ECF
EUROPEAN CYCLISTS' FEDERATION

# THE EU CYCLING ECONOMY

*Arguments for an integrated EU cycling policy*

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## About ECF

The European Cyclists' Federation (ECF) is an umbrella federation for national cycling organisations (organisations that promote bicycle use in the context of mobility) throughout Europe. Today, ECF represents over half a million people in 45 countries. It has pledged to ensure that bicycle use achieves its fullest potential so as to bring about sustainable mobility and public well-being. To achieve these aims, ECF seeks to change attitudes, policies and budget allocations at the European level. ECF will stimulate and organise the exchange of information and expertise on bicycle related transport policies and strategies as well as the work of cyclists' movements.

In order to get better conditions for cyclists throughout Europe and to get more people cycling, more often, ECF actively advocates for cycling at the European institutional level. ECF recognises the important funding opportunities at this level and actively works towards securing the best deal for cycling. Ensuring that policy-makers are aware of the benefits of cycling and that policies mention bicycle transport and make the right funds available to its development is one set of priorities of ECF's work. Maximising the benefit of the available funds to cycling and making sure that these funds materialise into concrete results on the ground throughout Europe is another. It is with this in mind that this guide on EU funding opportunities was put together.

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COVER PHOTO
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# FOREWORD

Dear Reader,

We are happy to present to you the second, revised and expanded version of ECF's report on the economic benefits of cycling in the EU. Since the first publication in 2013, continuous efforts have been made both to quantify the positive effects of cycling on society, the environment and the economy, to refine methodologies, and to elaborate a systematic classification of these effects in line with the Active Mobility Agenda.

The present report clearly shows that the benefits of cycling occur not only in specific, isolated fields like transport or environmental policy, but in many other areas where the EU has competences as well, like industrial policy, employment, health and social policy. An integrated EU cycling strategy that includes these fields and considers cycling in all relevant policy areas will therefore enable the whole EU to reap these benefits in the future, including the countries which currently have low rates of cycling.

At the ECF, we continue to work towards these goals and we are convinced that the present report makes a compelling case both for more investment in cycling as well as a for a coordinated cycling policy at all levels of governance, including the European.

**Ádám Bodor**
**ECF Advocacy Director**

# EXECUTIVE SUMMARY

This report is ECF's second calculation of the internal and external benefits of cycling linked to the current level of cycling in the EU-28. It is an extended and updated version of the first report published in 2013. The calculations have been updated with the latest available figures; in some cases, the methodologies for calculating the benefits have been refined taking into account the feedback received; and more benefits have been added in a systematic way, following the development of the active mobility agenda during the last years.

Summing up the calculated and estimated benefits of cycling in all these sectors, we arrive at the following aggregate figures:

| Calculations based on **concrete evidence** | Calculations based on **best available data** | Estimations based on **best available indications** | **Total value** |
|---|---|---|---|
| 239.99 bn € | 90.7 bn € | 182.5 bn € | **513.19 bn €** |

In some areas, we have identified benefits of cycling but were not able to give any calculation or estimation yet. More qualitative and quantitative research is needed in those fields to quantify these benefit. The aim of this report is therefore also to encourage further research on the subject in order to draw a more precise picture of the economic benefits of cycling in the future.

The present report clearly shows the benefits of the Active Mobility Agenda not only for further research, but also for well-structured advocacy and agenda setting in policy. In particular for the European policy cycling appears not only in specific, isolated fields like transport or environmental policy, but in many other areas where the EU has competences as well, like industrial policy, employment, health and social policy. This makes the case for an integrated EU cycling strategy that includes these fields and considers cycling in all relevant policy areas and will therefore enable the whole EU to reap the benefits if cycling in the future.

# INTRODUCTION

## 1. Contribution to the EU cycling strategy and global perspectives

The present report clearly shows the benefits of the Active Mobility Agenda not only for further research, but also for well-structured advocacy and agenda setting in policy. In particular for the European policy cycling appears not only in specific, isolated fields like transport or environmental policy, but in many other areas where the EU has competences as well, like industrial policy, employment, health and social policy. This makes the case, delivers targets and enables an integrated EU cycling strategy that includes these fields and considers cycling in all relevant policy areas that will therefore enable the whole EU to reap these benefits in the future. Practically this means also a lot of cost savings in several fields of public investments like for health, environment, climate and social-educational fields, or – in other words – a transfer from transport whenever delivered through active mobility to other budget topics.

