



EU CYCLE

Interreg Europe



INTEGRATED CYCLING PLANNING GUIDE

INVESTING IN CYCLING FROM
EU STRUCTURAL FUNDS DURING THE 2021–2027
MULTI-ANNUAL FINANCIAL FRAMEWORK



European Union
European Regional
Development Fund

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ABBREVIATIONS USED IN THIS DOCUMENT

CEF – Connecting Europe Facility
CF – Cohesion Fund
CSRs – Country-Specific Recommendations
EAFRD – European Agricultural Fund for Rural Development
EC – European Commission
ECF – European Cyclists' Federation
ERDF – European Regional Development Fund
EU – European Union
GDP – Gross Domestic Product
GHG – Greenhouse Gas
MFF – Multiannual Financial Framework
NECP – National Energy and Climate Plan
NGO – Non-Governmental Organisation
PO – Policy Objective
SME – Small and medium-sized enterprise
TEN-T – Trans-European Transport Network

1. FOREWORD

Dear Reader,

Perhaps it has come to your attention that the EU is investing ever more resources into cycling. While it was just 700 million Euro that went into cycling and walking projects in the years 2007 – 2013, that figure almost tripled to 2 billion Euro for the years 2014 – 2020. And with the European Green Deal addressing climate urgency as well as with the unprecedented popularity of cycling since the outbreak of the COVID-19 pandemic, that figure is only set to rise.

However, you may also be under the impressions that EU funds are not always easy to unlock. That the administrative burden is high. Well, while there are certainly some strings attached – after all it is taxpayers' money – the good message is that it is doable. And this guide is here to help you.

We dig deep into the relevant regulations; we explain process; we showcase how to phrase specific objectives and output indicators in your Partnership Agreement and Operational Programme; we demonstrate how to plan, develop and implement a regional cycle network; and we list a series of good practice examples in real-life investments in cycle projects from EU structural funds.

Now is a crunch time for the future of European regions. With regions currently developing their programming documents for the 2021 – 2027 Multi-Annual Financial Period, this is the moment to draw a new vision of regional policy. We have to answer these questions: What cities, towns and villages do we want to live in? How do we want to safeguard the safety and well-being of our citizens? How can we ensure that the bold investments outlined today will bring the greatest possible economic and social benefits? These were never simple questions, but today the answer is even more difficult. The COVID-19 pandemic, which has shaken the whole world, has presented us with completely new challenges. The health and safety of our citizens have become a top priority.

What is more, the need to adapt our investments to the requirements of the Green Deal poses further challenges. The European Union aims to achieve climate neutrality by 2050 at the latest. Emissions of the transport sector have to come down by at least 90 %. This is undoubtedly a very ambitious goal and the EU has unlocked unprecedented financial resources to help us achieve it. We must all be ready to seize this opportunity.

Bearing in mind the experience of many European regions, we believe that an ambitious cycling policy is among the best responses to both challenges: public health and climate protection. More people cycling on the roads of our regions mean lower greenhouse gas emissions, lower noise levels and better air quality, but also greater physical activity for citizens and hence much better personal and public health.

However, to achieve this aim, we need reliable knowledge on how to obtain necessary funding for our cycling projects and how to plan infrastructure to be attractive, efficient and safe for users. Sharing this knowledge is precisely the main objective of the EU CYCLE project, within which this manual was developed. We hope that the guidelines presented here will help you to create a cycling-friendly environment and contribute to achieving the ambitious climate, health and economic goals of the European Union.

Best regards

EU CYCLE TEAM

ABOUT THE EU CYCLE PROJECT

EU CYCLE is an INTERREG project, financed through European Regional Development Fund, which aims at building capacity with regional authorities through interregional learning and regional action planning so as to better use EU funds for cycle investments.

The project will contribute to improve the quality of cycling projects and increase the share of cycling in the target regions by introducing policies and state-of-the-art solutions that have a greater impact on the decarbonization of transport.

Although cycling related projects were supported by approximately 2bn EU investments between 2014 - 2020, good practices were systematically not shared and knowledge about them is unevenly distributed in regions involved. Regional stakeholders and potential project holders are not aware of good practices and of advantages of potential adaptation, lack of knowledge decreases interest in developing cycling projects and risk that hundreds of millions of EUR allocated for cycling in the policy instruments addressed are spent ineffectively.

The partners of the project are:

- West Pannon Nonprofit Ltd.
- European Cyclists' Federation asbl
- Euregio Rhine-Waal
- Association of Bialystok Functional Area
- Region of Apulia

All those partners, active in different subtopics – regional cycling, cycling tourism, urban cycling, intermodality, urban-rural connections, territorial cooperation in cycling – have decided to share their experiences to increase capacities of using available funds fully and in an efficient way for quality cycling projects.

This Integrated Cycling Planning Guide is the intrinsic part of this project.

EU CYCLE increases capacities both on the governance side of policy instruments and on the side of potential beneficiaries to develop and realize projects

2. EXECUTIVE SUMMARY

The ultimate goal of this Guide is to support authorities responsible for drafting programming documents and citizens interested in dynamic and sustainable development of their regions on their way to obtaining substantial European funding for excellent and beneficial cycling investments.

2021 marks the beginning of a new 7-year financial period in the European Union, called the Multiannual Financial Framework (MFF). After the unprecedented crisis of the COVID-19 pandemic, the EU will focus now on the economic recovery without losing sight of the need to protect citizens' health and to pursue ambitious Green Deal objectives. The new 2021–2027 MFF and regulations concerning the European Structural and Investment Funds are based on these very principles.

The project partners of the EU Cycle Project believe that bold and visionary investments in cycling transport and tourism are the best way to achieve the above goals and trigger dynamic economic growth of regions, while respecting the natural environment as well as health and well-being of citizens. This belief is based on many years of field experience, hard economic data and scientific research on the health and environmental benefits of active and sustainable mobility. To fully confirm this thesis, Chapter 3 will outline the significance of cycling in the new budget perspective and chapter 4 will review the general benefits from cycle-related investments. Then, chapter 5 will describe how the EU regulations translate to specific investments.

In chapter 6 we highlight established cycling infrastructure design criteria and design practices.

Chapter 7 will set out key elements in developing a regional cycle network. It aims to address the regional level of cycling networks and challenges specific for it. While in city centres space is a critical commodity, on the regional level key barriers are often administrative in nature. In terms of design, conflicts with pedestrians or parking are replaced by sharing the routes with agricultural vehicles and collisions with large-scale infrastructure, often belonging to the trans-European transport network (TEN-T).

Chapter 8 provides a diverse collection of inspiring investments funded through the European Regional Development Fund and Cohesion Fund. And finally, in chapter 9 identifies a selection of good practice provisions included in programming documents of the European countries who succeeded in obtaining significant amounts of European funds for cycling investments in the 2014–2020 financial period. The exemplary wordings of pro-cycling objectives included in successful programming documents can be used directly or can serve as a source of inspiration for even bolder projects and objectives by others.

To this end we have added two annexes; the first one describes the benefits of bicycle investments for the European economy; the second one is the analysis of country-specific recommendations, country reports and national energy and climate plans of 26 Member States. These documents clearly show that investments in active mobility are an excellent answer both to the challenges facing the EU as a whole and to the specific problems of individual European countries.

3. THE SIGNIFICANCE OF CYCLING FOR THE NEW BUDGET PERSPECTIVE 2021–2027

3.1. The priorities for the new budget

The 2021–2027 EU budget has been the subject of heated disputes among European policymakers. The amount, sources of financing and the division of funds between various EU programs were debated. Only two principles remained undisputed: that the new EU financial policy must tackle unprecedented health and economic challenges caused by the COVID-19 pandemic and that it must contribute towards making Europe a pioneer in responsible and sustainable transformation so that it can meet the ambitious goals of the European Green Deal.

In order to achieve these aims, it was decided that at least 30% of the EU budget must be allocated to climate policies. Additionally, projects that will improve the health of European citizens and protect them from the spread of the COVID-19 virus will be favoured. These are key criteria which must be taken into account by all Member States who want to benefit fully from a new budget deal.

Cycling is a perfect solution for both these concerns. First, it is the only means of transport whose investments can be recorded a full 100% in support both of climate change as well as environmental objectives¹.

These are two indicators that enable the European Commission to monitor whether the necessary thresholds, i.e. a minimum of at least 30% investments in climate protection, are respected by the beneficiaries. In other words: Significant EU investments in cycling allow countries and regions to meet environment-and climate friendly spending thresholds, leaving the remaining money for other vital projects outside these policy areas.

Second, cycling has also proven to be one of the preferred modes of transport for many EU citizen during the COVID-19 pandemic. Now is an excellent opportunity to turn pop-up bike lanes into permanent high-quality cycle infrastructure.

COVID-19 AND TRANSPORT POLICY

The pandemic has drastically changed mobility patterns. Some of these changes are transitory but others will have long effects and shape the future of urban transport, becoming the “new normal”. There is no doubt that European regions have to react to this revolution and influence its development by acting swiftly to reinforce positive trends (such as calmed motorized traffic and increased interest in active mobility, including cycling) and mitigate negative ones (e.g., the loss of public transport ridership).

Many European cities have already taken up this challenge. As many as a third of Europe's capitals, including Brussels, Rome and Berlin, decided to close road sections to car traffic or reallocate road space in order to create temporary bicycle paths instead. Since the beginning of the pandemic in March 2020 more than 2,300 km of new pop-up bike lines and other pro-cycling measures have been announced across Europe, committing new investments of more than 1 billion EUR². This demonstrates how urgently European cities wish to see investments in active and sustainable mobility. In cities that added bike lanes during the pandemic cycle use increased between 11 and 48 % in the period March to July 2020.³

The mobility schemes must be rethought regarding our future in light of COVID-19 and the lasting solution must be worked out to answer the major shift in working environment, school mobility, urban logistics and modal choices. Both states and regions should focus their efforts on keeping the strategic transport documents, like demand analysis, traffic forecasts, sustainable urban mobility plans, and cycling strategies up-to-date and on considering how ERDF funding can support the implementation of their new transport policies which will accommodate the ongoing transformations.

3.2. EU funding programmes 2021-2027

This Guide is primarily focused on obtaining funds for bicycle investments from the ERDF and the Cohesion Fund. However, these are not the only sources of funding that can be used for developing zero-emission transport infrastructure in regions. Below we present the proposed breakdown of the EU resources for the 2021–2027 financial period. We have selected the programmes which in our opinion can be used to get funds for cycle projects. Please note that these numbers can still change, as the legislative process to adopt the new EU budget has not concluded yet.

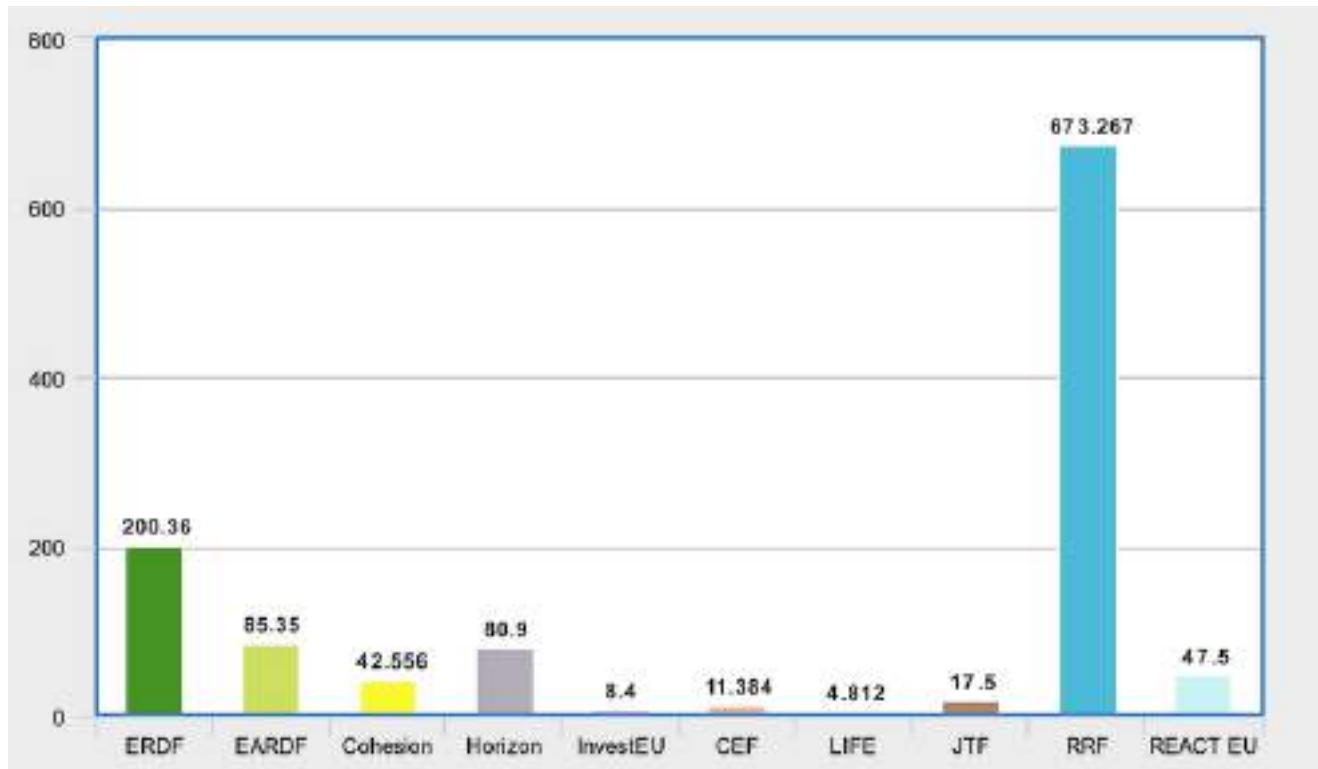


Figure 1: Comparison of the budgets of selected EU programmes

Programme	Purpose	2018 prices (in million EUR)
European Regional Development Fund	Development and structural adjustment of regional economies	200,360
European Agricultural Fund for Rural Development	Vibrancy and economic viability of rural communities.	85,350
Cohesion Fund	Reducing economic and social disparities among EU countries and promoting sustainable development.	42,556
Of which contribution to the Connecting Europe Facility - Transport		10,000
Horizon Europe	Research and innovation.	80,900
InvestEU Fund	Sustainable infrastructure; Research, innovation and digitization; Small and medium-size enterprises;	8,400

		Social investments and skills Strategic European investments.	
Connecting Europe Facility - Transport		Investments in building new transport infrastructure in Europe along the TEN-T (Trans-European Network – Transport) or rehabilitating and upgrading the existing one.	11,384
LIFE		Environment and climate action.	4,812
Just Transition Fund		Support for EU regions most affected by the transition to a low carbon economy.	17.500
Next Generation EU	Recovery and Resilience Facility	Support for EU countries to come out of the economic crisis.	673,267
	REACT EU	Additional resources for ERDF, European Social Funds and European Fund for Aid to the Most Deprived.	47,500

Table 1. Comparison of the budgets of selected EU programmes

A few words on the European Agricultural Fund for Rural Development

Few countries currently use the European Agricultural Fund for Rural Development (EAFRD) as a source of funding for cycling investments. But in fact, it can be used for substantial infrastructure cycling projects located on or crossing rural areas. For example, France used the EAFRD to build a network of several hundred kilometres of tourist bicycle routes, which are now a dynamically growing source of income for local agritourism, gastronomy and other accompanying services.⁴ An excellent example of this is the Burgundy Vineyards cycling route. Funds from the EAFRD can also be allocated to the construction of bicycle parking lots at local railway stations, safe bicycle paths connecting suburban municipalities with the metropolis, small-scale tourist routes in naturally valuable areas, mountain bike trails and many more!

3.3. The Recovery and Resilience Facility

EUR 750 billion will be allocated to Member States through grants and loans in the Next Generation EU to address the economic crisis caused by the Corona crisis. The largest single fund is the Recovery and Resilience Fund with a budget of EUR 672.5 billion. At least 37% of these investments must be used to support climate action.

On 17 September 2020 the European Commission issued a Communication and guidance to Member States on how to spend the money through the national recovery plans. 70% needs to be committed by 2022, the remaining 30% by the end of 2023.

ECF analysis of the draft National Recovery and Resilience Plans that Member States had to submit to the European Commission by 30 April 2021 showed big variances in how cycling was taken into account.⁵ In Member States that developed general 'sustainable urban mobility' budget lines, such as in the case of Spain, cycle projects could still be included.

4. GENERAL BENEFITS FROM CYCLING-RELATED INVESTMENTS

Current levels of cycling produce benefits of 150 billion EUR per year for the EU Member States. More than 90 billion EUR of these benefits are positive externalities for the environment, public health and the mobility system. In comparison, a recent study by the European Commission estimated the negative externalities, i.e. the costs for the environment, health and mobility, of motorised road transport at 800 billion EUR per year.⁶ Investments in cycle projects also have very advantageous benefit-cost ratios and are excellent value for money. About 650,000 jobs are associated with the cycling economy⁷.

The benefits of cycling appear 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, employment, tourism, public health and social affairs. Most European countries still have a lot of potential to reach higher levels of cycling. To increase the number of people cycling and decrease the negative externalities of motorised road transport, we need not only an integrated European policy framework, but also adequate funding.

The aggregated financial benefits from cycling for all the EU Member States, are presented below. Full details are provided in the annex at the end of the guide.

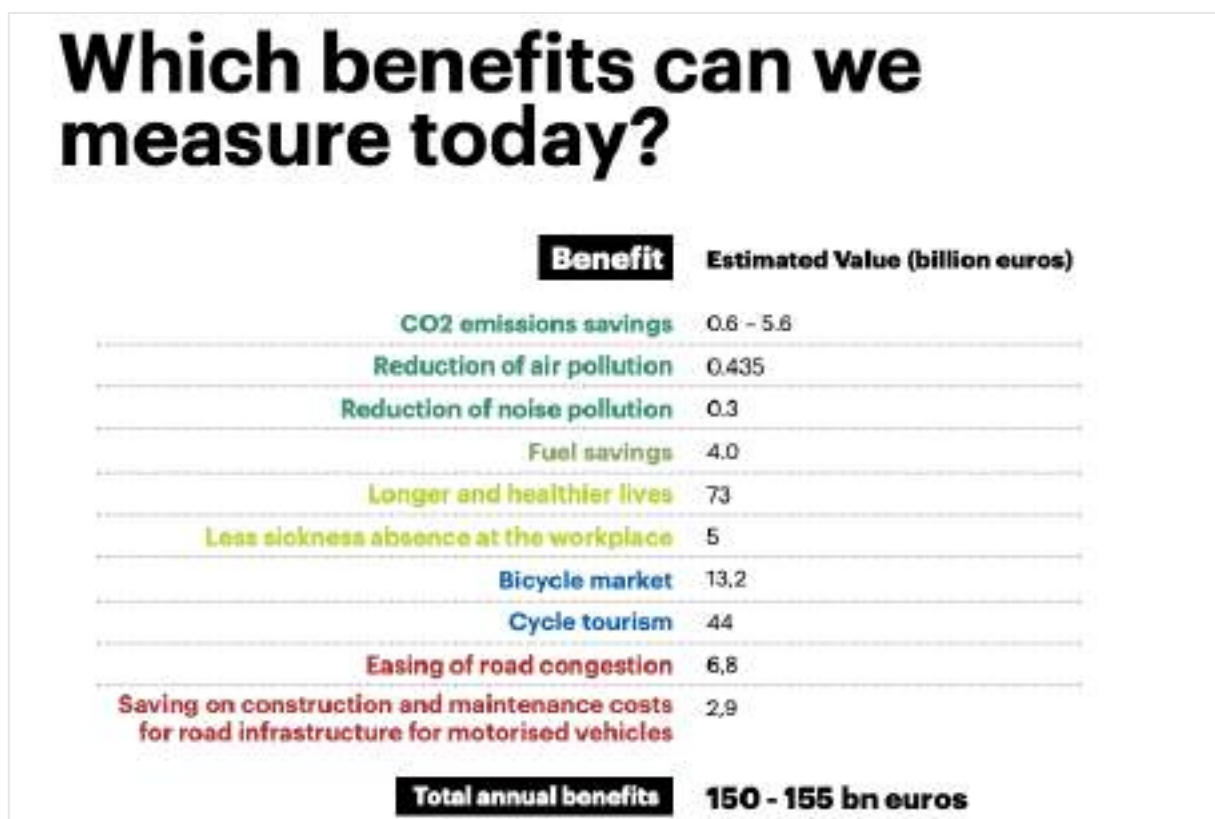


Figure 2. Current benefits of cycling.

5. FROM THE EU REGULATION TO SPECIFIC INVESTMENTS: THE ESSENTIALS

Understanding the benefits of cycling investments and having a bold future-oriented mobility vision in place for your state or region are keys to success. But equally important is to understand process and the ability to translate this vision into the specific provisions in your programming documents. Only in this way you can secure the EU funds necessary to turn your plans into reality.

Below, we outline the process starting from the EU regulations all the way down to the specific investments. First, we present the most important information about the new ERDF and the Cohesion Fund regulations. Then, we provide an overview of the structure of programming documents in which Member States and Regions declare how they want to spend resources from European funds.

5.1. Revision of the relevant EU regulations

Common Provisions Regulations

According to the European Commission, the fragmentation of the rules governing the various EU funds implemented in partnership with the Member States has overcomplicated the work of the authorities managing programmes and discouraged businesses and entrepreneurs from applying for different sources of the EU funding⁸. This prompted the Commission to develop the common regulative framework covering the most important EU funds. The new regulation is called the Common Provisions Regulation applying for the ERDF, European Social Fund+, the Cohesion Fund, European Maritime and Fisheries Fund, Asylum and Migration Fund, Internal Security Fund, Border Management and Visa Instrument.

What is especially important is that the CPR establishes the coefficient for the calculation of support for climate change and environment objectives. Cycling investments are 100% compliant with both these goals. The coefficients are used by the EC to track Member States' progress towards the fulfilment of Green Deal obligations.

Regulation on the ERDF and the Cohesion Fund

Crucially, the new ERDF and Cohesion Fund Regulation states that at least 30% of the ERDF and 37% of the Cohesion Fund must be devoted to climate objectives.

