycles fully into account in e-mobility policies. Member States should be allowed to introduce reduced VAT for bicycle purchases. Under the EU Green Public Procument criteria it should be compulsory to check whether the purchase of passenger cars can be replaced by bicycles. Perverse fiscal incentives for unsustainable mobility behaviour have to be phased out. External costs of car use are to be paid by the polluter through reform of the EU Energy Taxation Directive.

Chapter 8: The European Bicycle Industry
This chapter gives an overview of the industry's development and potential. More EU funds for research and innovation should be made available both for developing new machineries and production methods as well as qualifying the work force. In order to maintain product quality and safety, it should be defined that the bicycle has to comply with the ISO 4210 bicycle standards; non-compliant products should be monitored, suspicious products tested; an unified European authority for market surveillance and customs should be created. Finally, the effective EU trade instruments, in place since 1993, need to be maintained.

Chapter 9: Contribution of Cycling to Achieving Global Goals
Here we look at how Global/UN-level policies – such as the Paris Agreement – underpin the arguments to promote cycling in the EU and how the EU uses these agendas to promote cycling worldwide. The EU is advised to enlarge its technical assistance programmes dedicated to supporting active mobility and enforce infrastructure designs that account for the need of active modes of transport in EU financed projects. The exchange of knowledge should be facilitated through established networks, such as the THE PEP Partnership for Cycling.

Chapter 10: Governance
In six sections this chapter gives relevant recommendations as to ensure the proper implementation of the proposed actions. A cycling check in policies and inter-service consultation should ensure that cycling is included when new pieces of policy are drafted; a Cycling Focal Point should be established to coordinate and implement the cycling strategy at EU level; Stakeholders have to be involved; a Cycling Clearing House should systematically collect and disseminate expertise; finally, the EU institutions should 'talk the walk' and provide cycle-friendly conditions that entice employees to bike to work.

Chapter 11: Monitoring and Evaluation
In order to improve policies and projects at all levels of governance, they need to be monitored and evaluated over time. To this end, the chapters' four sections discuss 'Policy and project evaluation', 'Monitoring through key performance indicators', 'Common definitions and harmonisation to improve synergy among different cycling statistics' as well as 'Use crowdsourcing and big data collection for monitoring'.

Annexes
The document has two Annexes. The first gives an overview of the benefits of cycling and the second lists the Sustainable Development Goals to which cycling can contribute.

To clarify, this document is not the EU Cycling Strategy itself, but calls upon the EU's executive branch to include the development of an official EU Cycling Strategy in the Commission Work Programme 2018 or subsequent initiatives. The EU Cycling Strategy will be handed over to the European Commission at the Velo-city conference in Arnhem-Nijmegen in June 2017.

Table of content

EU CYCLING STRATEGY

Table of content

This document is the first consolidated version of a systematic review of all EU policies related to cycling. For better readability, it contains three main parts, which consist of a total of 11 chapters.

I Policy Context: Societal Challenges, EU Priorities and How Cycling Delivers (Chapters 1 – 2)

II Cycling Action Plan: Path to a More Rational and Effective Mobility System (Chapters 3 – 9)

III From Planning to Practice: Implementation, Monitoring and Evaluation (Chapters 10 – 11)

Part I will survey the wider policy context that sets the frame for this document.
Chapter 1 will look at the global level. We analyse how cycling can feed into UN processes such as the Sustainable Development Goals, the Paris Climate Agreement and Habitat III. The European agenda is largely dominated by creating 'Jobs and Growth', but also on challenges arising from said global commitments as well as internal problems such as meeting air quality standards. How can cycling deliver on these challenges?

Chapter 2 will give an account about the current state of cycling in the European Union and develop scenarios about the growth potential by 2030. We will look at some wider societal trends, such as urbanisation and smart cities as well as digital society and Internet of Things and how cycling may benefit.

Part II of this document – Chapters 3 to 9 – is the actual cycling implementation plan. Each of the 7 chapters will discuss the current situation of cycling in the respective policy field and how it is currently supported at European level. The central part of these chapters are policy recommendations addressed to the European level, complemented by recommendations to the national and regional/local level.

Policy recommendations were tagged with these 6 categories:

- Regulation – change, keep, enforce, repeal or modify (RE)
- Guidelines and recommendations (GR)
- Best practices, information, education collect/disseminate (BP)
- Provide, adjust funding (F)
- Further research/data is needed (RD)
- Org-ware – organisational/governance/coordination (ORG)

Producing an action plan is a necessary precondition for a successful cycling policy, but equally crucial are the adequate means to implement the proposed measures – Chapter 10 on 'Governance' – and the 'Monitoring and Evaluation' (Chapter 11) of said measures. Part III will look at this.

This document also includes 2 Annexes:

- The benefits of cycling
- Cycling contributes to Sustainable Development Goals

The roadmap towards the EU Cycling Strategy document

This strategy document has been put together by an expert group with 27 members, representing 15 governmental and non-governmental organisations, academia and business representations (see list below) which met three times in Brussels. In addition, input was collected over the past 8 months (September 2016–May 2017) from a much wider set of stakeholders through various channels: 7 public events/ workshops with a total audience of about 250 persons, a survey of more than 630 people and organisations from 37 countries and an online public

consultation in which close to 60 private persons and organisations participated.In total, approximately 1,000 individuals were involved in the process of formulating the strategy. The recommendations of the own-initiative report of the Committee of the Regions 'An EU Roadmap for Cycling' were also taken into account.

Events:

June 22, 2016	Cycling Forum Europe breakfast meeting
September 14, 2016	EU Cycling Strategy kick-off event 'Cycling into the Future'
September 29, 2016	Stakeholder workshop at CIVITAS conference
September 28 – November 6, 2016	Public survey (results: here)
October 12, 2016	Adoption of the Committee of the Regions opinion on 'An EU Roadmap for Cycling'
November 25, 2016	1st expert group meeting
December 6, 2016	Cycling Forum Europe Bikeconomics event
January 24, 2017	1st Workshop ECF – European Union Cycling Group
February 14, 2017	2nd expert group meeting
February 20, 2017	Public event on behavioural change (Bike2Work)
March 13, 2017	2nd Workshop ECF – European Union Cycling Group
March 20 – April 10, 2017	Draft version of EU Cycling Strategy blueprint document online for public consultation
April 25, 2017	3rd expert group meeting
June 16, 2017	Publication and public hand-over of EU Cycling Strategy to EU Commissioner for Transport, Violeta Bulc, at the Velo-city 2017 conference in Arnhem-Nijmegen
June 28, 2017	Big Bike Event': Public event where the EU Cycling Strategy will be presented, organised by the Permanent Representations of the Benelux countries to the EU

Expert group members

The following experts were represented in the group:

Organisation	Expert	Role
Catholic University Leuven (Leuven Mobility Research Center), Belgium	Thérèse Steenberghen	Leader of Chapter 11
CONEBI - Confederation of the European Bicycle Industries	Manuel Marsilio	Leader of Chapter 8
CROW, Netherlands	Hillie Talens	Leader of Chapter 4
Cycling Embassy of Denmark	Mai–Britt Kristensen	Leader of Chapter 3
Department of Transport – Ministry of Sustainable Development and Infrastructure of Luxembourg; Permanent Representation of Luxembourg to the EU	Christophe Reuter Sam Weissen	Leader of Chapter 10
ECF – European Cyclists' Federation	Adam Bodor Marcio Deslandes Holger Haubold Zoe Kruchten Fabian Küster Edward Lancaster Kevin Mayne Randy Rzewnicki Benedicte Swennen Emelie de Wagt Ceri Woolsgrove	Overall coordination; Leader of Chapter 1 and 2 and Annex SDGs
EPHA – European Public Health Alliance	Nina Renshaw	Leader of Benefits Annex
ETSC – European Transport Safety Council	Ellen Townsend	Leader of Chapter 5
European Commission	Piotr Rapcz	Observer
GIZ – German Development Agency	Jakob Baum	Leader of Chapter 9
Green Budget Europe	Bridget Farrel	Leader of Chapter 7
Federal Ministry of Agriculture, Forestry, Environment and Water Management, Austria	Martin Eder	Cross-chapter contribution
Ministry of National Development, Cycling Coordination Department, Hungary	Miklos Berencsi	Cross-chapter contribution
Polis	Florinda Boschetti	Leader of Chapter 6
Transport for London, United Kingdom	Brian Deegan	Cross-chapter contribution (3, 4, 5)
UCI – Union Cycliste Internationale	Michael Brennan	Cross-chapter contribution

Chapter 1 – Policy context, the benefits of cycling and the added value of EU action

Introduction

This Chapter is divided into 3 parts and addresses the following issues:

Part 1 surveys the wider policy context for the EU Cycling Strategy (EUCS) by identifying both European and global policy priorities.

Part 2 demonstrates how cycling can deliver on these policy priorities in a cost-efficient manner.

Part 3 explains why there is a need for EU action and lists the requests that were expressed by EU institutions in response to the call for an EU Cycling Strategy. It discusses the issue of EU competence to act and argues that the EU is well placed to take action which could not be met otherwise solely or not solely through Member States action at national, regional or local level.

1.1. Policy Context: European and Global Agenda

European Union

The European Commission has identified 10 strategic priorities it will focus on during its 2014 – 2019 term.[1] Cycling can make a crucial contribution to at least three of these priorities: **'A New Boost for Jobs, Growth and Investment' (Priority # 1), 'A Resilient Energy Union with a Forward-Looking Climate Change Policy' (Priority # 3)** and **'A Deeper and Fairer Internal Market with a Strengthened Industrial Base' (Priority # 4).** Cycling has also some links to 'A Connected Digital Single Market' (Priority # 2) and 'A Stronger Global Actor' (Priority # 9).

The challenges addressed by Priorities # 1 and 4 are straightforward: generating more employment opportunities by investing in the industrial base of the EU. More specifically, the Union has set itself the target that 75% of women and men aged 20–64 should be in employment by 2020; there should be a greater participation of young people, older workers and low-skilled workers; 3% of GDP should be invested in research and development, also thanks to innovative small and medium-sized enterprises; across the EU, there will be economic, social and territorial cohesion, with a high emphasis on social inclusion: 20 million people will be taken out of the risk of poverty and exclusion; bringing industry's weight in the EU's GDP back to 20% by 2020, from less than 16%.

As far as Priority # 3 is concerned, the Europe 2020 strategy set the 20/20/20 targets, i.e. reducing Green House Gas (GHG) emissions by 20% by 2020 (compared to 1990). This ambition has been upgraded to 40% by 2030. The Transport White Paper 2011 set the specific target for the transport sector at minus 60% by 2050.[2] 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.

[1] (Juncker, 2014)
[2] (European Commission, 2011)

At the moment, the EU is still a very long way from achieving these targets, as transport GHG emissions exceed 1990 levels by about 20%, so that transport is the single biggest GHG emitting sector and accounts for about 25% of all GHG emissions. All other economic sectors have managed to decrease their GHG emissions since 1990.

There is a wealth of subsequent Commission policy documents aimed at implementing said priorities, including the Green Employment Initiative[3] as well as the Horizon 2020 Work Programme 2018–2020.[4]

Global

At the global (UN) level, two major processes have taken centre stage over the past few years and have a strong link to the Commission's priorities # 1 and 3: the Sustainable Development Goals (SDGs) and the Paris Agreement. Although transport has no dedicated SDGs, cycling can contribute to 11 of the 17 goals. Also of global relevance is the New Urban Agenda which sets global standards for sustainable urban development. Cycling has a direct link to the agenda's action points on better public spaces, more liveable cities and road safety. (For further detail see Chapter 9)

Societal trends, drivers, technology

The policy context is also shaped by wider societal trends, drivers and technology. The project Mobility4Europe[5] aims at developing an 'Action Plan for the Future of Mobility in Europe' from now until 2030. Cycling plugs into at least 4 of the 8 identified trends, including:

- Inclusive society, personalisation and accessibility;
- Digital society and Internet of Things as novel business models and innovation in transport;
- Urbanisation and smart cities;
- Growing importance of environmental protection.

These trends will be discussed in Chapter 2 as part of the discussion on the growth potential for cycling by 2030.

1.2. The Benefits of Cycling: A High Return on Investments

The benefits of cycling in addressing the EU and global agenda

Quantifying the benefits of cycling for the EU

In 2016, ECF has published a report classifying and partially quantifying the benefits of cycling in the EU. The report found that every year, cycling in 28 EU Member States creates economic benefits of EUR 513 billion, that is more than EUR 1000 per inhabitant. It demonstrates that the benefits of cycling arise not only in specific, isolated fields like transport or environmental policy, but also in many other areas where the EU has competences, such as industrial policy,

[3] (European Commission, 2014)
[4] (European Commission, 2016)
[5] (European Commission - mobility4eu)

employment, health and social policy. The benefits of cycling even extend to such societal areas as integration of refugees, access to mobility, employability, etc.[6] (For a complete overview of the benefits of cycling: see Annex 'Benefits of Cycling')

Commission Priorities # 1: 'A New Boost for Jobs, Growth and Investment' and # 3: 'A Deeper and Fairer Internal Market with a Strengthened Industrial Base'

21 million bicycles and EPACs are sold annually across Europe, of which 13 million are produced in the EU: the European bicycle industry generates 90,000 jobs in the Union market with over 800 SMEs working in 20 of the 28 Member States[7], up from 70,000 jobs in 600 SMEs 5 years ago. This makes cycling one of the largest green employers in Europe, generating annually over EUR 1 billion EU investments and approximately EUR 12 billion worth of EU industrial output.[8]

Across all economic sectors, over 650,000 jobs are associated with the current level of cycling in Europe, mainly in the tourism sector. Cycling has higher employment intensity per million euro turnover than other transport sectors, thus offering a higher job creation potential. Furthermore, cycling jobs are more geographically stable than other sectors; they benefit local economies, and they offer access to the labour market to people with relatively low qualifications.[9]

If cycling's modal share were to be doubled, more than 400,000 additional jobs could be created, reaching a total of more than 1 million jobs in the cycling economy. This means that cycling helps the EU to achieve the Europe 2020 goals in terms of green growth and green job creation, as stated for example in the Green Employment Initiative.

Another economic benefit of cycling comes with the physical and mental health benefits of regular commuting by bike to work, namely diminished work absenteeism, hence providing significant benefits for businesses and employers. Employees who cycle to work have 1.3 fewer sickness days than those who do not cycle to work, a gain per employee of EUR 260 per year.[10] Across the EU, cycling to work provides a EUR 4.5 billion benefit due to reduced absenteeism and contributes to EU occupational, safety and health (OSH) policy goals of reduced absenteeism and sustainable jobs.

Commission Priority # 3: 'A Resilient Energy Union with a Forward- Looking Climate Change Policy'

Various studies at national, European and global levels have demonstrated the CO2 savings potential in the transport sector through increased levels of cycling:

i) National level

28% of CO2 emissions in Germany in passenger transport are on trips shorter than 15 km. With the growing popularity of electric bicycles (see Chapter 2), there is growing potential to shift from car use to cycling for these distances. For trips longer than 15 km, speed pedelecs as well as a better 'multimodal' or 'intermodal' combination of bike and public transport, in particular trains would add to the CO2 savings potential of 'more people cycling more often'.

[6] (Neun & Haubold, 2016)
[7] (Official Journal of the European Union, 2013)
[8] (Confederation of the European Bicycle Industry; European Bicycle Manufacturers Association, 2017)
[9] (Blondiau & Van Zeebroeck, 2014)
[10] (Hendriksen, Simons, Garre, & Hildebrandt, 2010)

Trip distance in passenger transport	Share of trips	Share of transport CO2 emissions	Accumulated share of 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%

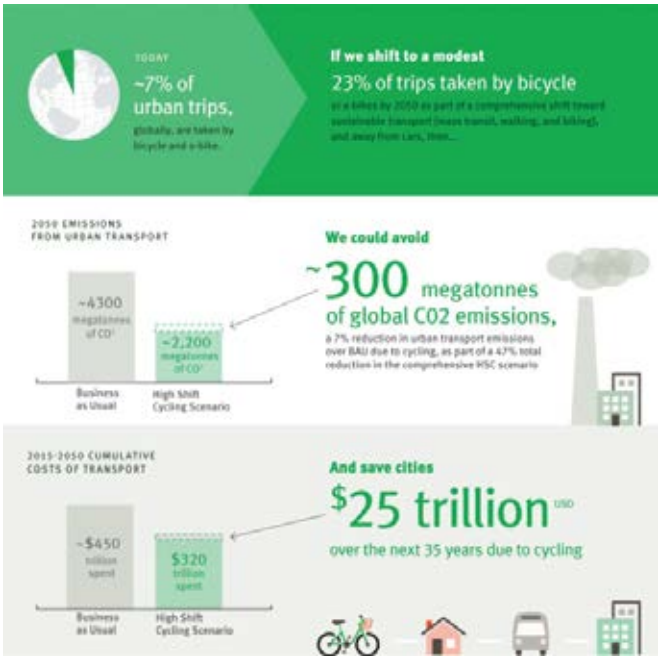
A study from TU Dresden[11] estimated that 11.2% of transport CO2 emissions could be saved if the cycling mode share in the transport modal split increased from 11% to 49%. The savings potential could be increased to 27.4% in an integrated approach – i.e. strong promotion of walking, cycling, public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

ii) European level

A 2011 ECF study estimated that the current levels of cycling saved 11–24 million tonnes of carbon dioxide equivalent (CO2e). If we assume that by 2020, the whole EU population would cycle as much as the population of Denmark did in 2000[12], between 55 and 120 million tonnes of CO2e could be saved annually. If the EU level of cycling was to reach Danish levels (as in 2000) by 2050, this would represent savings of between 63 and 142 million tonnes of CO2e per year, representing **12 to 26% of the target reduction set for the transport sector.[13]**

iii) Global level

A global high-shift cycling scenario developed by the Institute for Transportation and Development Policies (ITDP) and the University of California at Davis[14], 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 baseline, 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 account for up to 14% of urban kilometres by 2050 – ranging from about 25% in the Netherlands and China to about 7% in the U.S. and Canada.



[11] (Prof. Dr. -Ing. Ahrens, Prof. Dr. -ing. Becker, & et all., 2013)

[12] Danish levels of cycling were on average 5 times higher than the European average.

[13] (Blondel, Mispelon, & Ferguson, 2011)

[14] (Institution for Transportation & Development Policy;

Cost-benefit analysis

Studies from around the globe show that cycling is a very cost-efficient mode of transport. While the exact figures vary due to different local conditions and different methodologies used, the reports all show that the benefits of cycling in various areas like public health, congestion reduction or emission avoidance largely outweigh the costs of building new infrastructure, which are lower than for other modes of transport.

United Kingdom and Finland

In August 2014, the British Department for Transport published a report on cost-benefit ratios of cycling projects in both urban and rural environments (under the Cycle City Ambition Grant and the Cycling in National Parks Grant). The analysis showed that the average cost-benefit ratio for these projects was very high, with £5.50 of social benefits for every £1 of public money spent. Most of the benefits (61%) resulted from enhanced physical fitness, with congestion relief (18%) and journey ambience (18%) making up for most of the rest.[15]

Brussels and Helsinki

A similar study analysing direct and indirect effects of investments in cycling has been carried out for the Brussels region in Belgium by the region's transport authority. Looking at the situation in 2002 and 2012 and projecting the results into the near future (2020), the study found that investments in cycling yielded returns 5 to 9 times higher than the original investments already under current conditions. An ambitious cycling policy would lead to societal gains in Brussels of around EUR 300 to 550 million, which would be 8 to 19 times the original investment. Furthermore, 500 additional jobs linked to cycling could be created by 2020.[16]

The Helsinki Bicycle Account 2015 put the Benefit-to-Cost-Ratio of cycling investments at 8:1.[17]

New Zealand

Researchers from the University of Auckland studied the societal costs and benefits of commuter cycling in their city. Using 'system dynamics' modelling and building on knowledge from the local community, policy-makers and academics, they found that a best-practice cycling policy would deliver returns up to 24 times higher than the initial investments, while also saving 4,000 years of life from 2012–2051 and halving greenhouse gas emissions. The study took into account costs and rates of injuries, health effects of air pollution and physical inactivity, greenhouse gas emissions, and fuel cost savings.[18]

Comparing cycling with other modes of transport

Transport transitions in Copenhagen: comparing the cost of cars and bicycles

In a comparative study, Stefan Gössling from Lund University and Andy S. Choi from the University of Queensland have investigated a cost-benefit analysis that the Copenhagen

[15] (Department for Transport UK Government, 2014)
[16] (Van Zeebroek & Charles, 2014)
[17] (City of Helsinki, 2015)
[18] (Macmillan , et al., 2014)

Municipality uses to determine whether new cycling infrastructure should be built. It considers how much cars cost society and how they compare to bicycles in terms of air pollution, climate change, travel route, noise, road wear, health and congestion in Copenhagen.

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 per kilometre and the impact of the bicycle is EUR 0.08 per kilometre. The study also shows that if we only look at costs/benefits for society, one kilometre by car costs EUR 0.15, whereas society earns EUR 0.16 on every kilometre cycled.[19]

Pedestrians and cyclists receive "reverse toll money" in Norway

In 2014, around 10,000 NOK (EUR 1,200) was handed out in the town of Lillestrøm to pedestrians and cyclists in a symbolic action as "reverse toll money". The money symbolised the health benefits of walking and cycling, including better fitness, improved air quality and more efficient transport. Cyclists received around EUR 12, while pedestrians were given EUR 11. Calculations carried out by the Norwegian Directorate of Health showed that active transport gives the state a saving of 52 NOK (EUR 6) per kilometre for pedestrians and 26 NOK (EUR 3) per kilometre for cyclists. An average bike trip in Norway is 4 kilometres, providing a health benefit of 100 NOK (EUR 12), while an average walking trip is 1.7 km, worth almost 90 NOK (EUR 11).[20]

Vancouver – Cost of Commute Calculator

The Cost of Commute Calculator by 'Moving Forward', a data journalism project about the future of transportation in the Vancouver Metropolitan Region, is an interactive tool that aims to capture the full cost and benefit of driving, taking the bus, cycling and walking in Metro Vancouver. It looks at items like the cost to build road infrastructure or operate buses. In addition to these cost items, which typically dominate the debate over the cost of mobility, this calculator also considers the costs of less obvious impacts like emissions, climate change, accidents, congestion and even noise pollution. Taking the different cost factors together, the authors arrive at the following values (in Canadian Dollars, 1 CAD = 0.662 EUR on 5 May 2017):[21]

Cost to user	Cost to society
$ 1.22 / passenger-km by bus	$ 0.06 / passenger-km by bus
$ 1.29 / passenger-km by automobile	$ 0.56 / passenger-km by automobile
$ 0.74 / person-km by bike	$ -0.15 / person-km by bike
$ 1.59 / person-km by foot	$ -0.22 / person-km by foot

When the cost appears as a negative (-), there is a net benefit to the user or to society, rather than a cost.

[19] (Gössling & Choi, 2015)
[20] (Britton, 2014)
[21] (Stewart-Wilson, et al., 2015)

The Netherlands: cost of infrastructure

Dutch research from 2016 shows that cycling not only brings substantial benefits, but also costs less when building infrastructure. The report gives the following cost estimations per kilometre travelled and per year/user:[22]

Annual costs for infrastructure in EUR	Car	Cycling
per km travelled	0.10	0.03
per user	342	33

Germany: subsidies for e-mobility (fiscal measures)

For example, Germany had already spent ca. EUR 1.4 billion of public subsidies on research and development of electric cars up to 2014, and added another subsidy scheme of almost EUR 1 billion, including a buyer's premium, in 2016. The results of this massive investment up to the present are rather disappointing: currently there are 25,500 purely electric cars are on German roads, and the target of rolling out 1 million electric cars by 2020 seems almost impossible to reach. Over the same period, electric bikes have had a massive uptake in Germany with hardly any public subsidies involved either on the research and development side or in the form of purchase premiums, apart from a few small pilot projects. Currently, approximately 2.5 million electric bikes are in use in Germany, and the number would probably be much higher if there had been the same targeted and massive public financial support as for electric cars.[23] (See infographic in Chapter 8.1)

1.3. Possibility, Demand, and Added Value of EU Action

Legal basis

The legal basis of the EUCS Recommendations, is Article 4(2)(g) and Title IV of the Treaty of the Functioning of the European Union.[24]

A large part of the initial priorities for devoting a separate title in the Treaty for a common EU transport policy have been achieved: an economically successful and dynamic transport market. Social and environmental concerns have however now become increasingly serious constraints.

The objective of the EUCS Recommendations is thence to build on the 'sustainable mobility' model of the EU's common transport policy. Increased traffic volumes need now to be managed so as to minimise external costs, such as road accidents, air- and noise pollution, environ-

[22] (Vereniging van Nederlandse Gemeenten (VNG); het Interprovinciaal Overleg (IPO); vervoerregio's Rotterdam Den Haag en Amsterdam; de Unie van Waterschappen; het Nederlandse Ministerie van Infrastructuur en Milieu, 2016)

[23] (Haubold, Electromobility for all: Financial incentives for e-cycling, 2016)

[24] TFEU Article 4(2)(g) is 'Transport'; TFEU Title IV is 'Free Movement of Persons, Services and Capital'

mental damage, traffic congestion, and broadly, climate change.

Half of the EU (adult) population cycles at least once a year, with eight percent of the population using the bicycle as the primary mode of transport. The figure differs significantly across Europe: from high percentages in the Netherlands, Denmark and Hungary (36%, 23%, and 22% respectively), Germany and Sweden in the middle (12% and 17%), to levels close to 0% in Malta, Cyprus and Portugal.[25] Among cyclists 2,112 were killed on European roads in 2014, representing some 8.1% of all road fatalities.[26]

Subsidiarity (for non-exclusive competence)

The EUCS Recommendations complies with the subsidiarity principle as set out in Article 5 of the Treaty of the European Union.

The objectives of this EUCS Recommendations cannot be adequately achieved by the Member States alone.

The general objective of this initiative is to devise an EU Cycling Strategy to coordinate cycling policies among different Commission departments and Member States.

In pursuit of the 'sustainable mobility' policy model, many local authorities have been producing integrated transport strategies (some with the support of the European Commission), about half of the EU Member States have a current national cycling strategy in place, and many Member States are currently developing their national cycling strategies . For instance, Austria, the Czech Republic, Finland, Hungary, Germany, Ireland, Slovakia and the United Kingdom have set concrete quantitative objectives to increase the modal share of cycling.[27]

In the development of these national/local transport strategies, each individual Member State is unable to ensure overall coherence of its strategy with those of others. An initiative at the EU level would therefore help to ensure the development of specific cycling strategies that sufficiently target all EU objectives in the transport, environmental and health areas, in a coherent manner.

The gains to be had from lowering barriers to cooperation, reducing coordination costs within the EU institutions, and increasing exchanges of best practices across local authorities each working on their own cycling strategies, has wide-ranging impact as well.

A little less than half (42%) of all car trips could plausibly be shifted to (e-)cycling,[28] contributing to the green-house gas emissions reduction target for the transport sector (60% by 2050). Economic gains of a modal shift towards cycling are no fewer: benefits of cycling have been valued at EUR 513 billion and 650,000 jobs.[29]

The full socio-economic and environmental benefits of cycling can thus only be unlocked if there is an coordinated approach at European level that legislates where it has competence, identifies and exchanges best practice and builds capacities at those local, regional and national authorities that currently lack behind.

This EUCS Recommendations aims to devise an

[25] (European Commission, 2014)
[26] (Eurostat, CARE database, 2017; European Commission; European Road Safety Observatory, 2016)
[27] (Küster F. , 2017)
[28] (Reiter & Wrighton, Potential to shift goods transport from cars to bicycles in European cities. Cyclelogistics: Moving Europe Forward., 2011 - 2014); see for calculations Chapter 2.2. 'Cyclelogistics case study: the potential for shifting motorized trips to cycling'.
[29] (Neun & Haubold, 2016) (Blondiau & Van Zeebroeck, 2014)

EU Cycling Strategy to remove fragmentation in the development of relevant policies across the EU institutions, and avoid inefficiencies in the expansion of local cycling strategies.

Action at the EU level would be more effective than action at the national levels.

Demands for a cycling strategy by the EU

The European Commission's co-legislators (and consultative bodies) have already called upon the Commission to develop an EU Cycling Strategy (besides the Commission itself having referred to goals in transport policy, achievable through increased cycling).

The Council of the EU, meeting in their Transport, Telecommunications and Energy configuration in October 2015 (Transport, informal) in Luxembourg, saw transport ministers of all 28 Member States endorsing the 'Declaration on Cycling as a Climate-Friendly Transport Mode' (7 October 2015).[30] The Declaration included three action points as regards action on the European level:

i. Integrate cycling into multimodal transport policy, including smart mobility, stressing the need to promote physical infrastructure and behavioural change programs.

ii. Develop an EU level strategic document on cycling. 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.

iii. Set up a European focal point for cycling (1) to serve as a one-stop-shop for cycling related questions, (2) to facilitate the exchange of best practices among Member States, notably on cyclists' road safety, and (3) to monitor the implementation and the impact of the EU strategy for cycling.

The European Parliament, in its response to the European Commission's Midterm Review of the 2011 White Paper on Transport, called for 'an EU roadmap for cycling to be included in the Commission Work Programme 2016' (September 9, 2015).[31]

The Committee of the Regions adopted its own-initiative report for an 'EU Roadmap for Cycling' (October 12, 2016).[32]

The added value of EU action

Intervention by the EU in the following areas, such as economic growth, job creation and climate change mitigation, shall prove to be beyond the sum of initiatives at any local level.

Low emission mobility

In reference to the Paris Agreement, to lower greenhouse gas emissions by 1.5 degrees by 2030, the European Commission has come forward with a strategy for low emission mobili-

[30] (Présidence du Conseil de l'Union européenne / Luxembourg 2015, 2015)

[31] (European Parliament, 2015)

[32] (European Committee of the Regions, 2016)

ty, which is currently being implemented by the introduction of several proposals. At the same time reducing emissions in transport are also part of the Effort Sharing Regulation. The objective is to lower emissions with at least 60% by 2050.

On another level, mayors are also increasingly taking initiative to render their cities more green and sustainable. Under the Covenant of Mayors for climate and energy, cycling is consistently promoted as a means to contribute to a cleaner and more liveable environment.[33] Under the overarching idea of curtailing emissions, the EU should also consider adopting a strategy on specifically promoting the use of bicycles in cities.

Growth and jobs in a thriving bicycle manufacturing and cycling tourism industry (Chapter 8)

The European Bicycle Industry generates more than 90,000 jobs in the Union market with over 800 SMEs working in 20 of the 28 Member States. This makes cycling one of the largest green employers in Europe.[34] Since 1993, the EU industry has benefited from European Commission antidumping measures against the unfair competition from China's exporters of bicycles and has successfully had the measures renewed, along with anti-circumvention measures applied to some other countries.[35] With this protection, the EU bicycle industry has stabilised a loss of market share to Chinese producers and has been able to maintain a critical mass of manufacturing in the EU – unlike the USA and Japan, which have lost almost all local manufacturing. The employment trend over the past 5 years (+20,000 jobs) suggests that EU anti-dumping measures have been successful.[36]

Another significant contribution by cycling to the EU economy is tourism, an increasingly important part of the sector, generating approximately €44 billion per year,[37] and employing an estimated 450,000 people[38] around the continent. According to a study commissioned by the European Parliament, 2.3 billion cycle tourism day trips are undertaken per year in Europe, and 20.4 million cycle trips include overnight stays.[39] Article 6 and Title XXII of the TFEU advises specific measures to complement actions within the Member States to achieve the objectives of increased tourism. In order to encourage more people to cycle for tourism and recreation, many countries in Europe have started to coordinate and invest into the necessary actions on the national level (e.g. route management, signing, monitoring, communication and promotion etc.). Europe is the world #1 (cycle) tourism destination, mainly due to the internal market of the EU. Other countries around the globe are equally investing into cycle tourism and attract cycle tourists from abroad. Thus, the competition is getting stronger and the separate efforts

[33] (Covenant of Mayors)
[34] (Confederation of the European Bicycle Industry; European Bicycle Manufacturers Association, 2017)
[35] (European Commission (TRADE))
[36] (Confederation of the European Bicycle Industry; European Bicycle Manufacturers Association, 2017)
[37] Institute of Transport and Tourism, University of Central Lancashire and Centre for Sustainable Transport and Tourism, NHTV Breda University of Applied Sciences (2012) "The European Cycle Route Network EuroVelo - Challenges and Opportunities for Sustainable Tourism": http://www.europarl.europa.eu/thinktank/en/document.html?reference=IPOL-TRAN_ET(2012)474569
[38] ECF (2015) "Cycling Works – Jobs and Job Creation in the Cycling Economy": https://ecf.com/groups/cycling-works-jobs-and-job-creation-cycling-economy
[39] Richard Weston et al., ed. Marc Thomas, ed. assistance Nóra Révész, The European Cycle Route Network EUROVELO study (Directorate General for Internal Policies Policy Department B: Structural and Cohesion Policies – Requested by European Parliament's Committee on Transport and Tourism), Brussels, 08/2012, https://ecf.com/sites/ecf.com/files/EP%20-study%20on%20EuroVelo%20network.pdf

of the Members States are not sufficiently effective on the global market. To benefit from this growing global business, is a Commission competence – and this EUCS Recommendations argues, a dire necessity – to increase the support and coordination for more coherent and attractive European cycling tourism products (routes), services promotion and marketing especially on long haul markets.

Promote physical activity to improve population health

For 2016-2020, physical activity takes the central stage in the EU objective to promote cost- effective health and disease prevention. Physical activity reduces the risk of heart diseases, obesity and cancer. To promote physical activity in a clear and consistent matter across the EU, it is necessary to implement union-wide measures on promotion for physical activity such as promoting the use of bicycles to go to work. Currently, the range of efforts taken in this field across Member States varies broadly.

A level playing field (Chapter 7)

To achieve enhanced physical activity, lower emissions and the use of the most efficient modes of transport to avoid congestion, a technology-neutral approach should be established in taxation and fiscal systems as well. In April 2016, the Commission adopted an action plan on VAT and if it`s implemented it can make easier for Member States to extend reduced rates to bicycle sales.[40]. The European recommendation on other taxes, fiscal subsidies and green public procurement can help to divert mobility away from high emissions vehicles, be it in commuting to work or in delivery services, is often seen too narrow in terms of switching to public transport or to optimise delivery by reducing the number of rides or shortening routes. The recommendations on the European level set out in Chapter 7 can help to provide level playing field for cycling in comparison with other transport modes.

Urban mobility (Behavioural change - Chapter 3)

The quality of the urban mobility system in general and conditions for cycling in particular differ greatly between Member States (see Chapter 2) but also between cities within the same country. Local authorities who try to bring on change should not have to reinvent the wheel. As the Commission pointed out itself, "the EU added value consists of ensuring a more effective and coordinated policy making in and by the European urban areas, by providing national authorities with a policy and governance framework for the development of integrated mobility approaches in urban areas, in full respect of subsidiarity." [41]

Infrastructure (Chapter 4)

The European Union is spending at unprecedented levels on promoting cycling and improving infrastructure with €1.5 billion being allocated during the current financial period through the Cohesion Policy alone.[42] It is therefore important that value for taxpayer's money is attained and that infrastructure is delivered that does not compromise and promotes more people to cycle. The recommendations set out in subchapter 4.1 should ensure a high level of service that

[40] (European Commission, 2016)
[41] (European Commission , 2013)
[42] (Bodor, 2016)

will help to support the growth of cycling.

Cycling tourism projects may currently receive Cohesion Policy funding, but the actual use of these funds for tourism has occasionally been discouraged by the Commission during the preparation of the current funding programme.

Beside transport, the European Union has a shared competence on European Transport Networks. In December 15, 2011, the European Parliament gave significant support to EuroVelo, the European cycle route network in its response to the European Commission White Paper on Transport: "EuroVelo, the European long-distance cycle route network, should be included in the TEN-T network".[43] A reference to cycling and EuroVelo has was been included in the TEN-T Guideline by for the first time in 2014. Several Member States would like to use this opportunity and the coordination of the implementation needs coordination from the European institutions.

Road Safety (Chapter 3, 4 and 5)

There is real disparity in road safety between Member States, which shows that national, regional and local governments alone are not able to provide for a policy framework that ensures level of safety. There is also a real lack of knowledge amongst many Member States on how to start creating safer environments for cyclists despite the fact that within the EU there Member States who are world leaders in this field. This is a perfect market place for the EU to broker good safety standards and contribute to its road safety goals, such as the reduction of fatalities and serious injuries. Vehicle design and regulation through the General Safety Regulation is an area with strong EU competence. The added value in EU action is to enable type approved technologies like Intelligent Speed Assistance to work across the single market.

Multimodality and Intelligent Transport System (Chapter 6)

The Commission admits to following a policy of multimodality, whereby it ensures better integration of, and interoperability between, all transport modes.

This is also reiterated in the Commission's low emission mobility strategy, which states that "measures to support multimodal integration have an important role in achieving low emissions mobility by incentivising a shift towards lower emissions transport modes [...]."[44] EU action can ensure that cycling becomes a full partner in this multimodal transport system – for example, by providing funding through the Connecting Europe Facility, or through cohesion funds for bike parking facilities at intermodal transport hubs, or by improving conditions for bicycle carriage in other transport modes through Passenger Rights Regulation. Cycling and public bike-sharing data and services must also be included in the Commission's work on Intelligent Transport Systems, so as these may become interoperable and easily available for public authorities.

Protection of workers – bicycle delivery boom

The recent boom in bicycle delivery has led to an increase in bicycle traffic in cities across Europe. This does not only contribute to lower greenhouse gas emissions and pollutants in urban areas, but also assists in reducing congestion problems. At the same time, this trend exacer-

[43] European Parliament response to Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system (2011/2096(INI))
[44] (European Commission, 2016)

bates the urgent need for safer roads and infrastructure for cyclists, as well as adept training. Especially so, since it is found that "the risk of being involved in road accidents is significantly increased by time pressure."[45] Importantly, this evolution extends the issue of bicycling in the EU beyond protection of citizens to protection of employees (EU competence as set out in Article 153 of the Treaty) in their working environment, which happens to coincide with the public space. Guidelines that were set out by the European Agency for Safety and Health at Work explain the lack of EU efforts in this field and hence call for actions on the EU level.[46]

[45] (European Commission, 2013)
[46] (European Agency for Safety and Health at Work (Topic Centre - Work Environment Members), 2010)

End of CHAPTER 1

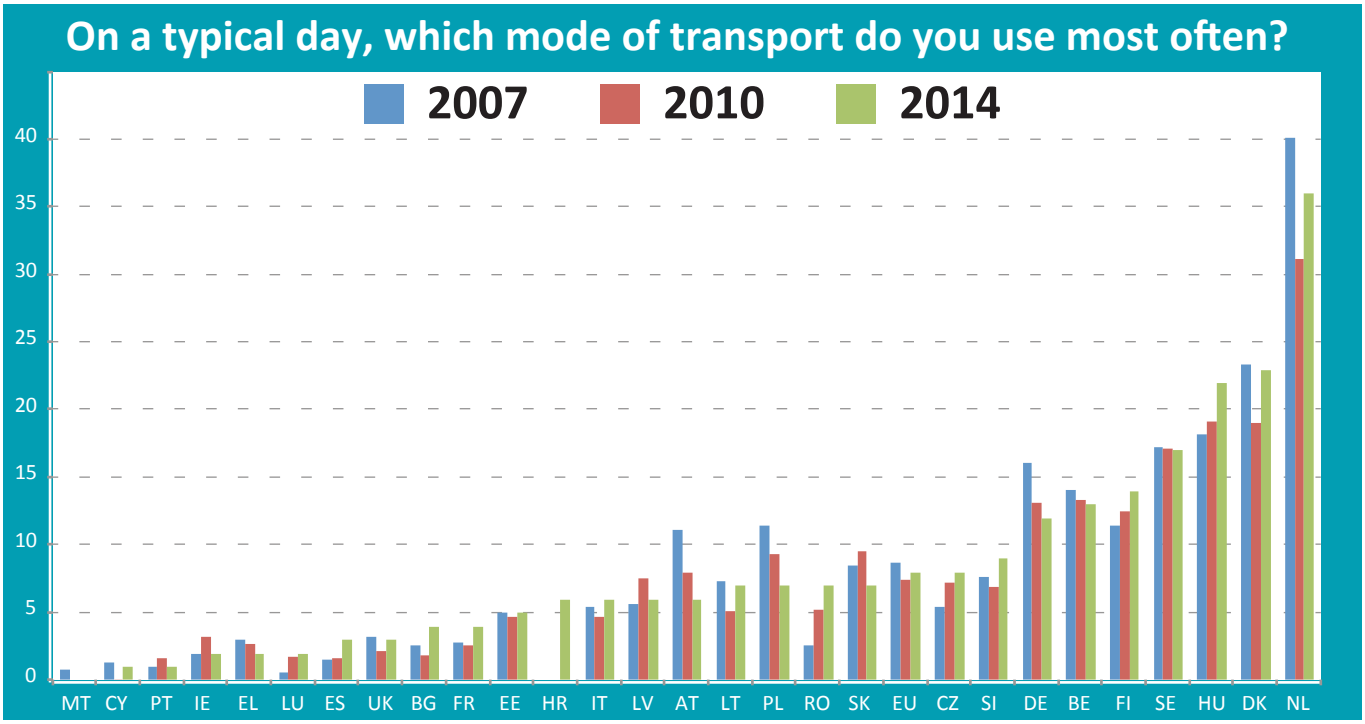
This chapter is divided into 3 parts:

1. The current state of cycling in the EU-28 with regard to cycle use, fatalities and bicycle sales;
2. The growth potential for cycling by 2030;
3. Overall policy objectives for the EU Cycling Strategy.