Thus, the approach based on the Active Mobility Agenda enables to unleash these enormous potentials for a long-term sustainable development policy in all countries in Europe. Furthermore, using the same methodological approach we have already identified the contributions of cycling to the UN Sustainable Development Goals[1], where cycling is contributing significantly to 12 of the 17 SDGs. Highlighted already to the UN Climate Summit COP 21 in Paris[2], this becomes now an invitation to researchers all over the world to contribute interdisciplinarily.[3]

The present report marks a step forward for the EU Cycling Strategy to develop and create the European role model for integrated transport and an overall sustainable policy. The 'Blueprint for an EU Cycling Strategy'[4] will be presented at the Velo-city conference Arnhem-Nijmegen. This report also can be seen as a small contribution to overcome the limiting, negatively connoted term NMT (non motorized transport) and to unleash the full potential of Active Mobility.

## 2. Context: The active mobility agenda as an evaluation matrix

The systematic classification of the benefits of cycling in this report is based on the development of the active mobility agenda during the last years.[5,6] 'Active mobility (AM)' as a concept already expresses the positive contribution of cycling to society. It has also helped us to identify nine 'key issues' where the benefits of cycling become tangible. As shown in the matrix below, these key issues are based on the three dimensions of sustainable development: the environment, the economy and social affairs. To this, we add boosting factors: energy and resources, technology and design, and mobility. Finally, balancing factors are health, time and space, and the diversity of cultures.

Furthermore in this context, the active mobility agenda is widening the frame. Active mobility is mainly walking and cycling, thus the agenda can be applied in the future to evaluate the benefits of walking in a similar structured way as for cycling, and this gives an idea of the real dimension of active mobility.

FIGURE 1: THE ACTIVE MOBILITY AGENDA


FIGURE 2: ECONOMIC BENEFITS OF CYCLING IN THE EU-28

- The calculations are based on a value of 134 bn kilometers cycled per year for the EU-28.
- The calculations are based on the latest available data, which can be from different years.

| | | | Calculations based on concrete evidence | Calculations based on best available data | Estimations based on best available indications | No data available at present |
|---|---|---|---|---|---|---|
| | Climate | Reduced $CO_2$ emissions | 2.2 bn € | | | |
| | | Related benefits to reduced $CO_2$ emissions | | | 10 bn € | x |
| | Environment | Reduced air pollution | 0.43 bn € | | | |
| | | Reduced noise pollution | 0.3 bn € | | | |
| | Environmental asset development | Less sealed soils | | | 2 bn € | |
| | | Less soil pollution | | | 0.5 bn € | |
| | | Better water quality | | | | € |
| | Energy | Fuel savings | 2.8 bn € | | | |
| | | AM hybrid contributions to E-mobility | | | | € |
| | Resources | Resource savings in vehicle production + infrastructure building | | | To produce a bike requires only ca. 2% of the resources for a car | € |
| | Direct health benefits | Longer lives | 97 bn € | | | |
| | | Healthier lives | | 39 bn € | | |
| | | Improved mental health | | | 30 bn € | x |
| | | Improved kids health versus sedentary life styles | | | 20 bn € | x |
| | Road safety benefits / reduced accidents | Reduced fatalities | 0.38 bn € | | | |
| | | Reduced serious injuries | 0.33 bn € | | | |
| | | Reduced light injuries | 0.06 bn € | | | |
| | Health economic benefits | Reduced absenteeism | | 4.5 bn € | | |