Additionally, the Regulation sets five new policy objectives (PO) for the ERDF resources of which PO 2, 3 and 5 are of particular relevance for cycling

- a greener, low-carbon transitioning towards a net zero carbon economy and resilient Europe by promoting clean and fair energy transition, green and blue investment, the circular economy, climate change mitigation and adaptation, risk prevention and management, and sustainable urban mobility (PO 2) by:
 - (i) promoting energy efficiency and reducing greenhouse gas emissions;
 - (ii) promoting renewable energy in accordance with Directive EU (2018)/2001, including the sustainability criteria set out therein;
 - (iii) developing smart energy systems, grids and storage outside the Trans-European Energy Network (TEN-E);
 - (iv) promoting climate change adaptation and disaster risk prevention and resilience, taking into account eco-system based approaches;
 - (v) promoting access to water and sustainable water management;
 - (vi) promoting the transition to a circular and resource-efficient economy;

- (vii) enhancing protection and preservation of nature, biodiversity and green infrastructure, including in the urban areas, and reducing all forms of pollution;
 - (viii) promoting sustainable multimodal urban mobility, as part of a transition to a net zero carbon economy.
- a more connected Europe by enhancing mobility (PO 3) by:
 - (i) developing a climate-resilient, intelligent, secure, sustainable and intermodal TEN-T;
 - (ii) developing and enhancing sustainable, climate resilient, intelligent and intermodal national, regional and local mobility, including improved access to TEN-T and cross-border mobility.
 - a Europe closer to citizens by fostering the sustainable and integrated development of all types of territories and local initiatives (PO 5) by:
 - (i) fostering the integrated and inclusive social, economic and environmental development, culture, natural heritage, sustainable tourism and security in urban areas;
 - (ii) fostering the integrated and inclusive social, economic and environmental local development, culture, natural heritage, sustainable tourism and security in areas other than urban area.

According to the Regulation, Member States and regions must allocate a certain percentage of their ERDF resources to certain Policy Objectives.

Region	Thematic concentration requirements for Member State or region
More developed region (those with a gross national income ratio equal to or above 100 % of the EU average)	allocate at least 85 % of their ERDF resources to PO 1 and PO 2, and at least 30 % to PO 2
Transition regions (those with a gross national income ratio equal to or above 75 % and below 100 % of the EU average)	allocate at least 40 % of their ERDF resources referred to in paragraph 1 to PO 1, and at least 30 % to PO 2
Less developed regions (those with a gross national income ratio below 75 % of the EU average)	Member States of group 3 or less developed regions shall allocate at least 25 % of their ERDF resources to PO 1, and at least 30 % to PO 2

Table 2. Required allocation to Policy Objectives depending on the level of development.

With sustainable multimodal urban mobility being included now under PO 2, this potentially opens up a higher share for cycle investments from these funds. In the 2013 regulation sustainable urban mobility did not enjoy a minimum allocation of the funds.

It is also worth mentioning that Annex I to the ERDF regulation includes ‘dedicated cycling infrastructure supported’ as one of the output indicators (RCO 58) and the ‘annual users of dedicated cycling infrastructure’ as a results indicator (RCO 64), however only related to PO 2.⁹ Investments into cycling under different POs technically would not need to be included into these indicators.

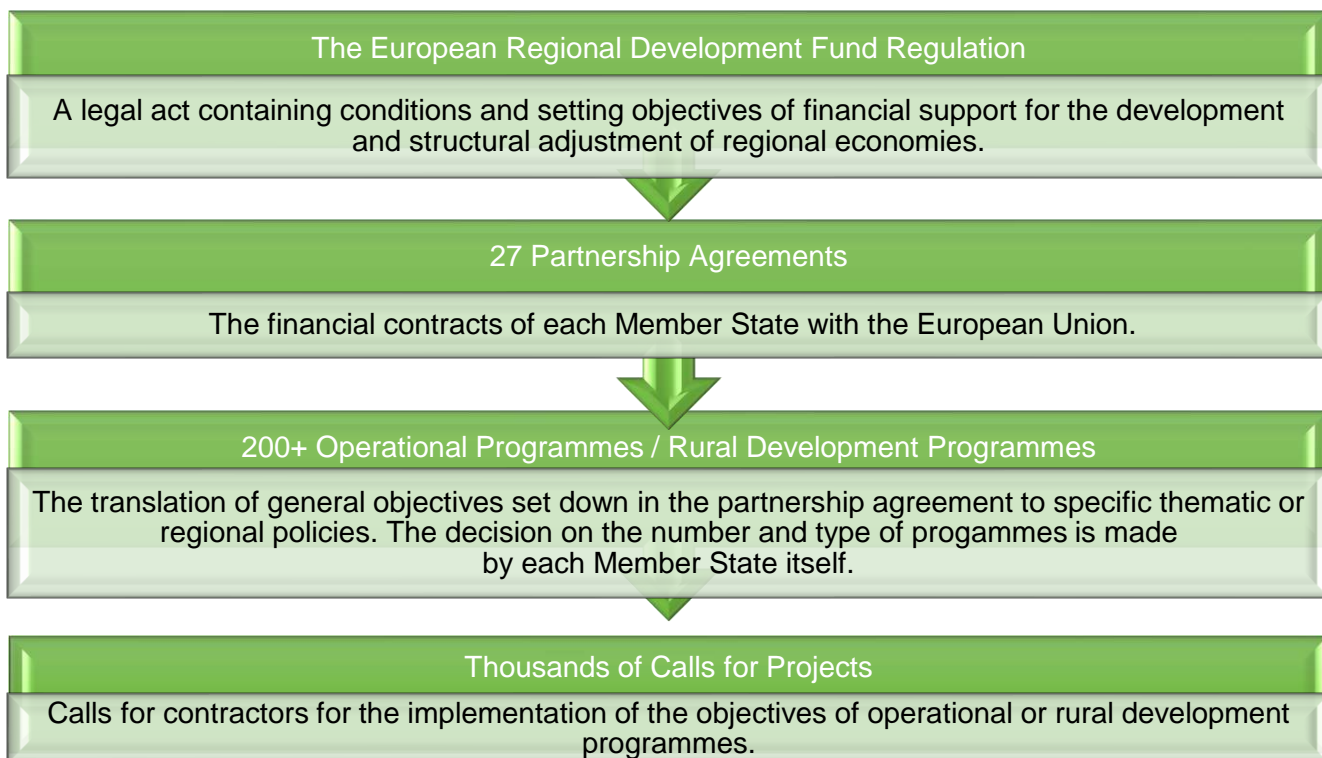
Last but not least, cycling also earned a reference in recital 12 stating “Investments under the ERDF should contribute to the development of a comprehensive high-speed digital infrastructure network, and to promoting pollution-free and sustainable multimodal mobility with a focus on public transport, shared mobility, walking and cycling, as a part of the transition to the net-zero carbon economy.”

5.2. Overview of programming documents

Of all the programming documents, the Partnership Agreement is the most important one. Partnership Agreements (PAs) are negotiated and signed between the European Commission and EU Member States. These are strategic plans outlining each country's goals and investment priorities and setting out the use of funding under the five European Structural and Investment Funds.

Based on Partnership Agreements agreed and signed between the European Commission and each Member State, ministries or regions work on operational programmes. These are detailed plans in which the decision-makers set out how money from the European funds will be spent during the programming period. They can be drawn up for a specific region or a country-wide thematic goal (e.g. Environment). For the European Territorial Cooperation goal, cross-border or interregional operational programmes are drawn up. In other words, operational programmes break down the overarching strategic objectives agreed in the Partnership Agreement into investment priorities, specific objectives and further into concrete actions. The equivalent of operational programmes for the European Agricultural Fund for Rural Development are rural development programmes.

The graphic below illustrates this process for an example of the ERDF:



EUROPEAN FUNDS AVAILABLE FOR CYCLING IN THE 2014–2020 FINANCIAL PERSPECTIVE

In the graphic below you can see approximately how much EU funding was available for cycling in each Member State in the 2014–2020 EU budget edition, according to ECF analysis of more than 200 operational programmes conducted in 2014. ECF analysis also shows that explicit references to cycling objectives in programming documents are the best guarantee of securing necessary resources for cycling-related investments.

Country	Estimated amount of funding available (€ million) based on:			Total
	Explicit references	Implicit references	Indirect references	
Austria	0.0	2.6	0.0	2.6
Belgium	11.4	0.0	0.0	11.4
Bulgaria	40.0	85.7	4.6	130.3
Croatia	0.0	30.0	0.0	30.0
Cyprus	0.0	7.0	0.0	7.0
Czech Republic	20.0	0.0	5.0	25.0
Denmark	0.0	0.0	0.0	0.0
Estonia	20.0	0.0	0.0	20.0
Finland	0.0	6.0	0.0	6.0
France	196.8	25.2	22.3	244.4
Germany	123.4	6.2	1.8	131.4
Greece	5.5	18.7	7.0	31.2
Hungary	106.7	15.0	30.0	151.7
Ireland	0.0	1.0	0.0	1.0
Italy	44.5	12.0	31.5	88.0
Latvia	0.0	15.0	0.0	15.0
Lithuania	0.0	10.0	2.0	12.0
Luxembourg	2.5	0.0	0.0	2.5
Malta	0.0	3.2	0.0	3.2
Poland	403.7	0.0	0.0	403.7
Portugal	6.0	9.5	0.0	15.5
Romania	25.0	0.0	46.0	71.0
Slovakia	28.7	0.0	0.0	28.7
Slovenia	20.0	0.0	0.0	20.0
Spain	135.5	96.2	15.7	247.4
Sweden	8.0	0.2	0.0	8.2
The Netherlands	0.0	0.3	0.0	0.3
United Kingdom	16.7	5.3	1.9	23.8
Summary	1,324.8	408.1	308.3	2,041.2

Table 3. Estimated amount of funds allocated to cycling in operational programmes¹⁰.

References to cycling in the programming documents

Explicit references – “Cycling, bicycle, cycling infrastructure, cycling industry” are listed among the eligible actions. In the best cases, the operational programme even includes a dedicated cycling fund and/or the estimated outputs include cycling.

Example: “Implement projects for the construction of linear infrastructure of cycling transport”.

Implicit references – Cycling-related measures are eligible under different headings, such as “sustainable transport/mobility, green infrastructure, green vehicles, soft mobility, urban transport, sustainable (transport) modes, multimodality, sustainable tourism”.

Example: “Clean urban transport infrastructure and promotion”.

Indirect reference – Covers situations where broader themes are mentioned, such as “land transportation, roads, tourism, SME development, training and campaign, vehicle industry”.

Example: “Investments for the accessibility to the local cultural heritage, which contributes to the valorisation of the local cultural heritage and to the promotion of the rural tourism”.

5.3. Investment needs

Besides the process from the EU regulation via a partnership agreement and operational programmes down to specific calls, it is also important to develop concrete projects that can be submitted in response to relevant calls of managing authorities.

For that you need to understand your investment needs. What is your ambition for cycle use and what does it take to increase it accordingly over a given period of time? What infrastructure do you have in place and where are the missing links and gaps in your network? And who will pay for it? Analysing your investment needs is crucial to align ambitions for increasing cycle use with resources needed and should be the starting point for developing individual projects.

Chapter 7 provides further theoretical background and an overview of practical experiences for planning and developing regional cycling networks.

In its final National Energy and Climate Plan, Austria set the target of increasing the mode share of cycling in the modal split from 7% to 15%. To that end, public authorities would need to invest 2.2 billion EUR in cycling from 2021–2030, primarily in infrastructure, with 20% of the investments to be financed by the national government and the remaining 80% by regional and local authorities. EU investments could contribute accordingly.

5.4. Programming documents and national cycling strategies

An increasing number of European countries have put in place and implemented national strategies on cycling. Most of these national strategies and/or action plans set clear activities and precise goals for the development of cycling at the national level.

In the first place, national cycling strategies allow national governments to set a clear framework for the development of cycling in their countries. This way, they can send the signal to regional and local authorities that cycling matters and that it should be taken into account in public policies. The framework set by national cycling strategies ideally refers to the coordination of cycling policies (vertically and horizontally between government authorities), the exchange of good practice, the capacity building for local and regional authorities, the co-funding for investments in cycling infrastructure and the funding of pilot projects, research and awareness-raising campaigns.

In addition to a general framework for the development of cycling, national cycling strategies enable the adoption of new legislative and fiscal frameworks at the national level. Particularly relevant areas are the highway code,

taxation rates and fiscal incentives for commuting by bicycle. Finally, national cycling strategies are also a means to boost dynamics at the national level and in various cycling-related areas such as cycling tourism, intermodality, education or physical activity. Setting clear objectives, in particular in terms of modal share, allows national authorities to mobilise the different stakeholders involved in the promotion of cycling.

Our analysis shows that having a good national or regional cycling strategy and relying on it in the process of creating programming documents is one of the factors that increase the effectiveness of states in applying for EU funds for bicycle investments. First, cycling strategies often include specific investment needs and projects which can easily be transferred to the programming documents. Second, they show European officials that planned investments are not isolated ad-hoc ideas but part of a larger strategy whose stages and final benefits are clear for the national decision-makers. Third, they guarantee that the implemented projects will make a real contribution to the long-term goals of countries and regions.

For all these reasons we always recommend for national authorities to develop their cycling strategies and use them in drafting their partnership agreements and operational programmes. The same can be said of other strategic documents like sustainable mobility plans, integrated territorial investments plans etc.

The Spanish region Andalusia, one of the main beneficiaries of EU funds for the development of bicycle infrastructure (estimated EUR 31,478,725), supported its application for ERDF resources for cycling investment, by mentioning in its operational programme that “these actions are framed in the Andalusian Bicycle Plan 2014-2020, the EuroVelo Network and in the corresponding Sustainable Mobility plans approved for the metropolitan area, and envisage autonomous, metropolitan and urban bike lane networks. Likewise, these actions are part of the 2020 Andalusia Energy Strategy”¹¹.

6. SAFE CYCLING INFRASTRUCTURE

Securing substantial funding for cycling infrastructure is of course a necessary condition for the modal shift in transport to happen. However, it is equally important to build this infrastructure so that it is safe, efficient and attractive for users.

6.1. Design criteria

The Dutch “Design Manual for Bicycle Traffic”,¹² probably the best known and most quoted set of guidelines for cycling infrastructure, structures the requirements the infrastructure should meet around the five main principles:

- **Cohesion**

Cohesion has to do with the ability to get somewhere and with the need for a complete and comprehensible bicycle infrastructure. Cycle routes connect (all) origins and destinations of cyclists. The network is in line with the movement pattern of cyclists. Cyclists can choose from different routes. Main cycle routes follow the largest cycle flows. Main cycle routes are recognisable as such, for example in residential areas (max. 30 km/h) due to the Cycle Street layout¹³.

- **Directness**

The factors that influence the travel time for cyclists are brought together in the aspect of directness. The following design requirements apply to this: cyclists travel as short a route as possible and are taken out of their way as little as possible on major routes. Connections ensure that traffic flows as smoothly as possible and the design speed on main cycle routes is at least 30 km/h. At intersections with traffic lights, priority is set in favour of the cycle route.

- **Safety**

Cycling infrastructure guarantees the safety of cyclists and other road users, minimising risk of accidents and their potential consequences. The cyclists are especially vulnerable if they move into a space with motorised traffic with differences in mass and speed. The cyclist does not have the protection of external safety features such as cage construction, wrinkle zones or airbags. In the case of a crash with a vehicle, there is therefore a high risk of serious injury.

The highest safety requirements must be set for routes for children and the elderly.

- **Comfort**

Cycle infrastructure minimises nuisance (vibrations, unnecessary exertion) and interruptions (stops). The quality of the road surface is good. Both fast and skilled cyclists and slow and vulnerable cyclists can cycle safely without interfering with each other and without being hindered by motorised traffic, including mopeds. There is as little stopping as possible, there are as few obstacles as possible, and there are as few turning manoeuvres as possible. Elevation changes and slope gradients are minimised.

- **Attractiveness**

Attractiveness is about the environmental characteristics that determine how the cyclist experiences the route. Cycle routes should be socially safe and run through a varied environment with well-designed and maintained public spaces.

Most of the modern national or regional guidelines follow similar approach, with minor variations, for example:

- “Manual for the design of cyclepaths in Catalonia”¹⁴ distinguishes separate principles of Accessibility (coverage on network level) and Continuity (lack of interruptions on route level) instead of “Cohesion” from the CROW manual.
- “London Cycling Design Standards”¹⁵ introduces the criterium of Adaptability (infrastructure should accommodate users of different bicycles, and an increasing number of users over time),
- “Cycle Highways Assessment Tool”¹⁶ includes Awareness (network or route “brand” recognisability, visibility in public space, important for attracting new users).

These five key principles are universal for all network levels: local, regional, national and European. The importance of different criteria may vary slightly between different network types. For functional routes, such as cycle highways, **directness** is the main principle. A cycle path that is more direct allows the user to get from A to B faster and with less effort. Direct route increases the outreach of cycle highway: the shorter the route, the more likely is the potential user to choose the bicycle for daily commuting¹⁷. In recreational cycling, directness is somewhat less important than in daily commuting. However, good recreational networks do not totally disregard directness, see Chapter 7, section 7.4.1. Backbone approach).

While several derivative works try to present safety as the most important criterium in all contexts, it is important to note that the original CROW manual stresses that if the minimum quality requirements in any of the main criteria is not met, the infrastructure needs to be modified (redesigned, rebuilt). It is sometimes tempting to excuse bad design with “safety first” slogan. However, a route which is perfectly safe but does not meet one of the other requirements will not be used and would therefore be a waste of money.



Figure 3. A route which is perfectly safe, but does not meet the other quality criteria, is unlikely to be used.

The general principles translate to specific design parameters, such as acceptable detour factor, criteria for segregation/integration of cycling and motorised traffic, width and clearance, horizontal and vertical curve radii, maximum gradients, stopping sight distance or visibility splays on crossings. Several European projects have looked at parameters used for different types of networks and provide a convenient overview:

- “Cycle Highways Manual”, developed in the frame of the CHIPS (Cycle Highways Innovation for smarter People transport and Spatial planning) Interreg project, compares quality parameters required on cycle highways in 9 European regions.¹⁸
- “Guides, objectives and indicators for the design of urban corridor roads” developed in the frame of MORE project, does the same for arteries in 5 major cities.¹⁹
- “EuroVelo European Certification Standard” contains a “common denominator” for long-distance routes.²⁰

6.2. Network and route components

A cycle network is built of routes. Each route can mix different types of infrastructure. On the regional level, the most common basic components are:

- **Cycle track** – an independent road or a part of a road designated for cycles, signposted as such, and separated from other roads or other parts of the same road by structural means.
- **Cycle lane** – a part of a carriageway designated for cycles, distinguished from the rest of the carriageway by longitudinal road markings.
- **Public roads** – suitable for cycling, if the volume and speed of motorised traffic and low enough.
- **Agricultural / forestry / industry / water management road** – closed to general traffic, with an exemption for cycling and service vehicles.

A more detailed classification of types of cycling infrastructure has been proposed in THE PEP European Cycling Master Plan – Infrastructure Module.²¹

Different routes and networks will mix and match different components in different proportions, depending on the type of the route and relevant context. For example, the four main routes, which form the backbone of the West Pomeranian regional cycling network, include 58% cycle tracks, 35% local public roads and 7% of asphalted forestry roads. On the EuroVelo 15 – Rhine Cycle Route – crossing Switzerland, Germany, France and Netherlands, cycle tracks amount to 37%, cycle lanes – 3%, public roads – 33% and agricultural / forestry / industry / water management roads – 27%. In West Pomerania many of the routes were built on disused railroad tracks, hence the high share of dedicated cycle tracks; the Rhine Cycle Route follows an important waterway; therefore, the share of water management roads is more prominent.

6.3. Good design practices

Below we have gathered good design practices whose implementation will improve safety and comfort of non-motorised commuters:

- Build segregated cycling infrastructure where the difference between driving speeds and cycling speeds is too great. Separated cycle tracks are not necessary when the speeds do not exceed 30 km/h and traffic volumes are low.²².
- The optimal surface for bicycle paths is asphalt. Using paved block types of surfaces should be avoided as they very often become uneven over time and provide an uncomfortable riding surface²³.
- It is important to remember that cyclists do not make sharp 90 degree turns! The cyclist should be able to complete the curve at the appropriate design speed. The Dutch give a minimum curve radius of 20 metres for a typical 30 km/h design speed infrastructure²⁴. For regional routes, especially outside built-up areas, a higher design speed should be considered to accommodate road cyclists and tap into the potential of e-bikes.
- It is essential that there is clear visibility at conflict points (points where cyclists come into contact with other road users). A comfortable sight distance of the surface of the infrastructure is considered equivalent to 8-10 seconds of cycling at the design speed (e.g., 70-80 metres at 30 km/h), bare minimum is 4-5 seconds (35-40 metres)²⁵.
- The recommended width for one-way cycle tracks segregated from the main road should be 2.2 m in both urban and rural areas; with a width of 1.7 m (minimum of 1.5 m) when a cycle track is part of a shared-use path. The following obstacle distances should be guaranteed: for green verges and low kerbstones 0.25 m; for higher kerbstones 0.50 m, for closed walls 0.625 m²⁶.
- Depending on the number of cyclists, main routes should be provided with good lighting. In remote areas, for good environmental (and fiscal) benefits, lights should be motion sensitive and turn on and off depending on whether a cyclist is passing.
- Light infrastructure can be a useful stopgap measure, which is both cheap and quick to implement and can provide a good level of safety and comfort. The idea is to use small physical objects (poles, plants, or other objects) which are quickly screwed/bolted onto the road surface to create a semi-physical separation between motorised traffic and cyclists²⁷.
- Advanced Stop Line/Bike Boxes can be used for cyclists to come to the front of the junction so that they can start first when the lights change and are clearly visible to car drivers²⁸.
- It is better not to continue cycle lanes through a small roundabout. Rather it is more advised to bring cyclists and vehicles together into a narrow lane as they approach the roundabout in order to have them before or after each other rather than approaching parallel to each other and risking side swipes and right hook crashes on exiting/entering²⁹.

- It may be a good option to allow cyclists to cross red light when indicated by a special sign, giving priority to pedestrians and vehicles having green light. It is a useful way to reduce waiting times without an expensive crossing reconstruction³⁰.
- Contra-flow cycling should be introduced and generalised city-wide. Contra-flow cycling is when cyclists are allowed to ride against the motorised traffic flow of one-way streets. This is a simple regulatory measure and highly attractive for cyclists. It creates shortcuts away from busier traffic. It has proven to be safe, even in the narrowest streets, when speeds are low and traffic quiet³¹.
- It is recommended to make 30 km/h speed limit the standard in urban areas with selected busier roads opting out and remaining at 50 km/h³².
- Consider introducing “green waves”—a series of lights synchronized so riders do not hit a red if they maintain a certain speed of around 20 km/h. The wave goes one way into the city during morning rush hour and changes direction for the evening rush hour³³.

6.4. Filtered permeability – invisible cycling infrastructure

Filtered permeability is a planning concept that “filters out” through car traffic on selected streets to create a more attractive environment for walking and cycling, while maintaining accessibility for local inhabitants, deliveries or emergencies.