2.1. The Current State of Cycling in the EU

Cycle use in the EU-28

The exact cycling mode share in the transport modal split is unknown. Eurostat, the statistical office of the EU, only collected and published figures on cycle use until 2002[47], perhaps due to the lack of data in the 10 Member States that joined the EU in 2004. The only source to enable reliable comparisons and conclusions are Eurobarometer surveys, for example the Eurobarometer transport surveys from 2007, 2010 and 2014, asking the question: **"On a typical day, which mode of transport do you use most often?"**[48]



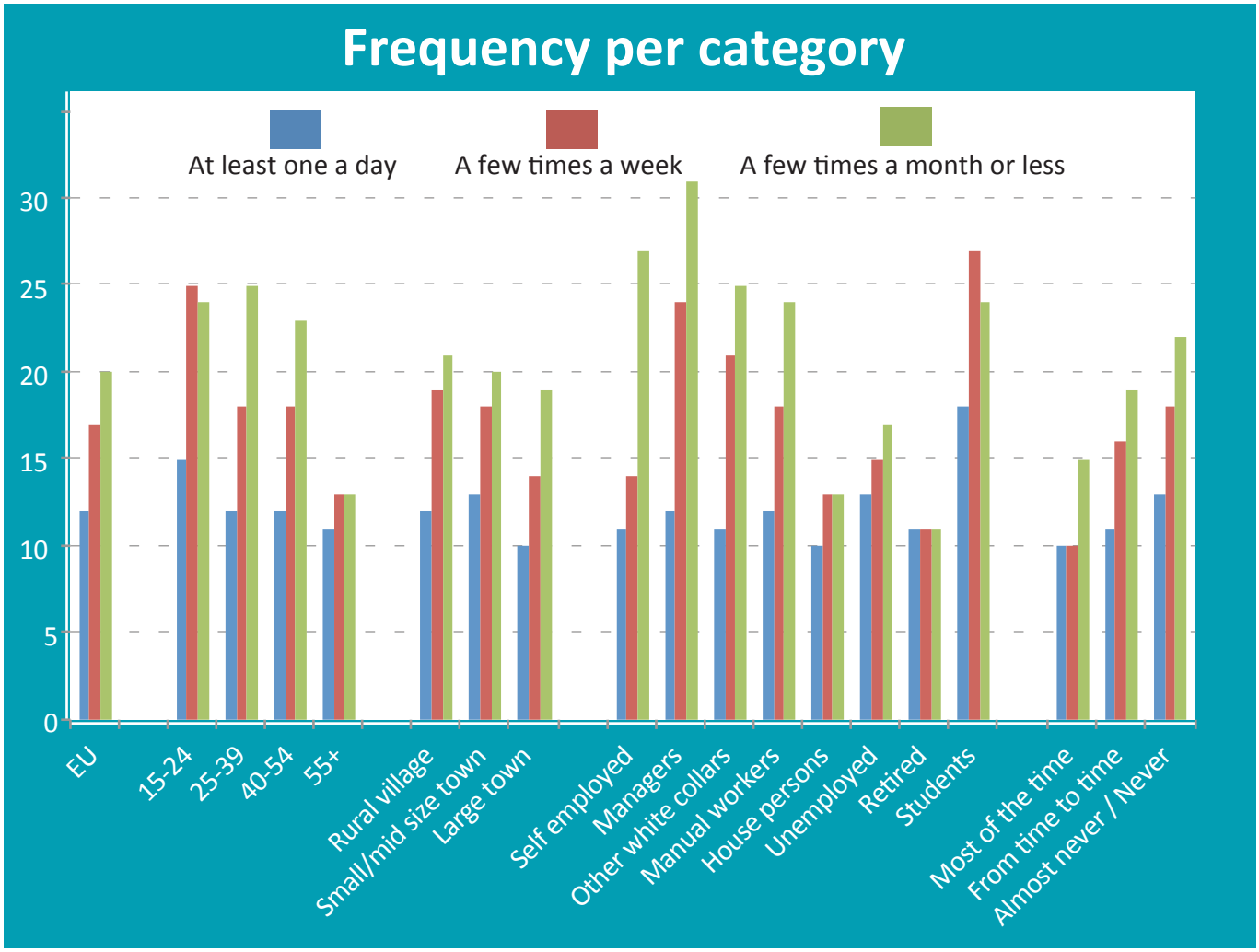
In 2014, 8% of respondents[49] replied 'bicycle' (compared to 8.6% in 2007 and 7.4% in 2010). The figures varied in the 2014 Eurobarometer between 36% in the Netherlands to 0% in Malta and 1% in both Cyprus and Portugal. Women and men were found to cycle to the same extent, namely 8%. With regard to age groups, the category 15–24 cycles most at 11%, whereas age groups 25–39 and 40–54 each came in at 7%; age group 55+ again saw a slight increase: 8%.

[47] EU Energy and Transport in Figures Statistical pocketbook, 2002; referenced in (ECMT, 2004)
[48] (European Commission, 2014)
[49] (European Commission, 2014)

About half the European population cycles

Another Eurobarometer[50] surveyed how often respondents used different modes of transport. Here 12% answered "at least once a day", 17% "a few times a week" and 20% "a few times a month or less". 50% replied they never did. We conclude that on a European average, 0.32 bicycle trips are made per adult person per day.

Once more, the Netherlands leads the pack with 43% of the respondents saying they cycled at least once a day and only 13% replying they would never cycle. The barometer also identified a clear age gap, with 64% of the age group category 15–24 found to be cycle users compared to 37% among the 55+.



Average cycle trip distance

The European Commission website cites a 1998 OECD report which found that in European countries the average cycle trip distance was around 3 km.[51] According to the same report, approximately 30–40% of the kilometres cycled are travelled on home-work trips, whereas home-leisure trips make up about 20–45% of the person-kilometres.[52]

[50] (European Commission, 2013)

[51] (European Commission, 2017); European countries included in the OECD report: UK, Switzerland, Denmark, Sweden, the Netherlands.

[52] (European Commission, 2017)

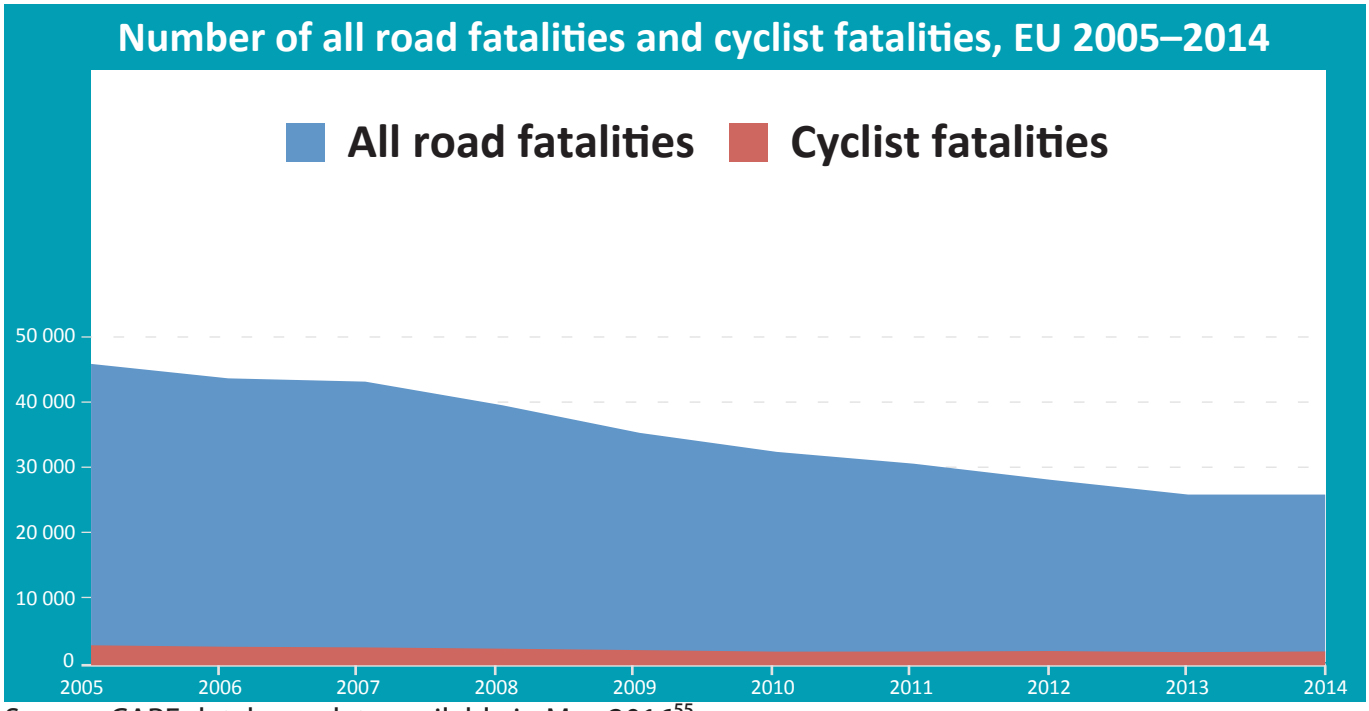
Cycle tourism, leisure and sport trips

Bicycles are also used for tourism and leisure. According to a study commissioned by the European Parliament, 2.3 billion cycle tourism day trips are undertaken per year in Europe, and 20.4 million cycle trips include overnight stays.[53]

ECF estimates that currently about 134 billion km are cycled every year in the EU.[54]

Road safety

In 2014, 2,112 cyclists were killed on EU-28 roads, representing 8.1% of all road fatalities. Many more were seriously injured. The proportion of cycle fatalities hence equals the proportion of cycle trips in the transport modal split.



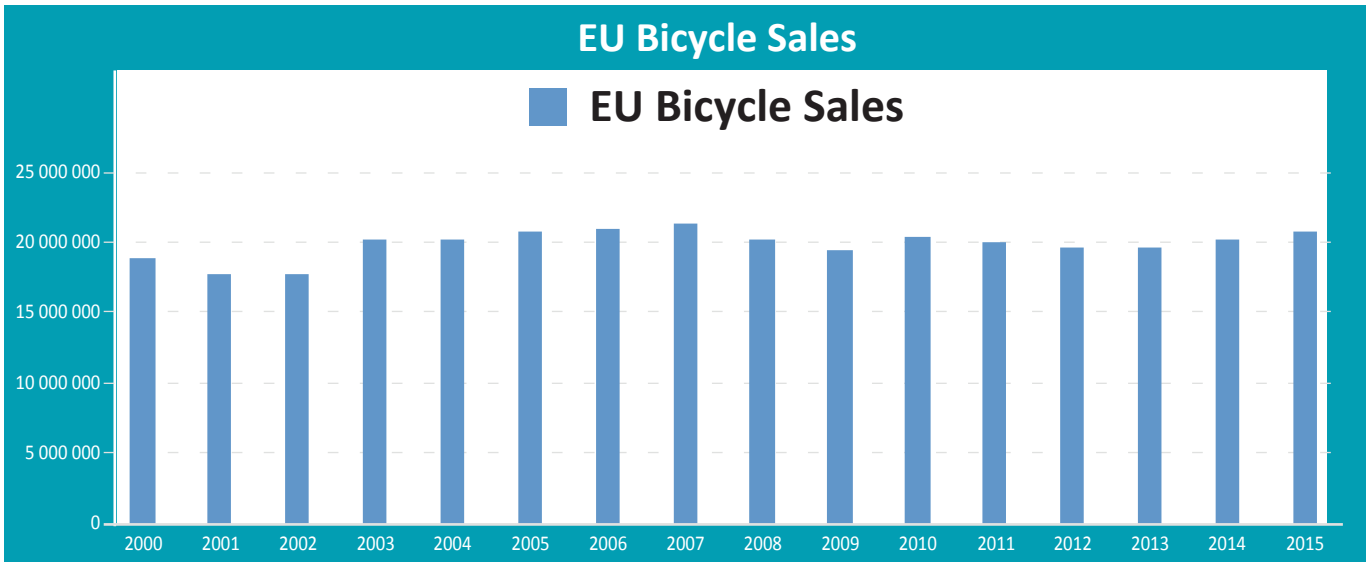
Source: CARE database, data available in May 2016[55]

For the EU as a whole, just over half of cyclist deaths occur in urban areas.[56] Collisions with motorised vehicles (other than powered two wheelers) make up around 78% of cycling fatalities in the EU. Collisions with goods vehicles and buses account for 24% of cyclist deaths (years 2011–2013). On average, single-bicycle accidents and bicycle-bicycle collisions account for 15% of all cyclist deaths in the EU.[57] The remaining causes for fatalities belong to the category 'unknown' or powered two wheelers.

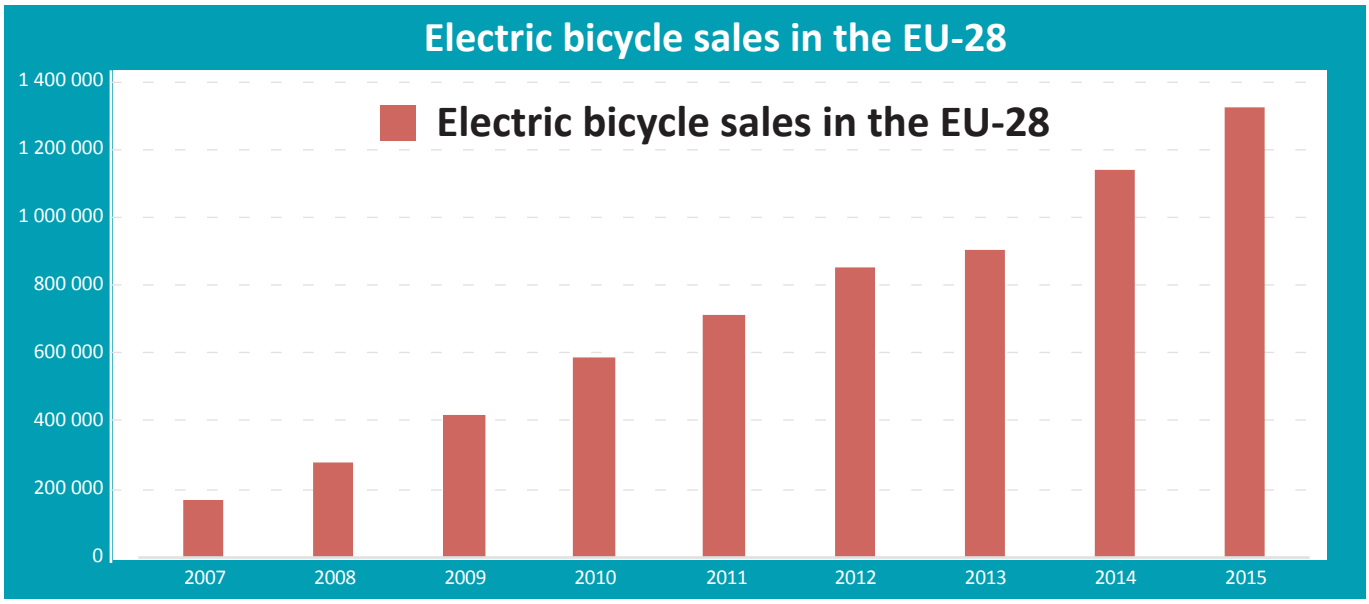
[53] (Weston, et al., 2012)
[54] (Neun & Haubold, 2016)
[55] (Eurostat, CARE database, 2017; European Commission; European Road Safety Observatory, 2016)
[56] (European Transport Safety Council, 2015)
[57] (European Transport Safety Council, 2016)

Bicycle sales

The EU bicycle sales market has been remarkably stable over the past 12 years or so in terms of quantity, with about 20 million bicycles being sold every year.[58]



At the same time, the electric bicycle market has seen strong growth figures over the past 10 years, with sales growing at an average annual rate of 16% in the period 2013–2015. In 2015 1.325 million electric bicycles were sold, bringing the total stock to about 6.5 million units in the EU by the end that year.



In absolute figures, Germany is the biggest market, with 535,000 electric bicycles being sold in 2015, bringing the total stock to about 2.6 million units.[59] In relative terms, Belgium leads the market with 39.2% of all bicycles sold in 2016 coming with electric assistance (186,000 units).[60]

[58] (Confederation of the European Bicycle Industry, 2016)
[59] (van Schaik, 2016
[60] (Editorial Staff (Becycled Magazine), 2017))

2.2. The Growth Potential for Cycling by 2030

Growing cycling is the stated policy objective of many political stakeholders. The intention, stated especially by local decision makers, is to realise this growth at the expense of individual car use. This section will discuss innovations specific to the bicycle sector as well as societal trends, look at the potential to shift motorised trips to cycling and sketch three possible scenarios for cycle use in Europe by 2030.

Cycle innovations

This part will focus on e-bikes, new ride/stability features, new materials and innovative cycle infrastructure solutions. The success of bike-sharing with its more than 500 schemes in Europe is well documented.[61]

Electric powered assisted cycles (EPACs)

For Europe as a whole, the steady growth in EPAC[62] sales is probably the main driver for an increase in cycling mobility.

The German Federal Environment Agency described the advantages of pedelecs as:

- Making it easier to travel longer distances,
- Making it possible to transport greater loads,
- Making it easier to overcome natural obstacles, such as inclines and headwinds,
- Offering an alternative to company cars, and
- Being ideal for recreational activities.[63]

This chapter already noted the big success in sales of EPACs on the European market. However, this success currently relies on the 5 most developed markets in terms of EPAC sales per capita (Austria, Belgium, Denmark, Germany, and the Netherlands), which accounted for 24.4% of the EU population[64] but 80% of EPAC sales in 2015.[65] In the meantime, other EU countries such as France, Italy, Spain, Sweden and the UK have seen growth in this segment pick up significantly.

This implies a tremendous potential to grow sales across the EU as a whole, with significant new growth taking place in regions of Europe where overall bicycle use is lower than the leading countries, i.e. the EPACs become the instrument for behaviour change and mode shift to cycling. In Europe's hotter climates, arriving at a destination transpiring is a major deterrent to cycling in the warmer months, a factor which is worse in hillier cities. Many of these countries have an established culture of using mopeds and scooters which are ideal for these conditions.

It is important to note that electric bike sharing has been introduced in Madrid, Milan and (in 2017) in Lisbon to address these major barriers to adoption of cycling. Barcelona, Paris and Lyon will introduce a proportion of electric bikes to their schemes in 2017 based on their market analysis of growth needs.

Based on 3 assumptions we conclude that there

[61] (Swennen, 2017)

[62] Electric powered assisted cycles include: Pedelecs – of speeds up to 25 kph and power cut out at 250 watts; L1e-A "powered cycles" – of speeds up to 25 kph and power cut out at 1000 watts; L1e-B for "mopeds" – of speeds up to 45 kph and power up to 4000 watts (speed pedelecs)

[63] (Wachotsch, Kolodziej, Specht, Kohlmeyer, & Petrikowski, 2014)

[64] (Eurostat, 2016)

[65] (Confederation of the European Bicycle Industry, 2016)

is a potential of generating about 103 billion km cycled on EPACs in 2030 through an increase in sales which would represent a 77% growth over current figures (134 billion km):

Assumption 1: The average annual growth rate in the years 2013–2015 for EPAC sales stood at 16%. The EPAC sales market continues to grow at an average annual growth rate of 16% until 2030. Hence about 12.3 million units will be sold in 2030 in the EU-28.

Assumption 2: EPACs will be in use for 8 years,[66] thus the total EPAC stock in 2030 will consist of 62 million EPACs sold in the period 2023–2030.

Assumption 3: The estimated annual mileage of an EPAC is approximately 2,000 km. A Swiss report put the figure at 2,400 km/year[67], a Dutch report at 1,500 km/year.[68] Calculation: 62 million EPACs × 2,000 km/EPAC = 124 billion km/year. The Swiss report also pointed out that about 1/6 of the kilometres cycled by EPACs were shifted from 'normal' bikes: 124 – 20.66 = 103.33.

Other types of EPACs

While pedelecs are the most common e-bikes sold, other types such as e-cargo bikes (in particular in the L1e-A category[69]) and speed pedelecs (L1e-B[70]) are entering the market (see Chapter 5).

E-cargo bikes can carry loads of up to 200 kg, and the number of logistic companies using them is steadily increasing.[71] The market for speed pedelecs is still in its infancy. In the Netherlands, 3,528 units were sold in 2015, bringing the total stock to about 5,700 (by October 2015).[72] A research project at the University of KU Leuven, Belgium, is currently studying the 'Quantification of technical performances, cyclist experience and safety of speed pedelecs for commuter use'.[73]

New bicycle design features

Bicycles are developing into hi-tech vehicles. The development of e-bikes and connected bikes enable features like active stability control and active speed adaptation, which can be brought to the market soon. Connected interaction with other traffic (sensors) and traffic control (e.g. traffic lights) are already being tested in pilots. These developments are aimed to improve rider confidence for first-time riders, new entrants and new users of e-bikes, overcoming some of the deterrents to use that stop people cycling. The bicycle industry is positioning itself as a provider of Smart Electric Mobility.

Innovative infrastructure solutions

'Convenience' and 'speed' are the two primary considerations for people to use a given mode of transport.[74] Hence the combination of EPACs with high-quality cycle infrastructure appears to be the right recipe for changing people's mobility behaviour.

Fast cycling routes[75] are "high standard bicycle

[66] (Delhaye, De Ceuster, Vanhove, Maerivoet, & (Transport & Mobility Leuven), 2017)
[67] (Buffat, Herzog, Neuenschwander, Nyffenegge, & Bischof, 2014)
[68] (Jones, Harms, & Heinen, 2016)
[69] (Official Journal of the European Union, 2013)
[70] (Official Journal of the European Union, 2013)
[71] (European Cycle Logistics Federation)
[72] (Rijksdienst voor Ondernemend Nederland (Netherlands Enterprise Agency), 2015)
[73] (Cappelle, Motoasca, & Rotthier, 2014 - 2018)
[74] (European Commission, 2014)
[75] (Ruebens, 2014)

paths reserved for cyclists for fast and direct commuting over long distances." At present, fast cycling routes projects can be found primarily in Northern European countries.[76] At city level, London and Copenhagen are the best-known examples. In the Netherlands, the construction of 675 km of 'Fietssnelwegen' (fast cycle routes) across the country is planned by 2025. Approximately one third of this is already in place. In North Rhine Westphalia, a 100 km long Ruhr fast cycle route is under development at an estimated cost of EUR 187 million. A feasibility study estimated that as much as 400,000 daily car-km could be shifted to cycling if this cycle highway is completed.[77] Many more cities are rolling out plans to build fast cycle lanes (Munich, Berlin, etc.).

Other innovations are related to the surface of infrastructure (such as the integrated use of solar panels), the gamification of cycle routes or the deployment of shared spaces.

Societal trends

Inclusive society, personalization and accessibility

'Healthy lifestyles' is one of the drivers identified. A healthy lifestyle is urgently needed in view of the huge costs of a lack of physical activity to Europe's health care systems. Numerous studies have come to the conclusion that a large segment of Europe's population does not meet the WHO minimum requirement for daily physical activity. A comparative study in 8 EU Member States found out that "the proportion of children who meet physical activity (PA) guidelines of 60 min of moderate-to-vigorous physical activity (MVPA) per day ranged from 2.0% (Cyprus) to 14.7% (Sweden) for girls and from 9.5% (Italy) to 34.1% (Belgium) for boys."[78]

Digital society and Internet of Things – novel business models and innovation in transport

'Mobility on demand' and 'shared mobility' (which imply a 'decline of the ownership model') are among the drivers identified here. Private car ownership, certainly in large cities where bike-sharing, car-sharing and ride-sharing options are becoming increasingly popular, is likely to decline in the mid- to long-term as mainly young people embrace these new technologies and mobility concepts. In the Netherlands, car ownership among the 18–30-year-olds decreased by 8% from 2005–2015 whereas it continued growing among the other age groups.[79] This coincides with a decline in the numbers of new driving licenses issued in cities, for instance in Brussels, where 30% fewer new driving licenses were obtained in 2016 than in 2000, despite 17% growth in the population of age group 18+. In the age group 18–21, the decline was even more marked with 48% fewer new driving licenses issued.[80]

With regard to bike-sharing, 524 schemes are currently operating in Europe.[81] Building on current success, bike sharing is still undergoing significant investment and changes in business models. This extends from moving bikes out of individual ownership into a fleet management structure similar to company cars through to

[76] An overview about cycle highways can be found at ECF website (Ruebens, 2014)

[77] (Planersocietät; Planungsbüro DTP; Planungsbüro VIA eG; orange edge; TCI Röhling Transport Consulting International; et al., 2014)

[78] (Ahrens, et al., 2017)

[79] (Centraal Bureau Statistiek (CBS), 2017); Age group : (30 – 50: + 3%; 50 – 65: + 12%; 65 – 75: +21%; 75+: +36%

[80] (De Sloover, 2017)

[81] (MetroBike, LLC, 2016)

huge fleets of bikes left on the streets of large cities without the need for traditional docking stations.

The fleet management approach to bicycle use is particularly interesting with the development of pedelecs and speed pedelecs because it overcomes barriers of price and maintenance for these more expensive and technical machines.

Connected bikes and bike fleets enhance this: Connecting bikes enables bike-sharing solutions to evolve to the next level and become an integral part of metropolitan mobility. Connected shared bikes are much easier to operate in shared systems and create opportunities for improved business models for bike sharing. Having an electrical power source on board a bike offers perfect opportunities for bikes to become part of a seamless, mobility-as-a-service (MaaS) transport network managed as a fleet, either by commercial operators or by employer fleet leasing schemes. The first connected bikes are coming to the market now, enabling new services to be linked to bikes that previously were only available in combination with cars. Once a bike is connected to a service network providing access to seamless plan, book and pay services, the bike will become an integral part of new mobility solutions in cities. Seamless connections with public transport and shared mobility services (see next section) are enabled and the bike will also become a reliable last mile solution. Even theft of (more expensive) high tech bikes is effectively tackled by connecting bikes.

Car and ride-sharing services are taking off in many cities across Europe as well. There is a potential for such services to contribute to an overall decrease in private car ownership, and if properly regulated, also a decrease in car trips, for example through the pooling of trips.

Urbanisation and smart cities

People are moving back to the cities. The European Commission predicts that by 2050, 85% of the people will be living in an urban environment, compared to 74% today.[82] If re-urbanisation is well-managed, i.e. if it respects the principles of mixed land-use planning, the trend to ever-longer average distances and total mileage caused by mass motorisation could come to a halt or even be reversed.

Short trip distances favour active modes: the average cycling trip distance in most European countries is about 3 km.[83] According to Dutch figures, e-bikes have a higher mileage compared to 'normal' bikes with a factor of 1:1.7, increasing the average distance of an e-bike trip to about 5 km.[84]

Growing importance of environmental protection

Poor air quality is one of the main environmental and public health challenges many cities are facing. The European Environment Agency estimates that more than 400,000 premature deaths per year are caused by toxic air in the EU.[85] In 23 out of 28 Member States, air pollution limits are still being exceeded. On February 14, 2017, the European Commission sent out final warnings to the 5 largest EU Member States (Germany, France, UK, Italy and Spain) for failing to address repeated breaches of air pollution limits for nitrogen dioxide (NO2).[86] Whereas

[82] (European Commission, 2011)
[83] (European Commission, 2017)
[84] (Delhaye, De Ceuster, Vanhove, Maerivoet, & (Transport & Mobility Leuven), 2017) (Ministerie van Infrastructuur en Milieu (Dutch Ministry of Infrastructure and Environment), 2015)
[85] (European Environment Agency, 2015)
[86] (European Commission, 2017)

more and more cities are introducing Low Emissions Zones (LEZ), environmental protections groups are taking authorities to courts in order to force them to step up measures.

Cyclelogistics case study: the potential for shifting motorized trips to cycling

As part of the Cyclelogistics projects,[87] a detailed analysis has been made as to what extent motorized trips could be shifted to cycling. The report says: "The share of motorised trips in European urban areas is on average 60% of all trips. 40% are done by public transport, cycling or walking.''

Taking all motorised trips as basis for the calculation (60% =100%), we find that 42% of all motorised trips could be potentially shifted to bicycle transport. Because these trips are:

- Related to light goods transport (more than a handbag less than 200 kg)
- Are short enough (less than 5 km for bike, less than 7 km for e-bike)
- Are not part of a complex trip chain that involves use of a car

Motorised trips and potential for shifting (Basis: 60% = 100% motorised trips)				
	Motorised trips purpose	Trips to shift to bike/cargo bike	Trips, no goods involved	Motorized trips; not to shift
Commuting	20%	5%	10%	5%
Leisure	23%	7%	8%	8%
Shopping	22%	17%		5%
Business	10%	5%		5%
Cargo & Service	25%	8%		17%
Total	**100%**	**42%**	**18%**	**40%**

Uncertainties and potential barriers to cycling

As described, important societal trends and technological innovations indicate that cycling will be growing over the next decade in Europe. However, there are also a number of uncertainties and potential barriers:

1) Rebound effects from use of autonomous cars and on-demand ride-sharing options for motorized transport

On the one hand, with the advent of autonomous cars and on-demand ride sharing/ride hailing options for motorized transport, driving a car, or rather being driven by a car, might

[87] (Reiter & Wrighton, Potential to shift goods transport from cars to bicycles in European cities. Cyclelogistics: Moving Europe Forward., 2011 - 2014)

become a lot easier and hence induce additional demand for car mobility. On the other hand, "most crashes involve some element of human error".[88] Hence the possibility that autonomous driving could have a positive impact on safety for all road users.

Questions remain:

- Several car manufacturers have been announcing to sell fully autonomous cars on the market by the turn of the next decade (2020/21). In the first instance, they will be primarily used on motorways. When will fully autonomous cars enter the urban realm? Will autonomous cars be able to cope with the many interactions with pedestrians and cyclists? Or will there be a push for 'cars-only' corridors to limit such interactions? In case of a collision, will algorithms prioritise the safety of car passengers or people outside the car?
- An OECD report claims that "the car fleet needed would be only 3% in size of the today's fleet",[89] freeing up 95% of the space currently needed for parking cars for other purposes, including the provision of bike lanes. However, this will only be the case if people give up private car ownership and if car journeys are pooled. But it is also imaginable that empty cars will be roaming the streets; and that road capacity will increase considerably (comparable to concepts of 'platooning' of heavy goods vehicle on motorways), etc.

2) Price signals: subsidies, internalization of external costs

Drivers respond to price signals. For example, in cities where congestion charges were introduced, car use decreased.[90] In its 2011 Transport White Paper, the European Commission declared the objective to "proceed to the full and mandatory internalisation of external costs (including noise, local pollution and congestion on top of the mandatory recovery of wear and tear costs) for road and rail transport"[91] in the period 2016–2020, yet in practice, motorized transport remains heavily subsidized, inducing artificial demand for car use.[92]

Question:

- Will we reach a fiscal and financial level playing field between transport modes? And if so, when?

3) Rural areas

While many urban centres see rapid growth in the level of cycling, the same cannot be said of rural areas. Alternatives to car ownership and car use are much more rarer as mobility- sharing options are not widely available (if at all) and public transport services often continue to deteriorate with rural areas depopulating in many places across Europe. Historic high levels of rural cycling, for example in Hungary, may come under threat due to an increase in car ownership.

Question:

- What are the success strategies to bring the decline in rural cycling to a halt and/or reverse negative trends and get more people cycling in areas with low population density?

Cycling in 2030: three different scenarios

The following part sketches three different scenarios for an increase of cycle use with horizon 2030, depending on the level of support by the public sector. Please note that each scenario

[88] (European Transport Safety Council, 2016)
[89] (International Transport Forum; Corporate Partnership Board)
[90] (Haubold, Congestion Charges and Cycling, 2016)
[91] (European Commission, 2011)
[92] (Delhaye, De Ceuster, Vanhove, Maerivoet, & (Transport & Mobility Leuven), 2017)

builds on the former ones. (The achievable growth rates ought to be scientifically substantiated in the future by conducting an academic study looking at different policy measures and their expected impact on modal shift).

Scenario 1: Europe without an EU Cycling Strategy – individual efforts from Member States, regions and cities

1. Assumptions:

a. Committed national, regional and local stakeholders who already invest in cycling continue their efforts.

b. The EU institutions continue to support cycling at the current level, however do not increase their activity level or enhance their coordination efforts.

2. Achievable growth rates in level of cycling by 2030:

The expert group predicts overall moderate growth in the EU, however the level amongst Member States will greatly vary with some countries experiencing a decline in level of cycling.

3. Feasibility, consequences:

a. This scenario does not require any further effort from the EU institutions, but does not make use of the EU's coordination potential to increase impact vis-à-vis cycling related measures.

b. Member States, regions and cities merely rely upon their national initiatives and expertise, hence limiting the exchange of knowledge and effectiveness.

c. The cycling industry and non-governmental sector should increase their efforts, however due to their limited resources and the non-favourable environment for cycling, the achievement of cycling objectives is at risk.

d. The option of a passive EU in this field can lead to severe damage to certain elements of the cycling environment (see details in Chapter 2.2 Societal Trends).

Scenario 2: EU Cycling Strategy accepted and implemented to provide level playing field for cycling

1. Assumptions:

a. The EU institutions increase their support for cycling and coordinate, both horizontally and vertically, better guided by the EUCS.

b. The EUCS will create a stronger commitment to cycling investment from national, regional and local stakeholders.

2. Achievable growth rates in level of cycling by 2030:

The expert group predicts significant and consistent growth across the EU in all Member States, leading to a substantial increase in cycling levels in all Member States.

a. 12% of the European population will chose cycling as their main mode of daily transport.[93]

b. 0.48 trips per day will be made by bicycle by an average adult living in the EU.[94]

[93] These percentages are related to the 2nd overall policy objective of the EUCS (I.e. Cycle use in the EU will increase by 50% in the decade from 2019/2020–2030. Its share in the transport modal split will be at least 12%, which means 0.48 cycle trips per person per day on average)

[94] See footnote 80

3. Feasibility, consequences:

a. Because this scenario attempts to establish a level playing field for cycling, it is realistic and feasible to gain sufficient support at all levels of governance to support and implement the EUCS.

b. This scenario does require further efforts from the EU institutions, however delivers its results mainly through coordination.

c. Member states, regions and cities can use the best available knowledge and can count on the support of the EU institutions. This motivates, in particular, stakeholders who were not investing in cycling-related measures to a sufficient degree.

d. The cycling industry and non-governmental sector can benefit from a cycling- friendly environment.

Scenario 3: In addition to pro-cycling activities, restrictive measures are applied to individual motorised transport. Sustainable modes of transport are prioritized.

1. Assumptions:

a. The EU institutions significantly increase their support for cycling and propose/apply restrictive measures directed at individual motorised transport (based on the internalisation of external costs).

b. The EUCS will bring about stronger committed national, regional and local stakeholders whom invest in cycling and restrict individual motorised transport.

2. Achievable growth rates in level of cycling by 2030:

The expert group predicts a greater, significant and consistent growth across the EU in all Member States, resulting in a doubling of cycling.

3. Feasibility, consequences

a. This scenario requires strong political commitment to prioritise cycling (sustainable transport) over other modes of transport. Every level needs to accept and implement measures.

b. This scenario requires significant efforts from the EU institutions. It delivers results mostly through coordination measures, however not by more direct subsidy, but by changing investment priorities, regulations and strong recommendations.

c. Member States, regions and cities can use the best available knowledge. They can count on the support of the EU institutions when they want to prioritise sustainable modes of transport.

d. The cycling industry and the non-governmental sector can benefit from a cycling-friendly environment and the increased use of cycling.

The abovementioned scenarios of course depend on external factors as well (see Chapter 2.2 Societal Trends); they are not determined by the public sector decisions alone. To highlight how the scenarios are related to the trends, we prepared the following table:

	No EUCS	EUCS approved	Priority for cycling
Healthy lifestyle	+	++	+++
Urban planning	+	++	+++
Mobility as a service	+	++	+++
Importance of environment	+	++	++
Electric powered assisted cycles	+	++	+++
New bicycles	+	+	+
Innovative infrastructure for cyclists	+	++	+++
Autonomous cars	-	0	++
Price signals to customers	-	0	++
Behaviour – image of cycling	+	+	++
Growth in cycling by 2030:	+	+50%	+++

+, ++ or +++ this trend/situation has positive impact on cycling
0 this trend has no impact on the level of cycling
- This trend has/can have negative impact on cycling in the specific scenario.

The present EU Cycling Strategy describes the necessary activities to achieve the second scenario and double the level of cycling, however it also shows the way towards achieving the 3rd and more ambitious set of objectives. The most committed stakeholders can already take the more ambitious actions (not written in detail in the present document, but which will be highlighted in the next version of the EU Cycling Strategy).

2.3. Overall Policy Objectives for the EU Cycling Strategy

The expert group elaborating this blueprint document identified following 4 key objectives for the EU Cycling Strategy with horizon 2030:

1) Cycling should be an equal partner in the mobility system. Users pay for the full external costs of motorised transport while the societal benefits of active mobility are fully taken into account in transport planning and investment decisions. In addition, it will show the path towards prioritising cycling over individual motorised transport.

2) Cycle use in the EU will increase by 50% in the decade from 2019/2020–2030. Its share in the transport modal split will be at least

End of CHAPTER 2

12%, which means 0.48 cycle trips per person per day on average.

3) The rates of fatalities and seriously injured among cyclists (per kilometre cycled) will be halved in the decade 2019/2020–2030.

4) The EU should double its investments in cycle projects to EUR 3 billion during the Multiannual Financial Framework 2021–2027 (from EUR 1.5 billion in 2014–2020) and aim for another doubling to EUR 6 billion during the 2028–2034 period.

Chapter 3 – Behavioural Change

Summary

This chapter focuses on how to achieve a shift in mobility culture to reduce the big disparities in levels of cycling amongst EU cities and support them to realise cycling's full potential. It contains three parts:

1. Convince decision-makers to support cycling
The 2013 EU Urban Mobility Action Plan established guidelines for cities on how to develop and implement Sustainable Urban Mobility Plans. This chapter calls for a complete implementation of this action plan by 2020 and adequate measurement of its results. Looking at the EUCS' horizon 2030, the EU should consider how to integrate, for instance, the European Mobility Week and European Sports Week into a larger and more coherent behaviour change policy. This policy should be based on lessons learnt from successful EU- funded projects that delivered highly transferable, tried and tested behaviour change campaign techniques.

2. Encourage people to cycle more
The EU is requested to support behaviour change initiatives that contribute to more everyday cycling among people of all age groups. In many countries, in particular those with lower daily cycling levels, cycling for recreation, sports and tourism purposes is an excellent way of establishing a cycling culture that in a second phase may contribute to a culture of using the bicycle as a daily means of transportation. Thus, this chapter recommends that the EU should extend its efforts to promote cycling for the purpose of recreation, sports and tourism (e.g. by establishing a European Mobility online platform to provide a one-stop-shop for anyone interested in active tourism in Europe).

3. Facilitate the cooperation among road users for safer cycling
Behaviour is influenced by many factors, including both hard and soft mobility measures. A combination of these can realize the full potential for cycling in EU cities and bring about a culture shift in the mobility culture. In this section, we look at training, both for cyclists as well as motorised transport users and highway codes, e.g. in the form of speed management and its enforcement, that help protect people's physical integrity.

3.1. Convince Decision-Makers to Support Cycling

The status quo of cycling in EU cities

Whereas the overall trend for cycling in EU cities is positive and the potential for cycling in European cities is enormous, its development is not fast enough, it is not occurring in all cities and is often is hindered by inaction of central government. This results in great disparities between champion, climber and starter cycling cities. The reason behind these differences is often a lack of political support for cycling as a good solution for the challenges facing urban areas. Whilst there is growing evidence that cycling has a positive impact on multiple urban policy areas (see Chapter 1 and Annex on health, environmental and congestion benefits), the divergence of EU cities in this area demonstrate the lack of common awareness of this evidence.

In line with the safe systems approach, the transport system should accommodate cyclists and take into account their specific characteristics.[95] This would invite more cyclists out onto the roads and help new users considering cycling as a habitual mode of transport.

The status quo of cycling in relevant EU policy

The Commission promotes cycling as a part of delivering the Urban Mobility Action Plan 2013, which includes guidelines for cities to set up Sustainable Urban Mobility Plans (SUMPs). Road safety is highlighted as a horizontal issue and specific guidance on integrating road safety is prepared. Following the UN Habitat Urban Agenda, the EU is also developing an Urban Agenda (including a partnership on urban mobility). The EU also organises conferences to stimulate the uptake of good practices on sustainable urban mobility (CIVITAS, Open Days, Green Week, SUMP conference).

Proposed policy changes

EU level

- Fully implement the current Urban Mobility Action Plan by 2020 with a focus on active mobility. [GR]
- Revise the Urban Mobility Action Plan (after 2020) to clearly reference cycling. [GR]
- Harmonise and encourage the monitoring of the progress in sustainable urban mobility and develop a benchmarking tool (including increase of modal share and km/h of cycling, reduction of fatalities/serious injuries, and budget increases – (see Chapter 11). [RD]
- Encourage Member States to nominate national focal points and set up centres of excellence for knowledge sharing at a national level; stress the importance of allocating budget to realise the objectives of national cycling plans including safety and research measures. [ORG]

National level

- Set a common framework for action by developing a national cycling plan or updating an existing plan (ideally as part of a holistic national transport plan and/or National Policy Framework for Urban Mobility). [RE/GR]
- Set concrete mode share and safety targets (both objective and perceived safety) and monitor progress. [RE/GR]
- Nominate focal points and set up centres of excellence for knowledge sharing at a national level.[96] [ORG]
- Allocate budget to realise the objectives of national cycling plans including safety and research measures. [F]

[95] (Schepers, et al., 2014)

[96] The Netherlands, Denmark, Germany and on regional level Flanders and Baden-Württemberg have such knowledge centres on cycling, e.g. (Kennisplatform Crow).