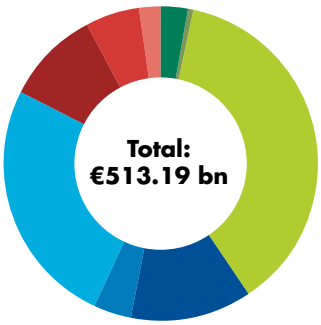
| | | | | | | |
|---|---|---|---|---|---|---|
| | EU bike industry | Value of EU bike manufacturing | 4.3 bn € | | | |
| | | Value of EU parts/accessories manufacturing | 1.7 bn € | | | |
| | Bicycle and parts sales and repairs | Value of bike sales | 6.6 bn € | | | |
| | | Value of parts/accessories sales | 2.3 bn € | | | |
| | | Value of bicycle repair | 0.99 bn € | | | |
| | Bicycle tourism | | | 44 bn € | | |
| | | ... from other businesses | | | | € |
| | Road safety | Reduced material damage | | 3.2 bn € | | |
| | Urban design | Urban design-benefits of ITS in urban planning+ infrastructure | | | 10 bn € | |
| | Smarter Cycling | Contributions to new technolog + smart cities development | | | 10 bn € | |
| | Quality of time spent cycling | | | | | € |
| | Shopping by bike | | 111 bn € | | Additional benefits for other key-issues! | |
| | Child welfare | Time savings for parents | | | | € |
| | Quality of space | Space savings bike : car 1:10 parking - 1:>5 moving | | | 20 bn € | € |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Social Affairs | Social equality | | | | € |
| | | Gender equality | | | 10 bn € | x |
| | | Child welfare | | | 30 bn € | x |
| | | Social safety | | | 10 bn € | x |
| | Mobility / transport | Congestion-easing | 6.6 bn € | | | |
| | Road infrastructure | Construction | 1.9 bn € | | | |
| | | Maintenance | 1.1 bn € | | | |
| | | Subsidies for public transport | | | | € |
| | | Inter- and multimodality | | | 20 bn € | |
| | | Transport taxes and tax subsidies | | | | x |
| | Diversity of (cycling-) cultures | Resilience + robustness | | | | € |
| | | Cultural connectivity | | | | € |
| | | Accessibility | | | 10 bn € | x |

| | | | | | |
|---|---|---|---|---|---|
| **TOTAL** | **513** | **239** | **90** | **182** | |

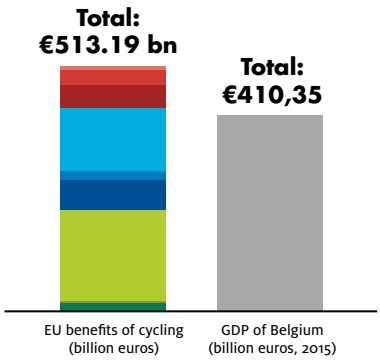
x = lack of data for precise calculation  € = general lack of data for quantification

## EU BENEFITS OF CYCLING - SUMMARY
(BILLION EUROS)




- Environment + Climate: € 15,43
- Energy and Resources: € 2,80
- Health: € 191,27
- Economy: € 63,09
- Technology + Design: € 20,00
- Time + Space: € 131,00
- Social Affairs: € 50,00
- Mobility: € 29,60
- Diversity of cultures: € 10,00

## CYCLING BENEFITS ARE HIGHER THAN BELGIAN ANNUAL GDP



# DESCRIPTION OF BENEFITS

## I. Environment and climate

Total: €15.43 bn

### 1. $CO_2$ EMISSION SAVINGS

- The calculations are based on the ECF study "Cycle more Often 2 cool down the planet! Quantifying $CO_2$ savings of cycling" from 2011.
- km cycled: 134 231 025 984
- $CO_2$ savings: 15,248,644,552 kg
- Cost of $CO_2$ pollution: 160.5 $ per ton
- Average exchange rate $/€ in 2015: 1.109729 <http://www.usforex.com/forex-tools/historical-rate-tools/yearly-average-rates>
- Cost in €: 144.63 € per ton
- Value of savings: **2.205.410.015 €**

### 2. RELATED BENEFITS TO REDUCED $CO_2$ EMISSIONS

- This includes benefits linked to avoided climate change damages that are caused by increased $CO_2$ emissions, the so-called "social cost of carbon".[7]
- Additionally, cycling prevents the so-called "rebound effect" identified from the use of electric cars.[8]
- Estimated value: **10,000,000,000 €**

### 3. REDUCTION OF AIR POLLUTION

- Calculation methodology refined in comparison to 2013 paper, taking a more conservative approach by only counting car kilometres replaced; data sources updated
- Car km replaced: 42.953.928.314,88
- Diesel cars in fleet: 41%, petrol cars: 54% <http://www.acea.be/statistics/tag/category/passenger-car-fleet-by-fuel-type>
- Share of car fleet according to EURO emission standards: <http://www.eea.europa.eu/data-and-maps/figures/allocation-of-passenger-cars-and-1>
- Cost of air pollution: <http://ec.europa.eu/transport/themes/sustainable/studies/doc/2014-handbook-external-costs-transport.pdf>
- Cost of reduced air pollution: **426,797,211 €**