The simplest and most effective solution for filtered permeability are bollards or other obstacles (plants, barriers etc.) that make a street unpassable by car, while comfortably rideable by bike. It is important to provide enough clearance (approximately 1.5 m/direction in straight line) for bicycles. Tight chicanes and similar solutions will make it impossible to use the route by less proficient cyclists, cyclists with kid trailers, cargo bikes etc. Such chicanes can also create artificial choke point and conflict points between different groups of users.

The same effect can be reached from an opposite starting point: having a dead end for cars because of natural or artificial barrier (for example a river or a fence) and opening it for cyclists (by building a cycling bridge or removing a part of fencing).



Figure 4. Dead end signs with exceptions for cyclists in Belgium (left) and Germany (right).

If making a section of a street completely unpassable by cars is not feasible, there are also other, “partial” means to reduce through traffic across an area, such as:

- One-way filtered permeability: a “gate” that can be crossed only in one direction by cars, but both ways by bicycles;
- One-way streets with contraflow cycling allowed;
- Limited turning possibility on selected crossings (i.e., no left/right turn);

- Filtered permeability solutions that allow selected other vehicles than bicycles through (e.g., deliveries in specific hours, emergency vehicles, public transport, agricultural vehicles).³⁴



In urban context, filtered permeability is used to get rid of the through traffic across the city centres or residential areas. The result is called different names in different countries: you can hear about a circulation plan in Belgium, a low-traffic neighbourhood in the UK, or a superblock in Barcelona. However, the general principles remain the same. Large scale circulation plans have recently been introduced for example in Leuven (2016, see below) and Ghent (2017).³⁵

Filtered permeability can be applied on rural roads as well. Cycling across Flanders you will encounter many “tractor gates” – concrete blocks around 20–25 cm high, that allow unhindered traffic of agricultural vehicles and bicycles, but demolish the oil pans of personal cars trying to pass.³⁶ This and more rural traffic calming measures for rural roads are discussed in a publication “Naar een eigenlijk gebruik van plattelandswegen” (“Towards a proper use of rural roads”, in Dutch).³⁷



Figure 5. Tractor lock on a rural Flemish road.



Figure 6. Typical bollards are prone to vandalism in remote rural areas, so more sturdy constructions are sometimes used to prevent unauthorised passage.

Natural areas are also typically protected with some sort of filtered permeability: you can take a shortcut across a forest with your bike, but cars need to drive around. Note that in remote places typical bollards can be prone to vandalism, so the measures to prevent unauthorised passage need to be more resistant than in cities. On the other hand, the barriers need to leave free passage for cyclists, not blocking the whole road.

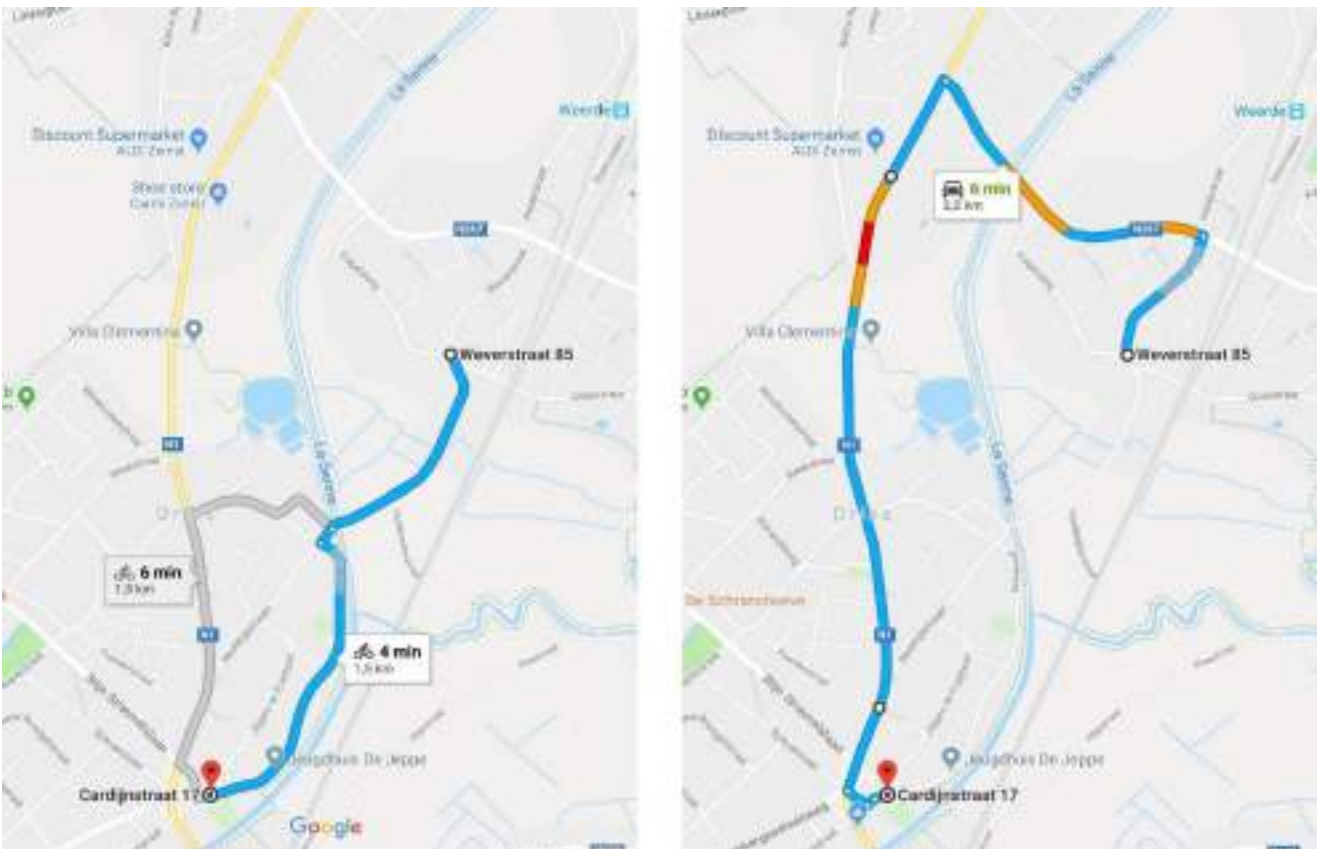


Figure 7. Filtered permeability offers cyclists a shorter route between the neighbouring villages, while eliminating through traffic from local and residential roads. Map: Google Maps.

6.5. Good practice example: Leuven

The traffic circulation plan introduced in Leuven in 2016 increased cycling volumes by 32% in one year thanks to eliminating through car traffic from the city centre. But it is not enough to build a ring road for a city, it is also necessary to change the traffic organisation inside of it.

Leuven has 100 thousand inhabitants and is the capital of the province of Flemish Brabant in Belgium. It is also home of the largest and oldest university in all the Low Countries, with more than 50 thousand students. In 2016 a new circulation plan was introduced in Leuven to eliminate through car traffic inside the city's ring road.

The centre of the city, with area of around 4 km² was divided into 5 sectors, and a car-free pedestrian zone. The new traffic organisation made it impossible to drive a car between the sectors. You can access all the sectors from the ring road, but if you want to drive for example from yellow sector to the neighbouring blue or orange sector, you need to go back to the ring road. This means that the centre is still accessible with car for its inhabitants, visitors, deliveries, or emergencies, but the through traffic was eliminated. Bicycles and public transport (buses) retained full freedom of movement across the centre.

The possibility of driving a car directly between sectors was removed by:

1. Closing short sections of street to motorised traffic entirely;
2. Introducing one-way flow for car traffic on selected sections of streets (often alternating direction between crossings), with contraflow traffic permitted for cyclists and sometimes also busses.

Three years after the introduction of circulation plan, on an average working day bicycle traffic in the city centre increased by 44%, bus ridership by 18%, while car traffic decreased by 19%.³⁸ Air quality improved already in the first year after the change, in some places the concentration of black carbon fell as much as 2.5 times³⁹.

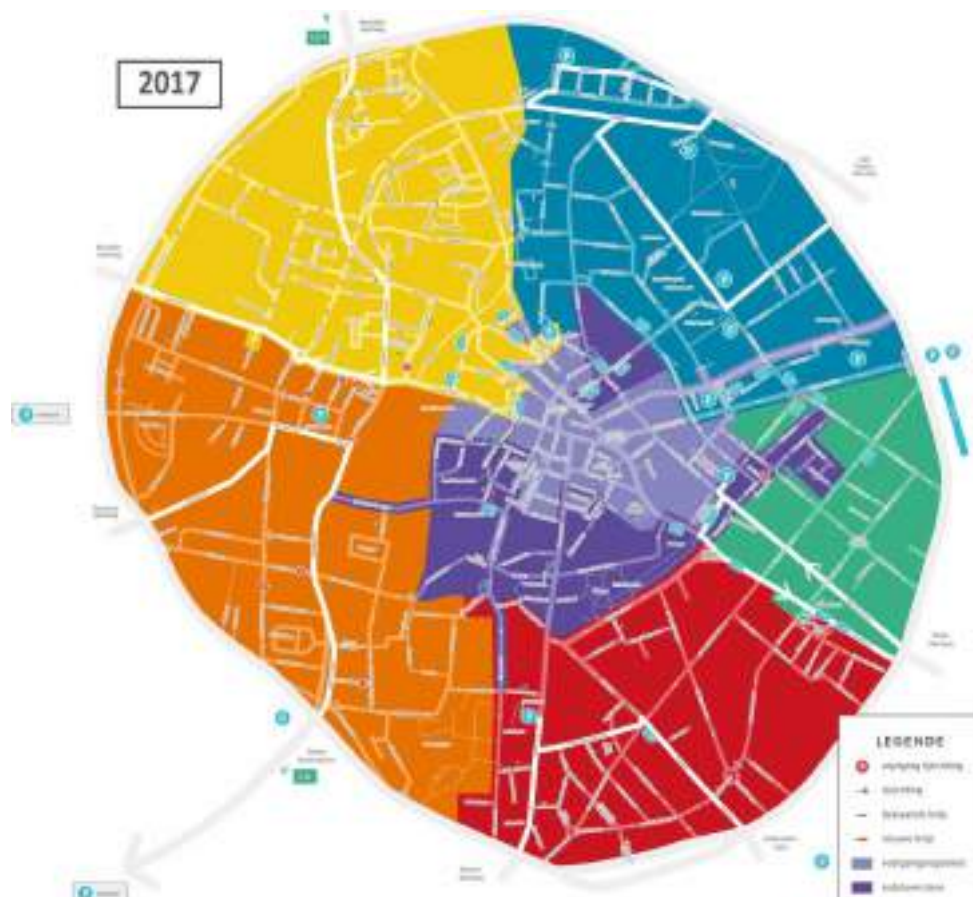


Figure 8. Centre of Leuven divided into pedestrian zone (purple) and 5 sectors (blue, green, red, orange, yellow). In order to travel between sectors by car, you need to use the ring road.

	2017 (one year after)	2019 (3 years after)
Bicycle traffic in the city centre	+32%	+44%
Bicycle traffic on the ring road	+26%	+32%
Car traffic in the city centre	-8%	-19%
Car traffic on the ring road	+9%	+1%
Bus ridership	+12%	+18%

Table 4. Effects of the circulation plan in Leuven - changes in comparison to 2016 (before introducing the circulation plan).

7. PLANNING A REGIONAL CYCLE NETWORK

7.1. The role of the regional level

7.1.1 Hierarchy of the network

Cycle networks vary in extent and range of the routes involved. Starting from the top:

1. EuroVelo, the European cycle route network
2. National cycle networks
3. Regional cycle networks
4. Local cycle networks

The EuroVelo network consists currently of 17 long-distance cycling routes crossing and connecting the continent, with total length amounting to 90,000 km. Wherever possible, these routes were designed to incorporate most important national cycle routes, for example EuroVelo 6 connects the Atlantic with the Black Sea by including, among others, French “La Loire à Vélo” and Austrian “Donauradweg”. On the other hand, where no national cycle routes had been present, the EuroVelo routes serve as an inspiration for developing national or regional networks. In this way, the EuroVelo routes form a backbone to much denser networks.



Figure 9. Hierarchical structure of cycle networks.

For example, the length of the sections of EuroVelo routes crossing the Netherlands amounts to around 1900 km. The national network of long-distance routes is more than twice as long (3900 km). This is complemented by additional 30,000 km of recreational “node network” (regional level), and if you also consider the local networks, the total length of cycle routes adds up to 90,000 km.

The 4 EuroVelo routes crossing the UK add up to 5800 km, but they are only a part of the National Cycle Network, which totalled 26,700 km (16,575 miles) in 2018.⁴⁰

Level	Network	Focus	Length
European	EuroVelo (routes number 2, 4, 12, 15 and 19)	Tourism	1900 km
National	LF-routes (to be replaced by a smaller number of “iconic routes”)	Tourism	3900 km ⁴¹
Regional	Node networks (45 regions) ⁴²	Recreation	33,900 km ⁴³
Regional	Cycle highways	Commuting	Not yet clearly defined in all 12 provinces; example length: ~150 km in Gelderland ⁴⁴
Local		Commuting	90,000 km (35,000 km dedicated infrastructure, 55,000 km in shared traffic) ⁴⁵

Table 5. Structure of cycling networks in the Netherlands.

Similarly, national cycle routes can serve as backbones for regional networks, and regional cycle routes as backbones for local networks. There are some variations in the model – smaller countries can skip regional level, while regions with very extensive cycling networks can distinguish additional levels. The important consideration is not to try to incorporate too much into one category (different users look for routes on a different scale, and a clear hierarchy improves the readability of the networks), or even worse, into one route (see section 7.4.1. Backbone approach). On the other hand, levels need to co-operate and co-ordinate with each other.

7.1.2. Challenges specific on the regional level

There are many existing guidelines that cover the principles of planning and designing cycling infrastructure (see section 6.1) and we do not intent to duplicate or challenge them. However, most of them have been developed with focus on the core urban areas. On the other end of the spectrum, the EuroVelo for Professionals website⁴⁶ provides manuals for developing long-distance cycle routes, spanning thousands of kilometres across the whole continent.

The focus on urban areas is understandable, as bicycles have been traditionally a local means of transport. This is the area where the potential of cycling is still the highest. But the arrival of Electrically Assisted Pedal Cycles (EPACs) allows to cycle faster and with lower energy expenditure, making cycling a viable option also on longer distances. Therefore, cycle networks need to expand from core urban areas into suburbs or whole regions.



Figure 10. Fast cycle route connecting Arnhem with Nijmegen in the Netherlands, with speed pedelecs allowed.

On the other hand, the long-distance cycle routes are usually in practice also developed by regions, as a part of regional policies, for example rural development. While national or international co-ordination is necessary to ensure cohesion, it is not practical to decide the detailed itinerary from the capital city of the country or Brussels.

The chapter aims to address the regional level of cycling networks and challenges specific for it. While in city centres space is a critical commodity, on the regional level key barriers are often administrative in nature. In terms of design, conflicts with pedestrians or parking are replaced by sharing the routes with agricultural vehicles and collisions with large-scale infrastructure, often belonging to the trans-European transport network (TEN-T).

We discuss the different types of regional networks – functional, touristic, and recreational, with a few selected good practice examples from Belgium, Netherlands, Germany, France and Poland. We discuss the different governance models. Basing on these examples we formulate a set of practical principles that appear to be crucial for developing a successful network. A separate section presents a few different prioritisation strategies.

Following the framework proposed in the PRESTO Cycling Policy Guide⁴⁷ for cities, we sometimes refer to regions or countries as starters, climbers, or champions, depending on their level of cycling development. We also note when an approach or a recommendation is particularly suited towards a specific stage of cycling development.

7.2. Types and examples of regional networks

There are several distinct target groups for regional cycle networks: commuters, tourists, and recreational cyclists. Specific routes or their sections can combine multiple functions (see 7.2.4), but it is important to understand the slightly different needs of these groups.

7.2.1 Functional cycle networks

Bicycles have been traditionally considered a local means of transport, with travelling speed around 16-20 km/h and perfect for daily trips on distances up to 5 or 7 km. But things change with the growing popularity of Electrically Assisted Pedal Cycles (EPACs) – bicycles that add a small electric boost to the pedal movement. EPACs constitute currently around 20% of the EU bicycle sales market with systematic 15–20% growth each year.⁴⁸ EPACs allow to cycle faster and with lower energy expenditure, making cycling a viable option for commuting also on longer distances. On the F3 cycle highway between Brussels and Leuven in Belgium, the average distance of a home-work commute by bike is as high as 22.8 km.⁴⁹

To tap into the potential of EPACs, functional cycle networks need to expand from core urban areas into suburbs or whole regions. They also need to provide a higher standard of infrastructure, allowing for higher speeds and mixing cyclists travelling at different speeds. This has led to introduction of a new mobility product: cycle highways, which combine different types of infrastructure, such as cycle tracks or cycle streets to provide a high-quality functional cycling connection. As the backbone of a cycle network, cycle highways connect cities and/or suburbs, residential areas and major (work) places.

Currently, the most extensive cycle highway network is under development in Flanders, Belgium, as a common initiative of the 5 Flemish provinces. 110 planned routes will form together a network of 2,400 kilometres. Of the 110 routes, 61 are already in use.



Figure 11. Planned cycle highway network in Flanders, Belgium.

Some of the most inspiring high-quality cycle highways, such as RijnWaalpad,⁵⁰ exist in the Netherlands. However, as for now, they do not form such a consistent network per se.

Cycle highways, under various names, are also developed in Denmark (Supercykelstier), Germany (Fahrradschnellwege), France (RER V in Île-de-France, Vélostras around Strasbourg), UK (Cycle Superhighways) and Finland (Baanat).

More information about cycle highways, including a detailed analysis of the planning process, can be found in the Cycle Highways Manual.⁵¹



Figure 12. The F325 cycle highway (RijnWaalpad) connects the cities of Arnhem and Nijmegen in the Netherlands.



Figure 13. Emerging cycle highway network in the province of Gelderland, Netherlands.



Figure 14. Plans to connect the towns by "fast cycle routes" in the Dutch province of Noord-Brabant.

7.2.2 Touristic cycle routes

Touristic routes are oriented towards people making multiday trips with bicycle, with overnight stays on the way. Often majority of users on touristic routes are short-distance day-trippers (covered in 7.2.3), but the long-distance tourists generate most of the income. For example, long-distance tourists represented 18% of 1.1 million cyclists on EuroVelo 17 - Rhone Cycle Route in 2017. But these 18% of users accounted for as much as 83% of the EUR 11.3 million of economic impact of the route.⁵² This is completely understandable: day trippers might stop for a coffee, a snack, or a lunch (but might as well bring lunch packages with them). On the other hand, long-distance tourists not only need (at least!) three meals per day, but also accommodation and occasionally other services (bike repair, laundry...) The economic benefits of cycle tourism make it worthwhile to pay special attention to this group of users.

Daily distances for most users vary between 30 and 100 km, depending on the area, weather conditions, as well as skill and fitness of the user. A 1000 km route can be a three-week adventure, but fit cyclists can complete it faster, while beginners can split the route into several shorter trips. A 300 km route provides for a one-week holiday for most users and can be considered a reasonable minimum length for a long-distance route. As it usually exceeds regional borders, national or international co-ordination is very important for development of cycle tourism.

Cycle tourists often use public transport to get to the starting point and come back from the ending point. Public transport with the possibility to carry a bicycle is therefore critical for accessibility of the route (see section 7.4.6). The more frequent “access points”, the more use scenarios are possible: day trips, weekend trips, one-week, or longer holidays.

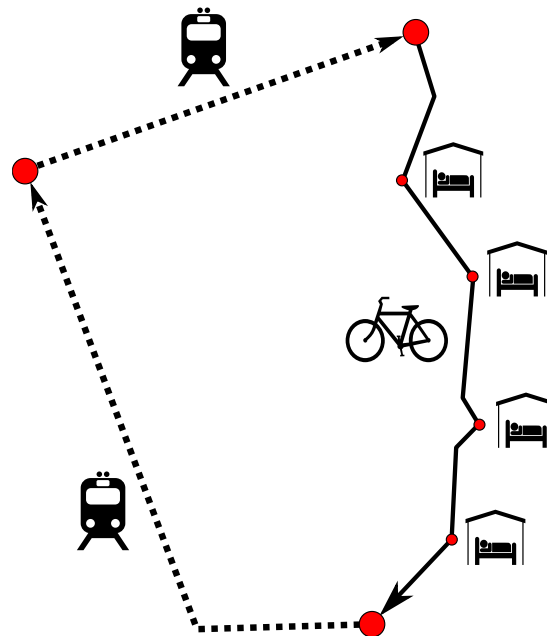


Figure 15. Typical use of a long-distance cycle route: travel by public transport to the starting point, cycling with overnight stops to the end point and return with public transport.



Figure 16. Cycle tourists with luggage on the EuroVelo 8 route. Photo credit: Vélo Loisir Provence.

Understanding the user: as the main target group travels carrying heavy luggage on their bikes, it necessitates a stricter approach to quality standards, especially surface material and quality, eliminating obstacles and steep

gradients. In this segment we also observe growing role of e-bikes: in Germany already 30% of cycle tourists use them (and therefore need charging points). The European Certification Standard for EuroVelo routes provides an overview of different criteria that a touristic route should meet.⁵³



Figure 17. Steep gradients are a barrier for all forms of cycling, but especially cycle tourists.

7.2.3 Recreational networks

Recreation targets the biggest variety of user requirements. It includes for example:

- fast cyclists on road bikes, requiring good quality of surface but able to cope with slightly higher volumes of traffic,
- families with children, for whom the separation from motorised traffic might be the highest priority,
- mountain bikers, enjoying sections of (stabilised) gravel or varied gradients.

If there are high-quality touristic routes in the region, they can serve as backbone for the recreational network. The most demanding recreational users can do short trips on the main touristic routes, while recreational side routes or loops focusing on specific target groups (road cyclists, MTB, families with children...) On the other hand, a high-quality recreational network can make it easy to define a touristic itinerary.

a) Node networks

An interesting concept for a recreational cycle network is the node network. The concept bases on assigning a number to each location (node) where cycle routes intersect. The user can use the node numbers to map out a cycling itinerary, deciding for themselves how long the trip should be and where to go.