Regional and local level

- Develop a regional/local cycling plan or update an existing plan, ideally as part of a holistic Sustainable Urban Mobility Plan (SUMP). [RE/GR]
- Adopt a clear hierarchy of transport users in urban areas, giving priority to safety, convenience and comfort needs of pedestrians, cyclists and public transport users. [GR]
- Set concrete mode share and safety targets (both objective and perceived safety) and monitor progress. [RE/GR]

EU added value (and/or cost of non-Europe)

If the EU clearly encourages cycling, more decision-makers will consider implementing cycling measures more often and more easily. If EU cities realize their full potential for cycling, they will become more liveable, efficient and sustainable while stimulating the economic viability of cities and making people healthier. This will contribute to the Paris Agreement, the goals set in UN habitat's New Urban Agenda and the EU targets for CO2 emission reduction for transport sector, air quality standards and noise (see Chapter 9).

3.2. Encourage People to Cycle More

The status quo of behavioural measures to promote cycling

To create a cycling culture, measures to overcome established patterns of behaviour are needed. Influencing commuting behaviour is a classic way of introducing cycling into our everyday activities, making it a quick way to get from A to B instead of an activity in itself. Bike to Work campaigns[97] and other programmes have proved to be useful ways of incentivising cycling. Reinforcing behaviour by bringing people from sports and recreational cycling into everyday cycling is another way to increase cycling numbers. Professional cycling also has unexplored potential to promote behaviour change in people.

One of the major barriers to cycling is not feeling safe. Cycling on streets where there are high volumes of motor vehicles passing at high speeds, with zero cycling infrastructure, does not encourage anybody to cycle. However, if cycling is seen as a relaxed pleasant everyday activity rather than a threatening dangerous activity, more people would be inclined to take the bike more often (see also Chapter 4).

Increasing the number of people cycling can also affect behaviour on the road in general. Some researchers[98] and observers argue that encouraging people to cycle can also increase road safety, and that a motorist is less likely to collide with a person walking or cycling when there are more people walking or cycling – the so-called 'safety in numbers' effect.[99] It is important to understand whether this is indeed a behavioural effect of drivers being more aware or if it is a consequence of more cycle friendly infrastructure that boosts numbers and safety. Full comprehension of this issue will affect cycling policy (to promote cycling alone or promote cycling and infrastructure).

[97] E.g. ECF is involved in an EU funded Bike 2 Work project (Ciarrocchi, 2016)

[98] (Jacobsen, 2003)

[99] (Jacobsen, 2003)

In order to encourage more people to cycle for tourism and recreation, many countries in Europe have now established National Cycle Tourism Coordination Centres that coordinate the necessary actions at the national level (e.g. route management, signage, monitoring, communication and promotion etc.). These include tasks related to EuroVelo, the European cycle route network. In some countries the Coordination Centre has developed national cycling-friendly service schemes that provide a platform where service providers can promote their offers to potential cyclist customers. However, some countries still do not have coordination centres and/or national cycling-friendly schemes.

The status quo of cycling in relevant EU policy

The EU campaign for sustainable transport – the European Mobility Week (EMW) – is a big success story with than 2,400 cities from 51 countries participating in 2016.[100] Cycling is part of the EMW and often features prominently in the activities at a local level.

Since the Treaty of Lisbon, tourism has been part of the remit of the EU; however, it allocates relatively few resources to this sector. Currently, most of the direct financial support it provides is through the COSME program, which is largely aimed at supporting SMEs. Nevertheless, cycling tourism and in particular EuroVelo, the European cycle route network, have benefitted from a number of grants over the past 5 years for relatively small projects related to the central coordination of the network and route development. It is possible for cycle tourism projects to receive Cohesion Policy funding but the actual use of these funds for tourism was generally discouraged by the European Commission during the preparation of the current funding program.

Several chapters in this EUCS deal with making cycling more comfortable and providing incentives; Chapter 4 on better and safer infrastructure, Chapter 5 on vehicle regulations for calmer and safer motor traffic, Chapter 6 on multimodality and ITS and Chapter 7 on fiscal and taxation incentives (including growth of EPAC/-pedelec use).

Proposed policy changes

EU level

- Embed the European Mobility Week and the European Week of Sport in a larger, coherent behaviour change policy based on lessons learnt from successful EU-funded projects that delivered highly transferable, tried and tested behaviour change campaign techniques. [GR]
- Provide EU funding for education projects [F]
- Establish a European Mobility online platform (in partnership with the European Travel Commission) to provide a one-stop-shop for anyone interested in active tourism in Europe. The existing EuroVelo.com website could be used as a basis and expanded to include hiking, mountain biking, road cycling routes etc. [BP]
- Set minimum standards for safe and attractive infrastructure (see Chapter 4) to encourage more cycling. [RE]

[100] (European Commission; EUROCITIES; ICF Mostra; Polis; ICLEI-Local Governments for Sustainability; Regional Environmental Center for Central and Eastern Europe; et al.)

National level

- Establish National (EuroVelo) Cycle Tourism Coordination Centres (where they do not exist) [RD].
- Introduce a national cycling-friendly service scheme (where they do not exist) [BP].
- Stimulate behaviour change with fiscal and taxation incentives, including the growth of EPAC/pedelec use [RE].

Regional and local level

- Participate actively in the European Mobility Week [BP]
- Organize cycle training for school for children, migrants, elderly [BP]
- Measure and stimulate the share of women cycling (see also Chapter 11) [RD]
- Apply minimum EU/national standards for safe and attractive infrastructure to encourage more cycling [RE]
- Develop sports and leisure cycling routes to promote cycle tourism and physical activity amongst local communities (see also Chapter 4) [F].

EU added value (and/or cost of non-Europe)

If the EU invests and supports behaviour change initiatives and other measures that help overcome barriers to cycling, this may influence national and local stakeholders to prioritize these more as well. This can help move cities toward a faster cultural switch with increasing everyday cycling. These measures would support cycle tourism in Europe, an increasingly important part of the tourism sector, which generates approximately EUR 44 billion per year[101] and employs an estimated 450,000 people[102] around the continent.

3.3. Facilitate Cooperation Among Road Users for Safer Cycling

The status quo of cycling in urban road safety

Fear of traffic is an oft-cited reason for not walking or cycling. Fear of safety risks is a major barrier to the uptake of cycling, and introducing safety measures and the fact that cyclist numbers are increasing can help to overcome this fear. Addressing both perceived and objective safety improvements will require slightly different but necessarily coordinated approaches (see Chapter 4). Heavy goods vehicles (HGV) make up 3% of the European vehicle fleet and 7% of driven kilometres, yet they are involved in 15% of fatal accidents, costing almost 4,000 lives across the EU. Collisions with passenger cars make up slightly more than half of the total number of cyclist deaths in the EU (52%). It is important that drivers are aware of the movements of cyclists and other smaller, slower modes of transport, and that cyclists are aware of danger areas around motor vehicles. Distraction and high motor vehicle speed are major

[101] (Weston, et al., 2012)
[102] (Haubold, 2015)

road safety problems that are also often behavioural issues. Speed is the factor most quoted as a cause in traffic collisions resulting in deaths and as such, it plays an important role in diminishing or increasing the severity of collisions. Though we include speed management under behavioural issues, it also requires a holistic approach including vehicle safety (intelligent speed assistance, ISA) and infrastructure measures; therefore speed reduction is also dealt with in Chapters 4 and 5.

The status quo of cycling in relevant EU policy

Road safety is a shared competence between the EU and Member States, so that joint efforts are needed to contribute to the creation of a safer environment for cyclists and all EU road users. At present, the European Commission does keep a list of some of the Member States' main road rules for travelling abroad, but not on signposting and road markings, or other road rules.

As part of the European road safety policy orientations (2011–2020), the improvement of education and training of road users was required. Within this context the two relevant EU Directives are due for review.

EU professional drivers are required to have taken professional training. In most Member States only 5% to 10% have this training. Directive 2006/126 sets the minimum standards for driving licenses, testing and training. At present this does not include training on interaction with cyclists and pedestrians. The Road Safety Policy Orientations also aimed at increasing enforcement of road rules and is moving towards this goal with the cross border enforcement Directive.[103] This Directive allows prosecution across borders including for the offences of speeding, alcohol use and running red lights. With regards to speed management please see Chapters 4 and 5. With regards to in-vehicle and cyclists distractions please see Chapter 5.

Proposed policy changes

EU level

- Include urban road safety and cycling safety in the amendment of Directive 2003/59/EC on the initial qualification and periodic training of drivers of certain road vehicles for the carriage of goods or passengers. [RE]
- Encourage Member States to adopt a default speed limit of 30 km/h in built-up areas and/or where many people work, cycle and play. These should be coupled with self- explaining infrastructure measures to support the enforcement of the speed limits. [GR]
- Support Member States in preparing national enforcement plans with annual targets for compliance in the areas of speeding, drink driving and distraction, especially in urban areas where there are high numbers of pedestrians and cyclists. [GR/F]
- Encourage a zero-tolerance approach to using motorised vehicles under the influence of drugs and alcohol. [RE/BP]
- Encourage education and training programmes on the use of drugs and alcohol for all road users. [BP]
- Strengthen the Cross-Border Enforcement Directive in the context of the revision in 2017 by ensuring greater convergence in enforcement of road-safety related road

[103] (Official Journal of the European Union, 2015)

traffic rules and developing common minimum standards for enforcement. [RE]
- Develop the principle of road usage with due consideration of all other road users, [BP]
- Develop methods to enable better assessment of the role of distraction in road traffic deaths with regard to road traffic death investigation, including a review of existing reporting systems. [RD]
- Include managing risks associated with distracted driving and smartphone use in driver training as well as [BP] continue to support the field operational trials of smartphone use and apply lessons learnt to address risks and benefit from safety services. [RD]
- Support awareness information campaigns on the risks of distracted driving and speeding.

National level

- Include cycling safety courses when implementing the Directive on the initial qualification and periodic training of drivers of certain road vehicles for the carriage of goods or passengers. [RE]
- Integrate distracted driving risks into driver training. [RE]
- Provide a framework for cycle training and encourage local and regional authorities to provide adequate training in cycling skills. This could be part of a broader safety training program for children and young adults. [BP]
- Improve enforcement of illegal road behaviour for all road users. [RE]
- Prepare national enforcement plans with annual targets for compliance in the areas of speeding, distraction and drink driving, especially in urban areas, where there are high numbers of cyclists. [RE]
- Strengthen enforcement against illegal parking when pedestrian and cyclist facilities are abused by parking on footpaths and cyclists' lanes. [RE]
- Encourage a Zero Tolerance approach to using motorised vehicle under the influence of drugs and alcohol. [RE/BP]
- Map high risk sites for cyclists and use this to inform and direct enforcement actions of especially speeding. [RD/BP]
- Adopt, or encourage the relevant authority to adopt, a default speed limit of 30 km/h in build-up areas and/or where many people work, cycle and play. [RE/GR]
- Encourage local authorities to separate cyclists where there is high speed/high volume motorised traffic. [GR]
- Create safe conditions on roads where cyclists do otherwise mix with motorised vehicles. [RE/BP]
- Run awareness campaigns alerting cyclists of dangers posed by distracted cycling (smartphone use/earphones) use of alcohol and drugs and lack of visibility in traffic, without discouraging cycling. [BP]
- Adopt clear and strict legislation banning the use of smartphones, including hands free, whilst driving. [RE]

Regional and local level

- Adopt a default speed limit of 30 km/h in built-up areas and/or where many people work, cycle and play. [RE]
- Strengthen enforcement against illegal parking when pedestrian and cyclist facilities are misused by parking on footpaths, cycle lanes and cycle paths. [RE]
- Segregate cyclists from other traffic where there is high speed/high volume motorised traffic, or otherwise create safe conditions on roads where cyclists mix with motorised vehicles. [BP/RE]

EU added value (and/or cost of non-Europe)

Cycling training and education courses are run throughout the EU. A variety of organisations provide these courses, ranging from cycling organisations, independent training organisations and companies, to public authorities and schools. Education in basic social rules for traffic and training starting from a young age (children) but also with people newly arrived in Europe (immigrants) can contribute to the EU Vision Zero: “By 2050, move close to zero fatalities in road transport. In line with this goal, the EU aims at halving road casualties by 2020”.

Summary

Good-quality infrastructure designed for cyclists is key to increasing the use of the bicycle. Cycle friendly design not only refers to street design, dedicated cycle paths and networks of cycle routes but also to good bicycle parking facilities as well as the ongoing maintenance of these facilities.

The four sections set out below look at different aspects of cycling infrastructure:

1. Infrastructure guidance
Establish EU principles for cycling infrastructure and ensure that these are fed through to all national design standards, which should focus on the user perspective.

2. EuroVelo and other cycle route networks
Include EuroVelo in the TEN-T network and issue guidance on network development at EU, national, regional and local levels.

3. Ensuring safer infrastructure for cyclists
Extend road safety audit procedures beyond the TEN-T and make sure that the needs of cyclists are considered.

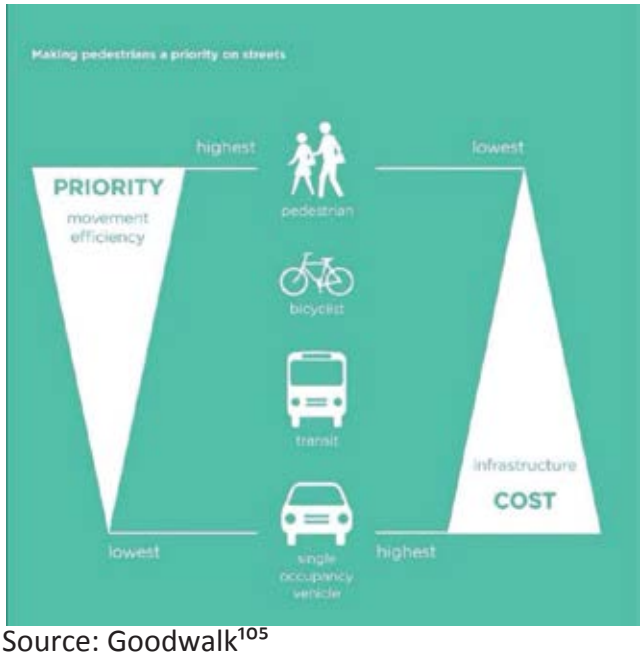
4. Cycle parking
Include EPAC recharging within the remit of the Alternative Fuels Directive and work with national, regional and local authorities to provide of cycle parking with recharging points at public transport and commuting nodes.

4.1. Infrastructure Guidance

The status quo of cycling in the relevant policy field

Safe and attractive conditions need to be provided in order to increase the propensity of people to take trips by bike and leave the presumptive stability and security of motorised transport. Cyclists have few standard characteristics (in terms of age, physical fitness, reasons for travelling etc.) and so infrastructure design should accommodate different user needs. They need comfortable, safe, direct and attractive routes and roads in a cohesive network.

The EU leads the world in this area and several best practices have emerged across the continent (e.g. CROW Design Manual for Bicycle Traffic[104]). These do tend to reflect the situation in the country where they were developed and therefore it is not always straightforward to adopt the recommendations in other countries. Indeed, the way each Member State delivers safe and attractive conditions can vary due to regulatory, financial and behavioural differences.



Source: Goodwalk[105]

[104] (Kennisplatform Crow, 2017)

[105] (Goodwalk)

Also, it should be noted that investments in cycle infrastructure are much more efficient than investments for motorised traffic and public transport in terms of transporting people from place to place, particularly in urban centres.

The status quo of cycling in relevant EU policy

The EU is investing significant sums (over EUR 1.5 billion as part of the Cohesion Policy alone[106]) in supporting projects that incorporate cycle-friendly infrastructure across the continent. However, it does not currently provide any specific guidance on cycling infrastructure. There is guidance on infrastructure for other transport modes related to the TEN-T network (separate directives related to infrastructure[107] and tunnels[108]) but there is no reference to cycling in either.

Proposed policy changes

EU level

- Adopt universal principles for cycle infrastructure across all Member States that can be incorporated into national and local standards. [GR]
- Adopt universal principles for cycle infrastructure across all Member States that can be incorporated into national and local standards. [GR]
- Consider cyclists in all EU-funded land-based infrastructure projects. [GR]
- Support the preparation of more detailed standards/guidance documents, based on bicycle user needs, at a national level (where they do not currently exist). [BP]
- Gather expertise and spread best practice both in the EU and beyond. Help build the capacity of public bodies where required. [BP]
- Encourage cities, as innovators, to undertake pilots/tests on cycling infrastructure (e.g. through Horizon 2020 grants). Communicate results together with recommendations for adaptation. [RD]

National level

- Prepare national standards/guidance documents, with EU support, based on bicycle user needs. [GR]
- Work with relevant authorities to ensure maintenance of cycle friendly infrastructure. [GR/F]

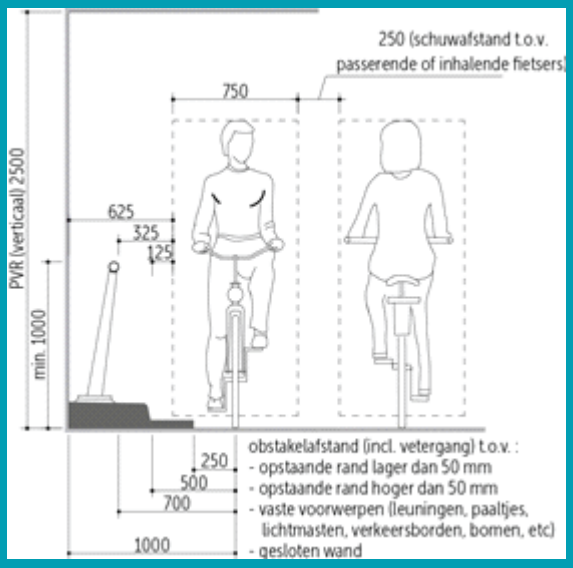
EU added value

The EU is spending at unprecedented levels on promoting cycling and improving infrastructure with EUR 1.5 billion being allocated during the current financial period through the Cohesion Policy alone. It is therefore important that value for money is achieved and that the infrastructure is of a standard that will actually attract people to cycling (and not compromised in its design). Following the recommendations set out in this section should ensure a high level of service that will help to support the growth of cycling.

[106] (Bodor, 2016)
[107] (Official Journal of the European Union, 2008)
[108] (Official Journal of the European Union, 2004)

Best Practice Example: CROW Design Manual for Bicycle Traffic, the Netherlands

CROW's Design Manual for Bicycle Traffic describes the steps required to create 'Dutch-style' bicycle-friendly infrastructure and is widely used across the continent.



4.2. EuroVelo and Other Cycle Route Networks

The status quo of cycling in the relevant policy field

Cycling infrastructure is constructed, managed, promoted and maintained at different levels of the public administration following a pyramid similar to other transport modes (see diagram below).

At the top there are a limited number of European cycling routes (EuroVelo), which form a backbone to European cycle infrastructure and can act as a 'flagship' developments in countries with limited cycle infrastructure. Denser networks can be found at national, regional and local levels. Each level of the pyramid serves a different purpose and supplies a different need, and thus has to follow a different logic. Transnational cycling routes should be planned with wider connections in mind (e.g. cycle tourism). National routes should form the backbone of the network, while regional and local routes should ideally form arteries for local communities going about their daily lives but also could double as routes for recreational and sporting use. Obviously, these purposes overlap and certain sections of the route serve multiple needs.

Unfortunately there can often be a lack of coordination between the different levels leading to missing links, especially on sections that cross the borders of different territorial and administrative divisions. Consequently, strategic planning is needed to connect the different levels of networks. It should be noted that a focus on promoting local trips can deliver the biggest health benefits whilst a focus on regional and international routes can deliver wider economic benefits, particularly from tourism.

The status quo of cycling in relevant EU policy

There currently is a reference to EuroVelo and long distance cycle routes in the TEN-T Guidelines[109] which states that cycling measures can be incorporated when implementing infrastructure projects for other modes. However, cycling projects cannot be the basis of a standalone project under the current wording.

In addition, the EU has provided support for some routes or networks through individual grants (e.g. an Interreg project related to EuroVelo 15 – Rhine Cycle Route[110]).
There is currently no EU policy or guidelines on cycle route network planning or coordination at international, national, regional or local levels.

Proposed policy changes

EU level

- Include EuroVelo, the European cycle route network in the TEN-T network. [RE]
- Issue guidance for the development of national, regional and local networks. This should refer to the TEC Methodology being developed as part of THE PEP Masterplan for Cycling. [GR]
- Support projects related to cycle route networks and individual routes, particularly cross-border connections (e.g. funding through Interreg projects). [F]
- Establish common certification standards for infrastructure and services [GR].

National level

- Develop and maintain national cycle route networks. [GR + F]
- Collaborate on cross-border projects related to cycle routes or networks. [F]
- Prepare national cycle signage guidance where it does not currently exist. [RE +/or GR]

Regional and local level

- Develop and maintain regional and local cycle route networks. [GR + F]

[109] (Official Journal of the European Union, 2013)
[110] (European Cyclists' Federation, 2016)

EU added value

The European cycle route network should receive the same treatment as the networks for other modes.

Best Practice Example: Fietsplatform Route Network

Fietsplatform (the Dutch cycling platform) is responsible for the development (signage), maintenance, improvement and promotion of the Dutch network of long distance cycle-routes (4,500 km) and coordinates the development and promotion of the complementary regional route networks.
Source: (Fietsplatform)

4.3. Ensuring safer infrastructure for cyclists

The status quo of cycling in the relevant policy field

With the exception of roads where cycling is prohibited, all road schemes affect cyclists and therefore the user needs of cyclists must be incorporated into road safety procedures. Currently this is not the case in many Member States. Indeed, in many countries the existing road infrastructure has not been built with cyclists in mind. As a result many potential cyclists are put off by the safety and attractiveness of the infrastructure that they would have to use.

As stated in Chapter 3, for many people the fear of traffic is their main reason for not cycling or walking. For example, 59% of potential cyclists in London cite safety concerns as the key barrier to cycling.[111] Introducing safety measures can therefore help to overcome this fear. Addressing both perceived and objective safety improvements require slightly different but necessarily coordinated approaches.

Also linked to the road infrastructure is the emergence of Intelligent Speed Assistance (ISA), which has potential benefits for cyclists. ISA covers a range of technologies that are designed to aid drivers in observing the legal speed limits (see Chapter 5 for the impact on vehicle regulation). Information regarding the speed limit for a given location is usually identified from an on-board digital map in the vehicle although other systems use speed sign reading and recognition or a combination of the two. Currently up-to-date speed information maps are available for most Member States from private map operators, which is complemented by data on changes in speed limits provided by governments to the map-makers through a standardized procedure. Mandating ISA is now possible, even if maps have not yet been provided by all Member States. From January 2018, the European New Car Assessment Programme (Euro NCAP) will increase their requirements for maps that embedded GPS in the car itself. Euro NCAP also asks for speed limit information to be provided by both maps and camera reading, which will increase the reliability of the speed limit information.

[111] (Transport for London, 2014)

The status quo of cycling in relevant EU policy

The aim of the European road safety policy orientations (2011–2020)[112] was to provide a general framework and challenging objectives to guide national and local strategies to:

- Create a cooperation framework based on the exchange of best practices across the EU;
- Adopt a strategy for injuries and first aid to address the need to reduce the number of road injuries;
- Improve the safety of vulnerable road users.

Specific actions within the orientations with regard to infrastructure include to "Ensure that European funds will only be granted to infrastructure compliant with the road safety and tunnel safety Directives" and "To promote the application of the relevant principles on infrastructure safety management to secondary roads of Member States, in particular through the exchange of best practices".

EU Directive 2008/96/EC[113] deals specifically with safety of road infrastructure primarily in the context of TEN-T, but Member States can extend its scope on a voluntary basis. It mandates the use of four procedures for all EU road networks, which include road safety impact assessments, road safety audits, network safety management and safety inspections although, as noted in Section 4.1., it makes no specific mention of cyclists.

The European Parliament Road Safety report of 2011[114] "Strongly recommends the responsible authorities to introduce speed limits of 30 km/h in residential areas and on all one-lane roads in urban areas which have no separate cycle lane..." and the European Council Valetta Ministerial declaration on road safety[115] this year stated that transport ministers should undertake to "engage with relevant stakeholders, as part of urban mobility planning, on the possibility of expanding and integrating reduced speed limits, such as 30 km/h, into high-risk areas, in particular areas where people work, cycle and play". It also stated that Member States will "take cycling and walking into account in mobility plans, safety policies and measures and, where feasible, consider the inclusion of dedicated infrastructure."

EPACs and speed-EPACS are separated into two different vehicle categories at the EU level (see Chapter 5 for details). At the national level, the same distinction is often followed, with implications for how electrically assisted bikes are treated within national road rules and consequently, which infrastructure they can use (although note that this is not the case in all Member States). For example, speed-EPACs are often treated as mopeds and not allowed to use cycling infrastructure.

Proposed policy changes

EU level

- Extend Directive 2008/96/EC beyond the TEN-T so that EU citizens can experience equal levels of safety on all roads they travel on. [RE]
- Finance research and disseminate best practice that showcases countries that have high cycling numbers, excellent cycling facilities and safe infrastructure. [RD + BP]

[112] (European Commission, 2010)
[113] (Official Journal of the European Union, 2008)
[114] (European Parliament, 2011)
[115] (Presidency of the Council of the European Union/Malta2017, 2017)

- Encourage Member States to adopt a default speed limit of 30 km/h in built-up areas and/or where many people work, cycle and play. These should be coupled with self- explaining infrastructure measures to support the enforcement of the speed limits. (GR)
- Research the safety implications of EPACs and speed EPACs use on existing and new infrastructure, and on interactions with mixed traffic. This would include road safety research, market data and Member State road rules (e.g. infrastructure use, helmet use, road regulations etc.). [RD]
- Coordination of infrastructure, mapping and signage to assist ISA, including data requirements, interface specifications and system performance evaluation. [GR]

National level

- Incorporate cycling into all road safety audits. Careful consideration should particularly be given to stipulating the degree of separation required from motor traffic based on the speed and volume of motor traffic and the street context. Cycle-friendly junction design is also of paramount importance as in most countries junctions are is where the majority of collisions occur. [RE]
- Undertake speed-limit mapping to assist Intelligent Speed Assistance. [F]
- Adopt, or encourage the relevant authority to adopt, a default speed limit of 30 km/h in built-up areas and/or where many people work, cycle and play (RE/GR)

Regional and local level

- Adopt a default speed limit of 30 km/h in built-up areas and/or where many people work, cycle and play (RE)
- Develop safe cycle routes to schools, city centres and business areas. [GR]
- Reduce the speed of motorized traffic at intersections and cycle crossings. [GR]

EU added value (and/or cost of non-Europe)

There is also a real lack of knowledge on the part of many Member States on how to start creating safer environments for cyclists, despite the fact that the EU includes some world leaders in cycling safety. This is a perfect market place for the EU to support transfer of good safety standards and contribute to its road safety goals – the reduction of fatalities and serious injuries. Vehicle design and regulation through the General Safety Regulation is an area with strong EU competence. The added value in EU action is to enable type-approved technologies like Intelligent Speed Assistance to work across the single market.

Best Practice Example: Cycling Street (Fietsstraat), The Netherlands

A cycling street is a street designed as a bicycle route but on which cars are also allowed. The car use is usually limited by the character and layout of the bicycle street – in many cases the speed limit is 30 km/h (20 mph) and there are no stopping restrictions. In the Netherlands, cycling streets are colored red, just like bike paths. Bicycle streets form an alternative to traditional cycle routes along main roads. The cycle streets are mostly located in residential areas that generally have less car traffic.

4.4. Cycle Parking

The status quo of cycling in relevant policy field

Bicycle parking is the often-overlooked part of bicycle infrastructure planning. However, secure and easily accessible bicycle parking, for example in multimodal hubs and at workplaces, is a crucial element in people's modal choices for their everyday mobility. A Berlin pilot project on the use of EPACs for commuting purposes has identified the lack of secure and easily accessible bike parking as a main barrier to a widespread use.

The status quo of cycling in relevant EU policy

At the moment there is no specific reference to cycle parking in EU policies although they are included in some EU-funded projects on an ad-hoc basis.

EU Directive 2010/31/EU on the energy performance of buildings currently does not include any provisions on parking. In a proposed update of the directive published in November 2016,[116] the Commission encourages the rollout of the required infrastructure for e-mobility (with a focus on large commercial buildings and excluding public buildings and SMEs) but this does not include electric assisted bicycles.

The Alternative Fuels Infrastructure Directive[117] seeks to move from fossil-fuelled to alternative-fuelled vehicles, including electric vehicles. Member States are required to provide electric vehicle charging points at certain points both

[116] (European Commission, 2016)
[117] (Official Journal of the European Union, 2014)

within and outside of urban areas. L-category vehicles are also included within the Directive, which means that speed EPACs, but currently not EPACs, are part of the Directive's aims (see Chapter 5 on EPACs and speed EPACs).

Proposed policy changes

EU level

- Consider the need for cycle parking in all EU-funded land-based infrastructure projects, particularly if vehicular parking is incorporated in the scheme. [GR]
- Include recharging points for EPACs within the remit of the Alternative Fuels Directive to ensure a level playing field with other electric vehicles. [RE]
- Encourage Member States to include bicycle parking facilities and charging provision for electric assisted bikes (EPACs) at public transport and commuting (offices) nodes. [GR]

National level

- Develop national building codes that include bicycle parking requirements. [RE and/or GR]

Regional and local level

- Provide sufficient bicycle parking facilities at public transport nodes, schools, CBD's, high density accommodation etc. [RE and/or GR]

EU added value (and/or cost of non-Europe)

Provide a level playing field for all modes.

Best Practice Example: Building Regulations in Hungary

Government Decree on Spatial Planning and Building Regulations (253/1997. (XII. 20.)) (Korm. Rendelet az országos településrendezési és építési követelményekről), Hungary

This governmental decree is mandatory for all municipalities and requires bicycle parking for all buildings where cycling "could be expected". In practice, authorities require bicycle parking for most commercial, public (including schools), and residential units.

Best Practice Example: Building Regulations in Hungary

There is an annex to calculate the minimum number of parking spaces for bikes, which includes:
1 spaces for each residential unit
2 spaces for every 150 m² area of commercial units
2 spaces for every 500 m² area of commercial units (above 1000 m² total area)
2 spaces for every 15 rooms in hotels
2 spaces for every 75 m² in restaurants
2 spaces for each 50 m² in schools and universities
1 spaces for every 10 employees for industrial units
1 spaces for every 100 m² area for offices
Source: (Hungary Government, 1997)

Summary

Of the 4 pillars[118] of road safety, regulating for safer vehicles is an exclusive EU competence. This chapter consists of 4 sections:

1. Motor vehicle safety
Vehicle technologies have been developing at an incredible pace over the past few years, which is coming at a time when road fatalities have been levelling off. In 2014 about 26,000 people of all modes were killed in road collisions throughout the EU. Bicycle fatalities make up 8.1% of the total number of road accidents at 2,112 deaths and have fallen from 3,044 in 2005. This is excellent progress, however this is a 30% reduction of cyclist fatalities, which though good is considerably less than the drop in total road fatalities at 42%. There has also been a levelling off of cycling fatalities recently, with 2,170 recorded in 2012 and even a slight increase from 2013 at 2,001. This is mirrored by the figures for all road fatalities. This is the European Commission's huge opportunity to kick-start the reduction in fatalities in crashes around the EU. It is also a key time since there are technologies that can really focus on stopping crashes with those outside the vehicle and on speed reduction; these are genuine firsts and could be a real revolution in road safety for cyclists, and indeed for all road users.

2. Bicycle, EPAC and speed EPAC technical requirements
Bicycles and Electric Pedal Assisted Cycles (EPACs/pedelecs) are developed through the International and European standards bodies (CEN and ISO), while speed EPACs) are regulated through the motor vehicle type approval system for two- and three-wheel vehicles. These seem to have been successful in creating a stable environment for manufacturers to enter the single market.

3. EPAC charger technical standards
Public charging infrastructure for electric bicycles needs to be further investigated to establish a widespread and accessible network of e-charging points for EPACs, Speed EPACs as well as eScooters.

4. Cyclists and automated/autonomous vehicles
The end point of the current crop of new vehicle technologies will be the autonomous or even driverless motor vehicle. It is important that these vehicles are safe and that their different behaviours, manoeuvres and technologies are managed responsibly.

5.1. Vehicle Safety

The status quo of cycling in vehicle safety

Collisions with cars, vans and lorries account for a large proportion of cyclist deaths. The severity of impacts between motor vehicles and cyclists is influenced by a variety of factors, including the level of protection provided by the vehicle. For large vehicles the risk of running over a cyclist is high, especially when turning, and countermeasures for this are needed. For all vehicles, the shape and stiffness of the vehicle front substantially influence injury risk, and measures to encourage forgiving vehicle fronts are needed. Since the number of fatalities for vehicle occupants has been falling at a faster rate than that for those outside the vehicle, including cyclists, it

[118] Infrastructure; Behaviour; Vehicles; Enforcement

could be argued that road safety measures for the vehicle have prioritised vehicle occupant safety over the safety of persons outside the vehicle.

The status quo of cycling in relevant EU vehicle safety policy

Though the European New Car Assessment Programme (Euro NCAP) provides vehicle consumers with useful information on vehicle safety, the EU has exclusive competence on vehicle safety measures and vehicle type approval under Article 114 of the EU treaty. The European Commission is set to revise the Pedestrian Protection Regulation EC 78/2009 and the General Safety Regulation EC 661/2009 (GSR), which set technical requirements applicable to all new motor vehicles sold in the EU market. EU pedestrian protection legislation prescribes requirements for the construction and functioning of vehicles and frontal protection systems in order to reduce the number and severity of injuries to pedestrians and other vulnerable road users who are hit by the fronts of vehicles. The General Safety Regulation prescribes many technological and design safety features, most of which are aimed at increasing the safety of occupants, so far with a lesser focus on safety of people outside the vehicle such as cyclists and pedestrians.

Proposed policy changes

There is an urgent need to update pedestrian protection in the legislation on motor vehicle testing procedures, including technical features defining requirements for more forgiving car fronts. These should explicitly include the needs of cyclists. In particular, for cyclist protection, new procedures should be introduced for assessment of automatic emergency braking for turning heavy goods vehicles. There should also be improvements in the crush depth available in the event of a collision with a vulnerable road user to reduce the number and severity of injuries.

Alongside this, the General Safety Regulation (GSR) 2009/661 will reconsider current technical requirements applied to all new motor vehicles sold in the EU market. An upcoming revision could offer an opportunity to maximise safety potential for both car occupants and for those outside the vehicles such as cyclists. A range of safety technologies, including overrideable ISA and Autonomous Emergency Braking (AEB) should be fitted as standard on new vehicles. In particular, for cyclist protection there should be procedures for assessment of automatic emergency braking for turning large vehicles.

Of relevance under both the GSR and Pedestrian Protection regulations is the development of a new protocol for consumer testing of cyclist AEB systems for passenger cars. The protocol will determine test ranges for bicycle speeds, the collision point on the vehicle, size and posture of the cyclist. This will be based on studying databases from 6 EU countries and looking at severe car-to-cyclist deaths and seriously injured, in order to prepare for including this technology in the Euro NCAP testing from 2018.

Each year European public authorities spend the equivalent of 16% of EU Gross Domestic Product in total on procurement and this is regulated at EU level. Criteria for procuring safe vehicles should be integrated into this legislative framework.[119]

[119] (European Transport Safety Council; Praise: Work-Related Road Safety, 2015)

EU level

- Update existing tests and extend scope of Pedestrian Protection Regulation 78/2009 to include cyclist protection. Ensure the safer design of motorised vehicles by extending the head impact zone. [RE]
- Support the development of airbags for the windshield and windshield frame as a viable safety measure to improve the protection of cyclists and other vulnerable users struck by cars. [RE]
- Introduce Autonomous Emergency Braking Systems, which operate at all speeds, as well as those that can detect cyclists, especially from turning heavy goods vehicles. [RE]
- Introduce energy-absorbing front underrun protection for all new heavy goods vehicles to attenuate the severity of cyclist/HGV collisions. [RE]
- Ensure that side protection closes off the open space between the wheels of all new heavy goods vehicles. [RE]
- Remove exemptions that exist so as to oblige use of side guards to protect cyclists in collisions with trucks. [RE]
- Develop new direct vision requirements for trucks that would improve the driver's current field of view by lowering the eye height and enlarging the size of the window apertures. [RE]
- Improve the vision of the passenger side both through the windscreen and through the side door window and to the rear. [RE]
- Develop procurement and other contractual processes to ensure that where construction, infrastructure or any other project or development is supported, partially or in full, via EU funding, that the use of trucks which meet the new direct vision, and revised underrun standards as a contractual requirement for that funding, both in construction work and in the operation of major infrastructure projects. [RE]
- Devise a new simple test procedure to reduce the frequency of cyclist/pedestrians going under the front of the HGV or its wheels. [RE]
- Adopt legislation for the mandatory fitting all new passenger cars and light trucks and vans under 3.5 tonnes with Autonomous Emergency Braking (AEB) systems which operate at all speeds, as well as those that can detect all kind of cyclists. [RE]
- Adopt legislation for the mandatory fitting of all new vehicles with an overridable assisting ISA system. [RE]
- Mandate indicator lights which flash alongside of the truck or the trailer of a truck to show that a truck is turning making this more visible to cyclists in the surrounding [RE]
- Encourage Member States to roll out digital speed map information and make this available to public and private operators covering the entire road network including a function to update changes to speed limits. [ORG]

5.2. Bicycle, EPAC and Speed EPAC Technical Requirements

Bicycles

In the European Union, bicycles are assigned to the field of application of the General Product Safety Directive. In recent years, several European and International Standards, including safety-related requirements and test methods for bicycles, have been developed. In 2014, the European standards for city trekking bicycles (EN 14764), mountain bikes (EN14766) and racing

bicycles (EN 14781) were replaced by the International Norm EN ISO 4210 (part 1 to 9).[120] This international standard also contains requirements for young adult bicycles. The requirements for children's bicycles are summed up in EN ISO 8098. This series of standards was published in the Official Journal of the EU under the General Product Safety Directive.[121] Adhering to the provisions of this norm means that the products are in line with the General Product Safety Directive and that they are sufficiently safe. Besides the safety standards for bicycles, international standards for bicycle lighting and bike trailers have also been established in the last few years. However road regulations on lighting requirements diverge strongly between EU Member States; this should be reviewed to look at the possibility of harmonising road rules is this area.

EPAC (electrically powered assisted cycles)

In contrast to bicycles, Electrically Powered Assisted Cycles (EPAC) are assigned to the field of application of the Machinery Directive.[122] This directive contains broad general safety requirements for machines. There is a European standard with safety-related and test requirements for EPACs (EN 15194). This guideline is currently under revision and will be published in an updated version of EN 15194/2017 soon. Since this standard was developed in close cooperation with the European Commission, the EN 15194 is likely to be listed in the Official Journal of the EU under the Machinery Directive in the short or medium term. Manufacturers and importers of EPACs have to meet the requirements of this standard in order to fulfil the safety requirements of the Machinery Directive. Thus, there are stricter rules for these products in terms of placing them on the market and the supervision by the public authorities within the market is much more efficient.

Within the EU Member States, EPACs are generally treated as equal to bicycles in legal terms within road regulations and use. So, EPACs should fulfil the same requirements as bicycles without electrical power assistance. Like in the case of bicycles, a harmonisation of the road traffic law – e.g. regarding the lighting equipment – would contribute to further simplifying market access in the EU Member States.

Speed-EPAC

Within the EU, the so-called speed EPACs, i.e. bicycles with electric power assistance up to a maximum speed of 45 km/h, are considered as motor vehicles classified in category L1e-B. For those vehicles, all safety-related requirements are harmonised by EU Regulation (EU) 168/2013 and its implementing acts. An EU type approval is the basis for legally placing these products on the market of all EU Member States.

[120] (Official Journal of the European Union, 2015)
[121] (Official Journal of the European Union, 2015)
[122] (Official Journal of the European Union, 2006)

Proposed policy changes

Several European and international standards contain safety-related requirements and test methods for bicycles and EPACs. Moreover, the products are clearly subject to the General Product Safety Directive, the Toy Safety Directive, the Machinery Directive and the Electromagnetic Compatibility (EMC) Directive.

The CEN EPAC standard EN 15194 is currently in the process of revision. In parallel ISO TC 149 SC 1 is working on a global ISO standard, which will mean discussion amongst other international stakeholders. This is currently ongoing with industry participation and will include input from EU cycling consumer organisations.

Since speed EPACs are defined as motorised vehicles (classification – L1e light two-wheel powered vehicle; sub-classification – L1e-B two-wheel moped) within EU type approval, Member States then often decide to define them in national traffic legislation as mopeds. This means that at Member State level the use of speed EPACs on the roads have the same rules as mopeds which often means wearing a moped helmet, driving license and insurance, and limited use of bicycle infrastructure. Applying the same national road regulations for mopeds to speed EPACs may not be the best approach. National legislators should critically investigate the possibilities to introduce a separate vehicle (sub) category for speed EPACs, to open the possibilities to introduce local or national dedicated legislation regarding i.e. the use of bicycle infrastructure and/or dedicated speed EPAC helmets.

There is a debate about whether an UN-ECE R22 motor helmet is suitable for the Speed-EPAC since it is an active mode of transport. On this topic the Dutch standards body NEN created together with relevant stakeholders a special speed-EPAC helmet standard (NTA 8776), which has been already accepted by the Dutch government.