### 4. REDUCTION OF NOISE POLLUTION

- No substantial change in underlying data; same calculation used as for 2013 paper:
  - Using the values of the "Handbook on estimation of external costs in the transport"
  - The bicycle substitutes other modes of transport as follows: bus (40%, average v bus occupancy of 10), car (30%), walking (20%), motor cycle (10%);
  - 90% of distance travelled by bike would otherwise take place during day time, 10% during night time;
  - 50% of km cycled are urban km, 30% are suburban km and 20% rural km.
- Value of reduced noise pollution: **300,000,000 €**

### 5. ENVIRONMENTAL ASSET DEVELOPMENT

- Cycling infrastructure needs less space than infrastructure for cars. If less infrastructure is needed, this leads to reduced building costs and resource savings (See points II.2 and VIII.2), but also to environmental benefits in the form of less sealed soil by infrastructure.
  - Estimated value: **2,000,000,000 €**
- Also, if there is less car traffic, there will be less soil pollution by car fuels and other pollutants.
  - Estimated value: **500,000,000 €**
- This will also lead to better water quality through less pollution of ground water.

## II. Energy and resources
Total: €2.8 bn

### 1. FUEL SAVINGS

- Calculation methodology updated since 2013 paper: direct calculation based on fuel price and average fuel consumption rather than indirect calculation based on $CO_2$ emissions
- Fuel price per l: 1.32 € (end of 2014, average of diesel and petrol; Eurostat)
- Average consumption: 5 l/100 km (real consumption probably higher than standard lab values) (http://www.theicct.org/sites/default/files/publications/ICCT_EU-pocketbook_2015.pdf)
- Fuel price per km: 0.066 €
- Fuel savings for 32% of car traffic replaced by cycling: **2,834,959,269 €**

### 2. ACTIVE MOBILITY HYBRID CONTRIBUTIONS TO E-MOBILITY

- E-bikes according to the EU EPAC regulations[9] are the most successful part of E-mobility.
- By combining active and passive mobility all the benefits of cycling can be used. The very little energy input is tripling the range in everyday cycling on an average.
- The further increase of cycling will be based significantly on E-cycling, to be measured also according to the Active mobility index.[10]
- Further research needed to calculate the exact value of the benefit.

### 3. RESOURCE SAVINGS IN VEHICLE PRODUCTION + INFRASTRUCTURE BUILDING

- Building bikes needs considerably less resources than building cars. Some of the resources are the same, but used in much less quantities (e.g. steel, aluminium, different polymers), others, like platinum or palladium for catalytic converters which cause significant emissions and environmental damage during their extraction, are not used at all for the manufacturing of bicycles. We can estimate that building a bike needs only ca. 2% of the resources that are needed for building a car.
- The same holds true for the building of cycling infrastructure, which needs much less concrete and asphalt than infrastructure for cars (see point VIII.2).
- Further research needed to calculate the exact value of the benefit.

## III. Health benefits
Total: €191.27 bn

### 1. LONGER LIVES - REDUCED MORTALITY

- Calculation from 2013 paper updated: Recent values from WHO database used for value of statistical live (EU-28 average: 3,465,694 €) and mortality rate (WHO European Region average, no EU average available: 414.49 deaths per 100,000 persons per year)
- Cycled kilometres per year: 264 km (reference: Austria)
- Persons in age group 20-64: 306 079 787
- Kilometres cycled: 80 805 063 768
- Monetary benefits (mortality): **96,554,944,000 €**
- The number of deaths per year that are prevented by this level of cycling is: 27,860
- Calculation based on the World Health Organisation's Health Economic Assessment Tool for Walking and Cycling (HEAT), which is available online.[11]

### 2. HEALTHIER LIVES - REDUCED MORBIDITY

Morbidity benefits: 40% of mortality benefits <http://www.gracq.org/sites/default/files/2014rbceconomievelo.pdf>: **38,621,977,600 €**