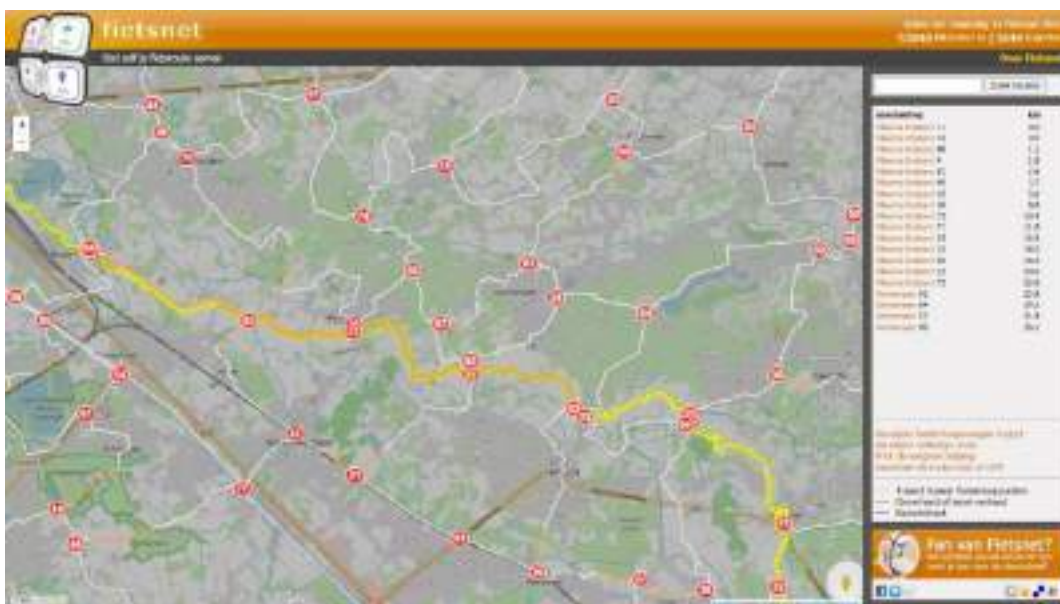


Figure 18. Part of the cycling node network between Leuven and Mechelen in Belgium. Screenshot taken from the online node route planner at fietsnet.be.

The planned route can be noted down as a series of numbers. Thematic routes or recommended circuits, for example the Wine Landscape Cycle Route in the Belgian province of Flemish Brabant,⁵⁴ can be also described as such. The same segments can be reused in other routes, without the need to put multiple signs along them.



Figure 19. The Wine Landscape Cycle Route in the Belgian province of Flemish Brabant is not signed in the field as such. The promotional materials instead list or show on the map node numbers to follow.

In the field, the sections of the network are signposted with the number of the next node. In some provinces a map of the neighbouring nodes is provided at every node.



Figure 20. Examples of signs located at a network node (knoppunt 07) and between nodes.

The node network originated in Flanders, but covers now also the Netherlands, as well as parts of Wallonia and Germany. In 2020 a decision was taken to implement a similar network in Denmark.⁵⁵

Currently the Flemish network includes 3,760 nodes and nearly 5,700 connections between them, with total length exceeding 13,000 km.⁵⁶ Distances between neighbouring nodes vary from a few hundred meters to 5-7 km (some are longer, up to 12.8 km in one case). Looking at the numbers it should be however noted that Flanders is a very densely populated region (484 people/km²).

Nodes		3760	
Node connections		5692	
Connection length	total	13,375	km
	mean	2.35	
	standard deviation	1.61	
	minimum	0.1	
	1 st quartile	1.14	
	median	2.09	
	3 rd quartile	3.27	
	maximum	12.8	

Table 6. Flemish cycle node network in numbers.

A node network is a good choice for champion regions, with existing extensive and coherent network of cycle-friendly routes (cycle tracks, greenways, agricultural roads with good surfaces etc.) For starter regions, it might be better to focus on bringing some selected routes to a consistent quality, instead of trying to cover the whole area with a comprehensive network (see section 7.4.1. Backbone approach). While travelling between the nodes in Flanders is almost uniformly a pleasant experience due to the developed infrastructure, in the neighbouring Wallonia cycling facilities are scarcer and planning a route with the use of the nodes can result for example in following a busy national road for 13 km in a row.

b) Other examples of recreational networks

The RAVeL network in Wallonia (Réseau Autonome des Voies Lentes – autonomous network of non-motorised paths)⁵⁷ represents an alternative approach to the topic. RAVeL started with laying greenways along towpaths and disused railway lines (see section 7.5.2 Low-hanging fruits) and is gradually interconnecting them into a more coherent network. As for now, it includes 45 routes with a total length of 1,440 kilometres. The density of the network is much lower (nearly 10 times lower than for the node network in neighbouring Flanders), but at this stage of development it is perfectly reasonable to focus on lower number of routes, to bring them to high quality, instead of dispersing funding.



Figure 21. Many RAVeL routes in Wallonia have been built on disused railroad lines.



Figure 22. On a busy coastal route in Zeeland (Netherlands) separate variants have been provided for fast (left) and slow (right) cyclists.



Figure 23. Provisional connection on RAVeL L126 provide two alternative variants: 1. on forest road, traffic free, but with steep incline; 2. on public road, flatter and better surfaced, but in high traffic.

7.2.4 Combining different functions

The fact that there are several distinct target groups for regional cycle networks does not mean that specific routes cannot combine multiple functions. Especially the starter regions should begin with routes that can serve all different groups of users to make best use of limited resources. But even in the champion regions dual functionality is not uncommon.



Figure 24. The cycle path and tunnel is a part both of the F3 cycle highway (upper sign) and the node network (lower sign, directing towards node 37).



Figure 25. RAVeL 38 is a part of the long-distance route number 2 and EuroVelo 3 – Pilgrims Route.

Example: in the Netherlands over the past few years the recreational node network has been synchronised with the long-distance national routes (LF).⁵⁸ This means that the long-distance route can also be described as a series of numbers connecting nodes, the routes between nodes follow exactly the same roads and paths, and both types of signs are placed on the same support poles. Of course, not all the connections between nodes have to be a part of a long-distance route. The aim is to make the whole system more readable for the user and the maintenance cheaper.

Starter regions might want to start with connecting the city centres with their suburbs and surrounding area. These routes have highest potential to be useful for all the three main groups of users.

- Inhabitants of the suburbs can use the routes to commute to the city centre.
- Long-distance tourists can safely enter and leave the city, with all its attractions and services. It also allows popular cities to disperse tourists out of the centres. On typical long-distance routes, the sections entering/leaving cities are those which need dedicated infrastructure the most. Outside the agglomerations it is often easier to find local roads with low volumes of traffic.
- Cities are also the most common source of recreational trips. Per definition, cities are densely settled, and the inhabitants appreciate a possibility to safely cycle outside.

It is, however, often also the most challenging part to realise. Other possible prioritisation strategies are described in section 7.5.



Figure 26. Signage of regional node network (lower sign) aligned with long-distance routes (upper sign). The LF4 (part of EuroVelo 15) turns right towards node 26 and until reaching it will follow the same route as the node connection.



Figure 27. A map of a part of the Dutch cycle network posted at node 31. Long-distance route (LF17): thick dark blue lines; other node connections - dashed green line; other (functional) cycle paths: dashed red lines.

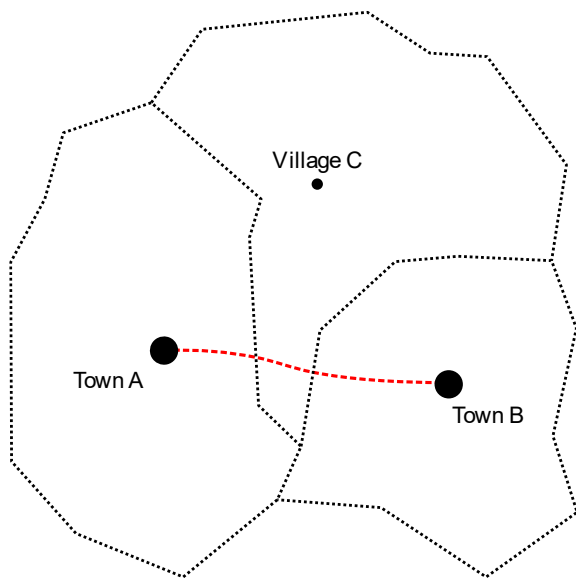
7.3. Governance and financing

7.3.1 Municipal or regional competence?

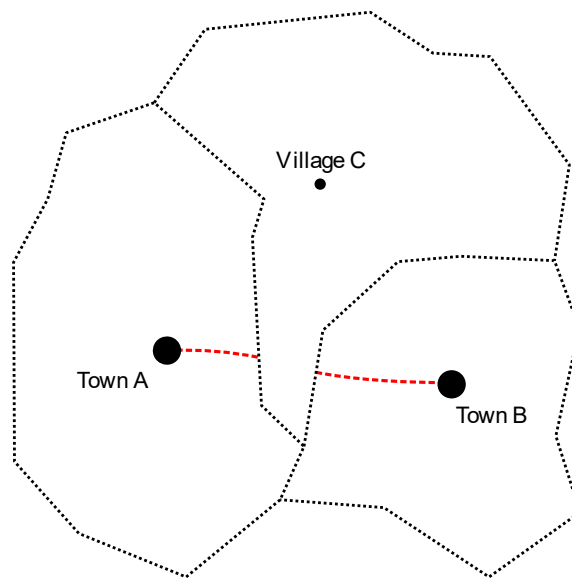
Cycling has traditionally been considered a local issue. The governance structures reflected that and competences in cycling infrastructure were assigned to municipalities. However, regional networks require planning, financing, and maintenance structures on regional level. There are some examples of networks developed in voluntary agreement of neighbouring municipalities (for example Copenhagen Cycle Superhighways⁵⁹), but most of best practices report a higher-level administration taking a decisive lead.

Planning regional routes by municipalities can result in lack of cohesion or suboptimal itinerary choices, because local priorities do not necessarily align with regional ones. For example, an optimal route (“desire line”) between two towns A and B with a high potential for cycle traffic passes a short stretch through a peripheral part of another municipality C (

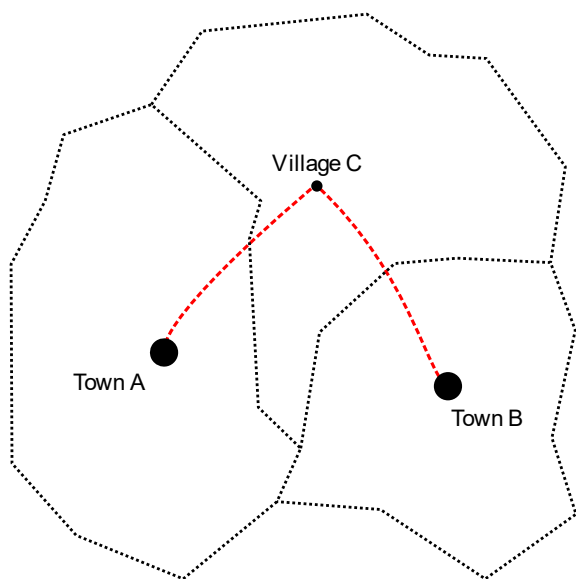
Figure 28, case 1). As C is not interested in the stretch, this can result in failing to develop it, leaving a hole or a low-quality section in the route (case 2). The municipalities can also agree to adjust the itinerary to include sections important for C, at the price of the quality of connection between A and B (case 3). Finally, A and B can adjust the itinerary to bypass C, with a negative effect at least on route directness (case 4).



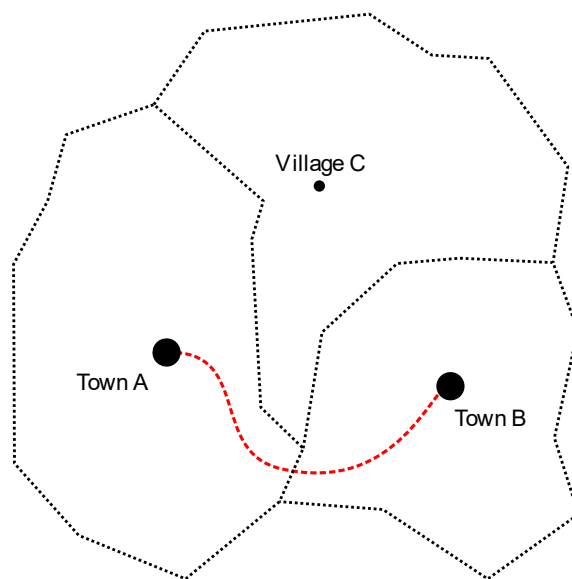
1. Desire line



2. Missing link



3. Compromise



4. Bypass

Figure 28. Possible scenarios of municipal borders affecting route itinerary.



Figure 29. Cycle track Połczyn Zdrój – Złocieniec in Poland, with a missing 3-km section in the middle, within the administrative borders of Ostrowice. The missing section was completed 8 years after the rest of the route.

The problem gets even more prominent for longer routes, crossing 10 or 20 municipalities. Even if only one of them is not interested, the whole route is jeopardised. On top of that, the quality of design is often not consistent along the route.

On the other hand, implementation by the regional road administration allows for economy of scale. It is generally cheaper to contract construction of 20 km of cycle tracks at once than 10 times 2 km. The regional road administrations usually also have staff and equipment for stringent quality assurance, for example laboratories to control surface composition and parameters.

7.3.2 Financial aspects

While there are some examples where voluntary co-operation of municipalities brings high-quality results, they almost uniformly come from the champion countries (Denmark, Netherlands). Flanders is moving forward with a half-way solution: the competence remains with municipalities, but the regional level takes lead in planning and provides 100% financing for the routes (up to 110% to compensate for the effort needed at the planning and design stage⁶⁰). But the success stories from starter regions base on the regional administration taking lead in the whole process.

In Poland, all 16 regions invested EU funds from MFF 2014-2020 into cycling networks – around EUR 400 million in total. The ones that have achieved the greatest progress in providing a coherent network have been the ones that planned, financed, and implemented the routes at regional level (Małopolska, Western Pomerania). In Małopolska the average costs of a cycle track designed and built by the regional road administration were under 50,000 EUR/km,⁶¹ at least two times lower than in the regions that provided financing but left the implementation to municipalities (for example 130,000 EUR/km in Pomorskie, despite overall lower quality – only 64% asphalted⁶²).

Region and country	Network name/type	Supra-local involvement in:			
		Planning	Financing	Implementation	Maintenance
Flemish Brabant, Belgium	Cycle highways (functional)	Leading role	Up to 110%	Pilot projects only	-
Noord-Brabant, Netherlands	Cycle highways (functional)	Potential assessment	50-80%	-	-
Utrecht, Netherlands	Cycle highways (functional)	Defining priorities and bottlenecks to address	65%	Selected projects	-
Greater Copenhagen, Denmark	Cycle highways (functional)	Part of the steering group	40-50%	-	-
Wallonia, Belgium	RAVeL (recreational)	Leading role (municipalities can create pre-RAVeL routes)	100%	“Hard” infrastructure and signage (municipalities provide benches, bins etc.)	Surface repairs, engineering structures, signage (municipalities responsible for cleaning)
Western Pomerania, Poland	Touristic	Leading role	92.5%	All the main routes	-
Małopolska, Poland	Touristic	Leading role	100%	Almost all the main routes	-
Green Velo, Poland	Touristic	Leading role	95%	Sections along supra-local roads	-

Table 7. Comparison of responsibilities across different regional networks.

The Cycle Highways Manual contains more in-depth analysis of cycle highway governance in several North-West Europe regions.⁶³

7.3.3 Other administrative issues

Other administrative barriers to overcome include:

- Lack of or inadequate legal provisions for signing long-distance cycle routes or signing cycle routes on public roads. Starter countries often do not have signs for long-distance cycle routes as a part of their road sign and signal system. For example, in Poland up until 2013 the cycle routes could only be distinguished by colours (which created confusion at meeting points of routes with the same colour) and the repertoire of signs was insufficient to provide clear information (especially on complex junctions). The EU co-funding of the Green Velo project⁶⁴ was used as a leverage to update the outdated national regulations for signs and signals to include a modern system of signing long-distance cycle routes. The necessary signs and rules of locating them on public roads were finally introduced by ministerial ordinances in 2013.⁶⁵

- Regional road administration not having competence outside the regional road network. The assigned competences often follow the structure of the road network for cars. At the same time, a road which is local or even non-public in the car network, can be a part of a main regional cycle route (see section 7.4.2. Unbundling cycling and road network). Consequently, the main road for motorised vehicle between town A and B has one owner, but the main cycling route connecting the same towns can have 10 or 20 owners, creating additional governance challenges.
- Regulations forbidding construction of cycling infrastructure on flood embankments, along railways or motorways. These are often the optimal corridors for regional cycle routes (see b)), but even in climber countries you can find regulations preventing the use of them. For example, only very recently, in 2020, Germany adopted a legislative change that allows construction of cycle tracks on motorway bridges.⁶⁶
- Lack of tools to acquire land for cycle track construction. While many routes can be provided with limited land acquisition (see section 7.5.2 Low-hanging fruits), eventually the cohesion of the network requires leading some routes through privately owned, for example agricultural, land. Tools that exist for roads or railways need to be applicable also for cycle tracks. Cycling deserves at least a level playing field in this area (and perhaps a certain preference, as cycle tracks are less disrupting for the neighbouring environment than heavier infrastructure for motorised vehicles).

7.4. Practical experiences

7.4.1 Backbone approach

A very common mistake in countries that only start to develop cycle tourism is trying to show the tourists everything, sometimes in a single route. Every seventeenth-century church, every cemetery and almost every meadow has something special to see and it is impossible to choose the most interesting ones. Sometimes, it can become a political question: why does the route visit the town of A and not B? We need to include both, otherwise the second mayor will be unhappy! So, the route leads from one attraction or town to the next, and the next, and the next...

As a result, the length of the route increases and can easily double or triple compared to initial estimates. Some attractions are remote and difficult to reach, for example on a top of a hill. Of course, there are also many obstacles to overcome between attractions, such as poor road surfaces, busy streets, or dangerous intersections. Due to the greater length of the route, there is not enough money and capacity to solve all these issues. Moreover, the complicated route is not clearly legible.

This kind of approach can be somewhat pejoratively nicknamed as 'Route of the Mad Tourist Guide'. The 'mad tourist guide' wants to show everything to everyone, not considering the effort it requires from the tourist.



Figure 30. The Green Velo route leaving Elbląg follows a complicated route through the hills, resulting in detour factor close to 2, gradients up to 15% and many sections of badly rideable surfaces.



Figure 31. Increasing the length of the Green Velo route from the initially planned 1000 km to 2000 km resulted in many non-rideable sections.



Figure 32. Overcomplicated proposal for the EuroVelo 8 itinerary in Friuli Venetia Giulia (Italy), as surveyed in 2018 (partially simplified later as a part of the development process).

The opposite of this approach is a system with clear backbone and side routes. The main route, the "backbone", should not only be attractive, but also as direct and easy as possible. The local side routes or loops lead to attractions that are a bit remote or more difficult to reach. Of course, the side routes can also be added at later stages. Such a network design can serve different users, with very different interests, ages, types of bicycles, holiday lengths, levels of physical constitution and experience.

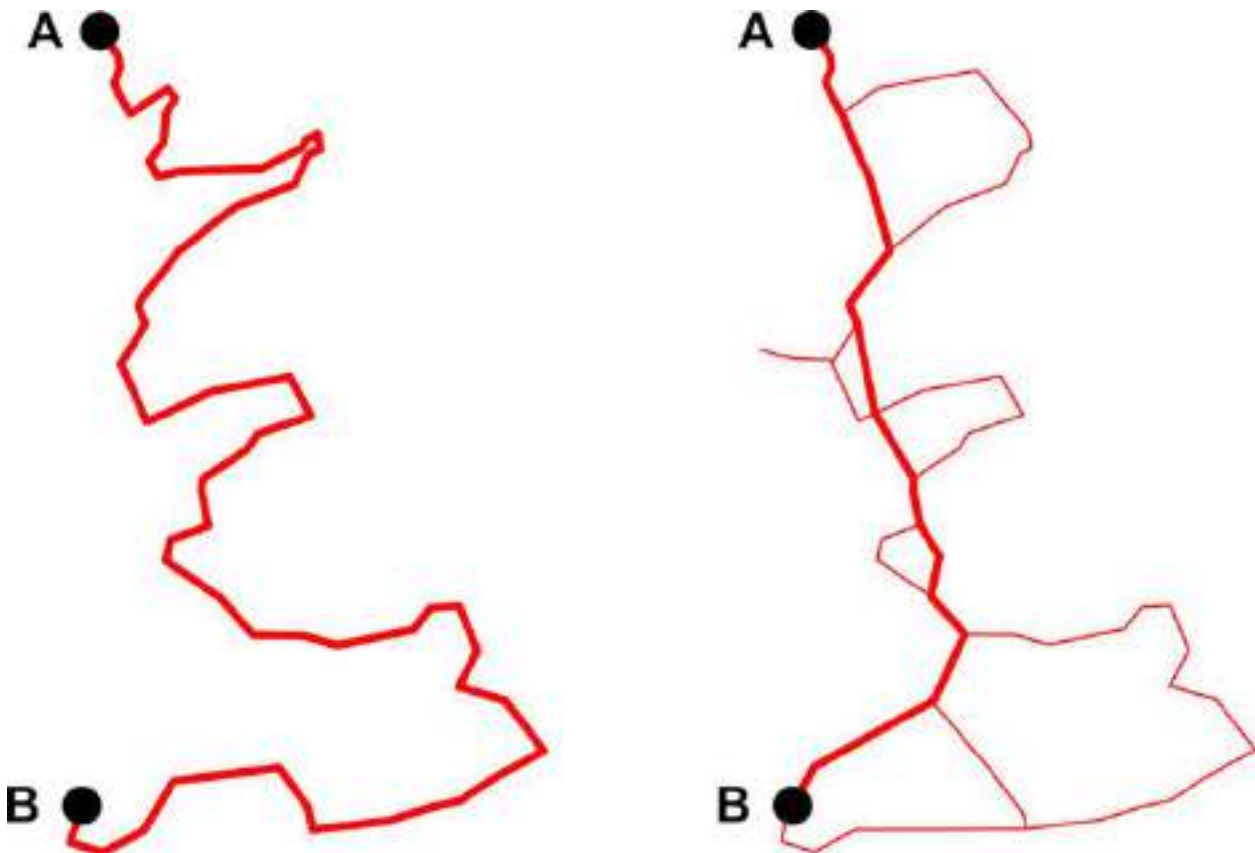


Figure 33. Left: 'Route of the Mad Tourist Guide'; right: backbone route with side routes.

A beginner or a family with children can keep it easy and just follow the main route. Users with a little more experience can explore the side routes, but in case of bad weather, technical or health problems, they can also return to the main route and quickly go to the next accommodation or train station. Experienced tourists are also happy if they can use the main route to easily reach the side route that they are most interested in. Long-distance tourists, travelling around Europe, can easily cycle with heavy luggage from one sleeping place to another via the main route and then explore the area without luggage using local side and walking routes.