It is important to keep on monitoring the safety of the cycling infrastructure, road user behaviour, training and education for a better use of these vehicles, and traffic management. Moreover, market uptake, modal share, security/theft, fiscal incentives etc. should be also monitored: it is important to transmit work like this to other Member States so that they can make the best informed decisions on how to deal with these very new vehicles. Many of these issues are dealt with in other chapters (Chapters 2, 3, 4, and 8).

EU level

- Provide information to Member States on management of these new vehicles on the roads. [BP]
- Continue current good collaboration in standards development at the global level. [RE]
- Include EPACs and LEVs in the context of the Alternative Fuels Infrastructure with regard to promotional and technical coordination to increase the numbers of electric vehicles. [RE]
- To continually work with all stakeholders to enforce the prevention of tampering. [GR]
- To improve information coming from retailers to consumers concerning the use of bikes. [BP]

5.3. EPAC Charger Technical Standards

The status quo of cycling in relevant policy field

Though charging for Light Electric Vehicles (LEVs) uses typical domestic charging, barriers of charging still have to be overcome to develop a comprehensive public network. Electric bikes require a publicly accessible network of charging points, which should be standardised, but separated from the well-known type 2 charging device. The type 2 charging device can serve as a good example but is oversized and not suitable for this application. All electric bikes are sold with a charger with a domestic plug for use at home. Further investigations at EU-level are probably needed to find a solution for a comprehensive public network.

There are already first activities concerning the standardisation of a public charging infrastructure and proposals are already available. In addition to this, there are proposals to develop and realise such concepts in publicly funded projects. In order to achieve a high public acceptance, the standardisation should comprise both EPAC, speed EPAC, and eScooter. That means on the technical side that the charging infrastructure needs to be designed for 60V and 40A.

EU level

- Further investigate the exact requirements for accommodating recharging of EPACs at publicly accessible network and establish e-charging points for EPAC, Speed EPAC and eScooter.[RD]

5.4. Automated and Autonomous Vehicles and Cyclists

The status quo of cycling in EU policy on the development of automated and autonomous vehicles

At present there is an urgent need for a new harmonised regulatory framework for automated driving at EU level. This should take other road users such as cyclists into account. Setting this up would be an essential precursor to automation. A multi-stakeholder initiative called Gear 2030 was launched by the European Commission and will aim to develop a roadmap for automated driving in the EU in 2017. A range of EU legislation such as vehicle type approval, driver licencing, data protection and insurance will have to be revised.

In parallel, the C-ITS Platform (cooperative intelligent transport systems) was created in 2014, gathering national authorities, C-ITS stakeholders and the Commission. This follows on from the ITS Directive 2010/40 and the ITS Action Plan. The platform's most recent report, published in January 2016, sets out a roadmap and a deployment strategy for C-ITS in the EU. The C-ITS Masterplan was published in November 2016 and prepares the way for the priority C-ITS applications.

"Safety and the potential to reduce accidents caused by human error" is one of the main motivations for higher levels of automated driving, according to ERTRAC.[123] This is especially true if these functions include watching out for and being sensitive to the needs of pedestrians and cyclists. Automated driving can therefore be considered as a key aspect to support several EU transport policy objectives including road safety. However, research to assess the potential safety benefits of automated driving is only just beginning.

C-ITS, automation and how to connect cyclists

ITS can detect the presence of cyclist/pedestrians and can also act to prevent a collision. More research is needed to find out how well current systems detect cyclists.[124] An EU report on C-ITS highlighted the challenge posed by unequipped users, including cyclists.[125] A recent EU-funded project VRUITS (vulnerable road users ITS) has produced a list of recommendations on how cyclists and pedestrians can be integrated to achieve the maximum benefits of C- ITS.[126] The project has presented a road map for deployment of cyclist/pedestrian applications. One of its key recommendations is that cyclists could benefit from the development of a statement of principles for ITS (similar to the HMI Statement of Principles for in-vehicle systems[127]).

There are real concerns about how these vehicles will interact with vulnerable road users, especially during the introduction and transitional stage of automation. Of course some of the in-vehicle safety technologies now already being deployed are specifically able to help prevent collisions with cyclists and pedestrians. Although research is ongoing with new ideas in this field,[128] at present pedestrians and cyclists are largely unequipped with ITS safety equipment which might allow them to interact with automated vehicles. The danger is that in an increasingly connected transport system, active modes of transport could be locked out.[129] On the positive side, C-ITS and the emerging driverless technologies can be used to better manage traffic, including congestion charging, restricting access to urban areas etc. Interaction between drivers of non-autonomous vehicles and cyclist/pedestrians often takes the form of communication through eye contact. Vehicles and their sensors and cameras will have to go above and beyond simple detection and be able to pick up on different forms of communication. Risk compensation and risk management methods by cyclists and drivers may be radically altered.

New ITS are also emerging and the use of personal devices by cyclists is on the rise. Some of these could help cyclists themselves for example for navigation and safe route choice, but they can also be a cause for concern with distraction. ITS is already being built into e-bikes with, for example, haptic handlebars which give feedback warnings, and in cyclist safety equipment (see Chapter 9 for details).

[123] (European Transport Safety Council, 2016)
[124] (Hynd, et al., 2015)
[125] (European Commission, 2016)
[126] (VRUITS, 2013 - 2016)
[127] (Official Journal of the European Union, 2008)
[128] (Prospect Project: Proactive Safety for Pedestrian and Cyclists) (VRUITS)
[129] There are also consequences of this for transport planning Chapters 2 and 4 looking at cycling promotion, active travel planning and infrastructure

Proposed policy changes

EU level

- Develop a coherent and comprehensive EU regulatory framework for the deployment of automated vehicles. [RE]
- Revise the EU type approval regime to ensure that automated vehicles comply with all specific obligations and safety considerations of the traffic law in different Member States. [RE]
- Revise type approval standards to cover all the new safety functions of automated vehicles, to the extent that an automated vehicle will pass a comprehensive equivalent to a 'driving test'. This should take into account high-risk scenarios for occupants and for road users outside the vehicle. [RE]
- Conduct research looking at the transitional phase of mixed automated and semi- automated vehicles and interaction with vulnerable road users. [RD]
- Develop a Human Machine Interface Statement of Principles for use of ITS by cyclists to guide the design of how cyclists interact with devices, apps and other smart technology without risky or distracting behaviour. [GR]
- Develop EU guidelines and regulations for the use of mobile devices by cyclists, with the goal of to minimizing distraction. [GR]
- Encourage research on vehicle detection systems to warn cyclists. [RD]

Summary

This chapter has two sections:

1. Integrating cycling into the multimodal transport system
Multimodal transport, according to the European Commission, in the sense of combining "optimally the various modes of transport, exploiting each one's strength and minimising the weaknesses. The Commission hence pursues a policy of multimodality by ensuring better integration of the transport modes and establishing interoperability at all levels of the transport system."[130]

Main recommendations to the EU include:

- Integrate cycling (and bike-sharing) into all relevant multimodal transport policies, project funding, research projects, etc.
- Include the potential of cargo bicycles and promote a shift towards last-mile cycle-logistics deliveries in the upcoming Commission guidelines on urban logistics.
- Improve the conditions for bicycle carriage on all modes and define general terms and conditions under which this provision should be met.

2. Smart cycling, ITS and digital agenda
Elaborates on the technological side of delivering multimodal transport 'Smart Cycling, ITS and Digital Agenda'.

Main recommendations to the EU include:

- Inclusion of cycling and public bike sharing data and services within the standardisation and harmonisation of multimodal and real-time transport data.

6.1. Integrating Cycling into the Multimodal Transport System

The status quo of cycling in the relevant policy field

The overall transport and mobility system can become more efficient and user-friendly if the different transport modes are well integrated and complementary. A system approach integrating walking, cycling, public transport and sharing services such as bike[131] and car-sharing (and car-hailing) services is needed to incentivise people to reduce car use, in particular for short and medium-distance urban trips but also for long-distance trips.[132] A special challenge is to create viable alternatives to individual car use in low-density rural areas.

Cycling and bike sharing can play an important role in the multi-modal transport system, in particular as a first- and last-mile feeder function for public transport. This can dramatically increase the catchment area of public transport, which is especially relevant in rural areas. In the Netherlands, about 40% of all train users arrive by bicycle at the railway station.[133] For deliveries of goods and services, (cargo) bikes can be a highly efficient last-mile solution. Some cities are experimenting with urban logistics consolidation centres where goods are loaded onto (e-)cargo bikes for delivery.

[130] (European Commission, 2017)
[131] (MetroBike, LLC, 2016)
[132] (MetroBike, LLC, 2016)
[133] (Ministerie van Infrastructuur en Milieu (Dutch Ministry of Infrastructure and Environment), 2015)

Important measures to facilitate multi-modal transport include:

- Design of public transport and interchanges that enable people cycling to switch or combine transport modes easily. This includes the provision of adequate bike parking facilities at public transport stations (see Chapter 4.4);
- Integration of cycling and public bike-sharing into multimodal journey planners and ticketing schemes;
- Optimized access ways for cyclists at and around public transport stations;
- Making public bike sharing accessible with the same card or account that is used for other public transport services;
- Full integration of bike sharing into the public transport system, ideally treating it as a public transport mode. Some railway companies operate their own bike-sharing schemes (e.g. OV-Fiets with the Dutch NS; Blue-Bike with Belgian NMBS/SNCB; Call-a-Bike with Germany's DB).

An important question is also the carriage of bicycles on public transport buses, trains, taxis, ferries, aeroplanes, etc. The extent to which it is possible or allowed to bring along a bicycle varies enormously between modes and regions, so that cyclists are faced with a confusing, complicated and unreliable patchwork. However, some general conclusions can be drawn regarding bicycle carriage (meaning full-size, assembled bicycles):

- Many public transport operators allow the carriage of bicycles on trams and light rail during off-peak hours on workdays and on weekends;
- On long-distance buses bicycle carriage is often possible in the cargo areas underneath;
- On most train services, carriage of bicycles is possible, with the exception of many (international) high-speed trains;
- Most airlines accept bicycle cargo for a fee and require the bicycle to be packed in some way, though rules and their application are far from consistent (turning handlebars sideways, removing pedals, putting bike in a bag or box, signing disclaimer forms etc.)

The status quo of cycling in relevant EU policy

The European Commission's website[134] lists these 4 measures to facilitate multi-modality:

1. The internalisation of external costs in all modes of transport, with a view to sending appropriate pricing signals to users, operators and investors. The social and environmental costs of transport should be paid in line with the 'polluter pays' principle.
2. More targeted investments in physical infrastructure, to create efficient and easy-to-use interchange points between the different modal networks.
3. Better use of information (on traffic, capacities, availability of infrastructure, cargo and vehicle positioning).
4. Financial support of multimodal/intermodal transport by the EU.

A fifth area, passenger rights, is also relevant to multi-modal transport. For example, the Regulation on Rail Passengers' Rights and Obligations does not currently contain any obligation to provide bicycle carriage, but it does include a

[134] (European Commission, 2017)

requirement for provision of pre-journey information on bicycle carriage[135] [136] (in Annex II). The other existing EU Passenger Rights Regulations (on air, road and maritime transport) have no provisions at all on bicycle carriage. However, the Commission is currently in the process of drafting passenger rights for multimodal transport.[137]

Turning to urban logistics, the Commission set out in its Transport White Paper 2011 the objective of achieving "essentially CO2-free city logistics in major urban centres by 2030". The Commission is currently developing non-binding guidelines for local authorities.

Proposed policy changes

EU level

- Integrate cycling (and bike-sharing) into all relevant multimodal transport policies, project funding, research projects, etc. [RE, GR, BP, F].
- Include the potential of cargo bicycles and promote a shift towards their use in last-mile logistics in the upcoming Commission guidelines on urban logistics [GR, BP].
- Improve the conditions for bicycle carriage on all modes and define general terms and conditions under which this provision should be met. [RE, GR, BP, F]. The EU has the competence for bicycle carriage through the Passenger Rights Regulations.
- Establish good practice guidance material to National Enforcement Bodies and transport operators on how to improve services to customers with bicycles with regard to the provision of information on bicycle carriage, prices of bicycle tickets, ticket reservation schemes and sales channels.[138] [BP]

National level

- Integrate cycling (and bike-sharing) into all relevant multimodal transport policies, project funding, research projects, etc. In particular, provide adequate co-funding to local multimodal infrastructure projects, e.g. for adequate bike-parking facilities at railway stations [RE, GR, BP, F].
- Include the potential of cargo bicycles and promote a shift towards their use for last-mile logistics in national guidelines on urban logistics [GR, BP, F].
- Encourage transport operators to introduce/improve bicycle carriage [GR, BP].

Regional and local level

- Integrate cycling and bike-sharing into the multimodal transport system, including in multi-modal journey planners, ticketing systems, parking facilities, etc. [RE, GR, BP, F]
- Prioritise, where possible, the last mile delivery of goods and services by bicycle, including electric cargo bikes. [RE, GR, BP, F]
- Encourage transport operators to introduce/ improve bicycle carriage [GR, BP].

[135] Art. 5 stipulates: "Railway undertakings shall enable passengers to bring bicycles on to the train, where appropriate for a fee, if they are easy to handle, if this does not adversely affect the specific rail service, and if the rolling-stock so permits." (Official Journal of the European Union, 2007)

[136] (Staes (Verts/ALE), 2015)

[137] (European Commission, 2017)

[138] (Küster, Lancaster, & Tusl, Bikes and Trains 7 basic services that give cyclists a smile: A collection of good practice examples of integrating cycling with long-distance and international rail services, 2016) (Transport & Mobility Leuven (TML), 2014 - 2017)

The EU added value

Improving multimodal transport services will reduce dependence on car ownership, thus reducing the number of car trips and contributing to the decarbonisation of the transport system, will improve air quality, reduce noise, etc. Improving the conditions for bicycle carriage in public transport will also boost cycle tourism and support creation of green jobs in related industries.

Best Practice Example: Dutch Railways NS and ProRail

Dutch railways NS and ProRail initiated a program with the objective to create additional capacity for bicycles in their system. There are now 444,000 bicycle parking spaces in Dutch railway stations. With the result that about 50 % of daily train travellers arrive by bicycle at the railway station and after arrival, 14 % cycle from the station to their destination. Source: (BiTiBI Project (Transport & Mobility Leuven (TML)))

6.2. Smart Cycling, ITS and Digital Agenda

The status quo of cycling in the relevant policy field

The transport sector is experiencing a surge in the use of new technology. Connection between modes, between infrastructure and between users is seen as a way of improving sustainability and safety. Most of this is being led by the car industry, which has been investing billions in what it sees as the next generation of motorised transport. This includes links to traditional ITS and the development of cooperative ITS (C-ITS). This will inevitably constitute the future of the transport system.

Although cycling has been slow to join this technology revolution, nowadays many companies are exploiting ways to utilise new tech. New cycling technologies include, for instance, travel and journey planning and navigation; sensors on bicycles to pick up air, light, surface & environmental information; upgrading bicycles with connectivity devices to communicate with the urban infrastructure and other vehicles; electric mobility; smart public bike sharing; and data sharing. The success of electric bicycles and public authorities adapting to new technologies stimulated the interest of established bicycle manufacturers as well as new big players, such as Bosch, Cisco and various car manufacturers in this area. They all want to establish their existing technologies within the bicycle sector. The electrification of bicycles also allows for slightly heavier and more power-consuming devices to be placed in or on the frame. This is increasingly significant for the rise of mobility as a service (MaaS). Connectivity and data constitute the cornerstone of any MaaS system, which is becoming a real trend across European countries

that will partially shape access to mobility – it is therefore essential to ensure that cycling is not locked out of these technologies.

Despite the rise of interest from big players used to dealing with a regulated and stable technology sector, the technology associated with the bicycle sector is still a patchwork, unregulated and difficult to compartmentalise. This causes potential problems considering the regulation, growth and clear comprehension of strengths and weaknesses in the sector. Cities and local authorities need data from active transport modes, which is often lacking (see Chapter 11). A huge amount of data is generated by individual cyclists on their individual devices, but this is not yet formed into big enriched data sets that could be used to leverage modal share and user safety and comfort. This localised data collected on various apps and devices would be exceptionally useful to authorities as big data if it could be collated. A first step would be to demand that the data from bike share systems is made available and accessible to the city authorities, offering a unique opportunity to better understand active and intermodal mobility across the urban space (see also Chapter 5).

The status quo of cycling in relevant EU policy

EU Commissioner for Transport Violeta Bulc has commented on the link between cycling and new technologies: "The development of cycling is steering several technological innovations. We want to effectively incorporate cycling into connected and smart transport networks of the future. Smart cities will be driven by technology, which, if properly implemented, has the power to introduce a behavioural change." [139]

Under the current goals of the 2011 Commission White Paper on Transport, reduction of emissions and fossil-fuelled vehicles and a move towards a safe, efficient and multimodal transport system including ICT are seen as major objectives. A legal framework (Directive 2010/40/EU, the 'ITS Directive')[140] was adopted on 7 July 2010 to accelerate the deployment of innovative transport technologies across Europe as part of the Action Plan on ITS.[141] It was unveiled in 2010 and was to last 7 years; however there its implementation period has now been extended. In 2016 the Commission published its Low Emissions Strategy[142] including the objective to increase the efficiency of the transport system by implementing digital technologies, smart pricing and further encouraging the shift to lower-emission transport modes. There are delegated acts in place from the ITS Directive, including the provision of EU-wide multimodal travel information services;[143] the provision of EU-wide real-time traffic information services;[144] data and procedure for the provision, where possible, of road-safety related minimum universal traffic information free of charge for users.[145] Once connected to the urban infrastructure network, cycling can deliver rich information on all of these initiatives.

The Commission has given a mandate to the European Standards Organisation CEN (under M/546[146] and Commission Implementing Decision 2016/209[147]) to develop and review Multimodal Travel Information data and services standards. This work includes collating and defining data sets and models, working groups looking

[139] (Bulc, 2016)
[140] Full details and links to all aspects of the Directive can be found on (European Commission, 2008) 128 (European Commission, 2008)
[141] (European Commission, 2008)
[142] (European Commission, 2016)
[143] This is upcoming during 2017
[144] (Official Journal of the European Union, 2014)
[145] (Official Journal of the European Union, 2013)
[146] (Official Journal of the European Union, 2016)
[147] (Official Journal of the European Union, 2016)

into creating urban access data portals, and making sure that legacy and new services and systems are compatible with public authorities' standards.

Also, the Commission has identified the need for a new harmonised regulatory framework for automated and semi-automated motor vehicles at EU level. To deliver this goal there are initiatives and research including Gear 2030,[148] the C-ITS Platform and the roadmap and deployment strategy for C-ITS in the EU.[149] The second phase of the C-ITS working group is under way in 2017 with a working group on urban areas which will have a broader remit and will be specifically looking into urban technologies and services related to connectivity. This will include input on the needs and requirements of cycling, walking and public transport to understand how to incorporate cycling data collection and sharing into C-ITS technology eco-systems according to the European Strategy on C-ITS. Being much more versatile, flexible and socio-demographically inclusive than motorised vehicles, bicycles must be strategically included in all Smart and Sustainable Urban Mobility Plans.

Proposed policy changes

EU level

- Do further research[150] into how to include unequipped users, including cyclists,[151] in the C-ITS policy framework [RD].
- Include active modes in one-stop-shop for transport services and therefore include them in the standardisation and harmonisation of multi-modal and real time transport data. [RE]
- Include cycling stakeholders within the ongoing work being of the ESOs[152] on urban ITS and C-ITS data and services [ORG]

National level

- Include public bike sharing and private cycling within public MaaS projects [RE, GR, BP, F].

Regional and local level

- Include public bike sharing and private cycling within public MaaS projects [GR, BP, F].
- Integrate the data collected from public bike sharing schemes into the real-time information from public transport to allow for better and seamless inter-modal trips.
- Encourage data collection from cyclists, to use this data to improve urban cycling and to allow access to data for individual cyclists. [GR, BP, F]
- Use data from cyclists' apps/devices to improve cycling environment in urban areas. [GR, BP, F]

[148] (European Commission, 2015)
[149] (European Commission, 2016)
[150] (Hynd, et al., 2015)
[151] (European Commission, 2016)
[152] "There are a number of existing mature standards.... However, many of these standards overlap or are not harmonised and there are gaps, particularly in the coverage of the new modes" (Urban ITS - Project Team TC278 1701, 2016)

Summary

In order to achieve a substantial modal shift towards cycling, a financial and fiscal level playing field is needed. Fiscal incentives like tax breaks for cycling to work or subsidies for electric bikes are powerful tools to steer mobility behaviour and hence contribute to the EU's societal objectives as a best return on investment policy approach.

1. Subsidies for cycling:

a) Funding for investments in cycling

Cycling should be streamlined into all relevant EU funding streams. The financial resources available for cycling measures should be further increased during the next Multiannual Financial Framework, and recipients should be encouraged by the European Commission to use them.

b) Financial incentives for purchasing electric bikes

The EU and Member States should develop comprehensive e-mobility strategies, promoting not only e-cars but also e-bikes. Purchase subsidies that are adapted to market conditions can help to reap the benefits of electric bikes by increasing comfortable cycling distances and opening up cycling to new groups.

2. Cycling-friendly public procurement

It should be an obligatory step in procurement procedures under the EU Green Public Procurement criteria to check whether the purchase of passenger cars can be replaced by bicycles (including pedelecs), and (electric) cargo bikes instead of light commercial vehicles (LCVs), including for postal services.

3. Cycling-friendly taxation systems

a) Pro-cycling Personal Income and Corporate Tax Regulations

National tax systems should be reformed with a view to incentivising sustainable mobility and abolishing tax subsidies for motorised transport, for example for company cars. Fiscal incentives for cycling can include tax benefits to install cycling-friendly infrastructure in companies or (direct or indirect) subsidies for commuting by bike.

b) VAT for bike sales, bike repairs

EU VAT reform should allow Member States to apply reduced VAT rates for the purchase and repair of bicycles.

4. Internalisation of External Costs of Car Driving

a) Congestion charges

Congestion charges should be introduced in more European cities, on a voluntary basis. Where they are introduced, all aspects of mobility, including cycling, should be considered in a comprehensive mobility plan and credible alternatives to car use provided for accessing the charging zone.

b) Fuel taxes

In order to achieve a level playing field for all modes of transport including cycling, the EU Energy Taxation directive should be reformed with a view to including all externalities of fuel use in price levels. Fuel taxes should be increased and reach the same level for both diesel and petrol.

7.1. Subsidies for Cycling
a. Funding for Investments in Cycling

The status quo of cycling in a relevant policy field

In the previous Multiannual Financial Framework for 2007–2013, approximately EUR 600 million was allocated to cycling. In the current period (2014–2020), we estimate that EUR 1.325 billion of EU funds are available for cycling, based on the explicit references included in the current versions of the programming documents. If we take into account the implicit and indirect references as well, cycling-related measures could absorb an estimated EUR 2.041 billion of EU subsidies. This is more than twice or, if we count all references, more than three times as much as was available in the former period. This is positive news, but the distribution of the funds is uneven among countries and regions, and with respect to the type of projects that can be supported.

The following EU-level funding streams could be used to promote cycling:

- European Regional Development Fund and European Agriculture Fund for Rural Development are the main source for cycling projects.
- The Connecting Europe Facility (CEF) can be used for the development of cycling infrastructure measures connected to the Trans-European Transport Networks (TEN-T).
- The Horizon 2020 program can support innovation and research projects containing cycling components.
- The COSME program can support the competitiveness of cycling-related enterprises (e.g. cycling-related manufacturing SMEs) and European-scale cycling tourism projects.
- The LIFE program can support environment- and climate-related actions.
- The Erasmus+ and Europe for Citizens programs can support European campaigns, events and other soft measures to involve European citizens and change their perceptions and/or behaviour (for example to promote physical activity).

However, there are some major challenges to a coordinated and efficient use of EU funds for cycling:

- The current TEN-T Guidelines allow co-financing of cycling-related measures through CEF but the current wording does not support standalone cycling projects (they have to be part of a wider project) and there is no obligation to integrate cycling-related measures.
- The Commission discouraged Member States and regions from allocating funding for cycling-related measures in their Operational Programmes (OPs).
- The Horizon 2020 program has a strong focus on supporting R&D&I in the car sector only, without taking a holistic approach to changing the mobility system to make it more sustainable.

Proposed policy changes

Based on examples from all around Europe, the following suggestions can be made for investment levels in infrastructure and promotional measures. Infrastructure investments should be

carried out according to planning guidelines (see Chapter 4.1). The investment levels are aggregated over all levels of governance: [F]

Minimum aggregated investment level per capita per year		
Category/modal share	Level	Grow
Starter (up to 10%)	€5	€10
Climber (10-25%)	€10	€15-25
Champion (over 25%)	€25	€30

EU level

EU funds provide a unique opportunity to boost cycling by providing additional resources for direct and indirect cycling-related measures. To use this opportunity, cycling needs to be treated on an equal footing with other modes of transport in at least the following areas:

- Streamline cycling into all relevant EU funding streams. This requires a close and regular coordination between all the responsible DGs within the European Commission and the executive agencies. 10% of the EU's transport budget should be invested in cycling measures. [F]
- Increase the financial resources available for cycling measures through the Cohesion Policy in the next Multiannual Financial Framework; regions and cities should be encouraged to use them. [F]
- Develop European guidelines for cycling measures that include best practices and can be used by regions and cities to facilitate implementing cycling measures co-funded by the EU. [GR]
- Integrate the EuroVelo network into the Trans-European Transport Network (TEN-T) using the Connecting Europe Facility (CEF). [RE]
- Move the transport part of the Horizon 2020 program from researching funding focused on developing new forms of cars to an approach that examines the mobility system as a whole, and includes (electric) cycling as an innovative form of transport and an integral part of the smart cities of the future. [F]
- Incorporate bikes and e-bikes within EU terminology to provide equal opportunities for funding for all transport modes, including cycling. In particular the term 'vehicle', (e.g. in EU-funded projects, road-safety etc.) should include (e-)bikes. In the context of ITS; Internet of Things, etc., 'connected car' should become 'connected vehicle' in order to include (e-)bikes. [F]
- Incorporate cycling measures into all relevant land-based transport projects co-funded by the EU. [F]

National level

- Ensure that cycling projects are eligible to receive an adequate share of funding from the transport and tourism-related sections when drafting operational programmes for the EU Cohesion and Rural Development Funds. [RE]
- Adopt cycling strategies and include concrete provisions on adequate funding levels for infrastructure and promotion measures, fulfilling the following tasks:
  - Invest in infrastructure projects the national level is responsible for.
  - Provide a subsidy scheme to support the regional and local level. [GR]

Regional and local level

- Make sure to have the administrative capacity to use available funding for cycling from the national and the EU level, meaning that there should be enough staff working on this topic and this staff should have adequate knowledge about all funding opportunities. [BP]
- Adopt regional and local cycling strategies and use adequate levels of national budgeting to co-finance investments and maintenance of cycling projects in order to reach the target investment levels stated above. [F]

EU added Value (and/or cost of non-Europe)

Funding cycling measures through EU funds gives the opportunity to promote cycling even in regions that do not have sufficient budgets of their own, and where cycling levels are currently not high enough to justify large investments through these limited budgets. It thus enables these regions to take advantage of the multiple benefits of cycling (see Chapter 2). A coordinated EU funding strategy for cycling with guidelines on how to best use the available funds can also encourage others to make more and better investments.

b. Financial Incentives for Purchasing Electric Bicycles

The status quo of cycling in the relevant policy field

Despite their obvious benefits, many public e-mobility strategies in Europe, including at EU level, focus exclusively on cars and do not take into account the opportunities offered by other forms of electric mobility like e-bikes to make the transport system as a whole more sustainable.

For example, Germany had already spent approximately EUR 1.4 billion of public subsidies on research and development of electric cars by 2014, and added another subsidy scheme of almost EUR 1 billion, including a buyer's premium, in 2016. The results of this massive investment to date are rather disappointing: there are 25,500 purely electric cars on German roads, and the target of rolling out 1 million electric cars by 2020 seems almost impossible to reach. Over the same period, the market for electric bikes in Germany has taken off with hardly any public subsidies involved either for research and development or for purchase premiums, apart

from some small pilot projects. Currently, approximately 2.5 million electric bikes are in use in Germany, and the number would probably be much higher if there had been the same targeted and massive public financial support as for electric cars.

Proposed policy changes

EU and national level

E-bikes are still considerably more expensive than conventional bikes. While there has been a large uptake in several countries (Germany, the Netherlands, Belgium), their market development is still in the take-off phase in others. Purchase subsidy schemes could help to bridge the price gap. We suggest an approach adapted to market conditions:

- In markets with low sales figures, a purchase subsidy of EUR 500 (around 10% of the current purchase subsidies of electric cars in many European countries) could help to bridge the price gap to conventional bikes and facilitate market uptake of electric bikes (including low-powered as well as speed pedelecs), which in turn have a high potential to achieve a modal shift away from car trips to cycling. [F]
- In more mature markets, more targeted subsidy schemes, e.g. for speed pedelecs and electric cargo bikes due to their higher price, or for charging infrastructure in small businesses, could be an option. Subsidies for electric bikes could also be given as a reward for cancelling a car's registration. [F]

EU added Value (and/or cost of non-Europe)

Following a balanced electromobility promotion strategy which includes e-cycling will help the EU to make its transport system as a whole more sustainable and tackle issues such as congestion or public health problems due to physical inactivity, which will not happen if the only focus is electric cars.

7.2. Cycling-Friendly Public Procurement

The status quo of cycling in the relevant policy field

The Clean Vehicles Directive (Directive 2009/33/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles),[153] as well as the current non-binding EU Green Public Procurement Criteria (EU GPP) for Transport, published in 2012,[154] only take into account improvements of motorised vehicles in terms of energy use and emission reductions. They do not yet encourage a modal shift towards sustainable modes of transport like cycling.

The provision of postal and courier services by environmentally friendly transport modes like

[153] (Official Journal of the European Union, 2009)
[154] (European Commission, 2012)

cycling is a dynamic and rapidly expanding sector, in which many local SMEs are active throughout Europe. Including these services in the criteria and giving recommendations on the use of bike/cargo bike postal and courier service would therefore give a boost to local economies in the EU while at the same time reducing congestion, air pollution and CO2 emissions.

Proposed policy changes

EU Level

- Create an obligatory step in procurement procedures according to the EU GPP criteria to check whether bicycles (including pedelecs) can be bought instead of passenger cars, and (electric) cargo bikes instead of LCVs. [GR]
- Include the replacement of a service car pool for public bodies by a subscription to mobility services that include flexible access to public transport, car sharing and (electric) rental bikes, in the GPP. [GR]
- Include the provision of postal and courier services by environmentally friendly transport modes like cycling in the GPP criteria for transport and give recommendations on the use of bike/cargo bike postal and courier services. [GR]

National, regional and local level

• Integrate the abovementioned criteria in the procurement policies and ensure that cycling is streamlined into all relevant procurement procedures regarding mobility and logistics. [RE]

EU added value (and/or cost of non-Europe)

The public sector stands for an important part of transport and mobility usage in the EU. EU guidelines on green public procurement for transport that include cycling as an integral part therefore have a large potential to improve transport and mobility systems, also in countries and regions with currently low cycling rates and where the public sector could be a pioneer.

7.3. Cycling-Friendly Taxation Systems

a. Pro-cycling Personal Income and Corporate Tax Regulations

The status quo of cycling in the relevant policy field

While in many countries, tax benefits are available for people using their car or public transport for their daily commute to work, fiscal incentives for cycling are only granted in a few countries. Monetary incentives are a powerful tool to steer behaviour; they have the potential to bring about a substantial modal shift, especially if subsidies for commuting by car (direct or indirect, e.g. favourable company car tax regimes) are abolished at the same time. Wheth-

er incentives for cycling are introduced or incentives for car use abolished, the result should be a fiscal system that is mode-neutral, providing a level playing field for all modes of transport.

The status quo of cycling in relevant EU policy

At the EU level, a study commissioned by the Directorate-General for Taxation and Customs Union (DG TAXUD) of the European Commission points out that direct revenue loss to state budgets linked to the under-taxation of company cars may approach 0.5% of EU GDP (EUR 54 billion) and welfare losses from distortions of consumer choice might be equal to 0.1 to 0.3% of GDP (EUR 12 billion to EUR 37 billion).[155] In its White Paper on Transport from 2011, the Commission set itself the goal of addressing these distortions during the first phase of the implementation of the White Paper by 2016:

"Reassess transport taxation where necessary, namely by linking vehicle taxation to environmental performance, reflecting on possible ways forward to review the current VAT system concerning passenger transport, and revising company car taxation to eliminate distortions and favour the deployment of clean vehicles."[156]

Up until now, little has been done to realise these ambitions. The only time the EU has addressed the issue in the framework of the European Semester is in the Country-Specific Recommendations for Belgium for 2016; however, it is mentioned only in the recitals, falling short of being included in the concrete recommendations:

"(11) There is also considerable potential for a 'green' tax shift which stems from, among other things, the favourable tax treatment of company cars and fuel cards, which contribute to pollution, congestion and greenhouse gas emissions."[157]

Proposed policy changes

EU level

• Put more focus on environmental tax reform in the Country-Specific Recommendations on fiscal reform that are published on a yearly basis in the framework of the European Semester. Eliminate distortions and perverse incentives for unsustainable mobility behaviour and treat sustainable modes of transport such as cycling at least at the same level as others in the fiscal system. [GR]

National level

Since commuting by bike is far less costly than commuting by car, abolishing (indirect) subsidies for commuting by car (e.g. low taxation of company cars and fuel, or commuting allowances) can already have a significant steering effect towards commuting by bicycle. In countries where company cars that can be used for private purposes are an important part of the salary structure, a tax-free 'mobility budget' for employees could be an alternative to the complete abolition of the tax subsidy for these cars. The mobility budget could be used for commut-

[155] (European Commission; DG TAXUD, 2010)
[156] (European Commission, 2011)
[157] (Official Journal of the European Union, 2016)

ing by all modes, and any amount saved could be converted into other fringe benefits. This would make cycling to work more attractive. In contrast to the widespread use of company cars as a tax-incentivised fringe benefit, offering bikes as an addition to the salary is much less common and tax incentives for purchase or use of bicycles only exist in a few countries. Tax benefits could be also be granted to companies for the instalment of cycling-friendly infrastructure such as bike parking or showers.

Depending on the national fiscal system, the aim of a fiscal level playing field for mobility can be achieved in different ways: [RE]

- Abolish or do not introduce subsidies for commuting by car. In countries where company cars that can be used for private purposes are an important part of the salary structure, replace the existing tax benefits with a 'mobility budget' system that rewards switching from car to cycling.
- Introduce a tax-free kilometric reimbursement for cycling to work: The amount of the reimbursement should be high enough to provide a real incentive, and ideally higher for shorter distances since they represent the greatest potential for modal shift.
- Introduce tax incentives for bikes and cycling infrastructure offered to employees by employers to create a level playing-field with company cars and other benefits like free car parking.[158]
- Using the bike for business trips should be as easy as using other transport modes and reimbursed at least at the same level.

EU added value (and/or cost of non-Europe)

The competence for changing tax regimes in this field lies mostly with Member States. However, action at the EU level could bring substantial benefits in terms of providing recommendations and sharing best practices. It will help the EU reach the targets it has set itself on taxation in the 2011 Transport White Paper.

b. VAT on Bike Sales, Bike Repair

The status quo of cycling at EU and national level

Under the current EU VAT regime, Member States can grant reduced VAT rates on bike repair services, but not on bike sales. Until recently, the threshold for adding new items on the list of reduced VAT rates has been very high, since unanimity in Council is required to change the list. However, in April 2016, the Commission adopted an action plan on VAT.[159] This proposes two options for reforming the VAT rate regime: either an extension and regular review of the current list, or abolishing the list and giving Member States control over reduced rates and their level. Either of these two options would make it easier for Member States to extend reduced rates to bicycle sales.

The following Member States currently apply reduced VAT rates for bicycle repair:[160]
• Belgium
• Ireland

[158] An overview of existing schemes that benefit cycling-friendly employers is given by the EU-funded "Bike2Work" project: ((Bike2Work) European Cyclists' Federation)
[159] (European Commission, 2016)
[160] (European Commission, 2017)

- Luxembourg
- Malta
- The Netherlands
- Poland
- Portugal
- Slovenia

Proposed policy changes

National level

Use the VAT action plan; if adopted use the opportunity to review the national system of reduced VAT rates (abolishing reduced rates/exemptions on highly polluting and CO2- emmitting modes of transport, reducing rates for bicycle sales). [RE]

EU added value (and/or cost of non-Europe)

Applying reduced VAT rates to bicycle sales would make high-quality bikes, which are more robust and adapted to daily use, and electric bikes, which can cover longer distances and make commuting by bike more attractive, more affordable for EU consumers.

7.4. Internalisation of External Costs of Car Driving a. Congestion Charges

The status quo of cycling in the relevant policy field

Road congestion is a major issue for many European cities. The costs of road congestion are estimated at around EUR 100 billion/year, or 1% of the EU's GDP.[161] Congestion also creates numerous other problems, such as increased air and noise pollution. To ease these problems, several cities in Europe have introduced congestion charging, in which users of motor vehicles are charged a fee to enter a certain, heavily congested, zone of the city during times of high demand (usually daytime during weekdays). These schemes are a form of traffic demand management, because only vehicle users with a willingness to pay the fee will enter the charging zone. They are also an application of the 'user pays principle' in transport and a step towards the internalisation of external costs, because the external costs of car use in highly congested city centres are much higher than elsewhere.[162] Introducing congestion charges thus helps to create a level-playing field for cycling. Such schemes also create an additional source of revenue for cities. An increased overall budget gives cities more financial leeway for investments in more sustainable urban transport systems (e.g. improvements in public transport or cycling).

In its White Paper on Transport from 2011, the European Commission set itself the task of developing guidelines for the application of internalisation charges to road vehicles, covering the social costs of congestion, CO2 (if not included in fuel tax), local pollution, noise and acci-

[161] (European Commission, 2017)
[162] (EPOMM, 2015)

dents and to create a framework for earmarking revenues from transport for the development of an integrated and efficient transport system. The Commission is currently preparing non-binding guidance documents on urban vehicle access regulations, which include congestion charges.

Proposed policy changes

EU level

- Include ambitious recommendations in the guidance in regard to congestion charges. [GR]

National Level

- Facilitate the introduction of congestion charging schemes. [RE, GR]

Regional and local level

- Study the feasibility and consider the introduction of congestion charging schemes, taking into account local conditions. [RE]
- When introducing congestion charging schemes, consider all aspects of mobility, including cycling, in a comprehensive mobility plan and provide credible alternatives to car use for accessing the charging zone. [GR]

EU added value (and/or cost of non-Europe)

Giving guidance at EU level will enable cities that plan to introduce congestion charging schemes to take advantage of best practices, meaning that they will not have to reinvent the wheel. It also ensures that EU policy goals in terms of e.g. air quality or CO2 emissions reductions are realised through these schemes.

b. Fuel Taxes

The status quo of cycling in the relevant policy field

Another fiscal issue, which favours the use of diesel vehicles in particular, is the cost of fuel. Fuel taxes should be at the same level for all types of fuel and internalise the external costs of using these fuels. This is not the case today.

The artificially low cost of diesel represents a subsidy for this fuel, and as such adds another distortion in favour of this mode of transport. Removing this distortion would be another step towards achieving a more level playing field for cycling.

Raising the cost of driving through increasing

fuel tax on diesel to reach the same level as taxes on petrol will, in parallel with other fiscal and infrastructural incentives, encourage more bike journeys and a greater switch away from cars. Reduced air pollution due to fewer diesel engines would also have a positive effect on cyclists' overall health and lifespan. In 2012 the World Health Organization confirmed the causal link between exhaust from diesel engines and lung cancer.[163]

Diesel cars once produced lower CO2 emissions compared to equivalent petrol cars. During the 1990s and 2000s this offered some justification for lower fuel taxes on diesel. Today, however, CO2 emissions from diesel and petrol cars are approximately equal and non-CO2 emissions such as soot (or carbon black) and nitrogen oxide must also be considered.

Once CO2 and non-CO2 climate emissions are considered, diesel is, litre for litre, 15–18% worse for the climate than petrol, as established by the OECD in 2014.[164] A diesel car may travel further on a litre of fuel, the OECD acknowledged, but this is typically a private gain, not a public one. Moreover, diesel cars emit significantly higher levels of other air pollutants, especially NOx and particulates.

In summary, subsidies for diesel, of which the fuel tax gap is the most obvious, have become increasingly hard to justify as public policy as our awareness of the damage to human health directly attributable to pollution from diesel engines grow.

Status quo of cycling in relevant EU policy

In the US and Japan diesel cars account for less than 5% of new sales. In Europe, however, diesel cars make up over 50% of new sales. Europe's unique position in the world in this respect urgently needs to be redressed to incentivise a modal shift away from diesel-powered transport towards cleaner fuels.

In 27 out of 28 EU Member States, diesel is still taxed less per litre than petrol.[165] In the EU the gap in tax levels for diesel and petrol paid by motorists is currently 14 cent/litre or 30% higher for petrol. Since a litre of diesel contains around 10% more energy than a litre of petrol, the tax gap per unit of energy is higher. Over the past 15 years, the gap has been reduced very slowly, at a rate of around half a cent per litre per year. Austria, Belgium, France, Finland, Hungary, Italy and Sweden are the main countries that have taken voluntary action to close the gap by several cents in recent years. Taking into account the full range of externalities associated with both main transport fuels, the OECD has urged Member States to re-balance their tax systems to no longer favour diesel

The EEA's 'Air Quality in Europe' report published in 2015[166] provides a detailed breakdown of how transport-related emissions contribute to the formation of secondary particulate matter in the atmosphere. The transport sector accounted for 46% of NOx emissions in the EU-28 in 2013. The EEA found that these emissions are not going down as quickly as had been projected with the introduction of the 'Euro standards' (European emission standards). This is partly due to the disparity between current test cycle results and real-life driving emissions, which has come to public attention through the 'Dieselgate' scandal since September 2015.