### 3. MENTAL HEALTH BENEFITS

- There is abundant evidence showing that cycling can improve the functioning of the brain and mental health:[12]
  - A Dutch study showed that regular cycling improved white matter integrity and thus brain connectivity both in healthy persons and patients with schizophrenia.[13]
  - A meta-study showed that regular physical exercise like cycling increased concentrations of peripheral brain-derived neurotrophic factor (BDNF), a protein supporting healthy brain function and helping to avoid diseases like Parkinson's or Alzheimer's.[14]
  - Physical exercise also helps to counter cognitive declines including memory, executive function, visuospatial skills, and processing speed in normally aging adults.[15]
  - In patients with depression, physical exercise helped both to decrease levels of the stress hormone cortisol and to improve subjective depressive symptoms.[16]
- Mental health always is embedded into a healthy body, so to consider the two of them together is important.,Active mobility and cycling in particular are today widelyrecognised as an excellent exercise to improve both.[17]
- E-cycling adds a new aspect to the discussion on health benefits of cycling. It is increasingly a psychological issue with regard to its motivation, technic-attracting and trend-setting aspects that attract new groups that might not have cycled previously, but also here the health benefits overall are substantial.[18]
- Estimated value: **30,000,000,000 €**

## 4. HEALTH BENEFITS FOR CHILDREN

- Cycling to school and for recreation at a young age – helps to reap the life-long benefits of cycling.[19]
- Cycling brings health and social benefits for families, as it's good to start cycling at a young age, to improve fitness, positive mental attitudes, stress resilience, habits in socialising and social education, with positive outcomes for the whole family.[20]
- The benefits of Active Mobility can be best triggered by using the natural inclination to run and exercise that existsg in early childhood, and further on these habits can be used as a driver of change, as we know from similar examples in other fields.[21]
- Research also points to the benefits of earlier behaviour change for health welfare.[22]
- All these good reasons together made a strong case for the ECF to initiate the "Charter of Vancouver" with a focus on children and cycling in 2012.[23]
- The relatively small investments into giving children a "playground" in public space are one of the most valuable matters for sustainable development,[24] but have already now an estimated value of: **20,000,000,000 €**

## 5. ROAD SAFETY BENEFITS AVOIDED CAR ACCIDENTS

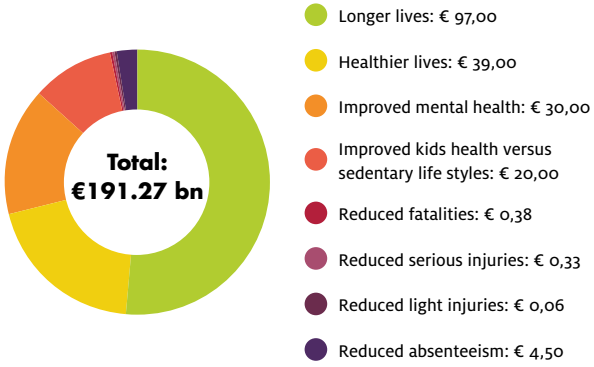
- Based on: https://nationaler-radverkehrsplan.de/de/aktuell/nachrichten/veroeffentlichung-der-forschungsergebnisse-des
- Adjusted for 2015 prices
- Fatality statistics: ETSC 10th Annual Road Safety Performance Index (PIN) Report http://etsc.eu/10th-annual-road-safety-performance-index-pin-report/
- Injury estimations: http://ec.europa.eu/transport/road_safety/specialist/statistics/index_en.htm ("For every death on Europe's roads there are an estimated 4 permanently disabling injuries such as damage to the brain or spinal cord, 8 serious injuries and 50 minor injuries.")

| | | Cost per unit | Total cost |
|---|---|---|---|
| Car crash fatalities avoided: | 268 | 1,417,267 € | 379,364,254 € |
| Serious injuries avoided: | 3,212 | 103,342 € | 331,943,722 € |
| Light injuries avoided: | 13,384 | 4.606 € | 61,646,691 € |
| | | | **772,954,667 €** |

## 6. REDUCED ABSENTEEISM FROM WORK HEALTH BENEFITS FOR BUSINESSES

- Average hourly labour cost in EU 28 2015: 25 € per hour (Eurostat)
- Average cost per day (8 hours): 200 € per day
- Employees cycling to work are on average 1.3 days less absent due to sickness than those who do not cycle to work. The gain per employee is thus 260 € per year (http://www.ncbi.nlm.nih.gov/pubmed/20580736)
- Active population: 238,991,000 (Eurostat)
- Employed population: 216,525,846 (Eurostat)
- Cycling to work (assumption: 8%, based on Eurobarometer "Quality of transport", 2014): 17.322.067,68
- Gain of reduced absenteeism: **4,503,737,597 €**