7.4.2 Unbundling cycling and road network

The main routes for cars do not have to be main routes for bicycles. Regions assuming responsibility for regional cycle route networks sometimes focus on equipping regional roads with cycle paths. However, routes that follow more local roads or make use of corridors outside the road network (riverbanks, railways), might be more attractive, comfortable, cost-efficient, and even offer more direct route for some relations. Sometimes a relatively small investment in a cycle bridge, cycle tunnel or a stretch of cycle track connecting two local roads can open a long corridor for cycling.

Notes:

- There is a hypothesis that unbundling the networks is also beneficial for safety, but it has so far only been confirmed in urban settings.⁶⁷ Up to date, no similar research for rural areas is known.
- Sections of cycle tracks along regional or national roads might be necessary anyway to ensure coherence of the network and making 100% of trip targets accessible by bicycle. However, they might not be the highest priority if an “unbundled” route is provided.
- To better address the road sections, which are a part of the main cycle network but have only limited importance in the road network, several countries developed the concept of bicycle streets.⁶⁸

Example: The towns A and B, 20 km apart, are connected by a busy primary road number 101. The road currently provides the only bridge across River Ro. A cycling connection between A and B could be provided by building 20 km of cycle path along the road nr 101 and adapting the bridge. But alternatively, a cycle route could be formed by constructing a separate cycle bridge between villages C and D. Because traffic volumes on local roads A-C and B-D is much lower than on the road 101, segregated cycle tracks are not necessary along them, cyclists can safely share the carriageway with the motorists. Such route would probably not only be cheaper and more attractive, but also offer much more direct local connection between C and D.

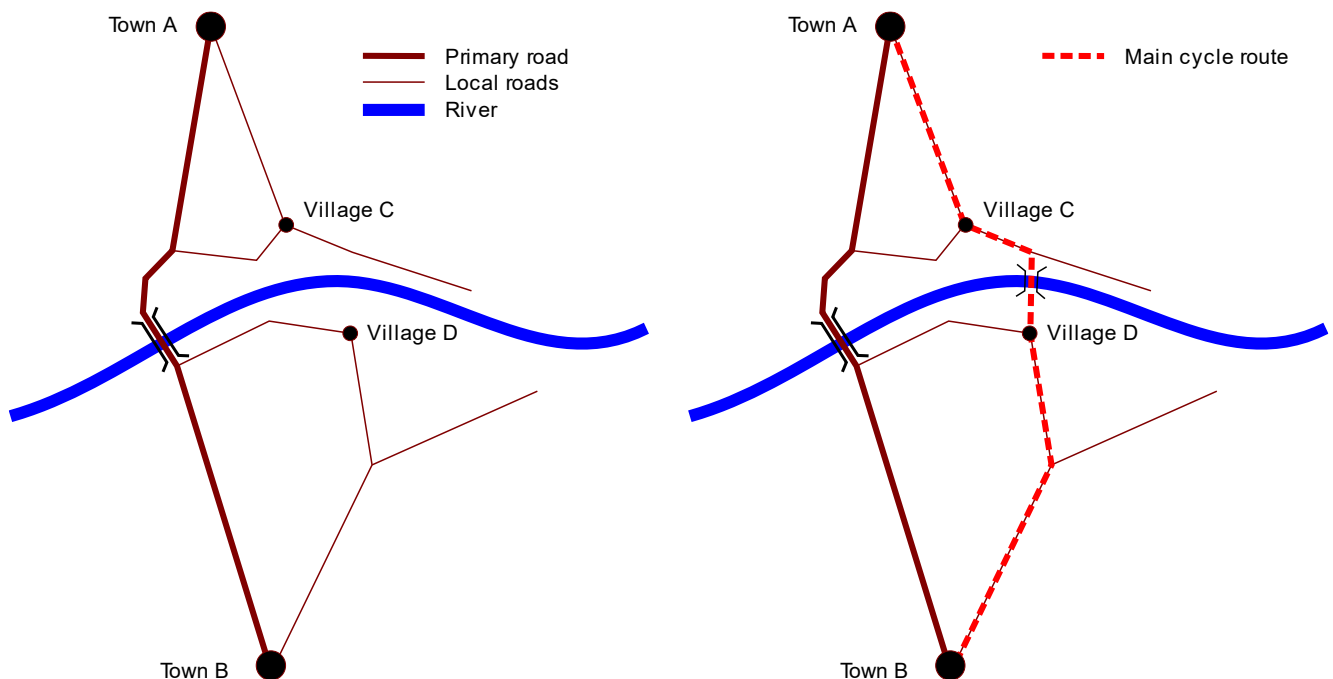


Figure 34. Construction of an independent cycling bridge allows for unbundling of main routes for cars and bicycles.

Of course, there are a few “ifs” in the scenario:

- If the villages C and D were located along the primary road, a route passing through a separate cycling bridge in a different location could have a lower potential for cycling traffic.
- If the new bridge between C and D were to be built not only for bicycles, but also for cars, it could result in a significant increase of traffic on the local roads A-C and B-D. Therefore, it is critical to keep some connections in the network unavailable for cars (see also 6.4. Filtered permeability – invisible cycling infrastructure).

In the example the barrier is formed by a river, but the same principles can apply for example to a railroad line or a motorway. A railroad upgrade or a road by-pass construction can be a perfect opportunity to unbundle the main cycling and motorised routes.

7.4.3 Non-public roads

The regional cycle routes can (and should, as explained in section 7.4.2) be to a large degree independent from the public road network. Routes that make use of non-public roads – for example agricultural, forest, industrial or water management – are safer and more attractive, but also create their own challenges.

One of them is a risk of temporary restrictions, including for example:

- Protected, industrial or other areas that can be crossed only during specific hours,
- Forest roads that might be closed because of hunting, logging or a high risk of fire,
- Areas that are periodically flooded,
- Ferries only operating on weekends or during holidays.

Such cases should be avoided whenever possible. Ideally, regional cycle routes should ensure the same level of service as public roads. For example, in Wallonia, the article 13 of the Forest Code excludes the RAVeL routes from the general provisions allowing to close a part of forest for public in case of a hunt or a fire hazard.⁶⁹

However, if a temporary closure is expected on a cycle route:

- (Potential) restrictions and their extent should be clearly communicated in advance – on the route itself, but also on the website, maps etc.;
- It is recommended to provide alternative itineraries.



Figure 35. Signposted detour in case of high water levels along the EuroVelo 15 and R6 regional cycle route in Hessen, Germany.



Figure 36. Different variants of the Thames route - crossing park in daytime, on public roads during the night, when the park is closed.

7.4.4 Integrating elements of cycling infrastructure in other investments

Investments in other infrastructure often provide an opportunity to improve conditions for cycling. A railroad modernisation can be an opportunity to provide a high-quality cycle highway along it. Putting a cycle track on top of an anti-flood embankment during its upgrade is a no-brainer. A road by-pass project can serve to funnel the car traffic to the main road, while cycle tunnels strategically located under the by-pass connects local roads allow more pleasant routes into the town for active mobility.

On the other hand, missed opportunities make the development of cycle network much more difficult and expensive. Large scale infrastructure, such as belonging to the Trans-European Transport Network (TEN-T), can be a significant barrier for cycling, cutting off suburbs from the city centre or forcing long detours. Adding a cycle tunnel or bridge at a later stage is more complicated and costly, creates disruptions and often results in lower quality of infrastructure.



Figure 37. The construction of M5 motorway in Hungary interrupted a popular cycle path connecting towns of Mórahalom and Domaszék with the city of Szeged. The cycle path was used both for commuting and tourism (as a part of EuroVelo 13).

The barriers created by the TEN-T network are most prominent in countries only starting to develop cycling infrastructure, but even in the Netherlands, with long tradition of cycle-inclusive planning, the large-scale infrastructure is surprisingly often a direct threat to the growth of bicycle use.⁷⁰ According to the CROW manual, the issue was supposed to be controlled by the new Environment and Planning Act, but at the time of writing it has not entered into force yet.⁷¹ On the F3 Brussels – Leuven cycle highway in Flanders, the construction of the missing bridge over the Brussels ring road will cost 24 million euro – more than the rest of the 26-km long route.⁷²

The problem is mostly administrative in nature. Improving conditions for cycling is usually not a part of core business for railway infrastructure or water management companies. But all those companies are financed by the same taxpayers, and from the point of view of a user of the transport system, the narrow sectoral approach makes no sense. Procedures to co-ordinate large-scale infrastructural investments with cycle plans and integrate necessary cycling facilities from the very beginning of the planning process are a pre-requisite for a rational regional cycle policy.

The scope and type of facilities to include in an infrastructure project depends on the type and location of the project. Table 8 be used as a rough guideline.

Type of project	Focus areas for integrating cycling
All road and railroad constructions and upgrades	Sufficient density of cycle crossings – preferably higher than density of crossings available for motorised traffic; see a). AND Cycle infrastructure along the (rail)road if there is potential for cycle traffic and no reasonable alternative route exists; possible synergy with service roads; see:
Additionally, for ring roads/bypasses of a town/city	Circulation plan in the bypassed area that ensures elimination of through motorised traffic from it.
Additionally, for road projects in new itineraries	Adaptation of the substituted road for safe walking and cycling. Old road that does not need to carry long distance traffic anymore can be redesigned to better accommodate cycling traffic. Of particular interest are bridges and tunnels, where reusing existing structures can bring substantial savings.
Additionally, for railroad line constructions or upgrades	Safe cycle parking at stations, accessibility of platforms with bicycles.
Metro/tram lines	Redevelopment of affected streets to cycle-friendly standards.
Building construction/renovation	Safe cycle parking, closer to the entry than car parking.
Flood defences (levees, seawalls), inland waterways	Cycle infrastructure along the river/canal/coast (possible synergy with service roads).

Table 8. Focus areas for integrating cycling into other infrastructure projects depending on type of the project.



Figure 38. Visualisation of the F3 cycle bridge over the Brussels ring road (under construction now).

7.4.5 Barriers and corridors

An important factor affecting planning a cycle network is major linear barriers, such as:

- motorways and other primary roads,
- railroad lines,
- main rivers and canals.

Those should be assessed from two main perspectives: both as a barrier, and as a potential corridor.

a) Roads, railways, and waterways as barriers

From the barrier perspective, the first step is to make an inventory of existing cycle crossings across the barrier (and, in case of doubt, also assess their quality). This should be complemented by identifying locations where a new cycle crossing would significantly improve directness of an existing cycle route, allow to create a new one, or unbundle the main cycle route from the primary road network (see section 7.4.2).

Generally, the barrier should be more permeable (offer more crossings) for cyclists than for motorised traffic (see section **Error! Reference source not found.. Error! Reference source not found.**). Even if you did not want to encourage more cycling, 10 or 20 km detour for car drivers is much more reasonable than for cyclists – motorised vehicles simply do not need as many crossings as cyclists.



Figure 39. Bicycle only crossing across the TEN-T railway line Ghent – Antwerp.

b) Roads, railways, and waterways as corridors

Sections of railways, waterways and, in some cases, also major roads, can be not only a barrier, but also an attractive, direct, and safe corridor for a cycle route. They usually include a buffer space next to the tracks that because of safety reasons, vibrations or noise is not suitable for any buildings or planting trees, but perfectly suitable for cycling infrastructure.

Especially railways and waterways offer good opportunities for locating cycle route alongside. Their advantages include low gradients and limited number of crossings with road network (and the easiness of integrating grade-separated crossings for cyclists at the locations roads cross a railroad or waterway). The cycle path can also serve as access for maintenance of the railway or waterway.



Figure 40. Cycle highway F3 follows the high-speed train line for most of its route between Leuven and Brussels.



Figure 41. A section of EuroVelo 6 following Canal du Centre in the region of Bourgogne-Franche-Comté, France.

Most of the Flemish extensive cycle highway network⁷³ is planned along railroads or canals. Other examples of cycle highways utilising railway corridors include RS1 near Mülheim in Germany, or de Liemers (Arnhem – Zevenaar) in the Netherlands. Numerous long-distance and regional cycle route follow rivers and canals.

The motorways and other primary roads are usually not so attractive, because of the noise and pollution generated by cars. Additionally, many interchange types necessitate detours or elevation change for the cycle track along the main road. As explained in 7.4.2, unbundling main routes for cars and bicycles is often a good idea. However, in urban agglomerations this general assumption might be worth reconsidering. The environmental nuisance from cars is usually alleviated by noise barriers, and more compact interchange types, for example diamond, are more common.

In the Greater Copenhagen area, the cycle superhighway C95 (also known as the Farum Route) follows the motorway number 16 for 9 km. It is the most popular cycle superhighway around Copenhagen and very successful in encouraging daily use of bicycle also for longer distance, with the average commuting trip of 15 km.⁷⁴ Also in Flanders several cycle highways connecting the region to Brussels, either under construction or in design phase, have been at least partially located along motorways: F28 along A12, F203 along A3/E40, F204 along A4/E411. In all those cases cycle tracks along motorways allow for less noise, less conflicts with cars, and fewer disruptions than cycling infrastructure on parallel secondary roads.



Figure 42. Cycle tracks along a motorway integrated in the interchange design. Farum Route, Greater Copenhagen.



Figure 43. Construction of the F203 cycle highway along the E40 motorway to the east of Brussels. The motorway is behind the noise barriers on the right.

Other situations, where it might make sense to collocate a cycle track along a motorway, include major bridges, tunnels, and causeways where constructing a separate engineering structure for cyclist would be less feasible or much more expensive. On bridges, locating the cycle path below the car level not only offers protection from wind and rain, but also usually reduces the need to climb to the bridge.

Note that all the pros of locating a cycle route along a railway, a waterway or a major road come also with a common challenge: the route will be less accessible from across the barrier. To use the route as a backbone, additional tunnels or bridges might be necessary to connect the routes from across the barrier and ensure coherence. Or, as in the case, for example, of the aforementioned Farum – Copenhagen cycle highway, and many river routes – provide bidirectional cycle tracks on both sides.



Figure 44. Cycle track on the lower level of the S33 expressway bridge across Danube, Austria.

7.4.6 Public transport

Cycle trips are often combined with segment(s) on public transport. For typical commuting trips cycle parking and bike sharing systems at stations can increase the catchment area of the public transport; for recreational and touristic trips, cyclists use public transport to get to the starting point and/or come back from the ending point with their bike. Public transport can also provide an alternative to less developed or particularly difficult sections of a route, where the desired level of safety or comfort has not been reached (yet).

The section focuses on issues of particular importance for planning the network; the EuroVelo manual on “Combining cycling with public transport”⁷⁵ provides further recommendations and specific guidance for different modes of transport.

Access points

Having the possibility to end the trip in a different place than the starting point greatly increases available options for recreational or touristic trips. The more frequent “access points”, the more scenarios are possible for short day trips, weekend trips, one-week, or longer holidays.



Figure 45. Western Pomerania regional cycle network (blue lines) with main access points: by long distance (Intercity), regional (Regio) and narrow-gauge (Wąskotorówka) trains.

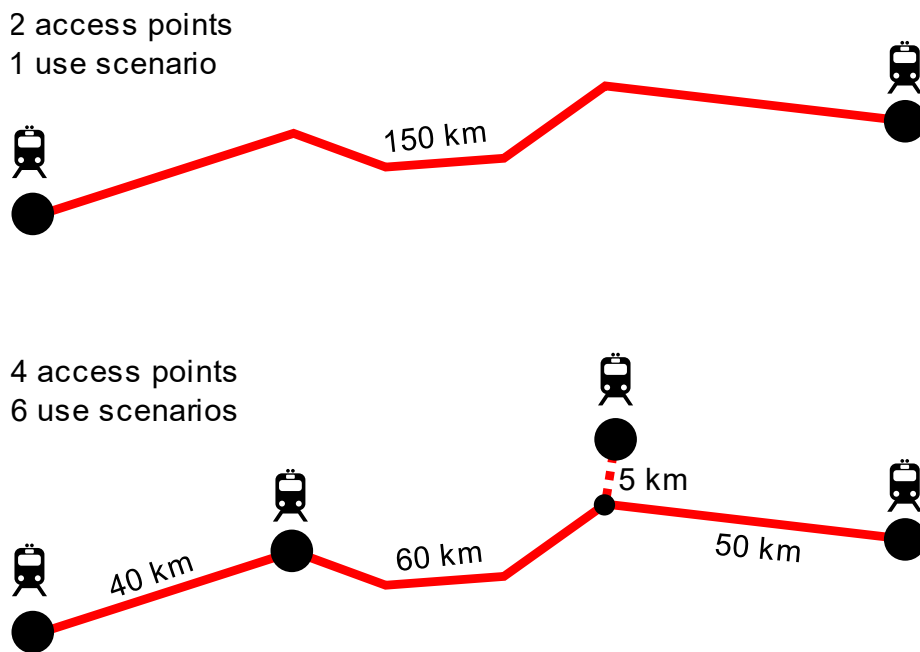


Figure 46. Top: having only 2 public transport access points to a 150 km long route forces riding the whole route in one trip. Bottom: 2 additional access points allow trips of varying length, from 40 km to 150 km, on the same route, catering for a much wider range of users.

Therefore, the regional cycling network should be planned considering the public transport access points, their infrastructure (accessibility of platforms, information about stopping locations of bicycle carriages), and available connections. It does not mean that the main routes must include all possible train stations in the region, in many cases it might be more beneficial to add a connecting route between the station and the main route instead.

Different aspects of public transport can be improved as a part of the regional network development: stations can be modernised (see also 7.4.4. Integrating elements of cycling infrastructure in other investments) and new trains with more space for bicycles can be bought (or more space for bicycles added on existing trains).



Figure 47. Simple, straight ramps provide a more reliable and higher capacity access to platforms than lifts. Stein-Säckingen, Switzerland.



Figure 48. A pictogram of bicycle indicates on the platform the location where the bicycle carriage stops. Skovbrynet St., Denmark.

Public transport offer

Two main aspects of the public transport offer affect the functionality of an access point:

1. Number or frequency of connections. If the number is very low, the specific hours also need to be considered and cross-checked with the route use scenarios. Can you get from major cities to the starting point in the morning? Can you come back in the evening?
2. Number of bicycle places per connection or a total per day.

Several good practices emerged in 2021, in response to increased demand for bicycle carriage. For example, the West Pomerania region removed some chairs from one of their regional trains to increase the available bicycle spaces in the carriage to 30. The train leaves from the region's capital to the coast in the morning, and comes back in the evening, taking into account the dominating travel direction.⁷⁶

Similarly, the Belgian trains (SNCB/NMBS) removed part of seats in some carriages to increase the number of bicycle spaces from 2 to 10 per train. In total it provided 600 additional places on two main lines.⁷⁷ By 2025 new carriages should increase the capacity from current 4450 to 6700 bicycle places,⁷⁸ but a quick action was necessary to address the discrepancy between supply and demand on the most popular connections from Brussels to Ostend, Eupen and Luxemburg.

Catchment area

Public transport system can also benefit from the regional cycle network. Good cycling access points mean expanding the catchment area of stops and stations, increased off-peak usage and reduced demand for car parking. Developing a cycling network around public transport stations can increase their catchment area more than 30 times.

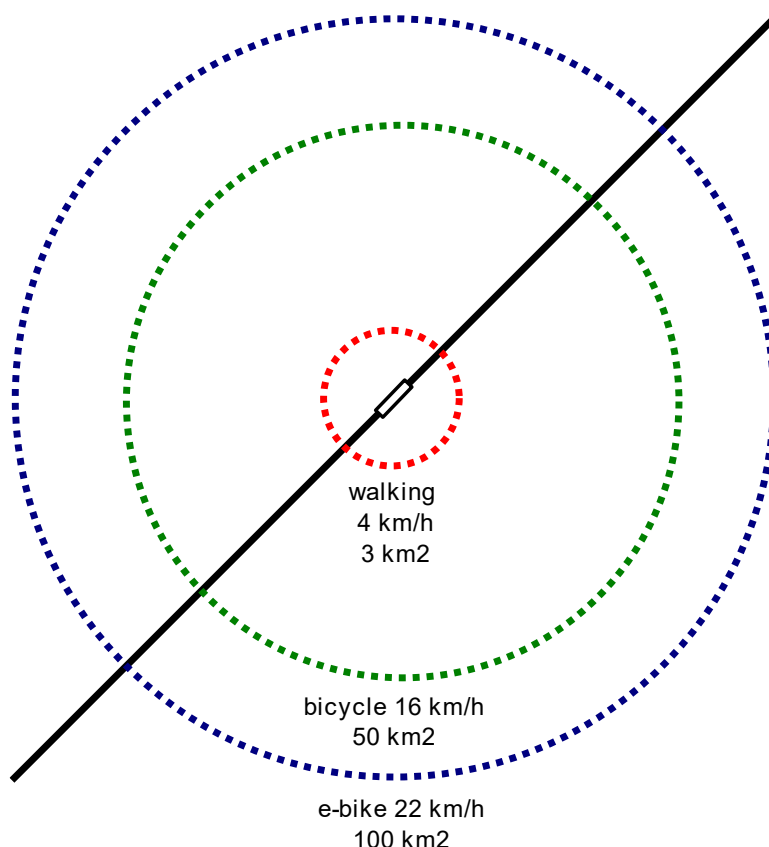


Figure 49. Area reachable in 15 minutes walking, cycling on a conventional bicycle, and cycling on an e-bike.

Some planners argue against cycle routes along the railway lines, as this allegedly creates a competition between two sustainable modes of transport. However, trains and bicycles should rather be seen as complementing each other in serving different ranges and types of trips. Given the time needed to get to the station, wait for a train, and then get from the station to the destination, train is not the most efficient means of transport on short, easily cyclable distances. Having a cycle route along the tracks increases the range of travel options for people living

along the railway without having to resort to use a car. At the same time, it allows these living in between stations to be in the catchment area without the need to stop the train every few hundred meters.

7.5. Prioritisation strategies

It is not always possible to build the whole network or even a complete route at the same time. Good choice of the starting sections maximalises the share of the target users that can already start using the route after the first investments. This in turn creates a momentum for further upgrading the route or extending the network. Celebrating progress, for example by photo opportunities when opening subsequent stages, can be an important element to gather political support. On the other hand, poorly chosen first investments (not connected to other sections, difficult to reach...), which do not attract cyclists, can discourage continuation of the effort.