The European Federation for Transport and Envi-

[163] (WHO - International Agency for Research for Cancer, 2012)
[164] (Harding, 2014)
[165] (Transport & Environment, 2015)
[166] (European Environment Agency, 2015)

ronment pointed out in their report, 'Europe's Tax Deals for Diesel 2015',[167] relatively low oil prices and commitments made on 2030 energy and climate targets make the present an opportune time to achieve this reform. While recognising the failure of previous attempts to introduce amendments because of the requirement for unanimity on tax issues, it is crucial to achieve the trend towards convergence

Proposed policy changes

EU level

- Revise the Energy Tax Directive; the gaps must be closed over a certain time period: e.g. " ... where a gap of more than 3c exists, action has to be taken to close the gap by 2020 ..." [RE]

EU added value

Drawing up stricter rules on fuel taxation and closing the fuel tax gap would help to remove current imbalances and distortions between different fuels, but also between modes of transport, thus helping to create a level playing field for cycling. It would also support the EU's wider environmental, climate and energy goals.

[167] (Transport & Environment, 2015)

Summary

This chapter gives an overview of the development and potential of European cycling as a manufacturing and supply industry, concentrating on the conditions that enable the EU to be competitive in terms of maintaining or growing its share of the industry and creating jobs in the sector. The chapter is divided into sections on industrial policy, workforce, quality management and trade.

This will maximise the contribution of the EU cycling industry to the goals of the European Union, in particular Commission President Juncker's stated Priority #4 of a 'Deeper and Fairer Internal Market with a Strengthened Industrial Base' bringing industry's weight in the EU's GDP back to 20% by 2020, from less than 16%."[168]

Thanks to the production of 13 million bicycles and EPACs and bicycle parts, 90,000 jobs are generated by over 800 SMEs operating in 20 of the 28 Member States.[169] There has been an increase of 20,000 jobs in the sector in five years, making cycling one of the largest green employment sectors in Europe.

In its report to a DG TRADE investigation into the bicycle market, the bicycle manufacturers association EBMA reported that European companies would invest up to EUR 1 billion in the period 2013–2018 if market conditions provided a stable market and a level playing field. The industry is now creating an ambitious plan to continue this development. This new investment is needed because the industry has focussed its investment more on product development than manufacturing processes in recent years, and because much of the manufacturing base is in small to medium-sized companies.

The bicycle sector in the EU is characterised by its leadership in innovation and product development. Maintaining an EU-based manufacturing sector means further investment in innovation which is changing mobility:

- Putting millions of electric vehicles into Europe's transport fleet (see Chapter 1) which are a substantial reduction of congestion and improving air quality in our cities, extending the benefits of cycling described in Chapter 2.
- Working with the public sector, the industry created the concept of public bike sharing.
- Now the bike industry is investing in integrating the bike in future mobility systems in terms of advanced safety features and connectivity.

8.1. Industrial policy – EU Bicycle Manufacturing and Supply Chain

The status quo of cycling in the relevant policy field

The cycling industrial sector has fared better in the EU than in some other regions (e.g. North America) in retaining a manufacturing base for both complete bicycles and parts, despite strong international competition. This growth and competitiveness of the EU bicycle industry adds significant value to the EU because it exactly matches the EU's broader industrial policies:

[168] (Juncker, 2014)
[169] (Official Journal of the European Union, 2013)

- Innovative products are increasing the market share of the EU manufacturers
- Improvements to industrial performance and supply chains enable further investments in both products and processes, including reshoring production back from Asia.
- Smart specialist clusters are emerging allowing added value chains to be developed within the EU and allowing a strong and innovative SME base to develop within the industry.
- EU companies are investing in EU research, innovation and production.

However, despite this strong contribution to EU goals, the cycling industry has been underrepresented in policy and financial support from both the EU and its Member States. Because the cycling sector does not enjoy a level playing field with other modes of transport, it has effectively been self-funded. This has led to shortages of finance in some businesses and countries which have hindered some parts of the industry from keeping up with modern production methods.

The key issues for further industrial growth in the EU cycling industry are in manufacturing new products in the EU and process innovation. Success in these fields could see further multi-billion-euro investments by 2025. With EU, Member State and regional support investment could be accelerated with consequential benefits in job creation and new products that address societal challenges.

The increased value of new products is enabling the industry to focus on high added-value production and supply chains (value creation), with a high degree of customer specification and flexible production. This relies on short supply chains and rapid distribution to consumers, often with direct contact between the consumer and manufacturer. Local dealerships will maintain high quality employment at a local level, including strong service in digital services and e-mobility. It is essential to implement digital strategies that work across the whole supply chain from parts makers through to the individual customer.

In parallel to this high added-value segment, companies need to maintain competitiveness with non-EU imports, which requires focus on cost. New factories are being opened and existing plants re-modelled. The smart factory of the future will streamline production processes and supply chains. Costs will be reduced by keeping lower inventories, which will be enabled by shorter delivery chains, reduced returns and inventory obsolescence, cheaper insurance and lower costs of other supply disruptions.

The cost of transportation/delivery of bicycles and electric bicycles (both outbound and inbound) has a significant impact on the final price to the consumer: in Europe, it can reach up to 25% due to a) the problems of inefficient European road networks b) incompletely utilized rail and inland waterways networks that would help decarbonize deliveries.

The status quo of cycling in relevant EU policy

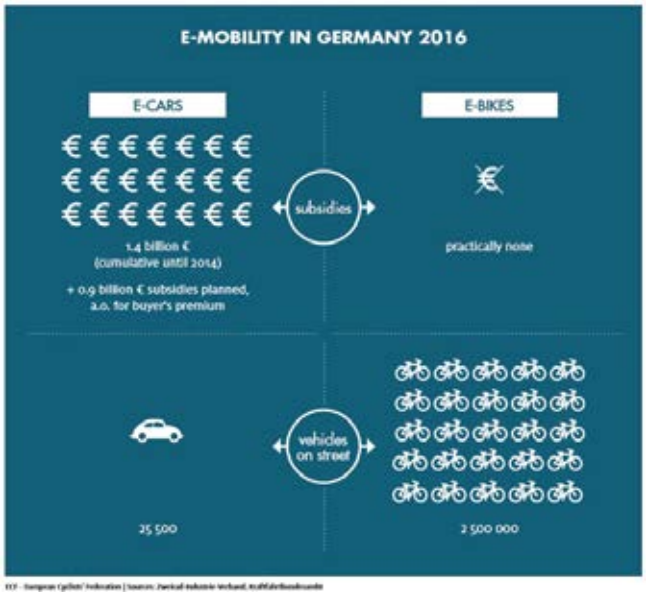
The cycling industry will grow the EU market share and invest in the development of new industrial strategies as part of a wider EU industrial regeneration.

Industrial policy is one of the key strategies of the EU. In his 2014 'Political Guidelines for the next European Commission' President Juncker stated that: "We need to stimulate investment in new technologies, improve the business environment, ease access to markets and to finance, particularly for SMEs."[170]

[170] (Juncker, 2014)

- The frameworks that support EU industrial policy are extensive:
- European Council conclusions calling to strengthen and modernise the EU's industrial base[171] and the Parliament resolution on the need for a European reindustrialisation-policy.[172]
- The 'Factories of the Future' multi-annual roadmap[173] sets out plans for industrialmodernization.
- For DG Regio, industrial policy is cross-sectoral, based on generic technologies, andoperationalized through clusters. The place-based approach, which is the basis of the smart specialisation strategy, promotes bottom-up dynamics and relies on initiatives developed at the regional level. ESIF funds in the EU 2020 flagships initiatives include Industrial Policy. These investments are guided by the concept of 'Smart Specialization'[174] to allow Member States and regions to concentrate investments on their competitive advantages and to encourage the creation of cross-European value chains.
- Research and Innovation is promoted by the EU's 2009 Lund Declaration and its 2015 revision.[175]
- The interests of SMEs are recognised in policy terms by the Small Business Act[176] and in terms of implementation by the COSME program.[177]

However, in terms of recognition by the EU and Member States cycling does not enjoy the sectoral support given to sectors seen as priorities such as automotive, aeronautics, engineering, space, chemicals and pharmaceutical industries. This is even though the cost-benefit return for investments in cycling is exceptionally high (see Chapter 1). In particular, the automotive sector is competing with cycling for the future of personalised mobility. This is supported by the EU strategic initiatives 'Cars 2020' and 'Gear 2030'. This EU Cycling Strategy argues that cycling should have a level playing field with the automotive and public transport sectors in terms of industrial support across the EU because its delivery of societal goals is equally successful. The graphic illustrates this using the example of electric bike sales in Germany compared to electric cars.



There has been some movement towards more equal access to industrial funds for innovation since the Green Cars Initiative became the European Green Vehicles Initiative.[178] Development of L category electric vehicles includes a limited part of the bicycle industry output. This could be more widely supported if the EU recognised the 'mobility' industries as a strategic priority, not just automotive. E-bikes of all categories should certainly be part of all industrial innovation strategies as they are addressing the key societal challenges of decarbonisation of transport, industrial growth and public health.

Member States that are approaching industrial

[171] (European Council, 2016)
[172] (European Parliament, 2016)
[173] (European Commission, 2013)
[174] (European Commission, 2014)
[175] (Ministry of Education and Research; Ministry of Enterprise and Innovation; VINNOVA; Swedish Research Council in co-operation with Lund University; the City of Lund, 2015)
[176] (European Commission, 2008, 2011)
[177] (European Commission, 2013)
[178] (European Commission; European Green Vehicles Initiative Association)

policy through 'sector support' for identified industries are best for cycling. For example, concentration of the main investments in cycling innovation in existing hubs (NL, DE, IT) and the development of new clusters (BE, PT, RO; see Best Practice example below).

Proposed policy changes

EU level

- Tackle the challenges faced by the Industry by developing an Action Plan called for by the joint declaration on EU Industrial Strategy (signed by 120 organisations) where the EU cycling industry was represented by CONEBI.[179] [GR]
- Open up more EU funds to the cycling industry for research and innovation for industrial purposes and development of new machineries and production methods, thus creating a level-playing field for cycling with other transport modes. [F]

National level

- Apply the policy frameworks for industrial innovation and support for manufacturing industry to the cycling sector.[180] Widen sectoral support for key industries so that there is no unfair exclusion of cycling when other transport/mobility sectors are given policy or financial support. This may include the development of industrial areas, including good infrastructure and fiscal incentives. [GR, F]

Regional and local level

- Recognise the need for cycling in local industrial policies as well as the possibility of creating clusters and collaboration between different business sectors and different geographical areas (smart specialisation). Cross-regional cooperation is needed to establish EU-wide added value (see case studies below). [GR, BP, F]
- Develop the current and future industrial areas, as well as good connections with harbours and other transport modes. [GR, F]

EU added value (and/or cost of non-Europe)

It is not realistic to stimulate increased bicycle use in the EU without considering the impact on the production and supply of the new bicycles.

A thriving EU bicycle industry is able to stimulate investments in new technologies, creating a virtuous circle in which sustainable jobs are created from technologies that deliver progress on the EU's societal challenges. This is a sector where the EU is a global leader in technological development and EU companies have out-performed their peers in maintaining market share of production within the EU.

The development of new production capacity is also expanding high quality technical jobs to new regions of the EU including Portugal, Bulgaria and Romania, which contribute to greater economic cohesion.

[179] (Confederation of the European Bicycle Industry)

[180] (European Parliament, 2015)

Best Practice Examples – Smart Specialization Clusters

The Bike Valley project in Eastern Europe, Belgium and Portugal aims to developing an autonomous supply of bicycle components in Europe and all the useful processes for components production: just in time process – short lead time – better inventory management – closer quality management. Eastern Europe has a very well developed bicycle production which is increasing its market share: in 2015 more than 1.2 million bicycles were produced in the region.

The Portuguese 'Bike Value' is a promotional initiative led by ABIMOTA, organized in collaboration with the Portuguese Smooth Mobility Cluster, which aggregates 37 companies, and more than 20 institutions (sports federations, universities, local and regional authorities, R&D institutes, advocacy organizations). Investments of €16.5 million have been deployed to set up a facility for a fully automated and robotized aluminium frame production, a paint shop and the in-house production of various aluminium frame parts. The investors are planning to spend €20 million more to install more production lines.

Flanders' Bike Valley unites existing companies and start-ups in one space and help them develop their innovative products. The construction of a wind tunnel with a high-tech particle image velocimetry measuring system based on laser technology is the first big project of the Flanders' Bike Valley. The aim is to focus on a highly automated production process that will enable the cycling industry to customise products like shoes and frames, generating competitive advantage and larger market shares.

8.2. Development of the Workforce

The status quo of cycling in the relevant EU policy

The bicycle industry in the form of manufacturing, supply chain and retail employs over 90.000 people. Upstream, R&D and innovation for production technology provide jobs to engineers and researchers, while downstream a wide range of other types of jobs associated with cycling require different skill sets. In particular, the WHO[181] has demonstrated that more cycling leads to not only more jobs but also the creation of services, which in turn result in new types of cycling-related jobs. As these become e-mobility and digital jobs there is a need for an integrated skills approach in public transport route planning, in mobility centres, in bike and e-bike sharing systems, in promoting innovations in mobility services, in awareness raising as well as mobility advisers, behaviour change practitioners and in bicycle maintenance and retail.

Manufacturing workers in bicycle assembly and parts manufacture need skills development on the increasing technicalities of operations, including heavy manufacturing, pre-assembly, assembly, analysis, quality controls and product safety.

However the widely reported skills gap in the EU for technical skills and vocational competences

[181] (UNEP; WHO; UNECE, 2016)

in sciences and engineering[182] as well as the development of the digital economy is putting huge pressure on skills and as a leading digital industry cycling will need significant resources.[183] For example the world's largest cycling company even had to move its EU headquarters within the Netherlands to a hi-tech campus to deal with projected skills shortages.[184]

The status quo of cycling in the relevant EU policy

The key policy instrument for addressing the skills needs of EU industry is the 'New Skills Agenda for Europe' adopted in 2016.[185] This has numerous relevant actions, in particular the development of digital skills[186] and qualifications frameworks which will be valuable to the cycling industry.

Of most importance to the competitiveness of the industry in future may be the development of sector skills alliances including business, trade unions, research, education and training institutions and public authorities. Beginning in January 2017, six pilot sectors have been established including automotive and tourism. This approach is set to expand after the pilots. The EU cycling industry stakeholders will in future have to decide whether to advocate for inclusion in a widening of the automotive sector or establishment of a dedicated cycling approach that could include supply chain and services. As currently framed, there is a risk of duplication or competition with the automotive sector.[187]

As a strategic priority, the industry needs to be part of EU and educational institutions' development of relevant skills. The European market is moving to short lead time digital sales and distribution, to 'bicycle sharing' facilities and expansion in the nearby future for EPACs from 1.5 to 5 million new units sold. This tripled EPAC fleet will require a different qualitative and quantitative European network from manufacturer to dealer and service provider. Furthermore, the best practice examples Bicycle Academy and TWIN (see case study below) show how the cycling industry can collaborate across the whole sector on upskilling electrical, digital and customer-service skills. This approach could be substantially expanded using EU, national and regional funding streams including references for SMEs[188] and under future EU Erasmus programmes.[189]

The cycling industry in terms of manufacturing and supply chain will also be alert to EU policy developments concerning demographic deficits in employment, for example labour market participation by younger people or by gender and seek to make its contribution to relevant initiatives. While the initiative of DGs Move and Justice, Consumers and Gender Equality to encourage more women in transport employment[190] is not specific to the manufacturing and supply chain its principles are definitely relevant, as are the wider developments of gender in the labour market.[191]

[182] (European Association of Automotive Suppliers, 2017)
[183] (European Commission, 2017)
[184] http://www.bike-eu.com/home/nieuws/2016/4/construction-of-shimano-europes-new-hq-started-10126135
[185] (European Commission, 2016)
[186] (European Commission, 2017)
[187] (European Association of Automotive Suppliers, 2017)
[188] (European Commission, 2016 - 2018)
[189] (European Commission, 2017)
[190] (European Commission, 2016)
[191] (European Commission, 2017)

Best Practice Example: 'Bicycle Academy' and TWIN

The boom in e-bike sales required shops to employ expertise in this new product. 'Bicycle Academy' and TWIN, started in 2009 in The Netherlands and 2013 at European level. They provide training for mechanics focusing on electronics, standards, battery and used EPAC handling.

The main obstacle for TWIN was to expand their network from the existing partners (BE, DK and NL) to more participating European countries. This increase gives the opportunity to exchange the existing bicycle-related Qualification Framework files (for students at vocational education institutes) and the competence profiles structure files (for employees at a bicycle dealers) on a wider European level. This is an important next step, because in the near future the bicycle industry and consumers could rely on a certified dealer-network in Europe with a generic and minimum recognized sales- and after sales service level. With the involvement from key members of the bicycle industry it will be possible to create an EU harmonized and bicycle related qualification framework and competence profile structure.
(TWIN, 2016)

Proposed policy changes

EU level

- Consider the needs and opportunities for cycling as part of next wave Sector Skills Alliances. (GR, F)
- Dedicate more funds to increase the link between Industry and Academia to provide next generations with green high-skilled jobs related to the bicycle and e-bike industry [F]

National level

- Identify cycling as a strategic sector in national skills development planning. In particular, recognise the emerging need for new integrated skills in the mobility sector that include digital and e-mobility skills alongside traditional mechanical engineering, traffic engineering and transport planning [GR, F]

Regional and local level

- Recognise regional skills shortages related to cycling manufacturing and services. In particular, address the need for services and retail skills in e-bikes and bike sharing in rural and tourism locations and for enhanced engineering and electrical skills in manufacturing locations. [F]
- Support education and re-skilling workforces as part of smart specialisation cluster development. [GR, F]

EU added value (and/or cost of non-Europe)

The EU must recognise the needs of the industry in respect of skills, innovation and the completion of the internal market and the need to maintain competitiveness of the EU cycling industry. As the industry is taking an added value and innovation approach to maintain its competitiveness against low-cost manufacturing countries, it is essential that the industry has the skills to maintain its leadership.

8.3. Maintenance of Product Quality and Safety

The status quo of cycling in relevant EU policy

The relevant standards at EU level for the production and sale of bicycles are described in Chapter 5 of this document. This section deals with the industrial consequences of the standards, in particular the infrastructure and procedures needed for testing and the procedures in place at Member State level to ensure compliance. Effective compliance is essential for consumer safety and for the functioning of a competitive internal market in the EU.

The Commission intends to create a deeper and fairer internal market with a strengthened industrial base through the implementation of its Single Market Strategy. In this context, the functioning of the single market for goods relies upon accurate compliance with harmonised product rules to enable free circulation.
In the cycling sector, there are different legal rules and standards in the area of bicycles, EPACs and speed EPACs:

Bicycles are subject to the General Product Safety Directive 2001/95/EC (GPSD). This directive requires neither a CE marking nor a conformity declaration of the manufacturers / importers. The safety standards EN ISO 4210 part 1 to 9 are a solid basis for the approval of these products and they are regularly updated to keep up with the latest state of the art. However the missing requirements for CE marking and conformity declaration make it difficult to control the imported bicycles.

In contrast, EPACs fall under the scope of the EU Machinery Directive which does require a CE marking and a conformity declaration of the manufacturers/importers. The standard EN 15194 is currently under review and represents the current state of the art. The EN 15194 should be harmonized with the Machinery Directive in the future.

Speed EPACs are considered to be motor vehicles and are therefore subject to Regulation (EU)168/2013. These vehicles require a European Whole Vehicle Type Approval (WVTA). Speed EPACs, which are put on the EU market and used within the EU, must comply with the EU WVTA requirements at the moment that the vehicle is put on the market (for a first admission/registration).

The fact that bicycles – in contrast to EPACs and speed EPACs – are governed by the GPSD and this directive does not require a conformity declaration of the manufacturers/importers makes it hard to control the products for conformity to the applicable standards.

Information from the RAPEX database on unsafe products prove that apparently some bicycles, and especially low-quality import bicycles, are imported to the EU without satisfying the

respective safety standards. In order to protect the consumers from unsafe products, stricter controls are necessary at the exact moment of import to identify unsafe and non- compliant products as soon as they arrive in the EU so that they can be kept out of the internal market.

Non-compliant products destroy jobs in European industry, and lax market surveillance is not acceptable.

The status quo of cycling in relevant EU policy

Compliance with EU legislation is checked during market surveillance activities (MSA), the general principles of which are laid down in Regulation 765/2008/EC. In addition, most EU harmonised legislation on non-food products and Directive 2001/95/EC contain market surveillance provisions.

The Commission recently carried out a public consultation on the evaluation of the market surveillance provisions of Regulation 765/2008/EC and on actions to enhance enforcement and compliance in the single market for goods. This is part of the Single Market Strategy, which can only function well and be fair for people and businesses if all market operators play by the rules.

Budgets of national market surveillance authorities have been cut during the last ten years despite a constant increase in the volume of imports of consumer goods from third-countries. For example the position of the Dutch Government position on consultation: "there is a strong need for harmonisation of market surveillance at the points of importation to prevent 'shopping' by selecting the weakest point; and secondly, the capacity of MSAs at the prime points of importation should be adequate for the workload associated with the imports".

There is evidence emerging in 2016 that importers from countries subject to anti-dumping tariffs are deliberately mislabelling bicycles and EPACs to avoid duties, which is further evidence that the import controls are inadequate in a large number of Member States. With 8 million bicycles being imported this creates some limited consumer risk, but as the EPAC market grows, there is also a high risk of imported EPACs that are not in conformity with the Machinery Directive.

Market surveillance needs adequate resources, suitable facilities and skilled officers benefiting from high quality training in order to function effectively and efficiently. This requires considerable financial resources at national and European levels.[192]

Proposed policy changes

EU level

- Define that a bicycle has to comply with the ISO 4210 bicycle standard. This is the industry-wide accepted standard for basic quality & safety. [RE]
- Monitor unsafe non-compliant products (both bicycles and e-bikes). The requirements are clear, and suspicious products can be tested by the authorities and industry accordingly. [RE]
- Create a unified European authority for market surveillance and customs. [RE]

[192] (Business Europe, 2016)

National level

- Impose stricter controls of imported products at the customs in order to identify unsafe non-compliant products and preventing their market access. [RE]
- Monitor unsafe non-compliant products (both bicycles and e-bikes). The requirements are clear and suspicious products can be tested by the authorities and industry accordingly. [RE]
- Provide a larger budget to cope with the increased volume of imported consumer goods [F]
- Introduce a central reporting point in each Member State where consumers and/or the retail can easily report their observations of unsafe products. [GR]

8.4. Cycling-Friendly Competition and Trade Policy Measures

The status quo of cycling in the relevant policy field

Since 1993, EU industry has benefitted from the European Commission's antidumping measures against the unfair competition from China's exporters of bicycles and has successfully had the measures renewed, along with anti-circumvention measures applied to some other countries.[193] With this protection the EU bicycle industry has limited loss of market share to Chinese producers and has been able to maintain a critical mass of manufacturing in the EU, unlike countries like the USA and Japan that have lost almost all local manufacturing in the same time period.

There has been a sustainable climate encouraging the development of SMEs in the whole territory of the EU, to create much needed long-term manufacturing jobs. According to the Commission, a robust European industrial base is central for creating good long-term manufacturing jobs and growth in Europe. [194]

Manufacturing in Europe means:

- Long-term industrial jobs for the young generations: every billion euros worth of EU production means on average 10–15,000 industrial jobs. Industrial output must be brought back up to 20% of GDP, especially by encouraging local production of consumers goods by SMEs;
- Innovation;
- Safe products and satisfied consumers;
- The most positive carbon footprint can only be achieved through sustainable local production;
- Respect of CSR, anti-pollution rules, quality standards such as Reach and EN standards;
- Respect for IP rights;
- Industrial investment.

With the stable regime of product standards and antidumping protection the sector has become the largest employer, investor and innovator among the green industries in the EU. Two of the most important innovations of the EU bicycle industry have been public bike sharing systems and the very successful pedal-assist e-bikes, which have brought millions of people in the EU back to cycling and where technologies originating in the EU are globally competitive.

[193] (European Commission (TRADE))

[194] (Bieńkowska, Speech: Reindustrialisation of Europe: Industry 4.0 - Innovation, growth and jobs, Forum Europe conference, 2016) (Bieńkowska, Keynote speech for the AVIO AERO conference on "Development, Growth and Innovation in strategic high-tech sectors", 2015)

The status quo of cycling in relevant EU policy

Anti-dumping measures are in place thanks to decisions recognised in the EU Official Journal.[195] The ruling recognised a number of policy implications for which the application of antidumping duties was the appropriate fiscal measure.

Outcomes of the imposition of duties include the survival of the EU industry; its continued ability to invest in new product development and sustainable transport innovation; and the continuation of the associated production of parts and accessories in the EU supply chain.

Industry actors propose extension of the anti-dumping and circumvention measures to include electric pedal-assisted bicycles and allied technologies such as cargo bikes.

Proposed policy changes

EU level

- Maintenance of effective EU trade instruments to legitimately defend the industry from unfair trade practices [RE]

Cost of non-action at EU level

Loss of SMEs due to loss of critical mass in production

In SMEs, innovation is generated by production: this is a sine qua non condition. In industrial SMEs making precision mechanical products, the know-how that comes from production is vital to developing safe & innovative products. The most important innovations of the last 50 years in the cycling industry worldwide have been manufacturing SMEs, among which EU SMEs played a role in developing new inventions to benefit riders worldwide. A good demonstration of this is that if the EU bicycle industry didn't exist anymore, and if the European Commission had not imposed the antidumping measures in the past 20 years, the pedal-assist e-bikes would not have been developed.

Risk to hi-tech and investment/innovation-intensive industries

Modern industry has more and more of the workforce upstream, in areas such as R&D, moulds/machines and production transfers preparation: one direct job in routine production often corresponds to 3.5 indirect jobs upstream. The impact of investments, automation, digitalized production and innovations is so much higher than in the past[196] that it can account for 30–40% of the price of a new product.

Therefore, if the industry in the EU is not able to keep up such investments and innovations – the EU bicycle, pedal assist e-bikes and components industry invested over EUR 1 billion in 2016 – there would soon be a loss of allied hi-tech industries in the EU resulting in damage to important new industrial developments over the next 10 years.

[195] (Official Journal of the European Union, 2013)
[196] (Scott & O Jiang, 2015)

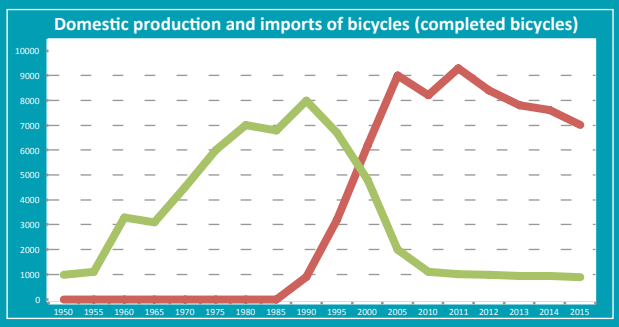
Substitution of EU-made bikes by bikes from China will have a negative CO2 balance

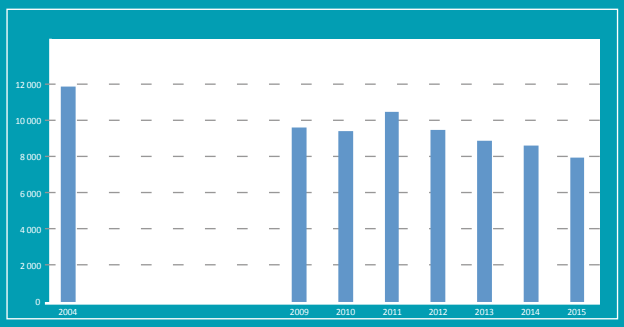
Politecnico of Milano confirms in their bench-mark study that a bicycle produced in China generates up to 123 Kg CO2 more than a bicycle produced in Europe.[197]

Relative to production in the EU, Chinese production for the EU market would involve additional emissions of 61.5–123 kg CO2 per bicycle. If we assume a value in the middle of this range, additional emissions of 92 kg CO2 per bicycle, and an EU market of 20 million bicycles and 1.5 million pedal-assist e-bikes, carrying out the production entirely in China would additional emissions of more than 2 million tons of CO2 compared to production entirely within the EU.

The example of Japan: cheap low-quality bicycles reduce sales

In Japan, China is by far the largest country of origin with a 95.6% market share and domestic production has almost ended





Looking at the above chart we can see that after peaking at 11.5 million units in 2004, the sales of completed bicycles in Japan have been on a downward trend and one of the main factors is the availability of cheap, low-quality bicycles which are therefore seen as consumable goods rather than durable goods – as stated by the Bicycle Association Japan during its presentation at the meeting of the Asian Bicycle Association in Chandigarh on 8 December 2016.

Also, with an increase in the number of cheap, low-quality imported bicycles, accidents involving such bicycles also increased.

[197] (Politecnico of Milano; European Bicycle Manufacturers Association)

Summary

Global/ UN-level policies – such as the Paris Agreement on Climate Change, the Sustainable Development Goals and the New Urban Agenda – carry a strong mandate to promote cycling. Cycling is part of the implementation of these global policies at a local level.

The EU has begun to implement these policies through multiple internal and external strategies. For example, the Paris Agreement is reflected in the EU's ambitious goal to reduce GHG emissions by 80% in the EU by 2050. Furthermore, the 'European Consensus on Development' announces an adjustment of the development cooperation of the EU, which will be geared towards achieving the Sustainable Development Goals.

However, the strategies do not take sufficient account of the potential of cycling and active mobility to contribute to progress towards these targets. The necessary shift of priorities in the transport system is mentioned only sporadically in the documents. This goes hand in hand with the fact that only a minor portion of EU development cooperation is dedicated to comprehensive sustainable mobility planning, even though a large portion of its budget is dedicated to the transport sector.

The EU's strategy documents form the basis for the further development of internal and external policies. It is therefore crucial that they emphasise the cross-sectoral benefits of sustainable mobility and specifically cycling in order to fulfil the Paris Agreement and the SDGs. Financial and technical cooperation programmes should tap the full potential of cycling by dedicating more funds to sustainable mobility planning and implementation. The exchange of Directorate-General for Mobility and Transport (DG MOVE) with implementing bodies is conducive to using existing knowledge for development cooperation. Finally, this knowledge should be enriched and exchanged through mutual learning with partner countries.

9.1. Status Quo on Global Policies: What's in It for Cycling in the EU?

The past three years have brought with them three major global processes: the Paris Agreement, the Sustainable Development Goals, and the New Urban Agenda. Cycling is essential to achieving these global agendas – and the EU has shown it is eager to respond in a strong manner to the challenge of reaching these goals. This section elaborates on policies derived from the global agendas and focused on EU internal action.

Paris Agreement

The Paris Agreement, the framework for global actions to address climate change adopted in December 2015, aims to keep the increase in global temperature below 2 degrees Celsius scenario (2DS). The agreement required all countries to prepare Nationally Determined Contributions (NDCs) as a route to compiling an overview of commitments and tracking progress.

The preparation and reporting of NDCs is legally binding.

Transport is a key sector in this agreement. It is one of the few sectors that keeps growing on emission levels – and it already accounts for 23% of all energy-related greenhouse gas emissions.[198] In order to reach the 2 degrees target, the transport sector has to completely decarbonize by 2045–2055.[199] Achieving this requires a comprehensive, cross-sectoral strategy for which cycling provides a climate-neutral alternative in passenger and freight transport. However, while transport on the whole is explicitly mentioned in 75% of the NDCs submitted, cycling and walking are only mentioned in 14% of them.[200]

The European Commission, on behalf of all 28 Member States, submitted a joint NDC with the objective of at least a 40% reduction in domestic greenhouse gas emissions by 2030. Sectors are supposed to share the necessary efforts, with greater energy efficiency being a key component of the measures.[201] This feeds into the 2030 energy and climate framework and the Roadmap 2050, both being strategies to reach substantial GHG emission reductions. By 2030, CO2 emissions should decrease by 40% compared to 1990 levels and continue to an 80% reduction by 2050. Transport is supposed to contribute to this by a 60% emission reduction from 1990 levels by 2050.[202]

The decarbonisation of the transport sector and the 2 degrees target will only be achieved if a transformation of mobility as well as a decarbonisation of drive trains takes place. The EU's NDC, as well as the guiding documents of the 2030 energy and climate framework as well as the Roadmap 2050 are largely focused on the latter and either do not mention cycling at all or mention it only sporadically.[203]

Sustainable Development Goals (Agenda 2030)

The Sustainable Development Goals (SDG) is a set of 17 goals – also known as Agenda 2030 – with 169 targets to achieve. In order to reach the SDGs, accessibility is key. Although transport has no dedicated SDG, achieving most of the goals will be difficult without a functioning mobility system.

Active mobility is the most equitable form of mobility – providing access to jobs, markets, and education for people in both urban and rural areas – therefore a shift in the transport sector can make a central contribution to delivering on the Sustainable Development Goals. Cycling has great potential to facilitate this change. The European Cyclists' Federation (ECF) has identified 11 out of the 17 goals to which cycling directly contributes, showing the importance of cycling in achieving these targets (see Annex 2).

For the Sustainable Development Goals, the European Union has set up two work streams: in the short term up to 2020, EU policies will be evaluated on their ability to meet the goals. In the midterm, changes to EU policies will be implemented post 2020 in order to reach the

[198] (OECD/International Energy Agency, 2016)
[199] (Gota, Huizenga, & Peet, Implications of 2DS and 1.5DS for Land Transport Carbon Emissions in 2050 : Partnership on Sustainable Low-carbon Transport (SLoCaT), 2016)
[200] (Gota, Huizenga, Peet, & Kaar, Nationally-Determined Contributions (NDCs) Offer Opportunities for Ambitious Action on Transport and Climate Change: Partnership on Sustainable Low Carbon Transport, 2016)
[201] (Latvia/Presidency EU Council; European Commission, 2015)
[202] (European Commission, 2014) (European Commission, 2014)
[203] Cycling is mentioned in paragraph 2.4 'Clean urban transport and commuting' in (European Commission, 2011)

goals. The Commission's communication on the implementation of the SDGs already referred to the importance of sustainable mobility systems as an enabler to achieve some of the goals.[204]

However, the linkage of active mobility to the SDGs, which has been elaborated above, has to be carried through to implementation of cycling policies and infrastructure.

New Urban Agenda

Launched on the occasion of the Habitat III conference in Quito in 2016, the New Urban Agenda (NUA) is an action-oriented document that sets global standards for sustainable urban development. It clearly mandates governments to promote cycling due to its potential for better public spaces (§37), more liveable cities (§100), road safety (§113), access for all through prioritizing cycling and walking over private motorized transportation (§114) as well as the encouragement of all levels of government to develop and explore financial instruments to improve infrastructure including cycling (§118).

As stated in the European Commission's event at the Habitat III in Quito, the main implementation of the New Urban Agenda in Europe will take the form of the Urban Agenda for the EU. It aims to strengthen the urban dimension in Europe, also by ensuring better access to European funds access by cities and facilitating knowledge exchange between cities. The work on the Urban Agenda for the EU is still on-going and its shape and impact remains to be seen.

9.2. How Does the EU Use the Global Agendas to Promote Cycling Worldwide

The Global Policies are a call for action in Europe, but also worldwide. The many facets of the EU's development cooperation can contribute substantially to the achievement of the goals. It is mainly carried out by the Directorate-General International Cooperation and Development (DG DEVCO), but also by other bodies such as the Directorate-General for Neighbourhood and Enlargement Negotiations (DG NEAR).

The Paris Agreement has already left a mark: With EUR 14 billion of the 2014–2020 EU foreign aid budget earmarked for climate-relevant projects, we see a substantial shift in priorities – consistent with the current EU internal budget reorientation.[205]

Energy and climate is also a focus area in DG DEVCO's management plan.[206] The interface of these topics with sustainable transport is already reflected in some programmes for technical cooperation: the EUROCLIMA+ program of DG DEVCO supports the MobiliseYourCity initiative, which implements climate-friendly Sustainable Urban Mobility Plans (SUMPs) in its partner cities. Since the concept of SUMPs was developed by DG MOVE, this makes an excellent example for the potential of good cooperation between the EU bodies as well as the facilitation of knowledge exchange with other parts of the world.

The EU is also engaged in other projects dedicated to climate and transport. The Global Cove-

[204] (European Commission, 2016)
[205] (European Commission, 2013)
[206] (European Commission, 2016)

nant of Mayors' member cities commit to reduce greenhouse gas emissions by at least 40% by 2030. This effort takes up the goal of the Paris Agreement, but also the idea of the New Urban Agenda to strengthen cities in working towards sustainable urban development. Through the Sustainable Energy and Climate Action Plans, the cities draw up measures to reach their aims – including a transport chapter. The EU provides an array of funding opportunities for European cities. By using the European Neighbourhood and Partnership instrument, the EU has financed a number of implementations with Sustainable Urban Demonstration Projects in various adjacent states. However, there is not yet a regular mechanism for supporting non-EU members.

With the adoption of the Sustainable Development Goals, the EU also started to readjust their development cooperation towards the achievement of the goals. Firstly, this was tackled by developing a new 'European Consensus on Development'.[207] In this, the EU and its Member States pledge to support more resource-efficient urban infrastructure, including transport.[208]

In addition, DG DEVCO funds a variety of infrastructure measures. There is a strong focus on Africa and the road sector[209], with the provision of infrastructure, equipment and technical assistance accounting for most of the expenditure.[210] By enhancing access to education and jobs, especially for the rural population, this contributes to a variety of SDGs. However, efforts to support a comprehensive approach to urban mobility and cycling are still minor.

Lastly, there are EU-funded research projects through Horizon 2020 that target the improvement of sustainable mobility planning worldwide. For example the SOLUTIONS project focused on transferring knowledge between cities from different parts of the world. FUTURE-RADAR is another example of a research project with global knowledge exchange components.

9.3. The Proposed Changes: Recommendations to Change Activities

The global agendas can only be achieved through global action. The EU's strategic documents are ambitious by focusing budgets and programmes to reach the agenda's goals – but cycling will have to play an integral part in order to achieve this.

This is not yet appropriately covered in the relevant documents: the role of avoiding trips and shifting to low-carbon modes in order to tackle climate change has to be covered better in the EU joint NDC, the 2030 energy and climate framework and in the Roadmap 2050.
While efficient and sustainable urban transport infrastructure is mentioned in the European Consensus on Development, the paragraph names only the economic benefits of those measures. More emphasis should be laid on the cross-sectoral benefits of the promotion of active mobility, which delivers on many of the SDGs.

The EU can draw on an array of good practices to promote cycling, ranging from planning systems such as SUMPs to examples of adequate infrastructure. However, only a fraction of the international cooperation efforts are utilizing this existing knowledge.
We urge the EU to take its own climate, SDG, and NUA strategies seriously and to account for

[207] (European Commission, 2016)
[208] (European Commission, 2016)
[209] (Ecorys (on behalf of the European Commission), 2016)
[210] (Ecorys (on behalf of the European Commission), 2016)

sustainable mobility in its development cooperation to a greater extent. To move forward with this is crucial if we are to take advantage of the existing expertise by enlarging DG MOVE's cooperation with implementing bodies, such as DG DEVCO and DG NEAR. The goal of this cooperation should be to dedicate more resources to the support of comprehensive mobility planning that includes active mobility in an urban and rural setting.

The shift of the EU foreign aid budget towards more climate projects means that DG DEVCO needs to scale up its programmes to strengthen local capacity, as planning for sustainable transport systems involves a certain complexity and requires larger capacity and tools. DG DEVCO has in part begun to provide sector- instead of project-based support; this could be a good starting point, if appropriately accompanied by knowledge exchange. In financial cooperation, a special focus should be on inclusive designs that take the needs of pedestrians and cyclists into account.

The Global Covenant of Mayors represents a substantial resource of cities dedicated to low-carbon development. In order to harness this, steady funding mechanisms should be put in place to setup and implement Sustainable Energy and Climate Action Plans for non-European member cities, e.g. through the EU Neighbourhood Policy.

Funding guidelines for research under the Horizon umbrella should take account of whether projects also test the applicability of their findings in a global context. Knowledge exchange and mutual learning with partners from the global South should also be a bonus in the application process.

Finally, the EU should seek to cooperate closely with relevant initiatives of other multilateral organisations. For example the Transport, Health, Environment Pan-European Programme (THE PEP), being jointly managed by the World Health Organisation (WHO) and the United Nations Economic Commission for Europe (UNECE), provides various opportunities for engagement. Its 56 signatory states from Europe, the Caucasus, Central Asia and North America adopted it in the Paris Declaration in 2014, in which they dedicated themselves to developing a pan-European Master Plan for Cycling Promotion. The plan will be supported by guidelines and tools to assist the development of cycling promotion policies at the national level and is supposed to be adopted in 2019.[211] It formulates a strong vision for cycling promotion, including the doubling of cycling in THE PEP Member States by 2030. The EU should actively engage in knowledge exchange and ensure the alignment of the EU's efforts with those of THE PEP.