HEALTH BENEFITS OF CYCLING
(BILLION EUROS)



## IV. Microeconomic benefits
Total: €63.09 bn

### 1. BICYCLE MANUFACTURING INDUSTRY

- Production of parts and accessories: 1,687,000,000 €
- Bikes produced in EU: 13,149,000
- Value of bikes produced in EU: **4,277,369,700 €**

### 2. SALES AND REPAIRS

- Turnover of Bike Sales 2015: 6,582,195,777 €
- Retail accessories and equipment (35% of bike sales): 2,303,768,522 €
- Bicycle repair (15% of bike sales): **987,329,367 €**

### 3. BICYCLE TOURISM

- Value of bicycle tourism: **44,000,000,000 €** per year
- Based on 2.3 billion cycle tourism trips per year in Europe
- Study commissioned by the Committee for Transport and Tourism of the European Parliament (2012): http://www.europarl.europa.eu/RegData/etudes/etudes/join/2012/474569/IPOL-TRAN_ET(2012)474569_EN.pdf

### 4. BICYCLE TOURISM ECONOMIC BENEFITS IN OTHER BUSINESSES

- Value of bicycle tourism in other sectors, like travel agencies not specialised on cycle tourism
- Clear indicators for additional benefits from specific target groups like e.g. “silver cyclists”

### 5. MATERIAL DAMAGE AVOIDED FROM CAR ACCIDENTS

- Based on: https://nationaler-radverkehrsplan.de/de/aktuell/nachrichten/veroeffentlichung-der-forschungsergebnisse-des
- Material damage avoided: **3,246,783,291 €**

## V. Technology and Design
Total: €20 bn

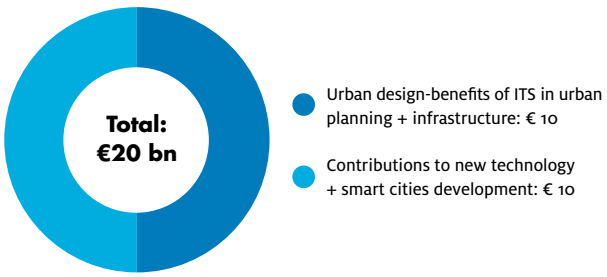
### 1. URBAN DESIGN – BENEFITS OF INTEGRATED URBAN PLANNING AND INFRASTRUCTURE

- Giving more space in cities to active modes of transport like walking and cycling and less to individual motorised transport will improve urban design as a whole, by making cities more accessible for everyone, connecting neighbourhoods and creating meeting places. This in turn leads to multiple other benefits, e.g. better social cohesion (see point VII.1) or more revenues for shop owners (see point VI.1).
- The investments of public authorities in these sectors are tremendous. Most of the money spent is from already existing sectors. For cycling we know about the fast RoI (return on investments)
- It has leveraging effects for many other businesses, and has to be taken into account with an estimated amount of at least **10,000,000,000 €** per year.

### 2. SMARTER CYCLING CONTRIBUTION OF CYCLING TO NEW TECHNOLOGIES AND SMART CITY DEVELOPMENT

- Some of the bikes produced today are high-tech products. New, light-weight materials are developed and tested for bikes (e.g. carbon fibres) 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. Today, many more electric bikes than electric cars are sold in Europe.
- 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.
- We are at the very beginning to open channel access for the bike industry to a multi-bn business of the $ 19 Trillion “Internet of Things” (IoT) market (per CISCO).[25]
- Cycling as a trigger at the center of smart mobility is gaining speed, and on a current first level estimated by **10,000,000,000 €** per year.

TECHNOLOGY + DESIGN BENEFITS
(BILLION EUROS)



## VI. Time and Space
Total: €131 bn

### 1. QUALITY OF TIME SPENT CYCLING

Linked to the physical and mental health benefits (see point III), studies show that cyclists are among the most satisfied transport users, indicating that they derive a higher utility of the time spent cycling than for example car drivers since the trip has value other than arriving at a destination.[26]
Further research needed to calculate the exact value of the benefit.