The section describes three main approaches to prioritisation, basing on potential usage, ease of implementation and level of improvement in conditions for cycling. In practice, development of a regional network will use a combination of these. For example, West Pomerania defined the priority corridors on basis of the location of the main touristic traffic generators (potential) and identification of low-hanging fruits (ease of implementation).⁷⁹

7.5.1 Highest potential

A reasonable strategy is to identify connections that can serve the most bicycle trips. For functional networks, this can be done by selecting from the traffic model trips within reasonable length (for example between 5 and 20-30 km). The Cycle Highway Potential Map, developed in the frame of the CHIPS project provides a rough estimation of potential traffic for all regions of the EU, basing on Eurostat demographic data (grid size 1x1 km).⁸⁰ The results should of course be refined with a more tailored national or regional traffic model, but can provide a first orientation which areas and corridors are worth further analysis.



Figure 50. Cycle Highway Potential Map, developed in the frame of the CHIPS project, is a simple EU-level model evaluating the potential for medium-range cycle trips on the basis of the Eurostat demographic data.

Touristic routes also have varying potential, depending on ease of access, main attractions, and attractiveness of the route itself. However, no ready to use tools for quantifying this potential are known at the time of writing.

7.5.2 Low-hanging fruits

Certain corridors offer very low-hanging fruits. Disused railroad lines, levees along rivers, towing paths along canals – all of these provide a possibility to build a high-quality greenway quickly and cheaply.

The advantages include:

- Natural separation from the road network.
- Flat route, without any steep gradients.
- Long stretches with single land ownership, often state owned – no need to negotiate with hundreds of individual landowners.
- Attractive surroundings – levees and railway embankments provide a view over the surrounding area, rivers and canals are attractive themselves. Railway engineering structures (bridges, tunnels) can be an attraction as well.



Figure 51. Cycle track on a levee in Malopolska, Poland. Photo credit: VeloMalopolska.



Figure 52. Cycle track on disused railroad in Western Pomerania, Poland. Photo credit: Wanda Nowotarska.



Figure 53. RAVeL L150, with one track preserved for railbikes.



Figure 54. Towpath along Meuse in Wallonia, part of the RAVeL network and EuroVelo 19.

These corridors can form a very good starting point for a regional network, as seen in Wallonia or Małopolska. Additional investments might be however necessary to connect loose ends and provide some missing links. It is very unlikely that a network can be built from greenways only.

Dual-track railways which lost their importance in the rail network, can be turned into cycle routes with one track preserved for touristic trains or railbikes. Prominent examples include sections of the Bristol – Bath greenway (UK), RAVeL L150 (Belgium)⁸¹, and Europa-RadBahn between Nijmegen (Netherlands) and Kleve (Germany).⁸²

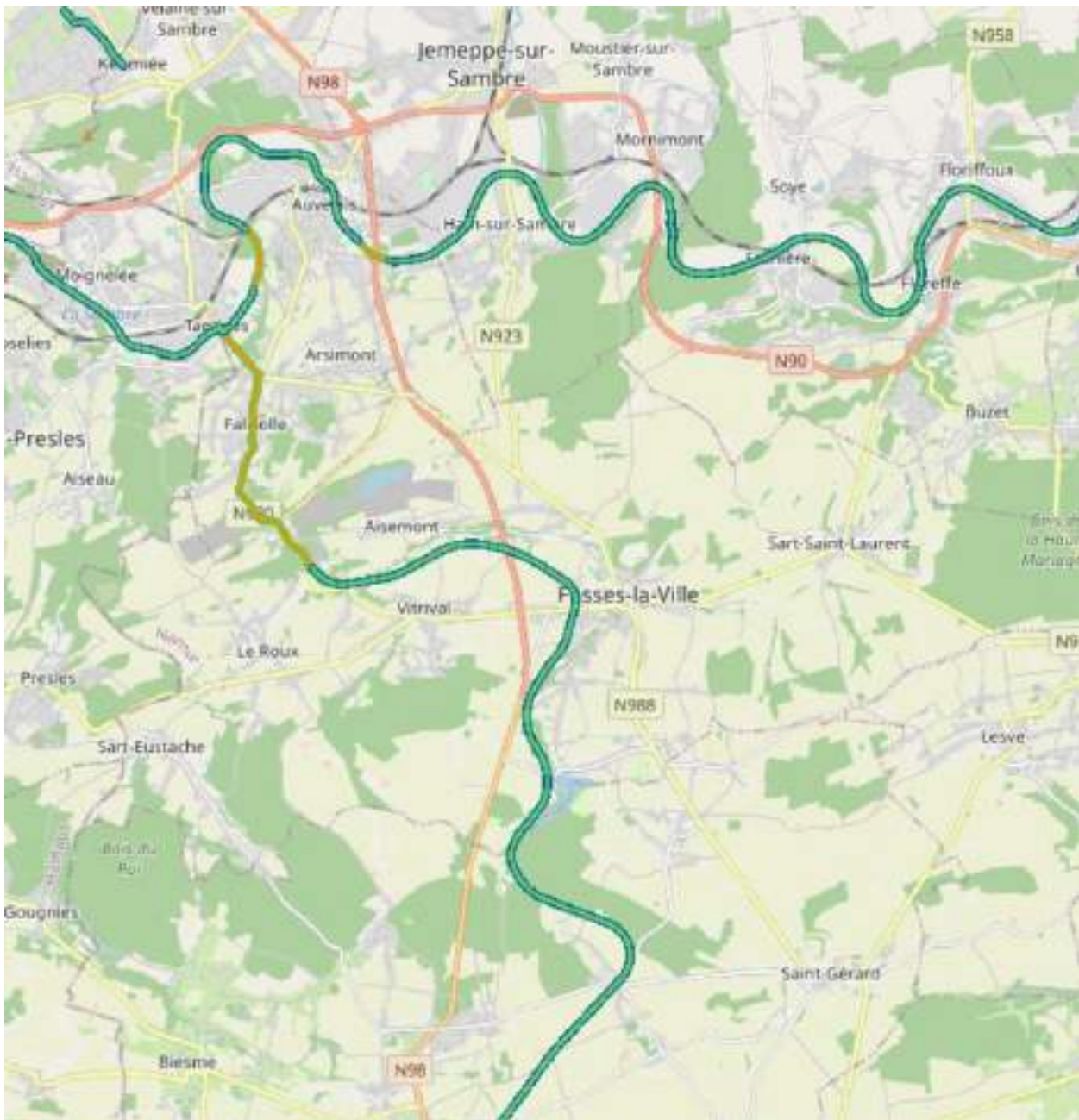


Figure 55. RAVeL routes on the towpath along Sambre (green horizontal line), on the disused railway L150 (green vertical) and a provisional connection in mixed traffic on public roads (yellow line).

7.5.3 Biggest improvement in conditions for cycling

The network or route development can also prioritise sections that currently provide the worst conditions for cycling (because for example of heavy traffic, not rideable surface, extreme gradients). This way a part of the target users can already start using the route after the first investments and create a momentum for further upgrading the route.

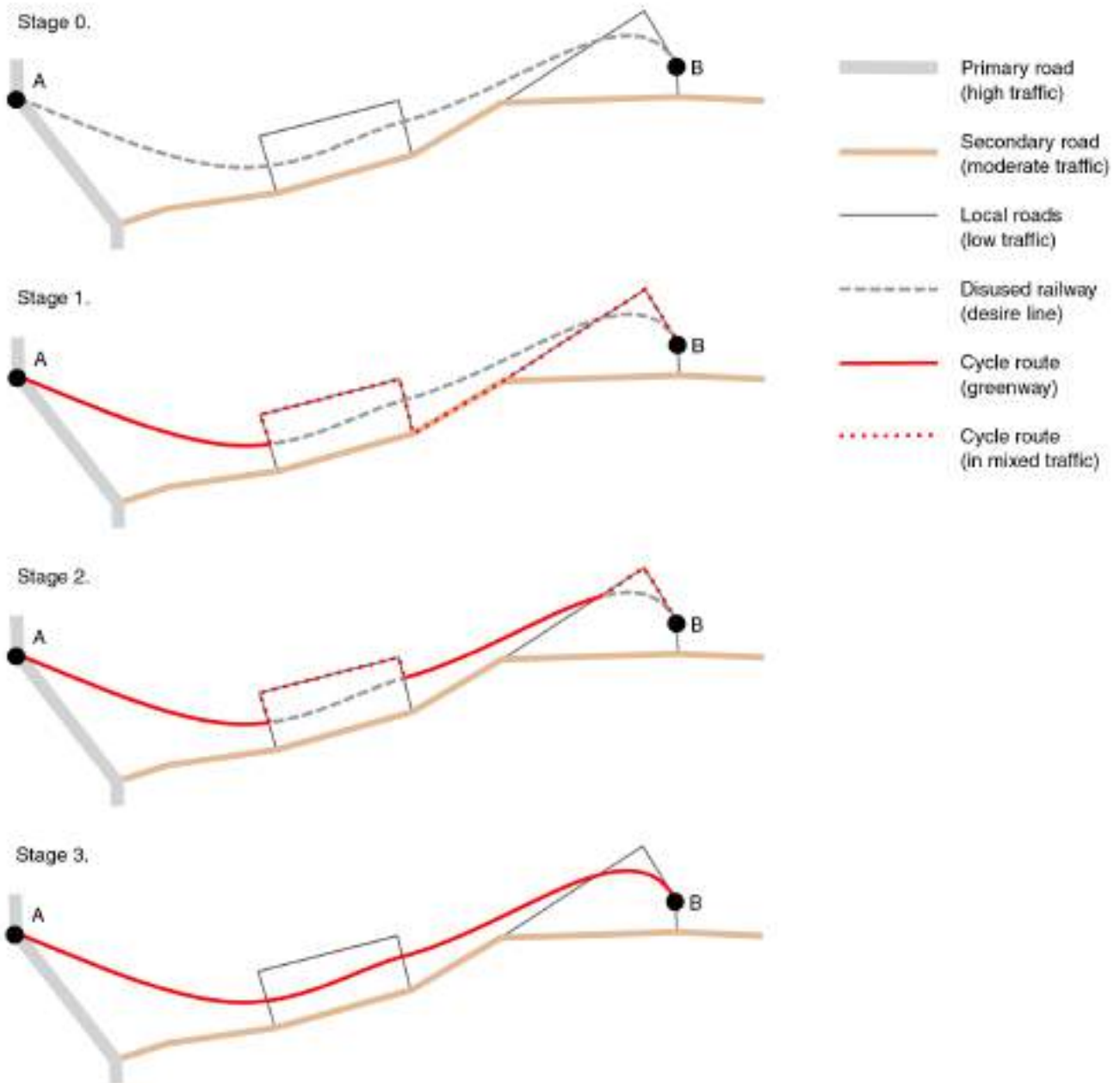


Figure 56. Example of a stage-by-stage route development process.

Figure 56 shows an example how the prioritisation principle could be applied to developing a route in 3 stages. Initially towns A and B are connected by a primary and a secondary road with respectively high and moderate traffic. Sections of the secondary road can be bypassed by detours on local roads with low traffic, but there is no alternative to the primary road. Therefore, the first investment should address this most pressing problem. After stage 1 is completed, the route can already be signposted, with only a short stretch on the secondary road. Stage 2 eliminates the need to enter also secondary road, attracting additional users. Stage 3 completes the process of turning the disused railway into a greenway, improving directness and attractiveness of the route.

The EuroVelo European Certification Standard provides a practical methodology to assess which sections of the route need an intervention most urgently, by dividing the criteria into three levels: Essential, Important and Additional, addressing the needs of cyclists with different level of fitness, skill and experience.

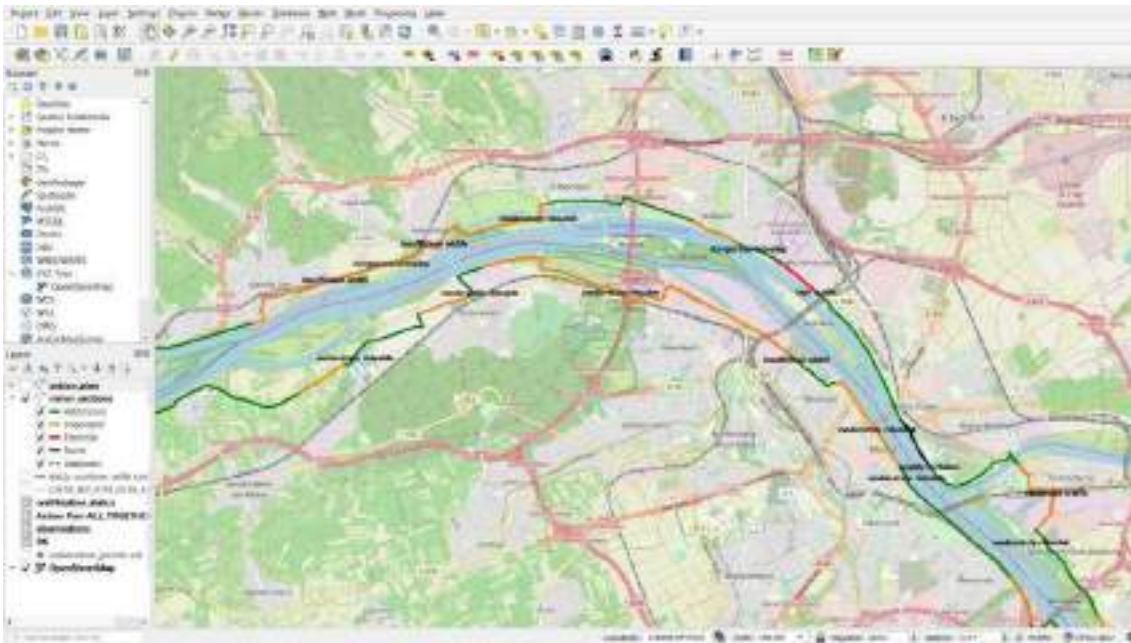


Figure 57. Example assessment of the EuroVelo 15 route. Different colours show the level of compliance with the European Certification Standard, for example orange sections meet the Essential and Important criteria, but not the Additional.

8. GOOD PRACTICE & GREAT INSPIRATIONS – CYCLING INVESTMENTS

The best way to see how European funds can be used to make great cycling investments is to look at some good practice examples. Thousands of inspiring cycling projects have been implemented across Europe thanks to the support of the ERDF. We chose a few of them to show you how ambitious your cycling ventures may be. Our examples come from different European countries, have different scale and require different amount of funds.

EUCY SUGGESTION:

If you would like to share with us the example of successful cycling project from your region and wish to promote it across Europe – do not hesitate to contact us! We are happy to distribute the knowledge on good practice investments.

8.1. Urban Transport: Valencia cycling infrastructure (Spain)

The experience of many Mediterranean cities shows that the provision of cycling infrastructure into the city centre is a great solution to many problems plaguing European metropolises, in particular traffic congestion. The construction of a dense network of various paths throughout the urban fabric in Valencia has caused to increase the volume of daily cyclists and decrease motorized traffic substantially.

It is complex to establish a direct cause-consequence relation. However, the growing and stupendous state of health of the Valencian cycle lanes coincides with a continued decrease in the volume of cars circulating through the city centre.

The debate on the usefulness of cycling paths in city centres is now taking place in many European metropolises. The example of Valencia seems decisive for its outcome. If cycling paths are built, people use them.⁸³



WHAT ARE THE BENEFITS?





In just two years after the EU funds were used to build bicycle infrastructure in the center of Valencia, the number of cyclists has doubled (picture above). At the same time, the analysis of car traffic shows that the number of motor vehicles on the roads has decreased by more or less the same value as the number of cyclists has increased (picture below).

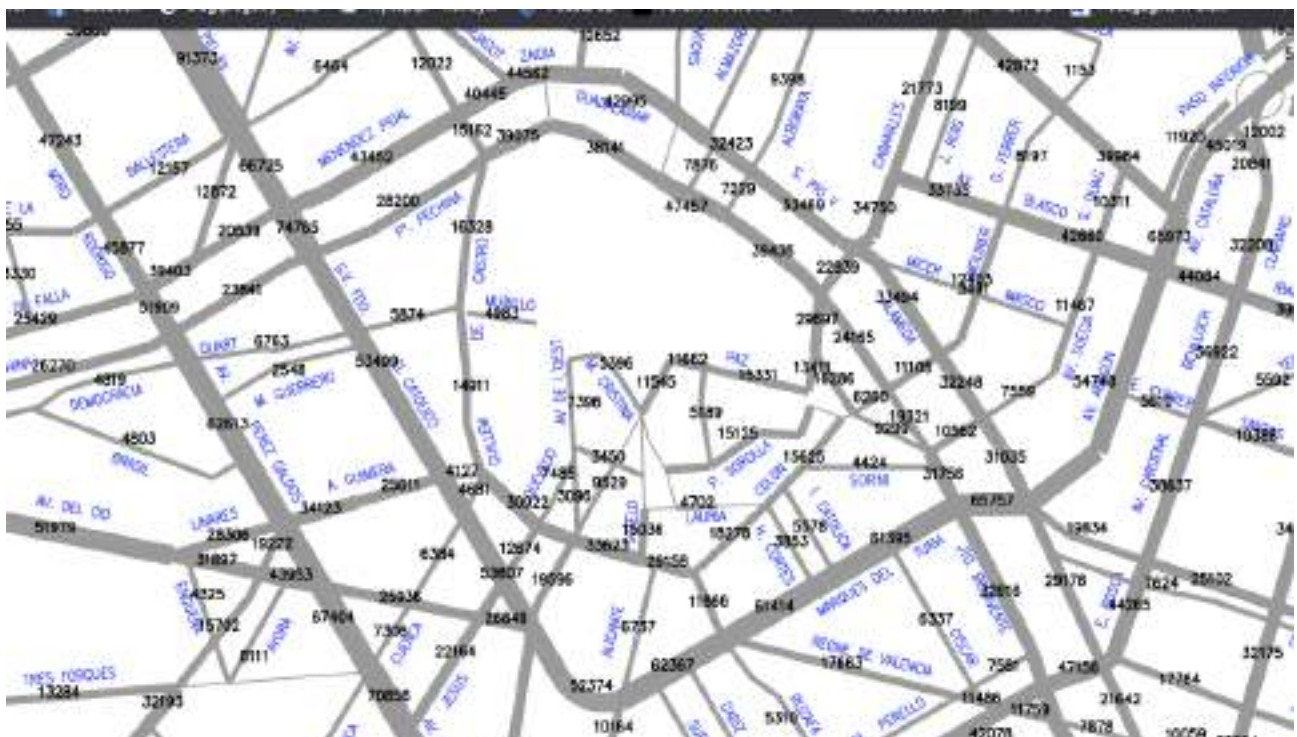


Figure 58. June 2017



Figure 59. June 2019

EU FUNDS IN PLAY

INVESTMENT PRIORITIES OF ERDF REGULATION	
Favor the transition to a low-carbon economy in all sectors	
Conserve and protect the environment and promote resource efficiency	
OPERATIONAL PROGRAMME	
Operational Programme 'Comunidad Valenciana' 2014 - 2020	
EXEMPLARY INVESTMENTS WITH AMOUNT OF ALLOCATED FUNDS:	
Construction of Constitución-Ronda Nord avenue bike path	
ERDF	TOTAL
80 642 EUR	161 284 EUR
Construction of Avenida Maestro Rodrigo bike path	
ERDF	TOTAL
143 136EUR	286 273 EUR
Construction of Manuel Candela-Tomás de Montañana bike path	
ERDF	TOTAL

221 264 EUR	442 529 EUR
Construction of Sancho Tello-Jerónimo Monsoriu bike path	
ERDF	TOTAL
71 621 EUR	143 243 EUR

8.2. Integrated Territorial Investments: Cycle Network in Warsaw Metropolis (Poland)

Warsaw is the capital of Poland, with 1.8 million inhabitants (3.1 million in the metropolitan area). One of the flagship projects of the Metropolis is the development of an intercommunal cycle routes network. The aim of the project was to encourage more inhabitants to use the bicycle as a means of transport by improving the quality (cohesion and comfort) of cycling infrastructure.

The feasibility study prepared when applying for funds demonstrated a benefit to cost ratio of 1.63, even though many social benefits (for example, the health impact of increased physical activity) were not taken into account.

The program included below investments, among others:

- Development of a cycle network in Warsaw; apart from constructing 75 km of cycle tracks, the project included 3 new bridges (longest: 600 m), retrofitting 1 interchange (tunnel + bridge), 43 km of sidewalks, new or modernised traffic lights on 70 intersections, 100 renovated public transport stops, 650 lanterns, 870 trees, and 84500 bushes;
- Construction of bicycle routes in the Nadarzyn Commune;
- Construction of integrated network of bicycle paths in the communes of Marki, Żąbki, Zielonka Kobyłka, Wołomin, Radzymin and Nieporęt;
- Construction of bicycle routes with accompanying infrastructure in the Izabelin commune;
- Green lungs of Mazovia - development of urban mobility in the communes of the south-western part of the voivodeship;
- Programme 'Let's choose a bike' - partnership for the development of low-emission communication in Józefów commune.



Figure 60. Cycle tracks built in Józefów, in the south-eastern part of the metropolis.

WHAT ARE THE BENEFITS?

A significant problem of many Polish metropolises is air pollution and excessive noise. In the fight against them, local governments use European funds, implementing joint and comprehensive activities that reduce both indicators. Warsaw's Integrated Territorial Infrastructure instruments is one of the best examples of such actions. The capital city, together with 39 surrounding municipalities, which are part of the Warsaw Functional Area, implements 13 cycle projects, totalling 330 km of bicycle routes, mainly built from scratch.

The effects will be evaluated until 2025, but according to the first estimates, the share of bicycle in modal split in Warsaw grew from 2.2% in 2014 to 7.5% in 2019.

This program gave us a chance to build coherent routes leading from the borders of Warsaw towards the city centre and connecting several districts. Until now, most of the outskirts have been very unfriendly to cyclists and it was indisputable that bicycle paths had to be built there - explains Mikołaj Pieńkos from the Municipal Roads Authority in Warsaw.⁸⁴

INVESTMENT PRIORITIES OF ERDF REGULATION	
Favor the transition to a low-carbon economy in all sectors	
OPERATIONAL PROGRAMME	
Operational Programme 'Mazovia Voivodeship' 2014-2020	
EXEMPLARY INVESTMENTS WITH AMOUNT OF ALLOCATED FUNDS:	
Warsaw city	
ERDF	TOTAL

16 649 328 EUR	43 128 426 EUR
Nadarzyn commune	
ERDF	TOTAL
1 605 547 EUR	4 492 557 EUR
Marki, Ząbki, Zielonka, Kobyłka, Wołomin, Radzymin and Nieporęt communes	
ERDF	TOTAL
13 969 734 EUR	17 703 278 EUR
Izabelin commune	
ERDF	TOTAL
967 987 EUR	1 472 474 EUR
Green Lungs of Mazovia	
ERDF	TOTAL
7 262 138 EUR	9 534 220 EUR
Let's choose a bike – Józefów commune	
ERDF	TOTAL
6 208 285 EUR	10 646 466 EUR

8.3. Peri-Urban cycle connections: Cycle Highways in Flanders (Belgium)

The potential of cycling transport is not limited to short sections. Cycle highways take cyclists quickly, safely and comfortably over longer distances to where they need to be. Flanders is developing 110 of these routes, together covering a network of 2,400 kilometres! Of the 110 routes, 61 are already in use.