Proposed policy changes

EU Level

- Emphasise the cross-sectoral benefits of active mobility in relevant strategy documents, such as the 2030 energy and climate framework and the European Census for Development and any forthcoming documents. [GR?/ORG]
- Establish a regular exchange format between DG MOVE and DG DEVCO as well as DG NEAR and develop a joint work plan on deploying sustainable mobility concepts worldwide. The EU should also provide policy advice to the national/local level. [ORG]

[211] (UNECE, 2014)

- Enlarge technical assistance programmes that are dedicated to supporting active mobility and cycling, e.g. through better urban mobility planning. Existing programmes include EUROCLIMA+ and its MobiliseYourCity initiative as well as the Global Covenant of Mayors' energy and climate action plans. [F]
- Enforce infrastructure designs that account for the need of active modes of transport in EU financed projects. [F/RE]
- Facilitate global knowledge exchange, also through research projects. [BP]
- Manage (through the EU Cycling Focal Point) the cooperation with THE PEP, the national cycling officers and all relevant stakeholders in developing, implementing, monitoring and evaluating national cycling strategies (See section 10.3: Cooperation with THE PEP, National Focal Points and Stakeholders). [ORG]

Best Practice Example: Ukraine

In Ukraine, cycling has experienced a massive boost during the recent five years. This is supported by awareness rising for the general population and decision makers as well as capacity building in the fields of network planning and facilitating cyclist needs – facilitated by activists and funded also through international cooperation projects. The efforts are yielding results: in Kiev, the amount of people cycling increased after a bike path was created on a key connector street. However, many new roads are still poorly designed. This can be partly tackled by establishing national standards, but another big challenge remains in building the knowledge base and capacity in municipal administrations to facilitate the shift in priorities appropriately. (Semenova, 2017). International cooperation programmes, such as various programmes by the German government, implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), supporting Lviv in becoming Ukraine's cycling capital, have supported local professionals in creating a momentum of change. This momentum needs to be carried onward by further supporting Ukraine's emerging cycling culture technically and financially, for example through the European Neighbourhood Policy programme.

Best Practice Example: Zambia

A study on dairy farmers in Zambia shows that access to cycling can unlock income: Farmers who were given bicycles made up to 25% more deliveries, transported 23% more litres of milk each trip and increased income by 23%, compared to farmers who walked or used other transportation modes. Similarly, enrolment figures in schools rise significantly when children have access to a means of transport. This is especially true for girls ((World Bicycle Relief, 2016). By scaling up the EU's cycling promotion worldwide, the European Union can strengthen this direct economic impact on the life of many people, also in rural areas.

Chapter 10: Governance

Summary

In order to ensure that the policies are on track and will be implemented it is necessary to deliver a functioning system that allows the potential of cycling to contribute to crucial EU policy areas. Current initiatives by NGOs, Member States (e.g. national cycling strategies), MEPs and other cycling advocates at EU, national and regional levels are insufficient to provide a systematic and coherent inclusion of relevant cycling contributions to EU policies and regulations. To achieve the positive impacts of cycling more efficiently and effectively, the benefits of cycling should be taken into consideration at the earliest possible stage of the decision-making process.

To achieve this we recommend six organisational solutions to support European, national, regional, and local institutions:

1. Cycling Check in Policies and Inter-Service Consultation
The EU ought to look at what cycling can contribute to the implementation of its main objectives. When deciding on policies and measures, an internal scan should be performed to take account of cycling-specific interests and potentials are to be taken into account in the inter-service consultations in the European Commission.

2. Cycling Focal Point
In order to implement many of the elements of the cycling strategy at EU level, a fully operational and dedicated focal point is indispensable.

3. Cooperation with Public Stakeholders
Cooperation with national cycling officers and stakeholders is a major component of the mission of such a focal point.

4. Cooperation with Private Stakeholders
Non-governmental organisations and the cycling industry are key to delivering the EU cycling strategy. Their systematic involvement is essential part of the EUCS.

5. Cycling Clearing House and Expertise Centre
The running of a cycling clearing house/expert centre which provides good practices and information to support the implementation of the EUCS.

6. Cycling-Friendly Institutions as a Role Model
The EU institutions should implement in their own daily activities what they advocate for others, in order to set an example of cycling-friendly organisations and workplaces.

10.1. Cycling Check in Policies and Inter-Service Consultation

The status quo of cycling in the relevant policy field

Currently there is no coordination in the EU decision-making process related to cycling. Any measures are taken in a disparate way that cannot provide the best return on investment. Especially, external costs are not taken into account. There is no systematic check of EU policies and measures as to their positive or negative impact on cycling. This likely leads to inefficient policies

and a waste of resources, as well as generating unintentional/unnecessary obstacles to a more cycling-friendly environment.

The status quo of cycling in relevant EU policy

At the moment, cycling does not enjoy a level-playing field with other transport modes in EU (and some Member States) decision-making on policy or on specific measures. The benefits of cycling (see Chapter 1 and Annex 1) are often overlooked by people in charge. In order to achieve a level playing field a cycling check would be necessary. The EU policy check is intimately linked to the Commission's inter-service consultation mechanism, hence cycling as being a legitimate interest should be at least consulted in the elaboration of EU initiatives.

Proposed policy changes

EU level

- Adopt a systematic approach to check whether new EU policies and proposals will have positive or negative effects on conditions for cycling and to suggest, if necessary, amendments aimed to creating a cycling-friendly regulatory framework. [ORG]
- Involve DG MOVE (represented by the EU Cycling Focal Point) in the consultation on all initiatives that are relevant from a cycling perspective. This should include consultations on issues that not otherwise are of a legitimate interest to DG MOVE, for instance, initiatives launched by DG SANTE against obesity and the like. [ORG]

National level

- As in the European approach, introduce a policy check and inter-ministerial consultation mechanism for national policies, initiatives and measures that could have an impact on cycling with the aim to create and maintain a cycling-friendly regulatory framework at the national level. [ORG]

Regional and local level

- At this level also use a cross-departmental check to take account of cycling in any decisions that could affect conditions for cycling within the competence of each level of governance. [ORG]
- Consult and learn from best practices from other regional or local actors. [BP]

EU added value

The benefit of the proposed new internal Commission set-up is to make sure that the EU becomes aware of the impact of its policies and measures on cycling. The EU could also avoid unintentional negative consequences, increase the positive effects and establish a cycling-friendly regulatory framework.

10.2. Cycling Focal Point

The status quo of cycling in the relevant policy field

If actions and spending relating to cycling are not adequately coordinated, losses of efficiency and consistency are inevitable. Coordination and responsibility for implementation are needed to ensure that strategies, policies and measures can succeed.

The status quo of cycling in relevant EU policy

The appointment of a cycling coordinator in DG MOVE is welcome progress and a significant positive development. A critical note remains however, that the resources allocated to the coordinator are inadequate to the task and diminish the potential impact on cycling culture and added value.

Proposed policy changes

EU level

- Shape the EU Cycling Focal Point into a fully dedicated assignment provided with adequate resources. The EU Cycling Focal Point would be best based within DG MOVE. [ORG]
- The main tasks of the EU Cycling Focal Point ought to be as follows:
  - Act as a one-stop-shop for cycling related questions
  - Facilitate the exchange of best practices among Member States
  - Check all relevant EU policies and measures and participate in inter-service consultations on initiatives with a possible impact on cycling, and
  - Monitor the implementation and the impact of the EU cycling strategy. [ORG]

National level

- Appoint national cycling officers or institutions acting as such. [ORG]
- Such national cycling officers could be in charge of similar tasks as their EU colleagues but working on national policy and measures. The national cycling officers could be in charge of implementing and monitoring the national cycling action plans and of exchanging best practices (two-way) with the EU Cycling focal point. [ORG]
- Seek financial assistance where available from EU funds for the setting up and implementation of national cycling strategies and for the national focal point. [F]

EU added value (and/or cost of non-Europe)

The role of the EU Cycling Focal Point is essential for the successful implementation of the EU Cycling Strategy. The efforts put into coordinating all relevant issues and tasks in a non- central-

ized manner create an unnecessary administrative burden in the Commission and obstruct gains in efficiency and consistency. Many opportunities would be lost without a fully operational EU Cycling Focal Point.

Also, in the focal point the Commission would develop its own internal competence point in this area, with progressively growing expertise, leading to more efficient and consistent handling of work related to cycling.

Best Practice Example: Luxembourg

Luxembourg has had a national cycling action plan in place but measures planned in the action plan have only been properly implemented since a specific unit dedicated to cycling has been established at the Ministry in charge of transport.

10.3. Cooperation with Public Stakeholders

The status quo of cycling in the relevant policy field

Cooperation is the key to a successful, consistent and timely creation and implementation of cycling strategies and action plans. ECF (together with two national cycling officers) initiated the informal network of national cycling officers, which was taken over by the PEP, and organises the Cities for Cyclists and Scientists for Cycling networks. The EU and the Commission are not sufficiently involved in these processes and the limited resources are not sufficient to reach the full potential of these networks or to establish new ones.

The status quo of cycling in relevant EU Policy

The Transport, Health, Environment Pan-European Programme (THE PEP) was established in 2001 in Geneva. Meetings in this format have been held regularly since 2010 to work on a pan-European Master Plan for Cycling Promotion with a scope extending beyond the EU. Not all EU Member States have adopted a national cycling plan or strategy and appointed cycling officers and not all EU Member States have joined THE PEP, nor are the EU as such or the Commission members of the partnership. All these initiatives with different scopes need to be coordinated.

Proposed policy changes

EU level

- Officially establish a network of national cycling officers and include all Member States. [ORG]
- Such a network should hold regular meetings with the objective of monitoring the implementation of the EU and national cycling strategies.

The EU Cycling Focal Point should manage the cooperation with THE PEP, the national cycling officers and all relevant stakeholders, as it will be the organizational centre of EU cycling policy.

National level

- Consider joining and actively participating in the EU cycling officers' network and pan-European cycling officers network of THE PEP as well as nominating national cycling officers. [ORG]

EU added value (and/or cost of non-Europe)

Coordination among different levels of strategies and action/master plans is required in order to guarantee a consistent, efficient and effective development and implementation of measures throughout the EU and beyond.

10.4. Cooperation with Private Stakeholders

The status quo of cycling in the relevant policy field

The EU institutions always involve Member States and often publish public consultations throughout the preparation of their decisions. In practice, these consultations are often formalities and the full potential of stakeholder involvement is not used. In the field of cycling policy, public bodies (especially at the national level) very often lag behind the initiatives and solutions proposed by the (cycling) industry, NGOs and academia. Currently these bodies and experts only provide proposals via informal channels (in most of the Member States) before the first drafts of initiatives are prepared, calls are published or projects selected or evaluated.

The status quo of cycling in relevant EU policy

A simple consultation strategy identifying and targeting relevant stakeholders and evidence must be developed for each European initiative. The consultation strategy and consultation documents must be discussed and agreed by the Inter Service Group (ISG) of the EU institutions or, if no ISG is established, by the Secretariat General of the European Commission and any other associated service. Without prejudice to the exceptional circumstances a 12-week internet-based public consultation must be part of the consultation strategy.[212]

[212] (European Commission, 2016)

Proposed policy changes

EU level

- Engage with stakeholders systematically at an early stage for the exchange of ideas on cycling, involve and continue to consult them during the whole cycle of a policy imitative until the implementation. Create regular cycling roundtables for general and specific topics. [ORG]

National, regional and local level

- Encourage Member States to follow the example of EU commission and engage with stakeholders [ORG].

EU added value (and/or cost of non-Europe)

Private for-profit, non-profit companies and NGOs will be needed to deliver significant parts of this cycling strategy. Including them in the implementation is essential to achieve the objectives. Several European Member States are already cooperating with cycling stakeholders in a systematic way, but most of the national governments do not do this. The European Institutions should set an example of how to do this properly.

Best Practice Example: Involving Cycling NGOs in Selecting Priorities

The cycling commissioner of the Hungarian national government created regular, sytematic roundtables with all relevant cycling NGOs to work out proposals for amandments to the national highway code. This example can be transferred to other countries and other policy fields because it helps to test the acceptance and support of the affected groups and use their expertise instead of considering them a risk for policy making.

10.5. Cycling Clearing House and Expertise Centre

The status quo of cycling in the relevant policy field

The European Cyclists' Federation and ELTIS,[213] among other initiatives, operate currently as an expertise centre and a cycling clearing house. The premier cycling conference of the world

[213] The urban mobility observatory; (Eltis)

(Velo-city) is organised annually by a host city and ECF (alternating between locations in Europe and outside Europe). These initiatives are useful and distribute knowledge and information in regard to cycling, but the outreach and inputs are limited (due to limited resources).

The status quo of cycling in relevant EU policy

EU-funded and supported projects and programs are coming to an end, leaving the current initiatives with limited resources which might not be sufficient to continue fulfilling the permanent tasks of a clearing house or expertise centre. To maintain the collection of best practices and exchange of expertise (after the end of the projects) and to transform it into a 'paying' service will leave the less resourced cities, regions and countries without access and will limits the use of the accumulated knowledge.

Proposed policy changes

EU level

- Appoint a relevant organisation, support and recognize it as the European cycling expertise centre and provide continuous financial support to it. [F]
- Provide access to all relevant information, contact details and best practices by means of a user-friendly tool. Also, a forum for exchange, notably on best practices, would be a good addition. [BP]
- The EU Cycling Focal Point should be in charge of the online tool even though outside sources may provide the content and run its technical operation. [BP]

National level

- Make best use of the expertise centre and share your own expertise and experiences. [BP]

Regional and local level

- Make the best use of the expertise centre and share your own expertise and experiences. [BP]

EU added value (and/or cost of non-Europe)

A European expertise centre and cycling clearing house are essential tools to avoid unnecessary waste of resources at all levels. It also contributes to better, more consistent and efficient policy making and implementation. A large knowledge base helps to spread the positive effects of successful cycling policies and can also help to reduce the risk of repeating mistakes already made previously by others

.

Some EU Member States are world leaders when it comes to cycling best practices and this incredible potential should be used to the benefit of all across Europe in the best possible way.

Best Practice Example: Learning from Bad Experiences

A city might understand that introducing a bike sharing scheme without other interventions e.g. enhancing the infrastructure for cyclists is likely not to become a success story. Therefore the possibility to learn from others is essential.

10.6. Cycling Friendly Institutions as a Role Model

The status quo of cycling in the relevant policy field

The EU institutions should be a real role model when it comes to implementing policy measures that they promote and this should also apply to cycling as a transport mode.

The status quo of cycling in relevant EU Policy

An association of cyclists working for the EU Institutions called the European Union Cyclists' Group (EUCG) advocates for their employers to become more cycling-friendly. The EU Institutions have indeed already implemented several recommendations.

Proposed policy changes

EU level

- Continue to put the recommendations of the EUCG into practice and provide a cycling-friendly environment in EU workplaces.
- Involve the EU Cycling Focal Point in the implementation and monitoring of the measures in the EU Institutions.

National level

- Member States hosting EU institutions should support the recommendations for improvements and provide a cycling-friendly environment.

EU added value (and/or cost of non-Europe)

The EU institutions would be less credible in the area of cycling if they do not lead by example and demonstrate good implementation of measures that are recommended or mandatory for other entities and stakeholders. With their positive action the EU Institutions contribute directly

to fulfil some of the essential EU policy objectives e.g. lowering the carbon footprint of transportation or providing growth and jobs for the EU economy.

Best Practice Example: Successful Measures at the EU Institutions

The Commission provides service bikes and e-bikes to its agents for trips in Brussels. The Council, the EP and the Commission have created dedicated parking areas for bicycles in their garages. The EU Institutions have launched a comprehenive information campaign covering all essential questions related to the use of bicycles in Brussels.

End of CHAPTER 10

Summary

In order to improve policies and projects at all levels of governance, they need to be monitored and evaluated over time. This requires the collection and processing of comprehensive and comparable data and statistics on cycling.

1. Policy and project evaluation
Cycling policies and projects should be subject to evaluation in order to improve them and to draw lessons for future policies and projects. The first step, presented here, consists of identifying indicators related to the proposed policies and projects. The next step should be to further elaborate what types of evaluations (ex ante; mid-term, final or ex post) are needed for each policy or project, including what should be the main focus of these exercises, when they are needed, and who is responsible for carrying them out.

2. Monitoring through key performance indicators
Key performance indicators are needed to assess cycle use (including gender split), bicycle business performance, safety and health effects of cycling, the cycling environment in terms of infrastructure and quality of life, the contribution of cycling to climate change mitigation and sustainable development, capacity building and governance.

3. Common definitions and harmonisation to improve synergy among different cycling statistics
To begin with, there is a need for common definitions in order to allow comparison between statistics produced by national and local travel surveys in Europe. This should be accompanied by harmonisation strategies, in order to maintain continuity of existing time series in countries and cities who have a tradition of measuring cycling.

4. Use crowdsourcing and big data collection for monitoring
The potential of crowd sourcing data collection on cycling infrastructure could be improved through stimulation of the community, better guidelines for contributors and addressing privacy issues through EU policy.

11.1. Policy and Project Evaluation

The status quo of cycling in policy and project evaluation

Because the cycling policies discussed in the EU Cycling Strategy are in different stages of the policy cycle – agenda-setting, policy formulation, legitimation, implementation, evaluation and maintenance – the required monitoring and evaluation encompass ex ante, mid-term and ex post evaluation. Currently there is a lack of overall concepts for European policy makers to support short, medium and long-term cycling monitoring and evaluation strategies.

The key principle of evaluation consists of assessing how far policy measures and projects contribute to local, national, regional, and global targets. This requires monitoring based on indicators that are able to register the current situation and any progress towards achieving objectives from local to global level. The monitoring efforts are complementary:

- Effective global monitoring relies on periodic country reporting.[214]
- Regional monitoring and evaluation is needed to stimulate interoperability, regional collaboration and coherence in pursued strategies.[215]

[214] (UN Secretary-General, 2015)

[215] (European Commission, 2011)

- Each local authority collects, analyses, and communicates data on progress with local challenges.[216]

Each of these monitoring efforts builds on existing data collection and processing mechanisms and processes, and may include official and unofficial data. While local level monitoring may be very context-specific, the global scale requires universal indicators based on standardized data collection and processing methods, ensuring harmonization.

The proposed changes in EU policy

EU Level

- Improve communication in order to allow policy makers to learn from each other and to improve coherence across policy domains, geographic areas, and time. [BP]
- Collect and disseminate information on existing good practice examples of cycling strategies, policies and projects such as the cycling barometer. [BP]
- Provide funding for further tool development and to promote the uptake of existing tools. [F]
- Encourage and extend joint initiatives to allow local policy makers to evaluate their cycling strategies, policies and projects, and stimulate comparisons among cities across Europe. [BP, F]

National level

- Include provisions for policy and project evaluation in national cycling strategies. [RE, GR]
- Provide fora and joint initiatives for regional and local policy makers to evaluate their cycling strategies, policies and projects, and encourage comparisons among cities at the national level. [BP]

Regional and local level

- Evaluate cycling policies and projects according to standard criteria. [RE]
- Participate in joint initiatives and fora at the European and national level to compare with other cities and share best practices. [BP]

EU added value

Indicators may serve the monitoring of progress towards more than one goal and target. By tracking cross-sectoral issues, the cycling strategy indicators help to evaluate policies and projects in terms of the level of integration and systems-based approaches to implementation.

Valorisation of existing knowledge and tools by stimulating the uptake of good practices helps to avoid the reinvention of the wheel and to stimulate collaborative learning across local authorities in Europe.

[216] (World Business Council for Sustainable Development, 2015)

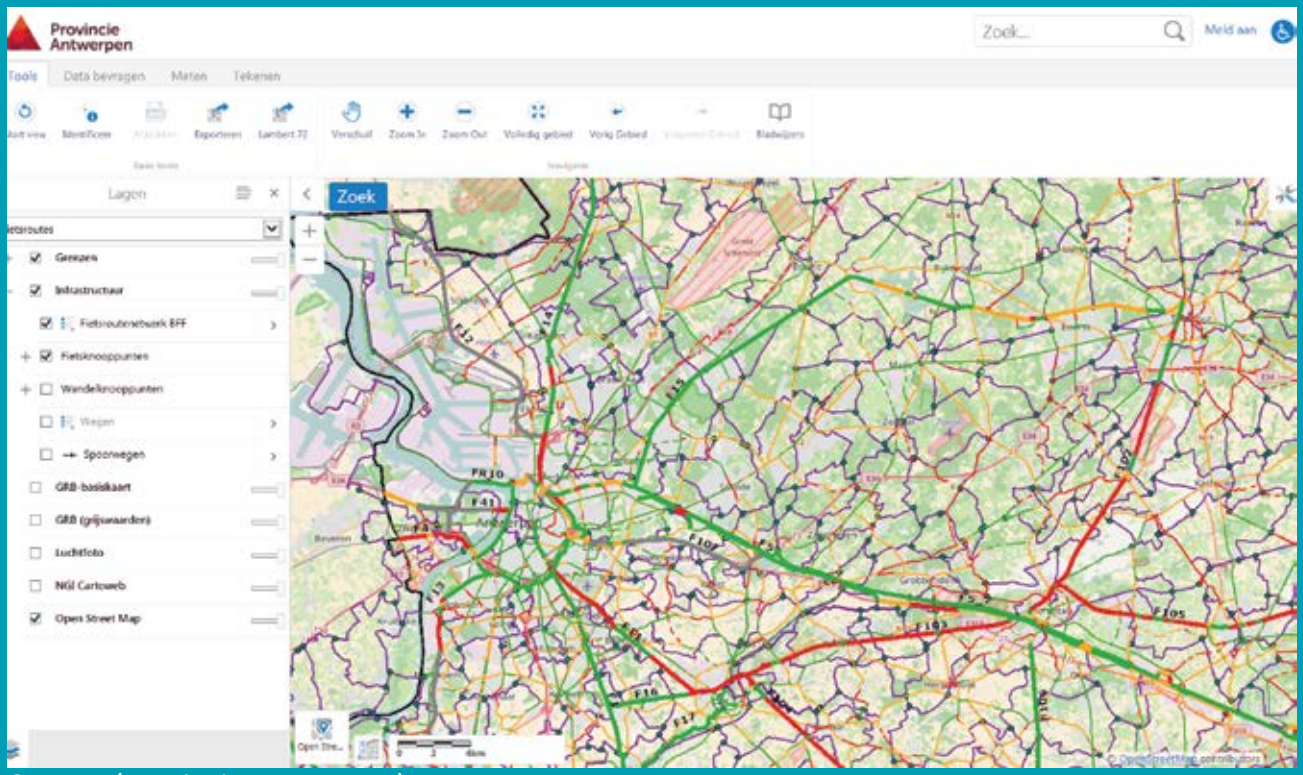
Best Practice Example: Cycling Barometer

The cycling barometer of the province of Antwerp monitors safety, comfort and infra-structure use across local borders, through collaboration between local, provincial and regional public departments and stakeholders. The initiative is collaboration among local, provincial and regional authorities, and provides information on financial support opportunities for cycling projects.

It provides measuring tools for local authorities:

- A shared infrastructure diagnostics bike
- Joined cycling count set ups
- Cycling accidents and behaviour statistics
- Surveys on cyclists' experiences and profiles

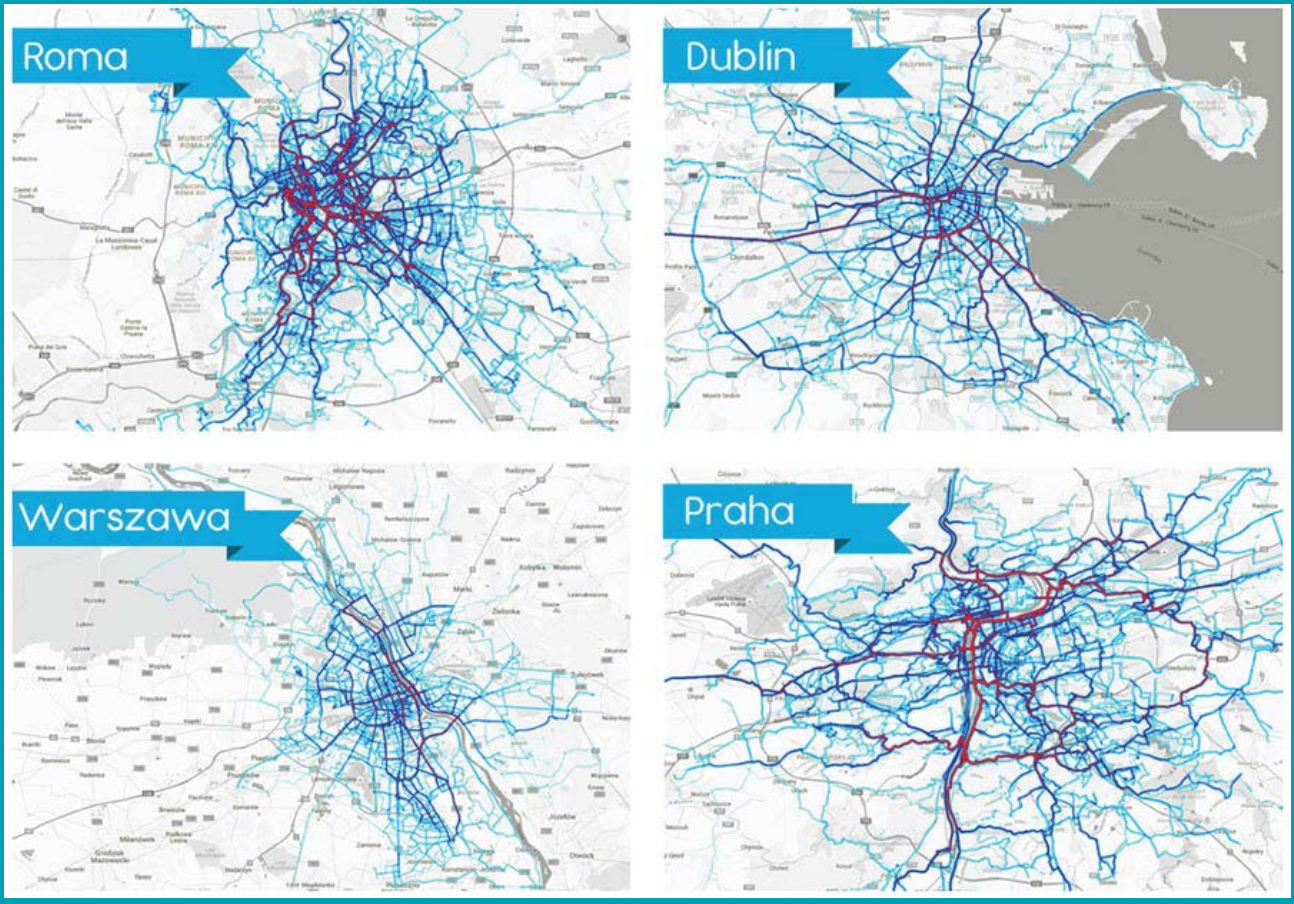
Guidelines, tools and tutorials for correct measurement and analysis of cycling data.
A platform for visualization.



Source: (Provincie Antwerpen)

Best Practice Example: European Cycling Challenge

The European Cycling Challenge – ECC is an urban cyclists' team competition that takes place every year in May. In 2016, 52 cities from 17 countries joined the challenge. Participants track their bike-trips with a free tracking app contributing to their team mileage, and through online leaderboards they can check their team's position in real-time. The collected GPS data are used to produce heatmaps of their bike trips which give an indication of the cyclists' behavior, the origins/destinations, time lost at intersections, congestion on cycle lanes, etc. These data provide maps of cycling networks in cities which can serve for the evaluation of cycling strategies, policies and projects from local to global level. Examples of the heatmaps produced for Roma, Dublin and Prague are presented below:



Source: (European Commission; Polis; Civitas 2020; EUROCITIES, 2015)http://www.cyclingchallenge.eu

11.2. Monitoring through Key Performance Indicators (KPI's)

The following domains are suggested based on their role in the monitoring and assessment of EU cycling policies proposed in the cycling strategy:

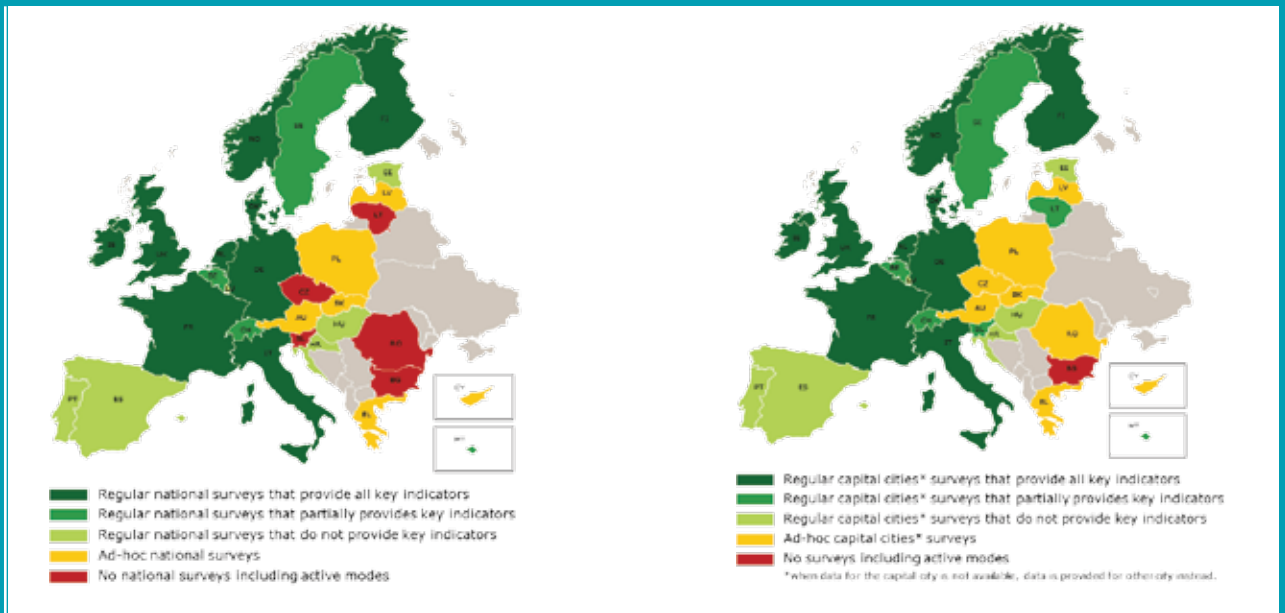
- Cycle use, including gender split indicators, refers to the achieved mobility targets and their impacts.
- The business performance indicates the importance of cycling contribution to the European economy.
- Safety and health indicators are primarily a matter of accountability of authorities towards the cycling population.
- Infrastructure quality is not a set of standard measures, but needs to be addressed in terms of user needs and is therefore an indicator of quality of life in European communities.
- An EU-wide study of the potential of cycling for climate change mitigation and sustainable development should be considered.
- Governance can be measured in terms of the number and success of good practices, and the uptake by follower communities, authorities, businesses and research.

Progress in each domain can be assessed through key performance indicators. Each indicator can be measured and calculated in different ways.

Status quo of KPI in EU policy – Cycle use

Increasing cycle use is the ultimate goal of the EU Cycling Strategy; therefore indicators of cycle use are the most important key performance indicators of the EU Cycling Strategy. The most

Map of the countries according to national and urban data collection of active modes (walking and cycling)



Source: (Steenberghen, Tavares, Richardson, Himpe, & Crabbé, 2017)

common indicators of cycle use are: average distance cycled per person, cycling frequency, modal split, share of the population that regularly cycles, and gender split of the cycling population. The person-kilometres cycled are the basis for calculation of environmental and climatic benefits, fuel and resource savings, congestion reduction, connectivity in terms of inter- and multimodality, and are needed for the impact assessment of behaviour change efforts.

These data are generally collected by means of travel surveys, but currently, there is a lack of systematic monitoring of cycling in many European countries. At urban level, measuring cycling is typically very ad hoc, linked to motivation for specific infrastructure projects. In those cases, there is rarely a follow-up or monitoring, thus making it hard to evaluate policies and projects.

Link to global scale

Monitoring cycle use is needed to assess the contribution of EU cycling policies to UN Sustainable Development goals (SDG) (see also Chapter 6 and annex):

- Ensure sustainable consumption and production patterns (SDG 12). Strategic environmental and social impact assessments (SDG 12). Develop and implement tools to monitor sustainable development impacts for sustainable tourism which creates jobs, promotes local culture and products (SDG 12.b). Indicator on policies for sustainable tourism (SDG 12.5).
- Ensure healthy lives and promote well-being for all at all ages (SDG 3). By 2030 halve global deaths from road traffic accidents (SDG 3.6.)
- Take urgent action to combat climate change and its impacts (SDG 3). Integrate climate change measures into national policies, strategies, and planning. (SDG 13.2). Improve education, awareness raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction, and early warning (SDG 13.3). Promote mechanisms for raising capacities for effective climate change related planning and management, in LDCs, including focusing on women, youth, local and marginalized communities (SDG 13.b)

Link to local scale

At local scale, cycle use measures allow cities to perform a standardized evaluation of their mobility system and measure the improvements resulting from the implementation of new mobility practices or policies in terms of:

- Energy efficiency: Total energy consumed for city transport (annual, total over all modes)
- Emissions of greenhouse gases: Tonne CO2 equivalent well-to-wheel emissions by urban transport per annum per capita
- Commuting travel time: Average duration of the combined outward journey and return journey to work or an educational establishment expressed in minutes per person per day
- Access to mobility services

Proposed policy changes (KPI – cycle use)

EU level

- Collect more cycle use data and statistics in existing European surveys to better inform EU policy, building on the cycle use indicators which are currently calculated from data collected through travel surveys organised at European level such as the Eurobarometers[217] and the Health Interview surveys.[218] [RD]
- Promote more harmonisation of National Travel Surveys in order to improve the cycling use statistics in the future (long term project – taking into account varying of national survey frequencies (sometimes 5 or 10 years)[219]). [GR]
- Create guidelines and recommendations for harmonisation for existing national, regional and local cycle use statistics which could better inform European policy and are available throughout Europe.[220] [GR]
- Provide additional funding for cycling data collection and analysis where there is a lack of (or inadequate) travel (cycling) data collection to fill the gaps in knowledge and better inform local policy makers. [F]

National level

- Carry out national travel surveys and include questions on cycling according to harmonised standards at EU level [RD]

Regional and local level

- Collect regional and local data on cycling according to national and European harmonised standards [RD]

Status quo of KPI in EU policy – cycling infrastructure, environment, and quality of life

Harmonisation of cycling infrastructure definitions proves to be difficult and may soon be outdated, considering the growth rate of pedelecs, speed pedelecs, (e-)cargo bikes etc. It is an EU-level task to update General Safety Regulations and include safety of cyclists (Chapter 5). Minimum quality criteria for old and new types of vehicles need to be developed (Chapter 5). Comparability of infrastructure quality requires harmonisation beyond suggesting minimum width of cycle tracks and maximum speed zones (Chapter 4).

Crucial for comparable data on infrastructure is the use of comparable definitions, guidelines for qualitative drawing and consistent tagging of one-way and two-way cycling infrastructure to allow comparable calculation of the length. In Europe, an attempt to collect cycling infrastructure statistics based on official statistics, resulted in some statistics in 12 of the 30 countries analysed, and in 24 of the 30 cities.[221] Although these produced good practice examples, they were not sufficiently harmonised for a comparative overview.

[217] (European Commission, 2013) (European Commission (DG REGIO), 2015)
[218] (Eurostat, 2014)
[219] (Eurostat, 2015)
[220] (Steenberghen, Tavares, Richardson, Himpe, & Crabbé, 2017)
[221] (Steenberghen, Tavares, Richardson, Himpe, & Crabbé, 2017)

Cycling infrastructure indicators need to be related to other subsidiary measurements and policies related to the quality of life, e.g. gender, social inclusion measures.

Link to global scale

Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all (see Annex: SDG 9.1).

Link to local scale

At local scale, mobility space usage is an important indicator of quality of life, in cities it is expressed as the proportion of land use taken by all city transport modes, including direct and indirect uses. This can be compared to the modal split to monitor the balance between space usage and mobility behaviour.

The length of roads and streets with sidewalks and bike lanes and 30 or 25 km/h zones and pedestrian zones related to total length of city road network (excluding motorways) may be an indication of opportunities for active mobility in a city. When assessing the presence of cycling infrastructure through such indicators in an urban environment it is important to include commuting zones and different degrees of urbanisation.

Proposed policy changes (KPI – cycling infrastructure, environment, and quality of life)

EU level

- Measure the quality of infrastructure building on indicators of quantity and quality in terms of user satisfaction. [RD]
- Produce guidelines and recommendations for more synergy among existing European data collections based on the link between infrastructure, user satisfaction and quality of life. [GR]
- Support further research on cyclists' needs for cycling infrastructure. [RD]
- Incorporate explicitly the related SDG goals into EU goals (see Chapter 6). [GR]

National, regional and local level

- Create national, regional and local databases/inventories of cycling infrastructure, including quality indicators.

Status quo of KPI in EU policy – bicycle business performance

The bicycle market contributes to the European economy in many ways. Indicators needed here refer to the (micro-)economic benefits in terms of turnover and jobs created by the cycling economy, from the manufacturing of bikes and of a wide range of related accessories and storage

equipment, to services in sales and repair (see Chapter 2). These are the basis for monitoring and assessment of policies on VAT regimes on bikes sales and bike repairs (see Chapter 7). They are also related to the performance assessment of policies on vehicle technology and standards (see Chapter 5).

The main current indicators are: bicycle production and sales in Europe, jobs in bicycle production, sales and repair. This categorisation may conceal important parts of the added value of cycling to the economy, such as research & development, related tourism and hospitality revenues etc.

Link to global scale

Bicycle business performance indicators can help to demonstrate Europe's contribution to 'strengthening the means of implementation and revitalize the global partnership for sustainable development' (see Annex: SDG 17), which is assessed in terms of domestic revenues allocated to sustainable development as percent of GNI, by sector.

Link to local scale

According to the World Business Council for Sustainable Development (WBCSD), economic success is demonstrated by:

- Economic opportunity: Citizens' perception of potential difficulties in accessing the job market and/or education system due to mobility network.
- Net public finance: net results of government and other public authorities' revenues and expenditures related to city transport.

Proposed policy changes (KPI - Bicycle business performance)

EU level

- Develop Transportation Satellite Accounts in Europe, including cycling as a medium-term EU policy, providing a means for measuring the contribution of transportation services to the national economy. [RD]
- Produce short-term guidelines for common definitions, harmonisation methods and more synergies among data collection initiatives. [GR]
- Support more research on the economic impact of cycling. [RD]

National, regional and local level

- Collect data on economic indicators related to cycling according to harmonised European standards. [RD]

Status quo of KPI in EU policy - Safety and health

In the field of road safety in general, and of cycling in particular, there is a tremendous gap between the scientific state of the art[222] and the state of play reflected in official statistics.[223] The use of accident statistics such as the number of fatalities in absolute numbers or by population, has been known for many years to be inadequate to support pro-active approaches to traffic

[222] (Fournier, Christofa, & Knodler, 2017)

[223] (Eurostat, CARE database, 2017)

safety: “Don’t wait for accidents to happen”.[224]

To evaluate the state of road safety for cyclists, exposure data based on actual cycling kilometres and on where people cycle (corridors …), are urgently needed.

The assessment of health impacts of behaviour changes (Chapter 5) needs to be related to an evaluation of air quality measures (Chapter 2) and of exposure of cyclists to pollutants.

Link to global scale

Cycling safety and health indicators are needed to prove a pro-active approach to ensuring healthy lives and promote well-being for all at all ages (SDG 3), more specifically towards the objective, by 2030, to halve global deaths from road traffic accidents (SDG 3.6.). It also enables monitoring of progress towards making cities and human settlements inclusive, safe, resilient and sustainable (SDG 11).

Link to local scale

The local scale is the level needed to properly monitor and assess exposure of cyclists, both to traffic accident risk levels and to clean air.

Proposed policy changes (KPI – safety and health)

EU level

- Produce guidelines and recommendations to produce comparable statistics on cycle use in person-kilometres, and in terms of modal split, combined with cycling accident statistics, which are urgently needed for a better understanding of cycling safety. However, this is only a starting point. Guidelines to calculate exposure are also needed from the perspective of where people cycle, in relation to motorized traffic and infrastructure characteristics. [GR]
- Support more research on the health effects of cycling. [RD]

National, regional and local level

- Collect data and produce statistics on road safety for cyclists based on exposure data, according to harmonised European standards [RD]

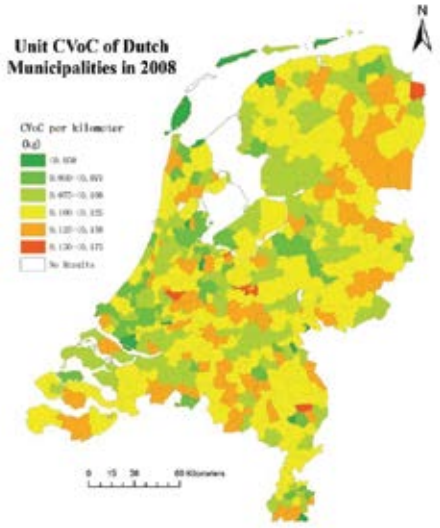
Status quo of KPI in EU policy – the contribution of cycling to climate change mitigation and sustainable development

There are methodologies such as the Climate Value of Cycling for the assessment of cycling mobility benefits in terms of avoided CO2 emissions, and cycling is prominent in many action plans of the Covenant of Mayors, yet the use of existing monitoring tools to assess the contribu-

[224] (ICTCT – International Co-operation on Theories and Concepts in Traffic Safety, 1988 - present)

tion of cycling policies and projects to climate change mitigation is far from widely used.

Unit CVoC of Dutch municipalities in 2008



The Climate Value of Cycling (CVoC) concept allows the calculation of the opportunity benefits of cycling in terms of avoided CO2 emissions. The methodology shows that bicycle mobility contributes to climate change mitigation. The CVoC is dependent on the amount of cycling mobility in the case study area, the competitive relation of the bicycle with the other modes and mode-specific CO2 emission factors.