### 2. SHOPPING BY BIKE

- Total amount calculated: **111,000,000,000 €** per year
- See ECF Publication: "Shopping by bike: Best friend of your city centre".[27]
- Additional benefits for other key-issues

### 3. CHILD WELFARE – TIME SAVINGS FOR PARENTS

As mentioned under point VII.2, cycling for children frees up time for their parents who do not have to give them a lift to school or extracurricular activities anymore.Further research needed to calculate the exact value of the benefit.

### 4. QUALITY OF PUBLIC SPACE

- Public space can be rare and expensive. Compared with cars the relationship of the bicycle is excellent: just about 10% space use when parked, but less then 5% when moved.
- These benefits are even higher taking into account that bicycles are not garbaging complete streets on a long-term, and the quality of stay in bicycle streets is always higher.
- Estimated amount of benefits: **20,000,000,000 €**

## VII. Social Affairs
Total: €50 bn

### 1. SOCIAL EQUALITY

By providing a cheap transport option, cycling can help to make jobs and participation in social life better accessible to disadvantaged population groups. Improving cycling conditions can therefore improve social equality.[28]

### 2. GENDER EQUALITY

Historically, cycling has helped women to move more independently and furthered their emancipation. Research shows that also in modern Europe, women tend to benefit more from higher cycling levels. For example, since they are still taking care of most of childrens' and older adults' mobility in families, they gain more free time if the children and elderly can undertake journeys by bike independently and do not need a lift by car.[29]

### 3. CHILD WELFARE

- The overall benefits for children are tremendous, therefore we launched the "ECF Charter of Vancouver" in 2012 (see point III.4).[30]
- E.g. children that start to cycle at an early age can derive benefits in terms of developing their motor and balance skills as well as gaining independence earlier by being able to move around without having to be given a ride by their parents. This has positive effects for the kids, the parents and in particular for our increasingly sedentary societies.
- There is evidence on various dimensions for better learning and social competence.

### 4. SOCIAL SAFETY

Coming from the "Safety in numbers"[31] effect, the more people cycle the safer traffic will become for all in a street. In a similar way, more people cycling and walking in streets increases social control, which can help to deter criminals and create a higher level of perceived safety. Even the social benefits therefore are significant.

## VIII. Mobility
Total: €29.60 bn

### 1. CONGESTION EASING

- Based on cycled kilometres: 134,231,025,984
- Price for congestion (€/km): 0,153030172 (based on UK WebTAG)
- Share of cycling km replacing car trips: 32%
- Result: **6,573,247,024 €**

### 2. CONSTRUCTION AND MAINTENANCE OF ROAD INFRASTRUCTURE

- Data on road infrastructure investment and maintenance costs: https://data.oecd.org/transport/infrastructure-investment.htm
- Data on car kilometres: ETSC 10th Annual Road Safety Performance Index (PIN) Report http://etsc.eu/10th-annual-road-safety-performance-index-pin-report/
- Road infrastructure investment costs avoided by cycling: **1,894,639,499 €**
- Road maintenance investment costs avoided by cycling: **1,114,457,693 €**

### 3. PUBLIC TRANSPORT SUBSIDIES

- Besides car trips, cycling also replaces public transport trips. By taking pressure of public transport systems especially in the peak hours, when costs are the highest, cycling can help to decrease subsidies for public transport.
- If Public Bike Schemes are part of public transport, this helps also to take pressure of the rest of the system.

### 4. CONNECTIVITY – INTER- AND MULTIMODALITY

Cycling helps in an excellent way to fulfil connectivity for inter- and multimodality solutions with several other modes of transport. It improves capacity building with public transport, several ride+travel solutions etc.

### 5. TRANSPORT TAXES AND TAX SUBSIDIES

The impact of cycling on tax revenues goes in two directions. First, there is foregone revenue from fuel taxes through less fuel consumption (see point II.1); however, depending on the tax system, there can also be a positive impact through higher tax incomes because less people choose company cars as a salary replacement that is taxed at advantageous rates, profiting effectively from a tax subsidy.[32]

## IX. Bringing people together Diversity of cycling cultures
Total: €10 bn

### 1. RESILIENCE AND ROBUSTNESS

- Cycling makes cultures more resilient by providing transport options also in cases of emergency like natural catastrophes or terrorist attacks.
- No matter the culture or level of economic development, cycling is a robust mode of transport that can be used in a sustainable way. Even in highly advanced economies, this is a precondition of bringing people together (see also the social benefits in pt. VII).