A cycle highway is a mobility product that combines different types of infrastructure, such as cycle tracks or cycle streets, to provide a high-quality functional cycling connection. As the backbone of a cycle network, it connects cities and/or suburbs, residential areas and major (work) places⁸⁵.

The priority is for each cyclist to travel quickly and safely to their destination.

Characteristics of a cycle highway include among others: limited number of stops, priority for cyclists where possible, wide and comfortable surface. Especially in combination with the growing number of e-bikes, cycle highway innovation can effectively get commuters out of their cars.

According to Tom Dehaene, deputy for mobility in Flemish Brabant, cycling highways rose in popularity rapidly during the coronavirus pandemic. Although travel to and from work has been reduced, the number of cyclists has not decreased, as specialists advised all those working from home to exercise regularly. "In recent weeks, we registered almost a doubling of the number of cyclists at some counting points. The typical morning and evening rush hours disappeared from the graph and made way for a cycling peak in the early afternoon" – added Mr Dehaene. This example supports the thesis that cycling is among truly effective tools in the fight against pandemic.



WHAT ARE THE BENEFITS?

A study commissioned by the Flemish institute for technological research (VITO) shows a cost-benefit ratio of bicycle highways of 1 : 2-14.⁸⁶

The researchers looked at the construction cost, the number of users, the external costs related to air pollution and traffic accidents, the positive impact of physical activity on health (less risk of cancer, diabetes, depression and dementia) and the resulting reduction in health care costs, assuming a 20-year lifespan for every bicycle highway.



Their conclusion is unambiguous: bicycle highways pay for themselves twice over in savings on health care and economic costs: "Even in the least favourable scenario (where only 600 cyclists use the bicycle highway every day), the gains from saved health costs amount to double the construction costs. In a favourable scenario (where 4,400 cyclists daily use the bicycle highway) the profit is even ten to fourteen times greater. Even if the model assumes that the cyclists were not motorists before (and so they do not cause less CO2 emissions or less traffic jams), the profit remains greater than the cost".

EU FUNDS IN PLAY

INVESTMENT PRIORITIES OF ERDF REGULATION	
Favour the transition to a low-carbon economy in all sectors	
OPERATIONAL PROGRAMME	
Operational Program 'Vlaanderen' 2014 - 2020	
EXEMPLARY INVESTMENTS WITH AMOUNT OF ALLOCATED FUNDS:	
At the moment 1406km of the planned 2400km or 58% of the cycling network are in place, partly thanks to investments from ERDF. We only list a few examples here.	
F105: Bicycle bridge over Kempisch Kanaal, Herentals (3)	
ERDF	TOTAL
632 000 EUR	3 091 211 EUR
F7: Bicycle bridge over Volhardingslaan N35, Deinze (1)	
ERDF	TOTAL
774 400 EUR	1 936 000 EUR
F24: Bicycle tunnel Tiensesteenweg, Leuven (2)	
ERDF	TOTAL
660 000 EUR	4 000 000 EUR



Figure 61. Investments planned (1), in construction (2) and ready to welcome cyclists (3).

8.4. Regional cycle network: Velo Małopolska (Poland)

Velo Małopolska is a network of high-quality cycle routes that stretch through the entire province to show tourists great natural and cultural heritage of the Małopolska region.

The Vistula River Cycle Route (which is 232 km long in the region) is the backbone of the network. The riverside cycle paths are increasingly popular among both road cyclists and less experienced travellers. The almost flat profile of the routes, the plethora of historical monuments close to the rivers and the experience of nature make riverside routes a perfect tourist product. The creators of Velo Vistula made sure that visitors can enjoy all of this travelling alongside the river.

Over 200 kilometres of mountain views are offered by another cycle route in the network, VeloDunajec. Built in accordance with the European standards, it has clear markings and numerous service points. It crosses the picturesque areas of the Dunajec valley, with views of several mountain ranges: the Tatras, Gorce Mountains, Beskids and Pieniny.

The other routes in the network are, among others, VeloKrynica, VeloRaba, VeloNatura and VeloMetropolis, each of them exploring another part of region's rich heritage. The local government made sure that all the routes comply with EuroVelo standards, thanks to which VeloNatura is now part of the **EuroVelo 11 East Europe Route** and VeloMetropolis is a section of the **EuroVelo 4 Central Europe Route**.



WHAT ARE THE BENEFITS?

Two things make VeloMałopolska a perfect example of large-scale bicycle investments. First, the scale of Małopolska in kilometers is 2–3 times longer than most other projects of this sort. According to local authorities, this centralized planning and spending on a large network has resulted in significant cost savings, as well as ensuring that the routes and signage are made to uniform standards. Second, the Province wants to ensure that the bicycle infrastructure is integrated with the railway network, enabling tourists to move freely between sections of the route and to return conveniently to the starting point after the end of the trip. This feature makes VeloMałopolska a perfect example of multimodal planning.

Although the construction of the routes has not been completed yet, local authorities are already experiencing the benefits of the cycle network for their communities. Along the route, bicycle rentals and restaurants are being built, there is also a tourist offer profiled for cyclists, such as crossing or rafting the river with bicycles.

EU FUNDS IN PLAY

INVESTMENT PRIORITIES OF ERDF REGULATION
Favour the transition to a low-carbon economy in all sectors
OPERATIONAL PROGRAMME 'Małopolska' 2014–2020
Amount of Funds
The figures below show the amount of expenditure for September 2020. As the construction of the

network is still ongoing, it is estimated that both the amount of funds obtained, and the funds spent will be finally approx. 70% higher than indicated below.	
ERDF	TOTAL
19,289,000 EUR	29,164,456 EUR

8.5. Bike sharing: BUBI (Hungary)

The BUBI project aimed to overcome challenges facing many capital cities today, including excessive road vehicle traffic, air and noise pollution, deteriorating environmental quality, and longer journey times. The project implemented the BUBI public bike-sharing scheme alongside bike-friendly road measures within the inner city – such as cycle lanes and bike-friendly intersections. For short city journeys, this prompted road users to switch from private cars to traditional public transport combined with public bikes as a first/last mile solution⁸⁷.

Since the launch of the public bike system, inhabitants and tourists have made more than 3 million trips using Bubi bikes. A trip with MOL Bubi usually takes 8 minutes. Users have travelled a total of about 6 million kilometres in the capital since the system was launched⁸⁸. The number of collection stations has increased from the initial 76 to 157 today, and the 2,071 bicycles at the stations serve an area of about 40 square kilometres.

EU FUNDS IN PLAY

INVESTMENT PRIORITIES OF ERDF REGULATION	
Favor the transition to a low-carbon economy in all sectors	
OPERATIONAL PROGRAMME	
Operational Program 'Central Hungary' 2007-2013	
Amount of Funds	
ERDF	TOTAL
2 200 000 EUR	3 500 000 EUR



8.6. Cross-border travels: Freedom Cycle Bridge (Austria – Slovakia)

The main objective of the project was to plan and construct a bridge across the river March/Morava, which forms a border between the two countries. The bridge was crucial in linking the countries because previously, throughout the 70 km border, there was only one road bridge and one ferry.

The bridge also serves a symbolic purpose, one of open-mindedness and peace between the regions. This project allowed a historic bridge in the area, which was destroyed in 1880 and never rebuilt, to be reconstructed. During the time of the Iron Curtain, border traffic, bridges and border crossings were removed. Today, almost three decades after the Iron Curtain fell, these bottlenecks are being removed and the border regions are cooperating on expansion and reconstruction. The bridge over the Morava River, linking the natural border between Austria and Slovakia, is an important symbolic and economic step for the region.

The city of Bratislava, with about half a million inhabitants, is the biggest beneficiary. New businesses oriented toward cyclists have opened in the Devinska Nova Ves area of the city. In addition, the major tourism site of Schlosshof, Austria, has also reported increasing numbers of tourists coming over the bridge from Slovakia.⁸⁹

EU FUNDS IN PLAY

INVESTMENT PRIORITIES OF ERDF REGULATION	
Accessibility and Sustainable Development	
OPERATIONAL PROGRAMME	
Operational Program 'Cross Border Cooperation Program Slovakia-Austria' 2007-2013	
Amount of Funds	
ERDF	TOTAL
4 191 282 EUR	930 920 EUR



8.7. Cycling Tourism: Eurovelo 17 – Via Rhône (France)

EuroVelo 17, i.e. ViaRhône, has a grand ambition – to connect by high-quality cycle route Lake Geneva and France's Mediterranean beaches. This 815km cycle route, still work in progress, leads the cyclist from Alpine panoramas to Camargue beaches across emblematic landscapes of the Cotes du Rhône vineyards and those of the southern Provence: hilltop villages, lavender or olive tree fields, gastronomic discoveries. ViaRhône cycle

route spreads more than 2,000 years of history and heritage treasures alternating secure greenways and shared paths.

Alongside the route there are located facilities with the label "Accueil Velo". These include accommodation, restaurants, tourist attractions, tourist information centers and bike rental & repair companies. "Accueil Velo" is a national accreditation scheme guaranteeing a high quality of welcome and services for cyclists using French cycle routes⁹⁰.

Cycling tourism generates 2 billion EUR per year in the French economy and represents 16,500 jobs. The market is particularly interesting because it is growing steadily (more than 10% per year in France) and the average expenditure of the cyclist (75 EUR / day) is substantially higher than the average expenditure of other tourists.

EU FUNDS IN PLAY

INVESTMENT PRIORITIES OF ERDF REGULATION	
Environmental protection & resource efficiency	
OPERATIONAL PROGRAMME	
Operational Program 'Interregional Rhône' 2014-2020	
Amount of Funds	
ERDF	TOTAL
2 096 744 EUR	12 12 322 EUR



8.8. Mountain Biking: Singletrek pod Smrkem (Czech Republic – Poland)

Singletrek pod Smrkem consists of natural bicycle paths designed for downhill cycling with a maximum slope of 5%, width up to 1 m, located in Nove Mesto pod Smrkem and Świeradów-Zdrój, in the Zającznik massif. The system of paths is over 57 kilometres long on the Czech side and is connected with paths on the Polish side (over 20 km). In places where passage would be difficult, bridges, footbridges and crossings were built. The paths

are one-way and color-coded according to difficulty, just like the trails. A cyclist, depending on his abilities, may choose a route appropriate for their abilities⁹¹.

Single trek trails claim to be safe and environmentally friendly—requiring few building materials and minimal maintenance—and intended for cyclists of various levels who prefer non-asphalt surfaces. They are a good way of making the most of the recreational opportunities offered by forests and attract users throughout the year, all of which makes them a very cost-effective tourist product.

EU FUNDS IN PLAY

INVESTMENT PRIORITIES OF ERDF REGULATION	
Sustainable transport & removing bottlenecks in network infrastructures	
OPERATIONAL PROGRAMME	
Operational Program 'Poland - Czech Republic' 2007-2013	
Amount of Funds	
ERDF	TOTAL
671 251 EUR	789 700 EUR



8.9. Security: SAVEMYBIKE (Italy)

Residents in the city of Livorno, Italy are signing up to a scheme which rewards them for using their bikes to get around and for using the other sustainable transport modes. The SAVEMYBIKE project uses modern technology to log the benefits of cycling. It also uses a tagging system that is effective in reducing bike thefts and can help retrieve any that are stolen.

SAVEMYBIKE's second system aims to reduce theft by installing passive radio frequency identification (RFid) tags on bikes. Through the project, safe areas have been established where registered users with tags can leave their bikes. If a bike is stolen, the user will receive an alarm on the GOOD_GO App, followed by an acoustic signal near to where the theft took place. Portable RFid readers have been distributed to the police and other local bodies.

By mid-2018, more than 1,000 bikes had been tagged through SAVEMYBIKE, and the scheme has received some expert backing. The insurance company Zurich and the local police estimate a decrease in bike thefts of about 40 % is possible in Livorno. The same company is interested in providing insurance for bikes covered by the scheme and estimates a 30 % demand in the city for SAVEMYBIKE services. The project team is confident that they have built a platform that can be replicated in other urban areas. Tutorials on how the project works have been made available on an e-learning platform.

EU FUNDS IN PLAY

INVESTMENT PRIORITIES OF ERDF REGULATION	
Support the shift towards a low-carbon economy	
OPERATIONAL PROGRAMME	
Operational Program 'Tuscany' 2014-2020	
Amount of Funds	
ERDF	TOTAL
366753 EUR	815 007 EUR



8.10. Innovation: AG Motors Factory (Poland)

AG Motors is an intelligent, robotic factory that integrates the world of industrial machines used for the production of aluminium and composite bicycle frames with the digital world. The factory is the first and most modern comprehensive Research and Development Centre in Central and Eastern Europe, specializing in conducting research on innovative structural elements for the bicycle industry. The potential of the research laboratory is an advanced set of test machines with the possibility of testing components as well as entire bikes. Thanks to the use of specialized research infrastructure and innovative technology, the Centre ensures the highest quality of research. Additionally, the Centre carries out fatigue, impact and climatic chamber tests. Using extensive equipment, each bicycle component can be tested both in the virtual and real world, which in turn allows to reflect the processes taking place during the use of the vehicle⁹².

According to Małgorzata Jarosińska-Jedynak, Undersecretary of State in the Ministry of Infrastructure and Development, the factory will bring benefits not only from the production of components but also from the commercialization of research. The Research and Development Centre has already signed contracts for production and delivery of bike frames with Romet – one of the biggest bicycle manufacturers in Central Europe. The factory plans to hire about 200 workers.

EU FUNDS IN PLAY

INVESTMENT PRIORITIES OF ERDF REGULATION	
Innovation and the knowledge economy	
OPERATIONAL PROGRAMME	
Operational Program 'Investments and Development' 2014-2020	
AMOUNT OF FUNDS	
ERDF	TOTAL
7 112 273 EUR	9 389 671 EUR



8.11. Capacity-Building: Central Meetbike (Germany and other)

Central Meetbike is encouraging the development of sustainable transport policies in Central European countries by supporting the establishment of integrated cycling strategies. Cycling is increasingly seen as a solution to traffic congestion and pollution in urban areas, particularly for short journeys and in conjunction with public transport. The Central Meetbike project sought to spread the effective cycling support policies in Germany to the Czech Republic, Poland and Slovakia. The project helped regions assess their local situations and alter policies accordingly. It also demonstrated that taking a comprehensive spatial approach, which allows safe movement of all modes of transport, is feasible and cost effective.

Moreover, the project assisted town officials in the running of these plans by providing a publication on the “Three Principles” for developing a national cycling strategy. A national strategy was almost simultaneously adopted by the governments of the Czech Republic and Slovakia. In Slovakia, a new national cycling coordinator and eight regional coordinators were established. The country’s strategy sets a target of increasing the share of cycling to 10 % by 2020.

EU FUNDS IN PLAY

INVESTMENT PRIORITIES OF ERDF REGULATION	
Sustainable transport & removing bottlenecks in network infrastructures	
OPERATIONAL PROGRAMME	
Operational Program 'Central Europe' 2007-2013	

AMOUNT OF FUNDS	
ERDF	TOTAL
2 271 743 EUR	2 762 572 EUR



PROJECT PARTNER

- **Czech Republic**
 Transport Research Centre (CDV)
 cities of Pardubice and Uherské Hradiště
- **Germany**
 Technical University Dresden (TUD)
 cities of Dresden and Leipzig
- **Poland**
 Pomeranian Association Common Europe (PSWE)
 cities of Gdańsk and Tczew
- **Slovak Republic**
 Transport Research Institute (VUD)
 cities of Zilina and Presov

9. GOOD PRACTICE & GREAT INSPIRATIONS – PROGRAMMING DOCUMENTS

This part of our Guide will highlight examples of wording of pro-cycling provisions used by selected Member States in their past programming documents. For your convenience we divided the examples into two main categories: 1) partnership agreements and 2) operational or regional development programmes.

Consider this collection as an inspiration and do not hesitate to include even more extensive and ambitious pro-cycling objectives into your programming documents.

9.1. Programming documents and national cycling strategies

a) DIAGNOSIS

Below we present some examples of diagnostic observations, a necessary part of a Partnership Agreement (PA), which justifies investments in active mobility. Remember that country-specific reports are one of the best sources of information for writing the diagnosis part of partnership agreement.

- **What proportion of pollution in your country / region is caused by transport?**
 - “Urban transport is a major source of emission of pollutants in Poland⁹³”.
 - “The largest sectoral contributors to GHG emission in 2011 in Croatia were energy industries and the transport sector, followed by agriculture⁹⁴”.
 - “The main sector in which the Slovak Republic has so far failed to stabilize the growth of a substantial volume of greenhouse gas emissions is the road transport sector due to the expansion of individual car transport, outdated public transport and insufficient use of non-motorized transport, especially bicycle transport. Since 1990, the share of transport emissions in total emissions has increased by 11.5%⁹⁵”.

- **What proportion of energy does it consume?**
 - “The transport sector is the largest consumer with 39.8% of total final energy consumption, mainly based on petroleum products, which is a determining factor in the high national energy dependence⁹⁶”. [Spain]
 - “The largest sectoral contributors to the final energy consumption are the general consumption sectors, mainly households and services including public sector infrastructure, with 43% share and transport (34%), while the industry sector amounts to 17%⁹⁷”. [Croatia]

- **What other problems could be combated through promotion of cycling?**
 - “Individual traffic congestion on the streets results with reduction of the speed of trips⁹⁸”.
 - “The number of daily commuters [in Zagreb] (estimated at 80,000 workers plus 20,000 others) puts significant pressure on the existing infrastructure and raises the need for further development of a complex and sustainable urban transport system⁹⁹”.
 - “Increasing costs of transport of goods and persons and progressive degradation of road infrastructure¹⁰⁰”.
 - “Low quality of life in urban and other residential areas¹⁰¹”.

- **What are the main problems with existing cycling infrastructure?**
 - “[There is] an incomplete network of cycle paths and cycle routes¹⁰²”.

- “The urban transport network [in Split] of connections between urban and suburban areas contains gaps, limiting both everyday use and tourism development¹⁰³”.
- “[There are] breaks in national cycle route and greenways scheme, including seven European routes, which creates a link between urban areas and the countryside. In addition to their use by nearby residents, these cycle paths are also used by tourists, who generate significant economic spinoffs for the territories crossed¹⁰⁴”.
- “The use of bicycles for normal transport functions is far from reaching its potential. The length of cycle paths in cities is insufficient, individual bicycle routes are often unconnected and with frequent interruptions¹⁰⁵”.

b) PRIORITY OBJECTIVES

Below, you can find the exemplary pro-cycling provisions which the selected Member States put into their partnership agreements for the years 2014-2020. You can use similar wording in your own programming documents or adjust them to your own needs.

As you can see your priorities can be formulated fairly broadly in partnership agreements. However, the more varied pro-cycling objectives you include into the partnership agreement, the easier it will be for ministries/regions to project specific investments in their operational programmes, rural development programmes and calls for projects. Having experience from the past budget editions, we can see that states which introduced numerous separate references to various fields of cycling investments, e.g. tourism, transport, safety, intramodality and innovation, managed to get and spend the most funds for extensive infrastructural projects.

• Investment Priority 4 – supporting the shift towards a low-carbon economy in all sectors

Under the revised ERDF regulation, the provisions presented below could be included under Policy Objective 2: a greener, low-carbon transitioning towards a net zero carbon economy and resilient Europe by promoting clean and fair energy transition, green and blue investment, the circular economy, climate change mitigation and adaptation, risk prevention and management, and sustainable urban mobility

- “Creating plans of sustainable transport to schools and workplaces, transferring, when feasible, to bicycle transport and developing necessary infrastructures¹⁰⁶”.
- “Reducing emissions from transport, including the use of alternative fuels such as CNG and electricity, and the promotion of alternative types of transport including the pedestrian and cycling ones¹⁰⁷”.
- “Improving air quality, in particular through supporting low-emission transport and soft mobility (especially walking and cycling)¹⁰⁸”.
- “Reducing greenhouse gas emissions in urban areas by implementing sustainable urban mobility plans (low-carbon strategies in the case of the small cities), promoting investment in non-motorized mobility in all cities of Romania (cycling and walking, discouraging personal car use)¹⁰⁹”.

• Investment Priority 6 – preserving and protecting the environment and promoting resource efficiency

Under the revised ERDF regulation, the provisions presented below could be included under Policy Objective 2: a greener, low-carbon transitioning towards a net zero carbon economy and resilient Europe by promoting clean and fair energy transition, green and blue investment, the circular economy, climate change mitigation and adaptation, risk prevention and management, and sustainable urban mobility or under Policy Objective 5: a Europe closer to citizens by fostering the sustainable and integrated development of all types of territories and local initiatives

- “Developing sustainable and quality tourism¹¹⁰”.

- “Using the potential of tourism and leisure in natural areas and developing ecotourism¹¹¹”.
- “Presenting new tourist products, around specific themes (hiking tourism, rural tourism, particularly agritourism, industrial heritage tourism, urban tourism, memory tourism) and innovative tourism experiences¹¹²”.
- “Informing the population about environmental issues and promoting environmental activity of the population to stimulate the public’s interest in the protection of the environment and nature. In order to stimulate interest in nature, it is important to ensure that visiting nature does as little damage as possible to nature itself. It is also important to install separate objects in state parks – educational trails for pedestrians and cyclists¹¹³”.

• Investment Priority 7 – promoting sustainable transport and removing bottlenecks

Under the revised ERDF regulation, the provisions presented below could be included under Policy Objective 3: a more connected Europe by enhancing mobility or under Policy Objective 2: a greener, low-carbon transitioning towards a net zero carbon economy and resilient Europe by promoting clean and fair energy transition, green and blue investment, the circular economy, climate change mitigation and adaptation, risk prevention and management, and sustainable urban mobility or under Policy Objective 5: a Europe closer to citizens by fostering the sustainable and integrated development of all types of territories and local initiatives

- “Supporting the construction of cycle paths and additional infrastructure, stimulating the wider use of non-motorized transport in urban areas, supporting intermodality (interconnection of public transport, individual car transport and bicycle transport) and interchanges (parking lots, bicycle shelters), supporting the construction of traffic calming elements and zones, as well as the safe separation of motorized and non-motorized traffic¹¹⁴”.
- “Prioritizing pedestrian and bicycle traffic (including through the construction of bike paths), facilitating multimodal travels (park&ride, bike&ride), including their location in reasonable places, restricting car traffic in city centres¹¹⁵”.