Top ten municipalities in terms of total CVoC (data source: MON 2008, emission factors ADB (2010))

Source: (Zuidgeest, Brussel, Chen, Massink, & van Maarseveen, 2011)

Name	Population	Total CVoC per year (tons CO2)	CVoC per capita per year (kg CO2)	Bicycle passenger Kilometer Traveled (PKT) per capita per year (km)	Total Bicycle PKT per day (km)	Average cycling distance per person per day (km)	Cycling share in modal split (%)
Amsterdam	747,090	41,091	55	1,003	2,053,496	2.8	21%
Utrecht	294,740	27,140	92	1,290	1,041,470	3.5	22%
Groningen	182,480	26,055	143	1,644	821,832	4.5	36%
Eindhoven	210,330	25,986	124	1,284	739,869	3.5	26%
The Hague	475,680	22,064	46	735	957,249	2	18%
Rotterdam	582,950	20,014	34	538	859,363	1.5	14%
Tilburg	202,090	19,921	99	846	468,615	2.3	25%
Enschede	154,750	17,588	114	1,023	433,900	2.8	32%
Breda	170,960	15,137	89	913	427,714	2.5	24%
Amersfoort	141,210	14,721	104	999	386,524	2.7	27%

Although cycling is related to a large number of SDGs, there are few policy evaluation and monitoring tools allowing consistent and systematic assessment of the complex relations between cycling and sustainable development.

Photo source: Covenant of Mayors[225]

[225] (Covenant of Mayors)

Proposed policy changes (KPI – the contribution of cycling to climate change mitigation and sustainable development)

EU level

- Support further research to model the complex relations between cycling and sustainable development. [RD]
- Collect and disseminate good practice examples of demonstrating the benefits of cycling in terms of climate change mitigation. [BP]

National, regional and local level

- Include cycling measures in the monitoring of the achievement of national, regional and local climate goals. [RD]

Status quo of KPI in EU policy - capacity building and governance

Measuring governance is a major challenge because of its multi-dimensional character, as well as its conceptual and definitional issues. Good governance is often associated with principles such as transparency, participation, and accountability. These are inherent to all the policies proposed in the European Cycling Strategy. Therefore the key performance indicators proposed concern the policy stages achieved in all the previous chapters, for example, the number of cycle friendly highway codes in European countries, the number and implementation level of national cycling strategies, the number and implementation levels of sustainable urban mobility plans, etc.

The proposed changes in EU policy

EU level

- Set up initiatives to stimulate sharing of best practices among communities, authorities, businesses and research. Stimulate cross-border, trans-national co- operation and networking to combine complementary expertise, strategies, policies and projects in different countries. [BP]

National, regional and local level

- Participate in networking initiatives to share and benefit from best practices and expertise from across Europe

EU added value

SMART key performance indicators enable the monitoring and policy evaluation of the EU cycling strategy, and related policies and projects, helping to adjust and optimise them in the future.

11.3. Common Definitions and Harmonization to Improve Synergy among Different Cycling Statistics

The status quo in terms of synergy among different statistics

The Eurostat guidelines on Passenger Mobility Statistics[226] give indications on data collection, processing and reporting, but they are not detailed in terms of cycling, and the implementation in national travel surveys takes years to produce comparable statistics.

None of the travel surveys reported in the country reports of the 'Support Study on Data Collection and Analysis of Active Modes Use and Infrastructure in Europe' have a definition of bicycle in the guidelines. Some mention examples to be included or excluded, but that is the most guidance given to the respondents. Only in the Netherlands have e-bikes been recorded separately since 2015. 'The EN ISO standard 4210 'Cycles – Safety requirements for bicycles', also listed as a harmonised standard (GPSD), and different types of pedelecs have not yet found their way into travel surveys.

The country research conducted in 2016 for the Support Study on Data Collection and Analysis of Active Modes Use and Infrastructure in Europe[227] showed that national averages differ from those at city (capital) level, that there is a need for comparisons between cities, and that cross-border, international and interregional comparisons among EU countries and cities are not possible. There is a lack of standard approaches to calculate the mobile population, the share of the population cycling regularly, and cycling tends to be underestimated in many travel surveys because of inconsistent treatment of trip stages.

The proposed changes in EU policy

EU level

- Use the absence of definitions as an opportunity for short term change through guidelines and recommendations, provide countries, region and cities with an operational definition of cycling, allowing travel survey respondents to record their trips in a standardized way. [GR]
- Produce guidelines on how to record and publish cycling trips [GR].
- Develop guidelines for harmonising statistics; create a database of definitions and data-collection methods used. Cycling statistics need to be calculated by degree of urbanisation, city and commuting zones. [GR]
- Continue to research the possibilities for assessing user satisfaction, safety and security linked to cycling infrastructure. In the long term, a monitoring of active modes is needed, combining indicators based on official and unofficial data. [RD]

National, regional and local level

- Participate in the development of EU-level guidelines and recommendations on definitions and collection and harmonisation methods and apply them once adopted [GR]

[226] (Eurostat, 2015)

[227] (Steenberghen, Tavares, Richardson, Himpe, & Crabbé, 2017)

EU added value

Comparable statistics across the whole EU enables statistics to be compared without having to change national and local data collection methods. It thus allows countries and cities to keep time series, while improving comparability.

11.4. Use Crowdsourcing and Big Data Collection for Monitoring

The status quo in monitoring and evaluation

There are some successful examples of how crowdsourcing can provide reliable data for monitoring cycling (e.g. Fietstelweek Netherlands + Flanders). However, in their current stage of development, big data collection methods tend to be biased when used to produce cycling statistics due to their reliance on users agreeing to upload applications monitoring their mobility. Although algorithms exist to extract cycling trips from location data, privacy issues prevent the use of smartphone and GPS tracking to produce cycling statistics.

The comparison of statistics derived from the OpenCycleMap (a product of OpenStreetMap, OSM) with official statistics in the Netherlands shows that it is possible to extract reliable cycling infrastructure statistics from volunteer contributions. This initiative might not be transferable to other countries where the cycling associations have fewer members and resources. The quality of OSM cycling infrastructure data varies, impeding its use to monitor and evaluate the cycling infrastructure across Europe. However, the fact that there are contributions all over Europe indicates that cyclists are willing to volunteer in crowd sourcing initiatives. The main shortcomings of crowd-sourced data on cycling infrastructure are inconsistencies due to different interpretations of mapping guidelines. As guidelines are incrementally developed, these open data from crowd sourcing will gradually improve.

The proposed changes in EU policy

EU level

In order to stimulate further implementation of the good practice example identified in the Netherlands for cycling infrastructure statistics, a number of initiatives are possible:

- Further standardize the definitions of cycling infrastructure in the European Cycling Lexicon, for example by taking into account traffic calming measures. [GR]
- Harmonise definitions used for cycling infrastructure in Europe. [GR]
- Make the mapping rules in crowd sourcing initiatives such as OSM evolve towards these definitions for mapping cycling infrastructure in Europe. [GR]
- Stimulate participation in mapping cycling infrastructure. This could be combined with successful initiatives such as the European Cycling challenge. [F, BP]
- Develop a legal framework and guidelines

for harmonised data collection from big data sources like smartphone GPS sources. That way, EU policies could resolve issuesconcerning e.g. privacy in the medium term. [RE]

National level

- Develop a national legal framework and guidelines for harmonised data collection from big data sources, in line with the EU framework

Regional and local level

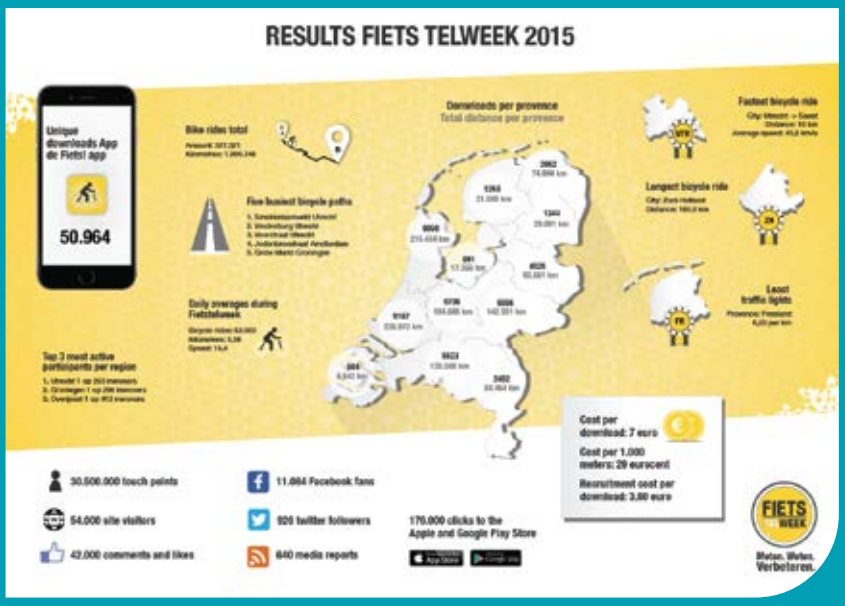
- Stimulate participation in crowdsourcing initiatives [F, BP].
- Participate in European and national level projects and initiatives, using harmonised data collection methods and standards [RD].

EU added value

Crowdsourcing and big data are cost-effective ways to provide detailed data, and in particular, big data is a very cost-effective way of collecting large amounts of harmonised trip data from location histories. Harmonisation of collection methods and solving regulatory issues about privacy at the European level will help to unleash its potential for more detailed and comprehensive statistics on cycling.

Best Practice Example: Fietstelweek

An initiative combining voluntarily gathered geographic information and traffic counts to produce comparable cycling statistics in Flanders and the Netherlands.



End of CHAPTER 11

Summary

1. Economic, environment, climate, energy & resource benefits
The cycling economy provides thousands of jobs, and doubling cycling would mean more jobs for lower-skilled people. The value of bike manufacturing, sales and cycle tourism far exceeds EUR 50 billion. Cycling regularly, including cycling to work, translates into reduced work absenteeism, supporting the key EU asset: the productive capacity of the workforce. Cycling currently contributes to EU climate and CO2 goals, air and noise pollution, saves fuel and natural resources.

2. People: health, well-being, social & cultural affairs
The millions of people cycling regularly in the EU enjoy, on average, longer, healthier lives and better mental health from the physical activity and related benefits. This translates into reduced work absenteeism, improved children's health, development, and well-being benefits.

Cycling's low costs and ease of use contribute to social and gender equality, and to reducing health inequalities for all, including refugees fleeing violent conflicts. Cycling improves connectivity between people, accessibility especially, but not only in congested and urban areas. It enhances social safety, and resilience.

3. More liveable cities: mobility, technology & urban design
Cycling makes EU cities more liveable and more cycling will do so even more. The benefits of cycling are to be found in mobility, including reductions in congestion, reductions in construction and maintenance of road infrastructure and by complementing and supporting public transport costs, by reducing pressure especially at peak times. Cycling provides enhancements and efficiencies in connectivity e.g. inter- and multimodality; to urban design by freeing space in cities through integrated urban planning and infrastructure, and to smart city development through smarter cycling, with cycling's contributions to new technologies.

EU competences related to cycling include the fields of industry, employment, transport, environment, climate, health and social policy, and global development. We make the case that cycling delivers significant cost savings in public investments and helps meet established EU targets. This implies development of an integrated EU cycling strategy that includes cycling in all relevant policy areas to aid the EU to multiply the benefits cycling delivers.

Introduction

The benefits of cycling are widespread and concrete; they range from less congestion and better air quality to more jobs, and improved mobility. This 'Benefits of Cycling' – Annex will discuss what are the advantages of cycling for individuals and society as a whole.

Whereas some benefits are purely economic and for the benefit of individuals, such as saving money by cycling instead of using private motor vehicles, other economic advantages benefit all taxpayers, such as reduced costs and subsidies for infrastructure due to relatively lower maintenance costs for cycling friendly infrastructure. In addition to these economic benefits cycling also produces numerous positive externalities, for instance a fairer, more liveable and healthy society.

Most of the contributions cycling makes to help the EU meet policy goals are in the fields of industry, employment, transport, environment,

climate, health and social policy, and global development. This annex thus further elaborates the case that is made in Chapter 1 of the EU Cycling Strategy (EUCS), namely that cycling contributes to established EU targets and has a high return on investments. Implied is that the development and implementation of an integrated EUCS including all relevant policy areas will multiply the benefits cycling delivers.

2.1. Benefits to the Economy, Environment, Energy, Climate & Natural Resources

Economic benefits: boosting jobs, growth and investment

Cycling makes a significant contribution to the European Commission's Priority #1 of providing a new boost for jobs, growth and investment as expressed by Commission President Juncker in his political guidelines.[228]

Cycling generates annually over €1 billion in EU investments and approximately €12 Billion EU worth of Industrial output[229] The value of bicycle tourism is EUR 44 billion from 2.3 billion cycle tourism trips per year in Europe. This does not include the value of bicycle tourism in other sectors, such as travel agencies not specialised on cycling.

Over 650,000 jobs are associated with the current level of cycling in Europe. Cycling has a higher employment intensity per million euro turnover than other transport sectors, thus offering a higher job creation potential. Furthermore, cycling jobs are more geographically stable than other sectors; they benefit local economies, and they offer accessible jobs to the labour market with added value in Member States with high levels of youth unemployment.[230]

If cycling's modal share were to be doubled, more than 400,000 additional jobs could be created, reaching a total of more than 1 million jobs in the cycling economy. This means that cycling helps the EU to achieve the Europe 2020 goals in terms of green growth and green job creation, as stated for example in the Green Employment Initiative.[231]

Cycle commuting to work is related to reduced work absenteeism, providing significant benefits for businesses and employers. Employees who cycle to work have 1.3 fewer sickness days than those who do not cycle to work, a gain per employee of EUR 260 per year.[232] Across the EU, cycling to work provides a EUR 4,5 billion benefit due to reduced absenteeism and contributes to EU occupational, safety and health (OSH) policy goals of reduced absenteeism and sustainable jobs.

Environmental benefits

The estimated value of air pollution from cars avoided by current levels of cycling is EUR 427 million. Cycling is an important means to achieve the EU air policy objectives of reducing the

[228] (Juncker, 2014)
[229] (Confederation of the European Bicycle Industry; European Bicycle Manufacturers Association, 2017)
[230] (Blondiau & Van Zeebroeck, 2014)
[231] (European Commission, 2014)
[232] (Hendriksen, Simons, Garre, & Hildebrandt, 2010) 233 (European Commission, 2013)

health impacts of air pollution by 52% in 2030 compared to 2005 and reducing the share of ecosystem area exceeding eutrophication limits to 35%, as stated in the 2013 Communication 'A Clean Air Programme for Europe'.[233]

Cycling also contributes to reducing noise pollution in Europe, with an estimated value of EUR 300 million. This helps to achieve the target of significantly decreasing noise pollution in the Union, moving closer to levels recommended by the World Health Organisation, by 2020, as stated in the General Union Environment Action Programme to 2020 'Living Well, within the Limits of Our Planet'.[234]
Cycling infrastructure requires much less space than infrastructure for cars. This leads to reduced construction-related and maintenance costs, because cycling infrastructure costs less and requires minimum maintenance.

Cycling helps save resources savings and preserve environmental assets such as soil and water. It also helps to achieve the aim of having no net land take in the EU by 2050 in the 2011 Roadmap to a Resource-Efficient Europe.[235] Another environmental benefit is increased permeable surface areas, meaning higher soil quality and less water pollution, helping to reach the objective of preventing further soil degradation and preserving soil functions stated in the Thematic Strategy for Soil Protection of 2006.[236]

Benefits in terms of climate protection and energy savings

The current estimate of 134 billion km cycled annually provides CO2 savings of 15 billion kg with a value of EUR 2 billion per year. Benefits include CO2 emissions avoided and the associated climate change damages, i.e. the "social cost of carbon".[237] Additionally, cycling prevents the so-called 'rebound effect' from the use of electric cars.[238] The fuel savings due to avoided car traffic linked to current cycling levels in the EU are estimated at EUR 2.8 billion.

Cycling contributes to achieving Commission President Juncker's Priority # 3 'A Resilient Energy Union with a Forward-Looking Climate Change Policy', firstly by reducing high energy dependency. Cycling helps meet targets in the EU 2030 Framework for climate and energy policy adopted in 2014,[239] namely the target of 40% cut in greenhouse gas emissions compared to 1990 levels (specific targets for the transport sector: 20% reduction from 2008 levels by 2030, and a 60% reduction from 1990 levels by 2050) and at least 27% energy savings compared with the business-as-usual scenario.

Cycling significantly contributes to 12 of the 17 UN Sustainable Development Goals,[240] as presented to the UN Climate Summit COP 21 in Paris.[241]

2.2. People: Health, Well-being, Social & Cultural Affairs

Cycling is an investment in health and productivity

Cycling is an investment in health and productivity across all ages. Health and well-being have central and innate value to everyone living in the EU. Physical and mental health among working

[234] (European Commission, 2013)
[235] (European Commission, 2011)
[236] (European Commission, 2006)
[237] (United States Environmental Protection Agency, 2016)
[238] See e.g.: (Rowley, 2011)
[239] (European Commission, 2014)COM(2014)
[240] (Neun M. , 2016)
[241] (Shchori, 2016)

age adults is essential to a key economic asset: the productive capacity of EU workforce.

Current levels of cycling in the EU prevent 27,860 premature deaths annually due to the physical activity, with an economic savings of EUR 96.5 billion estimated with the WHO HEAT tool.[242] The healthier lives also involve reduced morbidity from non-communicable diseases (NCDs) including cardiovascular disease (CVD), coronary heart disease, stroke, cardiopulmonary diseases, several cancers, hypertension, overweight and obesity, and type 2 diabetes. Morbidity benefits[243] from current levels of cycling in the EU are valued at EUR 38.6 billion annually.[244] The policy benefits include the EU Lisbon 2020 goal to increase the average healthy lifespan by 2 years and the reduction of NCDs by 25% by 2025, the Sustainable Development Goal 3 of reducing NCDs by 30% by 2030, and several other aspects of the EU Environment and Health Strategy and the associated action plan.[245]

Mental health benefits[246]

One in four persons in the EU suffers from a mental health condition during their lifetime. Cycling's contribution to better cardiovascular health delays dementia. Cycling can improve brain function and mental health:[247] Regular physical exercise has a dose-response relationship with better functioning at work and less mental health-related absenteeism.[248] It also helps counter cognitive declines including memory, executive function, visuospatial skills, and processing speed in normally aging adults.[249] The estimated value of cycling and mental health is EUR 30 billion. The contributions to EU policy goals include a healthy workforce, reduced absenteeism and sustainable jobs.

Health benefits for children

Cycling to school and for recreation at a young age helps generate life-long benefits.[250] Cycling helps meet the objective of halting the rise in overweight and obesity in children and young people (0–18 years) by 2020 in the EU Action Plan on Childhood Obesity 2014–2020.[251] Cycling brings health and social benefits for families.[252] The overall estimated value of cycling for children is currently EUR 20 billion.

There are social and demographic benefits of cycling, which include increased levels of social interactions and contribute to more liveable cities. "Interactions can be positive, neutral, negative and even aggressive ... Cycling also offers high potential of being exposed to spatial and social diversity." [253]

[242] (World Health Organization, Regional Office for Europe, 2014)
[243] (Van Zeebroek & Charles, 2014)
[244] (Neun & Haubold, 2016)
[245] (European Commission, 2003) (European Commission, 2004 -2010)
[246] (Legrain , Eluru , & El-Geneidy, 2015)
[247] (Wasmer Andrews, 2015)
[248] (Toker & Biron, 2012)
[249] (Chapman, et al., 2013)
[250] (Sustrans)
[251] (European Commission, 2014)
[252] (European Cyclists' Federation, 2012)
[253] (te Brömmelstroet, Nikolaeva, Glaser, Nicolaisen, &

2.3. More Liveable Cities: Mobility, Technology & Urban Design

Mobility

Congestion easing

Cycles ease congestion by providing mobility and logistics services despite being much smaller than fossil fuel powered motor vehicles which often contain one single occupant. The value of cycling replacing car trips is EUR 6,5 billion. Cycles currently provide a small but growing share of urban logistics trips, with the potential to replace 50% of them. This contributes to the EU target of carbon-free urban logistics by 2050.

Public transport subsidies

Cycling complements and supports public transport trips. Reducing pressure on PT systems especially in the peak hours when costs are the highest, cycling can help to add value to public transport subsidies. Public bike schemes integrated in public transport relieve pressure on the rest of the system.

Connectivity: inter- and multimodality

Cycling is a top provider of solutions for inter- and multimodality with other modes of transport. It improves capacity building with public transport, offering ride + travel solutions etc.

Smarter cycling: contribution of cycling to new technologies and smart city development

Many bikes produced today are hi-tech products. New, lightweight materials (e.g. carbon fibre) are being developed and tested that can be used in other areas as well. This is especially true for electric bikes and their innovative components like batteries and new power trains, which have made electro-mobility a reality in the EU. Currently, many more electric bikes than electric cars are sold in Europe. (For details see Chapter 5 and 8)

Cycling is also becoming more and more connected, using ICT for applications like route planning, public bike systems or GPS tracking. With these new services, cycling becomes an integral part of the transport systems of future smart cities.

Urban design: benefits of integrated urban planning and infrastructure

There are many benefits of improving urban design that enable and promote active transport like walking and cycling. The benefits of reducing motor vehicle congestion and air pollution are the headline effects. More space in cities for cycling, making cities more accessible for all, connecting neighbourhoods and creating meeting places leads to many other benefits, such as better social cohesion and improved business revenues. Both the EU Action Plan on Childhood

Obesity and the EU Council Recommendation promoting health-enhancing physical activity across sectors (HEPA, 2013)[254] note the need to address urban planning and urban design to achieve increased physical activity at the population level with the associated mortality and morbidity decreases.

Construction and maintenance of road infrastructure is decreased by avoiding car-related investment and reduced wear from cycles versus cars.[255] Cycling promotes effective land use and helps prevent urban sprawl since cycling needs much less space than cars while providing accessibility to all urban functions over large areas.

The positive effects of cycling go beyond mobility and sustainability. Cities with cycle friendly infrastructure are rated higher in terms of quality of life. The bicycle is therefore a potential catalyst for improving the living environment as a whole. In order to take advantage of this added value, an integrated approach should be taken to the planning of our communities.

[254] (European Council, 2013)

[255] (European Transport Safety Council, 2016) (Organisation for Economic Co-operation and Development (OECD), 2014)

Shifting towards a better economy, society, and planet for all

The Global Goals, as stipulated in the preamble of the Sustainable Development Goals (SDGs), seek to realize the human rights of all. Cycling is already delivering on these goals worldwide, and this is a good reason to invest more in cycling. Making transportation more sustainable is of critical importance for humanity and the planet. Moreover, active mobility is a human right on all scales – including the right to cycle. Governments at all levels should provide safe access to public space, protect those that walk and cycle, and ensure – through mobility – equal participation in society. Investment in better conditions for cycling - including e- cycling, cargo cycling and public bicycles - will help achieve these Global Goals as cycling is directly linked to the following 11 Global Goals:

Goal #1: End poverty in all its forms everywhere

Cycling is an affordable and simple mode of transport enabling access to education, jobs, markets, and community activities in both urban and rural areas. The bicycle is often the only affordable technical means of transport for people and goods , and thus helps individuals to lower the cost of transport for their household. Cycling can more than halve commuting time for those otherwise dependent on walking, giving them access to more job opportunities, schools, markets, and communities. In addition, the potential for economic growth through cycling-related job creation is high. Investments in cycling offer good opportunities for sound national, regional and international poverty-reduction strategies.

Goal #2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Cycling plays an important role for many small-scale food producers. It can provide secure and equal access to land, resources and inputs, knowledge centers, financial services, markets and opportunities for non-farm employment. Cycling helps to ensure access, in particular for the poor, to food all-year round. By widening the area accessible to people who do not have an alternative mode of transportation, cycling ensures better access to food markets and communities, increasing nutrition options and ensuring the sustainable transportation of food products.

Goal #3: Ensure healthy lives and promote well-being for all at all ages

Cycling generates healthy and non-air-polluting lifestyles. The physical activity cycling generates reduces heart diseases and other negative impacts of sedentary lifestyles. Air quality and road safety improve when individual motorized transport is replaced by cycling. Creating safe conditions for cyclists contributes to reducing the number of global deaths and injuries from road traffic accidents.

Goal #5: Achieve gender equality and empower all women and girls

Cycling provides access for women and girls to water, schools, markets, and jobs that are otherwise inaccessible through available transportation means or walking. Safe infrastructure for

cycling supports gender equality as it increases the number of women and girls that take advantage of cycling.

Goal #7: Ensure access to affordable, reliable, sustainable and modern energy for all

Cycling improves the energy efficiency of transport systems as it uses renewable human power in the most efficient way to move people and goods, and e-cycling offers access to the use of very efficient e-mobility technology. In addition, cycling offers a good solution for the first and last miles in combination with public transport and logistic systems. Good conditions for cycling give people access to mobility in an efficient and affordable way.

Goal #8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

The cycling industry sector, including services and cycling tourism, delivers products and services for sustainable, inclusive transport of people and goods as well as sustainable tourism and healthy leisure activities. The cycling sector creates more jobs per investment than any other transport sector.

Goal #9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Cycling enables people to switch from the use of individual motorized transport to a combination of active mobility (walking and cycling) and public transport. More people cycling more often makes it easier for governments to build resilient infrastructure and sustainable transport systems for economic development and human well-being, with a focus on affordable and equitable access for all.

Goal #11: Make cities and human settlements inclusive, safe, resilient and sustainable

Increased cycling makes cities and human settlements more inclusive, safe, resilient, and sustainable as cycling is affordable, safe, non-polluting, healthy, and promotes a sustainable economy. On the one hand it is largely independent from complex high-tech technology and therefore an extremely resilient mode of transport. On the other hand modern communication and e-cycling technologies integrate cycling into Intelligent Transportation Systems of cities. The higher the modal share of walking, cycling and public transport the more sustainable the transport system is.

Goal #12: Ensure sustainable consumption and production patterns

The transportation of people and goods by bicycle offers the opportunity to move around - as commuters, consumers, and tourists – as well as the production, consumption, and delivery of goods in a sustainable way. Cycling matches perfectly with the diversity and scale of regional

and local economies. In many urban areas, 50% of all goods deliveries can be done by bicycle. Furthermore, the increase of the cycle tourism sector creates more options for people to choose sustainable tourism.

Goal #13: Take urgent action to combat climate change and its impacts

The bicycle is a symbol for decarbonizing transport and societies; it offers the possibility for immediate climate action. Governments at all levels can take action by integrating cycling into their climate action policies, strategies, education and awareness-raising.

Goal #17: Strengthen the means of implementation and revitalize the global partnership for sustainable development

The cycling movement, civil society organizations and experts working on the promotion of cycling worldwide are supporting the global partnership for sustainable development. They encourage and promote effective public, public-private and civil society partnerships to promote cycling. In addition, they seek to significantly increase the availability of high- quality, timely and reliable data on cycling to support the global development and dissemination of successful environmentally-sound cycling technologies and the development and implementation of cycling policies in developing countries.

Glossary

2DS	2 Degree Celsius Scenario
AEB	Autonomous Emergency Braking
Bike-sharing	A service in which bicycles are made available for shared use to individuals on a very short term basis
Blue-bike	Bike-sharing system in Belgium run by the SNCB/NMBS (see glossary)
Call-a-bike	Bike-sharing system in Germany run by the DB (see glossary)
CBD	Central Business District
CEF	Connecting Europe Facility
Cen standard	Standardization by the European Committee for Standardization
C-ITS	Cooperative Intelligent Transport System; connected and automated road users and traffic managers who share information and use it to coordinate their actions. The cooperative element is enabled by the digital connectivity between vehicles and between vehicles and transport infrastructure.
CIVITAS	City VITAlity and Sustainability; network of cities for cities
CO2	Carbon dioxide
CONEBI	Confederation of the European Bicycle Industries
COSME programme	EU programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises
CSR	Corporate Social Responsibility
CVD	Cardiovascular disease
CVoC	Climate Value of Cycling
DB	National Railway Company of Germany. Deutsche Bahn
DG DEVCO	European Commission, Directorate-General Development and Cooperation
DG JUST	European Commission, Directorate-General Justice and Consumers
DG MOVE	European Commission, Directorate-General Mobility and Transport
DG NEAR	European Commission, Directorate-General European Neighborhood and Enlargement Negotiations

DG REGIO	European Commission, Directorate-General Regional and Urban Policy
DG TAXUD	European Commission, Directorate-General Taxation and Customs Union
DG TRADE	European Commission, Directorate-General Trade
EBMA	European Bicycle Manufacturers Association
ECC	European Cycling Challenge
ECF	European Cyclists' Federation
EEA	European Environment Agency
EMC	Electromagnetic Compatibility.
EMW	European Mobility Week
EN standards	European Standards (ENs) are documents that have been ratified by one of the three European Standardization Organizations (ESOs), CEN, CENELEC or ETSI; recognized as competent in the area of voluntary technical standardization as for the EU Regulation 1025/2012
EPAC	Electric powered assisted cycles (includes: Pedelecs/EPACs conforming to CEN standard 15194; L1e-A "powered cycles" and Speed Pedelecs, L1e-B for "mopeds" conforming to Regulation (EU) No 168/2013)
ERTRAC	European Road Transport Research Advisory Council
EU WVTA	Whole Vehicle Type Approval
EUCG	European Union Cyclists' Group
EUCS	European Union Cycling Strategy
Euro NCAP	European New Car Assessment Programme
EuroVelo	The European Cycle Route Network
ESIF	European Structural and Investment Funds
GDP	Gross Domestic Product
GPSD	General Product Safety Directive
GHG	Greenhouse Gas
Green week	Europe's biggest annual conference on environment policy
GSR	General Safety Regulation
GSRD	General Safety Regulation Directive
HEPA	Health Enhancing Physical Activity

HGV	Heavy Good Vehicles
HMI	Human-Machine Interface
Intermodal	More than one mode of transport is used for a journey (e.g. one can take the train and use the bike to get from the train station [the last mile]). Intermodal transport is a sub-form of multi-modal transport.
Interreg	- Programme to stimulate cooperation between regions in the European Union, funded by the European Regional Development Fund
ISA	- Intelligent Speed Assistance
ISO standard	International Organization for Standardization
ITDP	Institute for Transportation and Development Policies
ITS	Intelligent Transportation System applies advanced technologies of information, electronics, communications, computers, and control to all modes of transport
KPI	Key Performance Indicator
L1e-A	A category L1e vehicle (light two-wheel powered vehicle), the L1e-A vehicle is a 'powered cycle'. (See Regulation (EU) No 168/2013)
L1e-B	a category L1e vehicle (light two-wheel powered vehicle), the L1e-B vehicle is a 'two-wheel moped'. (See Regulation (EU) No 168/2013)
L - category vehicles	L-category vehicles comprise powered two-, three- and four-wheel vehicles as categorised in regulation (EU) No 168/2013 of the European Parliament and of the Council of 15 January 2013 on the approval and market surveillance of two- or three-wheel vehicles and quadricycles (see Article 4 and Annex I, including powered cycles, two- and three-wheel mopeds, two- and three-wheel motorcycles, motorcycles with side-cars, light and heavy on-road quads, and light and heavy quadri-mobiles)
LCVs	Light Commercial Vehicles
LEVs	Light Electric Vehicles
LEZ	Low Emission Zone
Life programme	EU financial instrument supporting environmental, nature, conservation and climate action projects throughout the EU
MaaS	Mobility as a Service

Multimodal	Multiple modes of transport are available to get to your destination (e.g. one can walk, cycle or car-share from A to B)
MVPA	Moderate-to-vigorous physical activity
NCD	Non-communicable diseases
NDC	Nationally Determined Contributions
NEN	Nederlandse Normalisatie Instituut (Dutch Standardisation Institute)
NGO	Non-governmental organisation
SNCB/NMBS	National Railway Company of Belgium. Dutch: Nationale Maatschappij Belgische Spoorwegen;French: Société nationale des chemins de fer belges
NO2	Nitrogen Dioxide
NOx	Generic term for the nitrogen oxides that are most relevant for air pollution, namely nitric oxide (NO) and nitrogen dioxide
NS	National Railway Company of the Netherlands. Nationale Spoorwegen
NUA	New Urban Agenda
OECD	Organisation for Economic Co-operation and Development
OP	Operational Programme
OSH	Occupational, safety and health
OSM	Open Street Map
OV-Fiets	Openbaar Vervoer – Fiets; national public bike-sharing scheme in the Netherlands
PA	Physical activity
Pedelec	Otherwise known as EPAC. Pedal electric assisted cycle. Can be lower powered (up to 25km/h; 250 W); or a 'speed' pedelec (up to 45 km/h; 4000 W).
RAPEX	Rapid Exchange of Information System – EU rapid alert system for consumer protection from unsafe products
REACH standards	REACH is a regulation of the European Union, adopted to improve the protection of human health and the environment from the risks that can be posed by chemicals, while enhancing the competitiveness of the EU chemicals industry
SDG	Sustainable Development Goal
SMEs	Small and Medium-sized Entreprises

Speed Pedelec	Pedal electric cycle of speeds up to 45 kph and power up to 4000 watts (falls under L1e-B categorization)
SUMP	Sustainable Urban Mobility Plan
TEN-T	Trans-European Transport Networks
TEU	Treaty of the European Union
THE PEP	Transport, Health, Environment Pan-European Programme
TWIN	a European funded project for the development of electric bike training in the European Union
UN	United Nations
UN-ECE	United Nations Economic Commission for Europe
VRUITS	Vulnerable road users ITS
WBCSD	World Business Council for Sustainable Development
WHO	World Health Organization
WHO HEAT tool	WHO/Europe Health Economic Assessment Tool

Bibliography

Ahrens, W., Siani, A., Adan, R., De Henauw, S., Eiben, G., Gwozdz, W., . . . Pigeot, I. (2017). Cohort Profile: The transition from childhood to adolescence in European children–how I.Family extends the IDEFICS cohort. doi:https://doi.org/10.1093/ije/dyw317

Bieńkowska, E. (2015, July 1). Keynote speech for the AVIO AERO conference on "Development, Growth and Innovation in strategic high-tech sectors". Retrieved from https://ec.europa.eu/commission/commissioners/2014-2019/bienkowska/announcements/keynote-speech-avio-aero-conference-development-growth-and-innovation-strategic-hi-tech-sectors_en

(Bike2Work) European Cyclists' Federation. (n.d.). Grants and tax-breaks. Retrieved from Bike2Work: http://www.bike2work-project.eu/en/Cycle-friendly-employers/Grants-and-tax-breaks/Overview/

Bieńkowska, E. (2016, June 23). Speech: Reindustrialisation of Europe: Industry 4.0 - Innovation, growth and jobs, Forum Europe conference. Retrieved from European Commission: https://ec.europa.eu/commission/commissioners/2014-2019/bienkowska/announcements/reindustrialisation-europe-industry-40-innovation-growth-and-jobs-forum-europe-conference_en

BiTiBI Project (Transport & Mobility Leuven (TML)). (n.d.). BiTiBI Factsheets. Retrieved from http://www.bitibi.eu/dox/BiTiBi_Factsheet_20140924.pdf

Blondel, B., Mispelon, C., & Ferguson, J. (2011). Cycle more Often 2 Cool down the planet: CO2 savings of cycling. Retrieved from European Cyclists' Federation: https://ecf.com/sites/ecf.com/files/ECF_-CO2_WEB.pdf

Blondiau, T., & Van Zeebroeck, B. (2014). Cycling Works: Jobs and Job Creation in the Cycling Economy. European Cyclists' Federation. Retrieved from https://ecf.com/sites/ecf.com/files/141125-Cycling-Works-Jobs-and-Job-Creation-in-the-Cycling-Economy.pdf

Bodor, Á. (2016). EU Funds Observatory for Cycling. Retrieved from European Cyclists' Federation: https://ecf.com/what-we-do/european-funding/eu-funds-observatory-cycling

Britton, E. (2014). Go Lillestrøm! Pedestrians and cyclists receive “reverse toll money” in Norway. Retrieved from WORLD STREETS: The Politics of Transport in Cities: https://worldstreets.wordpress.com/2014/09/19/pedestrians-and-cyclists-receive-reverse-toll-money-in-norway/

Buffat, M., Herzog, D., Neuenschwander, R., Nyffenegge, B., & Bischof, T. (2014). Verbreitung und Auswirkungen von E-Bikes in der Schweiz (Schlussbericht). Bundesamt für Energie BFE (Schweizerische Eidgenössisches Departement für Umwelt, Verkehr, Energie und Kommunikation UVEK). Retrieved from http://www.news.admin.ch/NSBSubscriber/message/attachments/36765.pdf

Bulc, V. (2016, June 17). Cycling: green and efficient transport for the future. Retrieved from https://ec.europa.eu/commission/commissioners/2014-2019/bulc/blog/cycling-green-and-efficient-transport-future_sl

Business Europe. (2016, October 31). Enhancing enforcement and compliance for goods - a BusinessEurope strategy paper. Retrieved from Business Europe - Publications: https://www.businesseurope.eu/publications/enhancing-enforcement-and-compliance-goods-businesseurope-strategy-paper

Cappelle, J., Motoasca, T.-E., & Rotthier, B.