### 2. CONNECTIVITY BETWEEN PEOPLE

- Cycling is a social activity. By bringing people together and connecting neighbourhoods, it provides the potential for improved social interactions and more exchange between them. It can connect people from different backgrounds and social classes, thus improving the cohesion of society (see also point VII.1).
- It is also always a matter of cultural integration in the diversity of cultures.

### 3. ACCESSIBILITY

Cycling increases accessibility, not only to employment (see point VII.1), but to also to places of social and cultural exchange.

# CONCLUSIONS

## 1. Background

This report is ECF's second calculation of the internal and external benefits of cycling linked to the current level of cycling in the EU-28. It is an extended and updated version of the first report published in 2013.[33] The calculations have been updated with the latest available figures; in some cases, the methodologies for calculating the benefits have been refined taking into account the feedback received; and more benefits have been added in a systematic way, following the development of the active mobility agenda during the last years. Taking this systematic approach, which we have already followed to identify the contributions of cycling to the United Nations Sustainable Development Goals,[34] we see that cycling has positive impacts in many more fields than previously considered.

According to an EU-wide survey, 8 % of Europeans used the bike as their preferred mode of transport on a typical day in 2014.[35] Statistical data on the average yearly cycling distance is not available for all EU countries; based on the statistics we have available, we assume a total of 134 bn km cycled per year.[36] The calculations on the economic benefits of cycling have been based on this value.

The main challenge that arose after having identified the fields where cycling can potentially bring about economic benefits was the lack of data to make concrete calculations about the extent of these benefits. We have therefore chosen to create four categories of benefits according to the availability of data:

- Calculations based on concrete evidence: Here, enough data and reference values are available to quantify the effects of cycling through a calculation.
- Calculations based on best available data: There is some data available, but estimates had to be used as well in order to make a calculation.
- Estimations based on best available indications: Research has been done on this subject, but there is not enough quantitative data available yet to make a concrete calculation. Estimations are based on the qualitative research available. They represent the order of magnitude of the described benefits rather than actual calculations. More data and research is needed to make these numbers more precise.
- No data available at present: More qualitative and quantitative research is needed in this field to identify the benefits of cycling.

The aim of this report is therefore also to encourage further research on the subject in order to draw a more precise picture of the economic benefits of cycling in the future. The list of benefits of cycling in this report is not extensive, and there are other qualitative benefits that can be taken into account in future research.

## 2. Discussion of results

The results of our calculations and estimations show that the value of cycling for society, the environment and the economy is clearly much higher than previously estimated, and covers a lot more fields than those considered traditionally. This is in line with continuous efforts in research to frame cycling as a form of active mobility whose multiple benefits are fully acknowledged, establishing a third pillar of transport policy next to public transport and individual motorised transport.[37]

The calculations in this report present the gross benefits of cycling. A next step would be to include also the costs of cycling into the calculation. For example, in the field of road safety, only the benefits of less car accidents are taken into account, not the costs of cycling accidents. However, research shows that as more people cycle, cycling becomes relatively safer, and thus the related accident costs would decrease as well.

## 3. Need for further research

Where calculations were made, they were based on the data available today. However, the data base on cycling is still rather scarce, including basic statistics like modal split or kilometres cycled per inhabitants per year. The calculations could be made much more precise if these data were available at the same level as for other modes of transport. Local, regional, national and European authorities should strive to collect these data and to develop methods to harmonise available statistics so that they can be compared between cities and regions as well as across borders.

In several areas, especially but not only concerning the social and cultural benefits of cycling, more research will also be needed on the quantification of these benefits in order to express their magnitude in monetary terms. The European Union could make a big contribution in this field by taking this type of research more into account in their research funding programmes like Horizon 2020.

Furthermore in this context, this report explains how the active mobility agenda works and widens the frame for further research. Active mobility is mainly walking and cycling, thus the agenda can be applied to evaluate the benefits of walking in a similar structured way as for cycling. For systematic analysis and advocacy, we already developed this agenda therefore as kind of an open source.[38] For researchers this means enlarged fields for research, and in this report we refer to the increasing demand in these fields related to the agenda. For decision makers in politics it delivers parameters for sustainable development and transport research policy:

- Public tenders for research can be structured transparently to demand;
- Existing tenders can now acknowledge cycling in a fair way;
- Investments in cycling modes, from planning and budgeting until concrete, can be realised in adequate sustainable ways.

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