(2014 - 2018). Quantification of technical performances, cyclist experience and safetyof speed pedelecs for commuter use. Retrieved from Fris' Research Portal: http://www.researchportal.be/en/project/quantification-of-technical-performances-cyclist-experience-and-safetyof-speed-pedelecs-for-commuter-use-(KUL_3E140643)/#tabs

Centraal Bureau Statistiek (CBS). (2017, February 22). 65-plussers met meer auto's en kilometers op de weg. Retrieved from https://www.cbs.nl/nl-nl/nieuws/2017/08/65-plussers-met-meer-auto-s-en-kilometers-op-de-weg

Chapman, S., Aslan, S., Spence, J., DeFin, L., Keebler, M., Didehbani, N., & Lu, H. (2013). Shorter term aerobic exercise improves brain, cognition, and cardiovascular fitness in aging. Front. Aging Neurosci. doi:https://doi.org/10.3389/fnagi.2013.00075

Ciarrocchi, M. (2016). Bike2Work. Retrieved from https://ecf.com/projects/bike2work

City of Helsinki. (2015). Helsinki Bicycle Account. Retrieved from https://issuu.com/helsinkisuunnittelee/docs/pyorailykatsaus_2015_en_issuu

Confederation of the European Bicycle Industry. (2016). European Bicycle Market 2016 Edition: Industry & Market Profile (2015 statistics). Retrieved from http://www.conebi.eu/wp-content/uploads/2016/09/European-Bicycle-Industry-and-Market-Profile-2016-with-2015-data-.pdf

Confederation of the European Bicycle Industry. (n.d.). Position Papers. Retrieved from http://www.conebi.eu/position-papers/

Confederation of the European Bicycle Industry; European Bicycle Manufacturers Association. (2017, May). Employment Study EU Bicycle Industry. Retrieved from Confederation of the European Bicycle Industry: http://www.conebi.eu/facts-and-figures/

Council of the European Union. (2013). COUNCIL IMPLEMENTING REGULATION (EU) No 501/2013 of 29 May 2013. Official Journal of the European Union, 56. doi:10.3000/19770677.L_2013.153.eng

Covenant of Mayors. (n.d.). Covenant of Mayors for Climate & Energy. Retrieved from http://www.covenantofmayors.eu/actions/sustainable-energy-action-plans_en.html

Cyclelogistics: Moving Europe Forward. (2011 - 2014, February). Potential to shift goods transport from cars to bicycles in European cities. Analysis done as part of Intelligent Energy Europe Project Cyclelogistics. Retrieved from http://cyclelogistics.eu/docs/111/CycleLogistics_Baseline_Study_external.pdf

De Sloover, S. (2017, January 17). Rijbewijs steeds minder in trek in Brussel. Retrieved from Bruzz: http://www.bruzz.be/nl/actua/rijbewijs-steeds-minder-trek-brussel

Delhaye, E., De Ceuster, G., Vanhove, F., Maerivoet, S., & (Transport & Mobility Leuven). (2017). Internalisering van externe kosten van transport in Vlaanderen: actualisering 2016. Transport & Mobility Leuven. Vlaamse Milieumaatschappij. Retrieved from http://www.milieurapport.be/Upload/main/0_onderzoeksrapporten/2017/20170224-Update_private_en_externe_kosten_finaal_TW.pdf

Department for Transport UK Government. (2014, August). Value for Money Assessment for Cycling Grants. Retrieved from Gov.uk: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/348943/vfm-assessment-of-cycling-grants.pdf

ECMT. (2004). Implementing Sustainable Urban

Travel Policies: Moving Ahead. National Policies to Promote Cycling. OECD Publishing. doi:http://dx.doi.org/10.1787/9789282103296-en

Ecorys (on behalf of the European Commission). (2016). Evaluation of EU support to the Transport Sector in Africa 2005 - 2013. Study carried out on behalf of the European Commission. Retrieved from https://ec.europa.eu/europeaid/sites/devco/files/evaluation-transport-annexes-volume2_en.pdf

Editorial Staff (Becycled Magazine). (2017, January 17). Belgische fietsmarkt 2016 in cijfers: e-bikes en damesfietsen op kop. Retrieved from Becycled Magazine: https://www.becycled.be/magazine/belgische-fietsverkoop-2016-elektrische-fiets-damesfietsen

Eltis. (n.d.). The Urban Mobility Observatory. Retrieved from http://eltis.org/

EPOMM. (2015, April). Congestion Charging. Retrieved from Endurance S.U.M.P-network: http://www.epomm.eu/newsletter/v2/content/2015/0415/doc/eupdate_en.pdf

European Agency for Safety and Health at Work (Topic Centre - Work Environment Members). (2010). Delivery and despatch riders' safety and health: A European review of good practice guidelines. Luxembourg: Publications Office of the European Union. doi:10.2802/31332

European Association of Automotive Suppliers. (2017). European Automotive Skills. Retrieved from http://clepa.eu/what-we-stand-for/growth-competitiveness/european-automotive-skills/

European Commission . (2013, 12 17). SWD(2013) 528 final Commission Staff Working Document - Impact Assessment - Accompanying Commission Communication 'Together towards competitive and resource-efficient urban mobility'. Retrieved from http://eur-lex.europa.eu: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013SC0528&from=EN

European Commission - mobility4eu. (n.d.). MOBILITY4EU – ACTION PLAN FOR THE FUTURE OF MOBILITY IN EUROPE. Retrieved from MOBILITY4EU: http://www.mobility4eu.eu/

European Commission (DG REGIO). (2015). Flash Eurobarometer 419. Quality of Life in European Cities. Retrieved from http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/urban/survey2015_en.pdf

European Commission (TRADE). (n.d.). Trade Defense Investigations: History of proceeding. Retrieved from http://trade.ec.europa.eu: http://trade.ec.europa.eu/tdi/case_history.cfm?init=1532

European Commission. (2003). Environment and Health Strategy. Retrieved from European Commission - Public Health: https://ec.europa.eu/health/healthy_environments/policy/health_environment/strategy_en

European Commission. (2004 -2010). Environment and Health Action Plan (2004-2010). Retrieved from https://ec.europa.eu/health/healthy_environments/policy/health_environment/actionplan_en

European Commission. (2006). COM(2006)231 final COMMUNICATION from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions: Thematic Strategy for Soil Protection . Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52006DC0231&from=EN

European Commission. (2008). Intelligent Transport Systems - Action Plan and Directive. Retrieved from European Commission - Mobility and Transport: http://ec.europa.eu/trans-

port/themes/its/road/action_plan/

European Commission. (2008, 2011). The Small Business Act for Europe. Retrieved from European Commission - Growth (Internal Market, Industry, Entrepreneurship and SMEs: https://ec.europa.eu/growth/smes/business-friendly-environment/small-business-act_en

European Commission. (2010). COM(2010) 389 final; Communication from the Commission - Towards a European road safety area: policy orientations on road safety 2011-2020. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC0389&from=EN

European Commission. (2011). /COM/2011/0144 final WHITE PAPER Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system. Brussels. Retrieved from http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0144:FIN:en:PDF

European Commission. (2011). COM(2011)571 COMMUNICATION from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions: Roadmap to a Resource Efficient Europe. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0571&from=EN

European Commission. (2011). SEC(2011) 391 final Commission Staff Working Document accompanying the White Paper - Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system. Retrieved from http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SEC:2011:0391:FIN:EN:PDF

European Commission. (2012). EU Green Public Procurement (GPP) Criteria for Transport. Retrieved from http://ec.europa.eu/environment/gpp/pdf/criteria/transport.pdf

European Commission. (2013). COM(2013) 918 final Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions: A Clean Air Programme for Europe. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013DC0918&from=EN

European Commission. (2013). COSME. Europe's programme for small and medium-sized enterprises. Retrieved from European Commission - Growth (Internal Market, Industry, Entrepreneurship, and SMEs): https://ec.europa.eu/growth/smes/cosme_en

European Commission. (2013). DECISION No 1386/2013/EU of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 'Living well, within the limits of our planet'. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D1386&from=EN

European Commission. (2013). Eurobarometer; Special Eurobarometer 406. Attitudes of Europeans towards Urban Mobility. Retrieved from http://ec.europa.eu/public_opinion/archives/eb_special_en.htm

European Commission. (2013). Factories of the Future: Multi annual roadmap for the contractual PPP under Horizon 2020. Retrieved from http://www.effra.eu/attachments/article/129/Factories%20of%20the%20Future%202020%20Roadmap.pdf

European Commission. (2013, November 19). Press Release: An EU budget for low-carbon growth. Warshaw. Retrieved from https://ec.europa.eu/clima/sites/clima/files/bud-

get/docs/pr_2013_11_19_en.pdf

European Commission. (2014). 2030 climate & energy framework. European Commission - Climate Action. Retrieved from European Commission - Climate Action: https://ec.europa.eu/-clima/policies/strategies/2030_en

European Commission. (2014). COM(2014) 520 final COMMUNICATION from the Commission to the European Parliament and the Council: Energy Efficiency and its contribution to energy security and the 2030 Framework for climate and energy policy. Retrieved from http://ec.europa.eu/energy/sites/ener/files/documents/2014_eec_communication_adopted_0.pdf

European Commission. (2014, July 2). COM(2014)445: Green Employment Initiative: Tapping into the job creation potential of the green economy. Retrieved from http://ec.europa.eu/transparency/regdoc/rep/1/2014/EN/1-2014-446-EN-F1-1.Pdf

European Commission. (2014). EU Action Plan on Childhood Obesity 2014-2020. Retrieved from European Commission - Public Health: https://ec.europa.eu/health/sites/health/-files/nutrition_physical_activity/docs/childhoodobesity_actionplan_2014_2020_en.pdf

European Commission. (2014). Eurobarometer; Special Eurobarometer 422a. Quality of Transport Report. Retrieved from http://ec.europa.eu/commfrontoffice/publicopinion/archives/ebs/ebs_422a_en.pdf

European Commission. (2014, March). National/Regional innovation strategies for smart specialisation (RIS3) - COHESION POLICY 2014-2020 - Factsheet. Retrieved from European Commission: http://ec.europa.eu/regional_policy/sources/docgener/informat/2014/smart_specialisation_en.pdf

European Commission. (2014). Reducing emissions from transport: A European Strategy for low- emission mobility. Retrieved from https://ec.europa.eu/clima/policies/transport_en

European Commission. (2015). The European Commission has launched a call for applications aiming to review the memberships of the High Level Group on Automotive Industry GEAR 2030. Retrieved from European Commission - Growth (Internal Market, Industry, Entrepreneurship and SMEs): http://ec.europa.eu-/growth/tools-databases/newsroom/cf/itemdetail.cfm?item_id=8507

European Commission. (2016 - 2018). Change your point of view! Retrieved from Design for Enterprises - A tool for SMEs: http://www.designforenterprises.eu/

European Commission. (2016). C-ITS Platform Final Report. Retrieved from http://ec.europa.eu/transport/sites/transport/-files/themes/its/doc/c-its-platform-final-report-january-2016.pdf

European Commission. (2016). COM(2016) 148 final Communication from the Commission to the European Parliament the Council and the European Economic and Social Comittee on an action plan on VAT Towards a single EU VAT area - Time to decide. Retrieved from https://ec.europa.eu/taxation_customs/sites/taxation/-files/com_2016_148_en.pdf

European Commission. (2016). COM(2016) 739 final COMMUNICATION from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions: Next steps for a sustainable European future - European action for sustainability. Retrieved from https://ec.euro-

pa.eu/europeaid/sites/devco/files/communication-next-steps-sustainable-europe-20161122_en.pdf

European Commission. (2016). COM(2016) 740 final COMMUNICATION from the Commission to the European Parliament, the Council, the Economic and European Social Committee and the CoR: Proposal for a new European Consensus on Development Our World, our Dignity, our Future. Retrieved from https://ec.europa.eu/europeaid/sites/devco/files/communication-proposal-new-consensus-development-20161122_en.pdf

European Commission. (2016). COM(2016) 765 final Proposal for a Directive of the European Parliament and of the Council amending Directive 2010/31/EU on the energy performance of buildings. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2016:765:FIN

European Commission. (2016, July 20). European strategies: Commission publishes Strategy for low-emission mobility. Retrieved from European Commission: Mobility and Transport: https://ec.europa.eu/transport/themes/strategies/news/2016-07-20-decarbonisation_en

European Commission. (2016, December 6). Guidelines on Stakeholder Consultation. Retrieved from European Commission - Better Regulation: http://ec.europa.eu/smart-regulation/guidelines/ug_chap7_en.htm

European Commission. (2016). Management Plan 2016 International Cooperation and Development. Retrieved from https://ec.europa.eu/info/publications/management-plan-2016-international-cooperation-and-development_en

European Commission. (2016, June). New Skills Agenda for Europe. Retrieved from European Commission - Employment, Social Affairs and Inclusion: http://ec.europa.eu/social/main.jsp?catId=1223

European Commission. (2016). Overarching Workdocument - Horizon 2020 work programme 2018-2020. Retrieved from European Commission - Horizon 2020: http://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/stratprog_overarching_version_for_publication.pdf

European Commission. (2016, April 21). Social issues - Women in Transport. Retrieved from European Commission - Mobility and Transport: http://ec.europa.eu/transport/themes/social/events/women-transport_en

European Commission. (2016, April 21). Social Issues - Women in Transport. Retrieved from European Commission - Mobility and Transport: http://ec.europa.eu/transport/themes/social/events/women-transport_en

European Commission. (2016, February). Statistics – accidents data. Retrieved from European Commission - Transport and Mobility: http://ec.europa.eu/transport/road_safety/specialist/statistics_en

European Commission. (2017). Digital Skills. Retrieved from European Commission - Digital Single Market: https://ec.europa.eu/digital-single-market/en/taxonomy/term/75988

European Commission. (2017). Equal economic independence. Retrieved from European Commission - Justice (Building an Area of European Justice): http://ec.europa.eu/justice/gender-equality/economic-independence/index_en.htm

European Commission. (2017). Funding. Retrieved from European Commission - EACEA (Education, Audiovisual and Culture Executive

Agency): https://eacea.ec.europa.eu/erasmus-plus/funding_en

European Commission. (2017). Inception Impact Assessment: Rights of passengers in multimodal transport. Retrieved from http://ec.europa.eu/smart-regulation/roadmaps/docs/2017_move_005_passenger_rights_multimodal_transport_en.pdf

European Commission. (2017). Logistics and multimodal transport. Retrieved from European Commission: Mobility and Transport: https://ec.europa.eu/transport/themes/logistics_multimodal_en

European Commission. (2017). Pedestrian and Cyclists References on Transport (Road Safety). Retrieved from European Commission - Mobility and Transport: https://ec.europa.eu/transport/road_safety/specialist/knowledge/pedestrians/references_en#ref_34_OECD_1998

European Commission. (2017, February 15). Press Release: Commission warns Germany, France, Spain, Italy and the United Kingdom of continued air pollution breaches. Retrieved from http://europa.eu/rapid/press-release_IP-17-238_en.htm

European Commission. (2017, January 1). Taxud.c.1 (2017) -- EN. VAT rates applied in the Member States of the European Union. Retrieved from http://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/vat/how_vat_works/rates/vat_rates_en.pdf

European Commission. (2017). Urban mobility (Clean Transport - Urban Transport). Retrieved from European Commission - Transport & Mobility: http://ec.europa.eu/transport/themes/urban/urban_mobility_en

European Commission. (2017). Walking and cycling as transport modes. Retrieved from European Commission - Mobility and Transport: https://ec.europa.eu/transport/road_safety/specialist/knowledge/pedestrians/pedestrians_and_cyclists_unprotected_road_users/walking_and_cycling_as_transport_modes_en

European Commission, DG Regio. (2015). Flash Eurobarometer 419. Quality of Life in European Cities. . Retrieved from http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/urban/survey2015_en.pdf

European Commission; DG TAXUD. (2010). Taxation Papers: Company Car Taxation (Copenhagen Economics) - Working Paper no.22 2010. Retrieved from https://ec.europa.eu/taxation_customs/sites/taxation/files/docs/body/taxation_paper_22_en.pdf

European Commission; EUROCITIES; ICF Mostra; Polis; ICLEI - Local Governments for Sustainability; Regional Environmental Center for Central and Eastern Europe; et al. (n.d.). 51 Participating countries in 2016 (total cities: 2427). Retrieved from European Mobility Week: http://www.mobilityweek.eu/

European Commission; European Green Vehicles Initiative Association. (n.d.). European Green Vehicles Initiative. Retrieved from European Green Vehicles Initiative (EGVI): http://www.egvi.eu/

European Commission; European Road Safety Observatory. (2016). Traffic Safety: Basic Facts 2016 - Cyclists. Retrieved from https://ec.europa.eu/transport/road_safety/sites/roadsafety/files/pdf/statistics/dacota/bfs2016_cyclists.pdf

European Commission; Polis; Civitas 2020; EUROCITIES. (2015). European Cycling Challenge. Retrieved from http://www.cyclingchallenge.eu

Bibliography

European Committee of the Regions. (2016, 10 12). COTER-VI/013 Opinion Factsheet - An EU Roadmap for Cycling - 119th plenary session, 10, 11 and 12 October 2016. Retrieved from The EU's Assembly of Regional and Local Representatives: http://cor.europa.eu/en/activities/opinions/pages/opinion-factsheet.aspx?OpinionNumber=CDR%2018 13/2016

European Council. (2013). (2013/C 354/01) COUNCIL RECOMMENDATION of 26 November 2013 on promoting health-enhancing physical activity across sectors. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013H1204(01)&from=GA

European Council. (2016, December 15). EUCO 34/16. CO EUR 10 CONCL 5. European Council meeting (15 December 2016). Retrieved from European External Action Service: https://eeas.europa.eu/sites/eeas/files/euco-conclusions-final_0.pdf

European Cycle Logistics Federation. (n.d.). About. Retrieved from European Cycle Logistics Federation: http://eclf.bike/about.html

European Cyclists' Federation. (2012). Charter of Vancouver: Children have the right to cycle. Retrieved from European Cyclists' Federation: https://ecf.com/who-we-are/our-mission/charter-vancouver

European Cyclists' Federation. (2016). EuroVelo 15: From the source of the Rhine to its mouth in the North Sea. Retrieved from EuroVelo: http://www.rhinecycleroute.eu/

European Environment Agency. (2015). Air quality in Europe — 2015 report (No 5/2015). Retrieved from https://www.eea.europa.eu/publications/air-quality-in-europe-2015#tab-data-references

European Environment Agency. (2015). The European environment — state and outlook 2015 (SOER 2015) - Key message. Retrieved from https://www.eea.europa.eu/soer-2015/europe/air/keymessage-2015-01-30-1654211257

European Parliament. (2011). (2010/2235(INI)) Report on European road safety 2011-2020. Retrieved from http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//-TEXT+REPORT+A7-2011-0264+0+DOC+XML+V0//EN

European Parliament. (2015, 07 29). (2015/2005(INI)) Report on on the implementation of the 2011 White Paper on Transport: taking stock and the way forward towards sustainable mobility . Retrieved from http://www.europarl.europa.eu: http://www.europarl.europa.eu/sides/getDoc.do?type=REPORT&reference=A8-2015-0246&language=EN

European Parliament. (2015). EU Industrial Policy: Assessment of Recent Developments and Recommendations for Future Policies. Retrieved from European Parliament; Directorate General for Internal Policies; Policy Department Economic and Scientific Policy: http://www.europarl.europa.eu/RegData/etudes/-STUD/2015/536320/IPOL_STU(2015)536320_EN.pdf

European Parliament. (2016, October 5). European Parliament resolution of 5 October 2016 on the need for a European reindustrialisation policy in light of the recent Caterpillar and Alstom cases (2016/2891(RSP)). Retrieved from European Parliament: http://www.europarl.europa.eu/sides/getDoc.do?type=TA&reference=P8-TA-2016-0377&language=EN

European Transport Safety Council. (2016). 10th Annual Road Safety Performance Index (PIN) Report. European Transport Safety Council. Retrieved from http://etsc.eu/10th-annu-

al-road-safety-performance-index-pin-report/

European Transport Safety Council. (2016). Prioritising the Safety Potential of Automated Driving in Europe - briefing. Retrieved from http://etsc.eu/automated-driving-report/

European Transport Safety Council. (2016). The European Union's Role in Promoting the Safety of Cycling: Proposals for a safety component in a future EU Cycling Strategy. Retrieved from http://etsc.eu/wp-content/uploads/The-EUs-Role-in-Promoting-the-Safety-of-Cycling_ETSC_15-July-2016.pdf

European Transport Safety Council; Praise: Work-Related Road Safety. (2015). Reducing road risk at work through procurement. Retrieved from http://etsc.eu/wp-content/uploads/REDUCING-ROAD-RISKS-AT-WORK_final.pdf

Eurostat. (2014). European Health Interview Surveys. Retrieved from http://ec.europa.eu/eurostat/web/microdata/european-health-interview-survey

Eurostat. (2015). EU Transport Statistics - Eurostat guidelines on Passenger Mobility Statistics. Retrieved from /CircaBC/ESTAT/transport/Library/passengers_mobility/meeting_documents/YEAR 2015/Task force on passenger mobility, May 21 2015. https://circabc.europa.eu/w/browse/db37bceb-2f-cf-4e3f-bbaa-ce23f1692ec4

Eurostat. (2015, May). Eurostat guidelines on Passenger Mobility Statistics. Retrieved from https://circabc.europa.eu-/w/browse/db37bceb-2f-cf-4e3f-bbaa-ce23f1692ec4

Eurostat. (2016). Population as a percentage of EU28 population. Retrieved from http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tps00005&plugin=1

Eurostat, CARE database. (2017). Road Safety Statistics - accident data. Retrieved from http://ec.europa.eu/transport/road_safety/specialist/statistics_en

Fietsplatform. (n.d.). Landelijk Fietsplatform: kennis- en coördinatiepunt recreatief fietsen (Dutch National Cycling Platform). Retrieved from http://www.fietsplatform.nl/informatie/english

Fietstelweek. (2015). Resultaten Fietstelweek bekend. Retrieved from http://fietstelweek.nl/resultaten-fiets-telweek-bekend/

Fournier, N., Christofa, E., & Knodler, M. A. (2017). A mixed methods investigation of bicycle exposure in crash rates. Accident Analysis and Prevention, 8.

Goodwalk. (n.d.). Goodwalk. Retrieved from http://www.goodwalk.org/

Gössling, S., & Choi, A. S. (2015, May). Transport transitions in Copenhagen: Comparing the cost of cars and bicycles. Ecological Economics. doi:https://doi.org/10.1016/j.ecolecon.2015.03.006

Gota, S., Huizenga, C., & Peet, K. (2016). Implications of 2DS and 1.5DS for Land Transport Carbon Emissions in 2050 : Partnership on Sustainable Low-carbon Transport (SLoCaT). Retrieved from http://www.ppmc-transport.org/wp-content/uploads/2016/11/SLoCaT-1.5DS-2050-Report-2016-11-07.pdf

Gota, S., Huizenga, C., Peet, K., & Kaar, G. (2016). Nationally-Determined Contributions (NDCs) Offer Opportunities for Ambitious Action on Transport and Climate Change: Partnership on Sustainable Low Carbon Transport. Retrieved from http://www.ppmc-transport.org/wp-content/up-

loads/2015/06/NDCs-Offer-Opportunities-for-Ambitious-Action-Updated-October-2016.pdf

Harding, M. (2014). The Diesel Differential: Differences in the Tax Treatment of Gasoline and Diesel for Road Use. OECD Taxation Working Papers. doi:http://dx.doi.org/10.1787/5jz14cd7hk6b-en

H**aubold, H. (2015).** Cycling Works Jobs and Job Creation in the Cycling Economy. Retrieved from https://ecf.com/groups/cycling-works-jobs-and-job-creation-cycling-economy

Haubold, H. (2016). Congestion Charges and Cycling. European Cyclists' Federation. Retrieved from https://ecf.com/groups/congestion-charges-and-cycling

Haubold, H. (2016). Electromobility for all: Financial incentives for e-cycling. European Cyclists' Federation. Retrieved from https://ecf.com/sites/ecf.com/files/FINAL%20for%20web%20170216%20ECF%20Report_E%20FOR%20ALL-%20FINANCIAL%20INCENTIVES%20FOR%20E-CYCLING.pdf

Hendriksen, I., Simons, M., Garre, F., & Hildebrandt, V. (2010). The association between commuter cycling and sickness absence. doi:10.1016/j.ypmed.2010.05.007

Hungary Government. (1997). Government Decree on Spatial Planning and Building Regulations (253/1997. (XII. 20.)) (Korm. Rendelet az országos településrendezési és építési követelményekről), Hungary. Retrieved from Hatályos jogszabályok: https://net.jogtar.hu/jr/gen/hjegy_doc.cgi?docid=99700253.KOR

Hynd, D., McCarthy, M., Carrol, J., Seidl, M., Edwards, M., Visvikis, C., . . . Stevens, A. (2015). Benefit and Feasibility of a Range of New Technologies and Unregulated Measures in the fields of Vehicle Occupant Safety and Protection of Vulnerable Road Users - Final Report. Retrieved from http://goo.gl/tmwYqp

ICTCT – International Co-operation on Theories and Concepts in Traffic Safety. (1988 - present). ICTCT – International Co-operation on Theories and Concepts in Traffic Safety. Retrieved from http://www.ictct.org/ictct/about-us/

Institution for Transportation & Development Policy; UC Davis (Institute of Transportation Studies). (2015, November). A Global High-Shift Scenario. The Potential increasing Bicycle and E-bike use in cieties around the world, with estimated energy, CO2 and cost impacts. Retrieved from European Cyclists' Federation: http://ecf.com/files/wp-content/uploads/A-Global-High-Shift-Cycling-Scenario_-Nov-2015.pdf

International Transport Forum; Corporate Partnership Board. (n.d.). Shared Mobility - Innovation for Liveable Cities (Corporate Partnership Board Report). OECD Publishing. Retrieved from https://www.itf-oecd.org/sites/default/files/docs/shared-mobility-liveable-cities.pdf

IntPanis, L., De Geus, B., Vandenbulcke, G., Willems, H., De graeuwe, B., Bleux, N., . . . Meeusen, R. (2010). Exposure to particulate matter in traffic: a comparison of cyclists and car passengers. Atmospheric Environment, 2263-2270.

Jacobsen, P. L. (2003). Safety in numbers: more walkers and bicyclists, safer walking and bicycling. Injury Prevention, 205–209. Retrieved from http://www.cycle-helmets.com/safety_in_numbers.pdf

Jones, T., Harms, L., & Heinen, E. (2016). Motives, perceptions and experiences of electric bicycle owners and implications for health, well-being and mobility. Journal of Transport Geogra-

phy, 41–49. doi:http://dx.doi.org/10.1016/j.jtrangeo.2016.04.006

Juncker, J.-C. (2014, July 15). A New Start for Europe: My Agenda for Jobs, Growth, Fairness and Democratic Change. Opening Statement in the European Parliament Plenary Session. Retrieved from European Commission: https://ec.europa.eu/commission/sites/beta-political/files/juncker-political-guidelines-speech_en_0.pdf

Kennisplatform Crow. (2017). Design manual for bicycle traffic. Retrieved from https://www.crow.nl/publicaties/_nieuw-design-manual-for-bicycle-traffic

Kennisplatform Crow. (n.d.). Fietsstraten en gemengd. Retrieved from Kennisplatform Crow: http://www.fietsberaad.nl/?section=voorbeeldenbank&lang=nl&mode=list&ontwerpvoorbeeldPage=Fietsstraten+en+gemengd

Kennisplatform Crow. (n.d.). Kennisplatform Crow. Retrieved from Crow: https://www.crow.nl/

Küster, F. (2015, 9 9). The European Parliament approves the EU Roadmap for Cycling in its plenary session. Retrieved from European Cyclists' Federation: https://ecf.com/news-and-events/news/european-parliament-approves-eu-roadmap-cycling-its-plenary-session

Küster, F. (2017, 04 11). National cycling policies. Retrieved from European Cyclists' Federation: https://ecf.com/what-we-do/cycling-all-policies/national-cycling-policies

Küster, F., Lancaster, E., & Tusl, M. (2016). Bikes and Trains 7 basic services that give cyclists a smile: A collection of good practice examples of integrating cycling with long-distance and international rail services. European Cyclists' Federation. Retrieved from https://ecf.com/sites/ecf.com/files/ECF%20Report_-Bikes%20and%20trains-%207%20basic%20services%20that%20give%20cyclists%20a%20smile.pdf

Latvia/Presidency EU Council; European Commission. (2015). SUBMISSION by Latvia and the European Commission on behalf of the European Union and its Member States. Subject: Intended Nationally Determined Contribution of the EU and its Member States. Retrieved from http://www4.unfccc.int/submissions/INDC/Published%20Documents/Latvia/1/LV-03-06-EU%20INDC.pdf

Legrain , A., Eluru , N., & El-Geneidy, A. (2015). Am stressed, must travel: The relationship between mode choice and commuting stress. Transportation Research Part F: Traffic Psychology and Behaviour, 34, 141-151. Retrieved from http://tram.mcgill.ca/Research/Publications/Commute%20Stress.pdf

Macmillan , A., Connor, J., Witten, K., Kearns , R., Rees, D., & Woodward, A. (2014). The Societal Costs and Benefits of Commuter Bicycling: Simulating the Effects of Specific Policies Using System Dynamics Modeling. Environ Health Perspect, 122. doi:http://dx.doi.org/10.1289/ehp.1307250

MetroBike, LLC. (2016). The Bike-sharing Blog. Retrieved from http://bike-sharing.blogspot.be/

Ministerie van Infrastructuur en Milieu (Dutch Ministry of Infrastructure and Environment). (2015). Fietsen en lopen: de smeerolie van onze mobiliteit. Retrieved from Kennisinstituut voor Mobiliteitsbeleid (KiM) - Publicaties: https://www.kimnet.nl/publicaties/rapporten/2015/10/26/fietsen-en-lopen-de-smeerolie-van-onze-mobiliteit

Ministry of Education and Research; Ministry of Enterprise and Innovation; VINNOVA; Swedish Research Council in co-operation with Lund University; the City of Lund. (2015, December). The Lund Declaration 2015 (outcome of the Conference - Lund Revisited: Next steps in tackling societal challenges). Retrieved from Vetenskapsrådet: http://www.vr.se/download/18.43a28830b15168a067b9-dac74/1454326776513/The+Lund+Declaration+2015.pdf

Neun, M. (2016, February 26). S4C and COP 21 – challenges, achievements and perspectives for the evolution of cycling (at Velo-city conference Taipei). Retrieved from Scientists for Cycling: https://drive.google.com/file/d/0ByM-LurB9op4KeFpjWlZ4UzM1cGk-tZDNNeXBiRFZDS0ktdXhJ/view

Neun, M., & Haubold, H. (2016, December). The EU Cycling Economy – Arguments for an integrated EU cycling policy. Retrieved from European Cyclists' Federation: https://ecf.com/sites/ecf.com/files/FINAL%20THE%20EU%20CYCLING%20ECONOMY_low%20res.pdf

OECD/International Energy Agency. (2016). World Energy Outlook. Retrieved from http://www.iea.org/newsroom/news/2016/november/world-energy-outlook-2016.html

Official Journal of the European Union. (2004). DIRECTIVE 2004/54/EC of the European Parliament and of the Council of 29 April 2004 on minimum safety requirements for tunnels in the Trans-European Road Network. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=URISERV%3Al24146

Official Journal of the European Union. (2006). DIRECTIVE 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast). Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32006L0042&rid=6

Official Journal of the European Union. (2007). REGULATION (EC) No 1371/2007 of the European Parliament and of the Council of 23 October 2007 on on rail passengers' rights and obligations. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32007R1371&from=En

Official Journal of the European Union. (2008). (2008/653/EC) Commission Recommendation of 26 May 2008 on safe and efficient in-vehicle information and communication systems: update of the European Statement of Principles on human-machine interface. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32008H0653

Official Journal of the European Union. (2008). DIRECTIVE 2008/96/EC of the European Parliament and of the Council of 19 November 2008 on road infrastructure safety management. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0096&from=EN

Official Journal of the European Union. (2009). DIRECTIVE 2009/33/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32009L0033&from=EN

Official Journal of the European Union. (2013). COMMISSION DELEGATED REGULATION (EU) No 886/2013 of 15 May 2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to data and procedures for the provision, where possible, of road safety-related minimum [...]. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TX-

T/PDF/?uri=CELEX:32013R0886&from=EN

Official Journal of the European Union. (2013, June 5). COUNCIL IMPLEMENTING REGULATION (EU) No 501/2013 of 29 May 2013 & COUNCIL REGULATION (EU) No 502/2013 of 29 May 2013. Official Journal of the European Union, Volume 56. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=OJ:L:2013:153:FULL&from=EN

Official Journal of the European Union. (2013). REGULATION (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2013.348.01.0001.01.ENG

Official Journal of the European Union. (2013). REGULATION (EU) No 168/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 January 2013 on the approval and market surveillance of two- or three-wheel vehicles and quadricycles. Official Journal of the European Union. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R0168&from=EN

Official Journal of the European Union. (2014). COMMISSION DELEGATED REGULATION (EU) 2015/962 of 18 December 2014 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide real-time traffic information services. Retrieved from http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32015R0962

Official Journal of the European Union. (2014). DIRECTIVE 2014/94/EU of the European Parliament and of the Council of 22 October 2014 on the deployment of alternative fuels infrastructure. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0094

Official Journal of the European Union. (2015). (2015/C 335/01) Commission communication in the framework of the implementation of the Directive 2001/95/EC. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52015XC1009(04)&from=NL

Official Journal of the European Union. (2015). Commission Implementing Decision (EU) 2015/681 of 29 April 2015 on the publication of the references of standard EN ISO 4210, parts 1-9, for city and trekking bicycles, mountain bicycles and racing bicycles, and of standard EN ISO 8098 [...]. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015D0681

Official Journal of the European Union. (2015). DIRECTIVE (EU) 2015/413 of the European Parliament and of the Council of 11 March 2015 facilitating cross-border exchange of information on road-safety-related traffic offences. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L0413&from=EN

Official Journal of the European Union. (2016). (2016/C 299/09) COUNCIL RECOMMENDATION of 12 July 2016 on the 2016 National Reform Programme of Belgium and delivering a Council opinion on the 2016 Stability Programme of Belgium. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32016H0818(09)&from=EN

Official Journal of the European Union. (2016). Commission Implementing Decision (EU) 2016/209 of 12 February 2016 on a standardisation request to the European standardisation organisations as regards Intelligent Transport Systems (ITS) in urban areas in support of Directive 2010/40/EU [...]. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016D0209

Official Journal of the European Union. (2016).

M/546 COMMISSION IMPLEMENTING DECISION C(2016)808 of 12.2.2016 on a standardisation request to the European standardisation organisations as regards Intelligent Transport Systems (ITS) in urban areas in support of Directive 2010/40/EU [...]. Retrieved from http://ec.europa.eu/growth/tools-databases/mandates/index.cfm?fuseaction=refSearch.search

Organisation for Economic Co-operation and Development (OECD). (2014). OECD Data: Infrastructure investment - Road / Rail / Air, Euro, 2014. OECD Publishing. Retrieved from https://data.oecd.org/transport/infrastructure-investment.htm

Planersocietät; Planungsbüro DTP; Planungsbüro VIA eG; orange edge; TCI Röhling Transport Consulting International; et al. (2014). Machbarkeitsstudie: Radschnellweg Ruhr R1. Retrieved from http://www.rs1.ruhr/fileadmin/user_upload/RS1/pdf/RS1_Machbarkeitsstudie_web.pdf

Politecnico of Milano; European Bicycle Manufacturers Association. (n.d.). Estimation of CO2 Emissions from the production of bicycles in China and in Europe (private study by Politecnico of Milano for the EBMA).

Présidence du Conseil de l'Union européenne / Luxembourg 2015. (2015, 10 7). Transport Declaration of Luxembourg on Cycling as a climate friendly Transport Mode - Informal meeting of EU ministers for Transport. Retrieved from 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

Presidency of the Council of the European Union/Malta2017. (2017, March 29). Valletta Declaration on Road Safety. Retrieved from http://ec.europa.eu: http://ec.europa.eu/transport/road_safety/sites/roadsafety/files/valletta_declaration_on_improving_road_safety.pdf

Prof. Dr. -Ing. Ahrens, G.-A., Prof. Dr. -ing. Becker, U., & et all. (2013). Potenziale des Radverkehrs für den Klimaschutz. Federal Environment Agency Umweltbundesamt. Retrieved from http://www.umweltbundesamt.de/publikationen/potenziale-des-radverkehrs-fuer-den-klimaschutz

Prospect Project: Proactive Safety for Pedestrian and Cyclists. (n.d.). Prospect Project: Proactive Safety for Pedestrian and Cyclists. Retrieved from http://www.prospect-project.eu/

Provincie Antwerpen. (n.d.). Provinciale Fietsbarometer. Retrieved from Provincie Antwerpen: https://www.provincieantwerpen.be/aanbod/drem/dienst-mobiliteit/fietsbeleid/fietsbarometer.htm

Reiter, K., & Wrighton, S. (2011 - 2014). Potential to shift goods transport from cars to bicycles in European cities. Cyclelogistics: Moving Europe Forward. Retrieved from http://cyclelogistics.eu/docs/111/CycleLogistics_Baseline_-Study_external.pdf

Rijksdienst voor Ondernemend Nederland (Netherlands Enterprise Agency). (2015, November). Special: E-tweewielers en Speed pedelecs. Retrieved from https://www.rvo.nl/sites/default/files/2015/11/Special%20E-tweewielers%20en%20Speed%20pedelecs%20oktober%202015.pdf

Rowley, S. (2011, February 22). Could the rebound effect undermine climate efforts? Retrieved from The Guardian - Climate Change Environmental Blog: https://www.theguardian.com/environment/blog/2011/feb/22/rebound-effect-climate-change

Ruebens, C. (2014). Fast Cycling Routes. Retrieved

from European Cyclists' Federation: https://ecf.com/what-we-do/urban-mobility/-fast-cycling-routes

Schepers, P., Hagenzieker, M., Methorst, R., van Wee, B., Wegman, F., Ministry of Infrastructure and the Environment , (., . . . Delft University of Technology, (. (2014). A conceptual framework for road safety and mobility applied to cycling safety. Accident Analysis & Prevention, 62, 331–340. doi: https://-doi.org/10.1016/j.aap.2013.03.032

Scott, R. E., & O Jiang, X. (2015). Unilateral grant of market economy status to China would put millions of EU jobs at risk. Economic Policy Institute (EPI). Retrieved from https://static1.square-space.com/static/5537b2f-be4b0e49a1e30c01c/t/55fc0373e4b09a69209aa9c2/1443621109236/Unilateral+grant+of+Market+Economy+Status+to+China+would+put+millions+of+EU+jobs+at+risk.pdf(Study%20Scott%20%E2%80%93%20EPI)

Semenova, K. (. (2017, 02 22). (J. (. Baum, Interviewer)

Shchori, E. (2016). Cycling delivers on the global goals. Retrieved from European Cyclists' Federation: https://ecf.com/what-we-do/global-cycling-policies/voluntary-commitment-un

Staes (Verts/ALE), B. (2015, June 24). Parliamentary questions: Subject 'Bike ban on European trains'. Question for written answer to the Commission. Rule130. Retrieved from http://www.europarl.europa.eu/sides/getDoc.do?-pubRef=-%2f%2fEP%2f%2fTEXT%2bWQ%2bE-2015-010116%2b0%2bDOC%2bXML%2bV0%2f%2fEN&language=EN

Steenberghen, T., Tavares, T., Richardson, J., Himpe, W., & Crabbé, A. (2017). Support study on data collection and analysis of active modes use and infrastructure in Europe; Final report. Brussels: European Commission, DG Mobility and transport.

Stewart-Wilson, G., Millar, C., Mclaren, C., Millar, E., Rockafella, J., & Poulos, G. (2015, March 26). 1.4 What is the full cost of your commute? Retrieved from Moving Forward: http://moving-forward.discoursemedia.org/costofcommute/

Sustrans. (n.d.). The benefits of cycling for children and families. Retrieved from Sustrans: http://www.sustrans.org.uk/what-you-can-do/children-and-families/cycling-kids/benefits-family-cycling

Swennen, B. (2017). Bike Share Schemes (BSS). Retrieved from European Cyclists' Federation: https://ecf.com/what-we-do/urban-mobility/-bike-share-schemes-bss

te Brömmelstroet, M., Nikolaeva, A., Glaser, M., Nicolaisen, M., & Chan, C. (2017). Travelling together alone and alone together: mobility and potential exposure to diversity. Applied Mobilities, 2(1). doi:http://dx.-doi.org/10.1080/23800127.2017.1283122

Toker, S., & Biron, M. (2012). Job burnout and depression: Unraveling their temporal relationship and considering the role of physical activity. Journal of Applied Psychology, 699-710. doi:http://dx.doi.org/10.1037/a0026914

Transport & Environment. (2015). Europe's tax deals for diesel. Transport & Environment. Retrieved from https://www.transportenvironment.org/sites/te/files/publications/2015_10_Europes_tax_deals_for_diesel_FINAL.pdf

Transport & Mobility Leuven (TML). (2014 - 2017). BiTiBI - Bike Train Bike. Retrieved from http://bitibi.eu/

Transport for London. (2014). Attitudes towards

cycling - Annual report 2014 - TfL number: 05110 - SPA FT number: 1644 - final report. Retrieved from http://content.tfl.gov.uk/attitudes-to-cycling-2014-report.pdf

UN Secretary-General. (2015). Indicators and a Monitoring Framework for the Sustainable Development Goals. Paris, New York: United Nations. Retrieved from http://unsdsn.org/resources/publications/indicators/

UNECE. (2014). THE PEP Paris Declaration - City in Motion - People First! Geneva.

UNEP; WHO; UNECE. (2016). Riding towards the green economy: Cycling and green jobs - Key findings of the forthcoming joint report by UNEP, WHO and UNECE. Retrieved from http://www.euro.who.int/__data/assets/pdf_file/0017/311471/Cycling-and-green-jobs.pdf?ua=1

United States Environmental Protection Agency. (2016). EPA Factsheet 'The Social Cost of Carbon'. Retrieved from https://www.epa.gov/sites/production/files/2016-12/documents/social_cost_of_carbon_fact_sheet.pdf

Urban ITS - Project Team TC278 1701. (2016, May 1). Urban ITS Prestudy (cen/tc 278 IThe CEN TC278 Prestudy for Uban ITS and the European Commission implementing Decision. Retrieved from Urban ITS: https://www.urbanits.eu/

van Schaik, J.-W. (2016, August 31). Bicycle Sales Slowing Down in Germany. Retrieved from Bike Europe: http://www.bike-eu.com/sales-trends/nieuws/2016/8/bicycle-sales-slowing-down-in-germany-10127474

Van Zeebroek, B., & Charles, J. (2014, 05 30). Impact et potentiel de l'usage du vélo sur l'économie et l'emploi en Région de Bruxelles-Capitale: Les effets directs et indirects de l'usage du vélo en 2002, 2012 et 2020 (Rapport pour: Ministère de la Région de Bruxelles-Capitale). Retrieved from http://www.bruxellesmobilite.irisnet.be/static/attachments/news/na/6757/%EF%BF%BDluation%20%EF%BF%BDnomique%20v%EF%BF%BD%20FR%2020140530_.pdf

Vereniging van Nederlandse Gemeenten (VNG); het Interprovinciaal Overleg (IPO); vervoerregio's Rotterdam Den Haag en Amsterdam; de Unie van Waterschappen; het Nederlandse Ministerie van Infrastructuur en Milieu. (2016). Agenda Fiets 2017 - 2020: Tour de Force 2020. Retrieved from http://www.aanbestedingsnieuws.nl/wp/wp-content/uploads/2017/02/blg-799772.pdf

VRUITS. (2013 - 2016). Recommended practices for improving usability of ITS applications and the integration of VRUs in C-ITS systems. Retrieved from Vruits - Improving the safety and mobility of vulnerable road users through its applications: http://goo.gl/3uK6hz

VRUITS. (n.d.). VRUITS: The Project. Retrieved from http://www.vruits.eu/

Wachotsch, U., Kolodziej, A., Specht, B., Kohlmeyer, R., & Petrikowski, F. (2014). Electric bikes get things rolling: The environmental impact of pedelecs and their potential. Federal Environment Agency (UBA) . Retrieved from https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/hgp_electric_bikes_get_things_rolling.pdf

Wasmer Andrews, L. (2015). Bicycling Can Sharpen Your Thinking and Improve Your Mood: Riding a bike is good for your cognitive health and well-being. Retrieved from https://www.psychologytoday.com/blog/mind-in-the-body/201505/bicycling-can-sharpen-your-thinking-and-improve-your-mood

Weston, R., Davies, N., Lumsdon, L., McGrath,

P., Peeters, P., Eijgelaar, E., & Piket, P. (2012). The European Cycle Route Network EuroVelo: Challenges and Opportunities forSustainable Tourism - study. Retrieved from Directorate General for Internal Policies; Policy Department B: Structural and Cohesion Policies; Requested by the European Parliament's Committee on Transport and Tourism: https://ecf.com/sites/ecf.com/files/EP%20-study%20on%20EuroVelo%20network.pdf

WHO - International Agency for Research for Cancer. (2012, June 12). PRESS RELEASE N° 213. IARC: Diesel Engine Exhaust Carciogenic. Retrieved from International Agency for Research for Cancer - World Health Organisation: https://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213_E.pdf

World Bicycle Relief. (2016). Mobility: Buffalo Bicycles Impact on Dairy Farmer's Productivity: Palabana Dairy Cooperative Research Study.

World Business Council for Sustainable Development. (2015, December). Methodology and indicator calculation method for sustainable urban mobility. WBCSD. doi:ISBN 978-2-940521-26-5

World Health Organization, Regional Office for Europe. (2014). Welcome to the WHO/Europe Health Economic Assessment Tool (HEAT). Retrieved from Health Economic Assessment Tool (HEAT): http://www.heatwalkingcycling.org

Zuidgeest, M., Brussel, M., Chen, Y., Massink, R., & van Maarseveen, M. (2011). A comparative analysis of the climate value of cycling in Dutch cities. Association For European Transport and Contributors 2011.

Follow us

#EUcyclingstrategy

www.cyclingstrategy.eu