• Investment Priority 9 – promoting social inclusion, combating poverty and any discrimination

Under the new ERDF regulation, the provisions presented below could be included under Policy Objective 3: a more connected Europe by enhancing mobility or under Policy Objective 2: a greener, low-carbon transitioning towards a net zero carbon economy and resilient Europe by promoting clean and fair energy transition, green and blue investment, the circular economy, climate change mitigation and adaptation, risk prevention and management, and sustainable urban mobility or under Policy Objective 5: a Europe closer to citizens by fostering the sustainable and integrated development of all types of territories and local initiatives

- “Developing cycle paths and cycle routes used for transport to work, school and services with the aim of supporting sustainable regional and local mobility¹¹⁶”.
- “Improving transport accessibility and safety for aging society¹¹⁷”.

9.2. Operational Programmes / Rural Development Programmes

Remember:

- you can include bold cycling plans into your operational programme even if the partnership agreement doesn’t put much (or any) direct emphasis on cycling. It is still good enough that the partnership agreement aims at combating such problems as: air pollution, congestion, ineffective transport infrastructure etc.
- it is advisable to include into operational programmes both output indicators (such as km of built cycle infrastructure) and specific funds allocation for cycling. This will be a significant facilitation for designing the future calls for projects.


a) CYCLING FOR TRANSPORT

- “Establishing, constructing and renewing bicycle routes providing transport to work and public services (e.g. routes leading to train stations and bus stops in municipalities and cities), including investments in additional cycling infrastructure, including rest areas, protected bicycle parking, charging stations for electric bicycles, etc.”.
- “Modernizing and constructing infrastructure for non-motorized transport:
 - bicycle paths - renewal and reconstruction of already existing bicycle paths, construction of new bicycle paths, cycle corridors on existing local roads and roads between settlements,
 - additional cycling infrastructure (protected cycle stands, charging stations for electric bicycles, bicycle rentals, sanitary facilities, etc.);
 - parking systems for bicycles,
 - traffic calming elements (pedestrian zones, shared space, exclusion of traffic from the streets except for public transport and cyclists, etc.);
 - increasing the safety of vulnerable road users, removing bottlenecks in pedestrian crossings, etc.”.
- “Including support for improved conditions for pedestrians, cyclists and public transport passengers in all road reconstruction plans”.
- “Promoting the perception of cyclists as daily commuters and not only sportsmen and tourists”.
- “Promoting and increasing the attractiveness of cycling in public through web portals, mobile applications, etc.¹¹⁸”.
- “Equipping state and municipal roads (including state and federal roads where the municipalities have the responsibility for maintenance) with cycle paths. The subject of funding is the expansion and new construction of standalone and roadside cycle paths, possibly as part of the state road construction program or the municipal cycle path plans. Funding is provided for construction costs for standalone and roadside cycle paths, including land acquisition, in accordance with the usual eligibility rules for funding and remedial/compensatory measures¹¹⁹”.
- “Expanding local public transport and non-motorized individual transport can be used, particularly in the area of individual transport, in order to reduce CO₂ emissions from transport. At the same time, further expansion of the nationwide network of cycle paths is intended to increase the attractiveness of low-emission cycling and its share in the total traffic volume¹²⁰”.
- “Supporting sustainable urban mobility interventions: increasing soft mobility - cycle and pedestrian paths. The scope of this Action Line - finalized and integrated, according to the procedures set out in the Partnership Agreement - concerns
 - the construction and / or strengthening of systems to support soft, cycle or pedestrian mobility, with particular reference to:
 - increase of the existing cycle and pedestrian network, favoring its completion throughout the urban networks;
 - increasing the safety of cycling traffic;
 - integration with the collective mobility system and/or connection with highly frequented places;
 - creation of rest areas and equipped parking areas dedicated to bicycles;
 - implementation of liveability and urban quality interventions aimed at cycling and walking¹²¹”.
- “The strategic objectives are: the increase of the existing cycle network, its completion in the urban area, the interconnection of cycle routes and their networking ("network effect"), the safety, the connection with the collective mobility and in particular with the regional railway system, the interconnection with which it is recognized as capable of maximizing the capacity to produce positive effects in the action of reducing CO₂¹²²”.
- “The following types of intervention will be eligible for funding:
 - creation / safety of cycle paths (own cycle paths, reserved lanes, cycle / pedestrian paths, Zone 30) with priority for those that interconnect the railway with the urban level attractions;
 - installation of horizontal and vertical signage dedicated to cyclists and cycle paths;
 - installation of bicycle parking spaces, which meet the requirements of the Plan, near the railway;
 - construction / redevelopment of velo stations;
 - automatic counters for cyclists on cycle paths and for use of controlled access parking lots
 - creation of a single regional bike sharing system (with particular reference to Municipalities with railway stations);
 - fare integration between public transport and bike sharing systems¹²³”.

b) CYCLING FOR TOURISM


- “Constructing and reconstructing of educational trails, cycling trails, constructing additional infrastructure (rest areas, shelters, bicycle stands, etc.), constructing viewing towers, setting up cycling markings on existing cycling routes, etc.¹²⁴”.
- „Supporting economic development projects based on the enhancement of the natural resources of rural areas by extending both the tourist attraction of the region and the leisure offer for the rural population of Lorraine through the major cycle-road green routes¹²⁵”.
- „Creating, extending and renovating investments relating to rooms, common areas and ancillary equipment or services for bikes users (eg: bicycle storage and maintenance space, laundry area dedicated to routes tourists)¹²⁶”.
- „Establishing a “Cycling guesthouse” label:
 - investing to meet the labeling criteria (e.g. secure boxes, washing stations, small repair workshop ...)¹²⁷”.
- “Creating the regional scheme for cycle routes and greenways, becoming an eco-responsible tourist destination, bringing overall consistency to the other actions supported by Europe to make tourism a lever for the economic development of Burgundy¹²⁸”.
- “Funding innovative investment projects (e.g. for new types of service offers for guests, new sales ideas, green tourism), tourist cycle paths as an integral part of the cycle path concept of the state of Mecklenburg-Vorpommern or tourist infrastructures, which are the basic conditions for meeting the recognition criteria in health resorts and recreational areas¹²⁹”.
- „Connecting natural heritage locations through the creation of itineraries or tourist routes (adapting trails and paths for pedestrian and / or bicycle use, etc.). Promoting clean and environmentally friendly means of transport and sustainable mobility in Protected Natural Areas¹³⁰”.

POSSIBLE OUTPUT INDICATORS FOR CYCLING OBJECTIVES:

 The share of bicycle traffic in the total transport

EXAMPLE

According to the Integrated Regional Operation Program of Czech Republic 2014–2020 the share of cyclists among commuters should increase from 7% to 10% in the period of the programme’s implementation.

 Length of new sections of cycle paths

EXAMPLE

The Operational Programme Mecklenburg-Vorpommern 2014–2020 set a target of 339 kilometres of cycle paths to be built in the region during the given period.

 Number of elements of additional cycle infrastructure created


EXAMPLE

The Integrated Regional Operation Programme of Slovakia 2014–2020 set a target value of 71 elements of additional cycle infrastructure. This includes, for example, public bike repair stations.

 Number of parking spaces for bicycles


EXAMPLE

The Integrated Regional Operation Programme of Czech Republic 2014–2020 set a target value of 5,600 new parking spaces for bikes.

 Number of cycling paths users in the region

EXAMPLE

According to the Operational Programme Małopolskie Voivodeship 2014–2020 the number of cyclists on the cycle paths should increase from 144,000 to 423,396 in the period of the programme's implementation.

 Decrease in number of cycling-related fatalities

EXAMPLE

According to the Croatian Operational Programme Competitiveness and Cohesion 2014–2020 the number of fatalities among cyclists should decrease from 12/1.000.000 to 6/1.000.000 people in the given period of time.

10. CALL FOR ACTION

Cycling is one of the most effective solutions to the major economic and environmental problems of our times.

Maximise your chances of securing EU funds for cycling related measures by following these suggestions:

If you are a citizen, an NGO or the representative of cycling industry:

- Participate actively in public consultations about programming documents.
- If no information about public consultation is available – contact the authorities responsible for the preparation of programming documents and ask how you can influence their content. To identify relevant authorities, you can research who prepared the partnership agreement and operational or regional development programmes for the previous financial period.
- Associate with others who share your goals and values. In a group, your voice is heard better.
- Find allies among diverse stakeholders. Show that the support for cycling is strong among all groups in society.
- Spread the knowledge about health, environment and economic benefits of cycling among your family, friends and colleagues. Share this guide with anyone who may find it useful.

If you work for a national or regional authority:

- Participate actively in the process of preparation of programming documents and inspire your colleagues with a vision of dynamic and sustainable development of your country or region.
- Have the courage to come up with bold ideas that can make your country and region stand out on the map of Europe.
- Learn from the experience of the countries that benefited the most from cycling-related investments. If you are looking for know-how do not hesitate to contact us. Our mission is to connect experts on cycling planning with ambitious decision-makers.
- Consult with relevant stakeholders about your ideas and do not be afraid to reach for their knowledge. Look for cycling NGOs in your region for support and advice about planned investments.
- Use the overview of the investment needs, if it is available at the national or regional level, to create projects that will fill the infrastructure gaps in the area.
- Listen to the needs, hopes and concerns of inhabitants of your region. Ask them what would make their life in a given area better. Less traffic, less noise, less pollution – these are often repeated answers, especially among urban residents.

If you work on regional policy at the European level:

- Encourage Member States to include sustainable transport objectives, including cycling, into their programming documents.
- Show the EU's determination to achieve the Green Deal goals and turn Member States' attention to how investments in zero-emission mobility can contribute to achieving set targets.
- Make Member States aware of the importance of implementing country-specific recommendations, also in the field of sustainable transport.
- Show that the EC takes the obligations of nations set in their NECP seriously.
- Share the knowledge about positive measures taken in countries which are most successful in meeting European climate goals.
- Draw Member States' attention to the increase in investment in cycling infrastructure during the pandemic and the beneficial effects of this means of transport in reducing the spread of the virus.

Whatever your role in preparing programming documents for the next financial period is, we are ready to give you any support you need to secure as much funds for your cycling projects as possible.

We hope that this Guide will be a useful tool to achieve this aim. However, if you have any further questions or doubts – feel free to contact our experts.

Here are the ECF/EUCY team members you can contact:



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ANNEX 1 - THE DETAILED BENEFITS OF CYCLING INVESTMENTS FOR EUROPE

ECONOMY



MANUFACTURES

- Goldstein Research analyst forecast that the Europe bicycle industry is set to reach almost 20 billion by 2024¹³¹ and is expected to grow with an annual rate of 5.5%.
- In comparison, the European car market is expected to grow by only 1.7% until 2024.

TOURISM

- There is an estimated number of 2.3 billion cycle tourism trips per year in the EU, which stand for a total economic value of 44 bn EUR.
- Cycle tourism is linked to ca. 525 000 jobs in the EU.
- In France, cycle tourists spend almost 20% more than the average for all tourists.

LOGISTICS

- Cargo bikes have the potential to replace the following share of motorised trips in urban areas:
 - + 23-25 % of the commercial deliveries in cities
 - + 50 % of the commercial service and maintenance trips
 - + 77% of private logistics trips (shopping, leisure, child transport)

COMMERCE

- Clients coming by bike spend more than those coming by car, be it during a certain time period or related to the parking space that has to be provided for them.
- Cyclists do their shopping locally, and are more loyal customers.
- If a street is transformed in a way that gives more space to cyclists and pedestrians and less to cars, the absence of clients that came by car before is more than compensated for by the clients that come by foot or by bike afterward.
 - In London, retail vacancy was 17% lower and retail rental values 7.5% higher after active mobility improvements in shopping streets and town centres.

CONSTRUCTION & MAINTENANCE OF ROAD INFRASTRUCTURE

- The annual costs for the construction and maintenance of infrastructure for motorised transport that are saved through cycling amount to 2.9 bn EUR per year in the EU.
- One mile of a high-quality protected bike-lane is estimated to cost 0.21 million EUR, whereas an urban freeway costs 50 million USD per mile, or 240 times as much.

CONGESTION

- The value of congestion easing through cycling for the EU can be estimated at 6.8 bn EUR per year.

- The total costs of congestion for the EU economy have been estimated at over 240 bn EUR per year or almost 2% of EU GDP.
- A number of local studies from Europe and the US also show the benefits of cycling for reducing congestion:
 - Cycling improvements lead to 45% less car traffic and faster public transport (Copenhagen, Denmark).
 - Cycle highways reduce time spent in congestion by 3.8 million hours (The Netherlands). + Cycle highway network reduces the need for 50,000 car journeys daily (Ruhr area, Germany).
 - Bike share programme eases congestion during city works (Bordeaux, France).
 - Bike share programme reduces congestion by 4% (Washington DC, USA).

CONNECTIVITY AND MULTIMODALITY

- Cycling helps to create sustainable mobility chains.
 - Dutch research shows that 44% of train commuters in the Netherlands use the bike to reach the train station from their home. People combining bike and train also use their car less.

RESILIENCE

- Cycling, including cyclelogistics, makes cultures more resilient by providing transport options also in cases of emergency like pandemics, natural catastrophes or terrorist attacks.

TECHNOLOGY



ELECTROMOBILITY

- In 2017, more than 10% of the bikes sold in Europe were electric, compared to only 1.5% of cars
- Since 2006, sales of electric bikes have multiplied by 20, with an average annual growth rate of almost 30%.
- When France introduced a national purchase incentive scheme for electric bicycles in 2017, 61% of beneficiaries stated in a survey that they used electric bicycles to replace car journeys.

BIKE-SHARING

- Bike-sharing makes work commutes and in-work trips more efficient and increases connectivity in a city by providing easy and fast first-mile/last-mile access, enhancing productivity in the urban economy.
- For the Dublin bike-sharing system, every 1 euro invested created 12.3 euros of time benefits, wider economic benefits and health benefits. The value of the time savings alone is in a range of 6 – 10.4 million euros.



ENVIRONMENT & RESOURCES

AIR POLLUTION

- Value of reduced air pollution through cycling: 435 million euros
- Air pollution is the single largest environmental health risk in Europe, causing around 400 000 premature deaths per year.

CO2 EMISSIONS

- Cycling saves emissions equaling more than 16 million tons of CO2 equivalents per year in the EU.
- Value of the savings: 600 to 5.630 million euros, depending on the Social Cost of Carbon

NOISE POLLUTION

- The current value of reduced noise pollution through cycling is 300 million euros.
- Noise pollution from road traffic is the cause of around 8 900 premature deaths and almost 800 000 additional cases of hypertension per year in Europe.

WATER AND SOIL POLLUTION + SPACE SAVING

- Cycling infrastructure needs less space than infrastructure for cars. If less infrastructure is needed, this means less sealed soils, less soil pollution and less water pollution.
- Establishing cycling instead of car infrastructure means also more land available for lucrative investments in the most attractive regions

FUEL SAVING

- The current levels of cycling in the EU correspond to fuel savings of more than 3 billion litres per year, which corresponds to the fuel consumption for road transport of a country like Ireland.
- The value of these fuel savings is almost 4 billion euros.

WASTE PRODUCTION

- The average weight of a car in the EU in 2017 was almost 1400 kg, a bike rarely weighs more than 20 kg, or 1.5% of the weight of a car. This means that much less resources are needed for its construction.
- 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.



HEALTH

- Cycling prevents 18 110 premature deaths per year in the EU-28. This corresponds to an economic value of EUR 52 bn per year.
- Cycling also contributes to healthier lives by helping to prevent a large number of severe and chronic diseases, for example:
 - cardio-vascular diseases
 - diabetes (type 2)
 - breast cancer
 - colon cancer
 - osteoporosis.

MENTAL HEALTH

- Engaging in moderate physical activity like cycling reduces the risk for Alzheimer's disease by 29% and for cognitive decline by about 26%.
- Physical activity is also linked to 17% lower odds for developing depression in a large metaanalysis of relevant studies

CHILDREN DEVELOPMENT

- 4 hours after arriving in the classroom, concentration levels of children who are cycling or walking to school are 8% higher than for those who are getting a lift by car.

ABSENTEEISM

- Employees that cycle to work regularly have on average 1.3 days less sickness absence per year.
- This means a gain of almost 5 bn EUR per year for employers around the EU.
- This amount roughly corresponds to the direct and indirect cost of sickness absence to the Austrian economy.



SOCIAL BENEFITS AND LIFE SATISFACTION

QUALITY OF TIME

- Studies from London, Montreal, the US and Colombia show that cyclist commuters are the most or among the most satisfied with their trips to work.

PUBLIC SPACE

- The bicycle is very space-efficient: During 1 hour, 7 times more bikes than cars can cross a 3.5m-wide space in an urban environment.
- The place that is needed for a single car-parking spot can fit up to 15 bicycles.

EQUALITY

- The yearly costs for owning and using a bike only amount to around 5% or 10% (for electric bicycles) to the costs for owning and using a car. By providing a cheap transport option, cycling can help to make jobs and participation in social life better accessible to disadvantaged population groups.
- In the United States, the lowest-income households — Americans making less than \$20,000 per year — are twice as likely as the rest of the population to rely on bikes for basic transportation needs like getting to work.

GENDER EQUALITY

- Research shows that 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.

SOCIAL CONNECTIVITY

- 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.

ACCESSIBILITY

- Cycling increases accessibility, not only to employment, but also to places of social and cultural exchange.
- During the last years, cycling classes for refugees have been a success story in a number of EU countries, including Sweden, Germany, the Netherlands, or Finland. Often managed by ECF member organisations, these initiatives give refugees, and in particular women, the possibility to participate more actively in society by giving them easy access to relevant facilities.

ANNEX 2 - EUROPEAN SEMESTER COUNTRY-SPECIFIC RECOMMENDATIONS

1. Austria

1.1. Country Report

1. Greenhouse gas emissions are still far above EU and national targets; without further measures carbon neutrality is unlikely to be realised by 2040. **Reducing transport-related emissions** is essential for meeting air quality standards and climate goals¹³².
2. Austria is at risk of missing its 2020 **greenhouse gas (GHG)** emission targets. While total emissions decreased by 3.7% in 2018, with the emissions from industrial processes declining by close to 10%. However, the **transport sector witnessed a further increase**¹³³.
3. Reducing transport-related emissions is key for Austria's shift to carbon neutrality, and for meeting air quality standards. According to the NECP, the **transport sector has the greatest potential for GHG emission reduction** (-7.2 million t CO₂ eq by 2030 compared to 2016). Between 1990 and 2017, CO₂ emissions from transport increased by 79.6%, while overall CO₂ emissions increased by 14.2% (excluding land-use-change emissions, but including international aviation and indirect CO₂)¹³⁴.
4. **Transport imposes significant external costs.** The total annual external costs of transport by road, rail and inland waterways are estimated at **€19 billion**, i.e. 5.9% of Austria's GDP in 2016 (EU: 5.7%). Road users generate almost all (95%) of the costs, while the rail sector is responsible for only 4%. Environmental costs (**air pollution, climate change, costs of energy production, i.e. the well-to-tank emissions, noise, habitat damage**) account for 33% of the external costs of transport. **Congestion (19%) and accident costs (47%) make up the remainder**¹³⁵.
5. **Air pollution continues to be a concern** and additional measures are needed to ensure compliance with EU air quality standards. Air pollution (as reflected by SDG 11) gives rise to health care costs, productivity losses and lower agricultural yield¹³⁶.
6. Low-density developments have sprung up around towns and cities more than in comparable countries, resulting in soil sealing, congestion and air pollution, due to an **increased reliance on private vehicles for transport and commuting**. This also entails a loss of agricultural soils and biodiversity. More **effective multi-level governance on planning, mobility** and housing development could help tackle these problems¹³⁷.
7. Austria's booming tourism sector faces costs from climate change and the challenge of reducing its own environmental footprint. **Tourism-related emissions stem primarily from travel**, which links to the need for cleaner transport¹³⁸.

CONCLUSION: There has been **limited progress on sustainability**¹³⁹.

1.2. Country-Specific Recommendations

(22) Austria's transformation to a climate neutral economy will require sizeable private and public investment over a sustained period. Austria's national energy and climate plan identifies significant challenges in reaching its 2030 target for greenhouse gas emissions not covered by the Union emissions trading system. Improving resource productivity is a key driver for future growth while minimising impacts on the environment. **Reducing transport related emissions is essential for**

meeting air quality standards and climate goals. Frontloading and pursuing new investments to support the green transition will help to create new green jobs and kick-start the economy (...). Investments in eco-innovation would trigger productivity growth while reducing Austria's ecological footprint¹⁴⁰.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on basic and applied research, as well as innovation, **sustainable transport**, clean and efficient production and use of energy.

1.3. National Energy and Climate Plan

In its NECP, Austria has made following commitments related to cycling:

- Increase walking and cycling by:
 - infrastructure development;
 - raising awareness
 - and funding¹⁴¹.
- The provinces and municipalities are responsible for providing an attractive range of local and regional public transport, spatial planning, pedestrian and cycling infrastructure and parking space management or parking ordinances¹⁴².
- The public sector will lead by example by switching to zero-emission or low-emission vehicles. Appealing infrastructure for cycling and charging electric vehicles will be created for employees¹⁴³.
- At federal level, the focus on promoting cycling in the climate protection programme [klimaaktiv mobil] is to be developed and the necessary resources secured through EU funds and support mechanisms — e.g. EAFRD, ERDF, including for the next funding period¹⁴⁴.

2. Belgium

2.1. Country Report

1. **Growing traffic** volumes boosted by commuting subsidies like tax advantages create **congestion** and are putting land transport infrastructure under pressure while inland infrastructure investments remain low¹⁴⁵.
2. Despite significant investment needs, public investment barely increased and remained below the euro-area average. Belgium has **important investment needs in (...) sustainable transport**¹⁴⁶.
3. **The level of investments** in inland transport infrastructure is among the **lowest in the EU**¹⁴⁷.
4. Wallonia has planned investments to achieve the objectives of **modal shift towards** public transport, collective modes and **active modes**¹⁴⁸.
5. Crucial in the success of **GHG emission reduction** plan will be **decarbonisation of road transport** through electrification and **modal switch**¹⁴⁹.
6. The transport sector is responsible for 35% of non-ETS greenhouse gas emissions in Belgium. A recent study by the European Commission estimates the total external costs of transport for road, rail and inland waterways in Belgium at **€27 billion annually**, which corresponded to 7% of Belgium's GDP in 2016. These external costs include costs related to **accidents**,

environment (air pollution, climate change, the costs related to energy production, i.e. the well-to-tank emissions, noise, habitat damage) and, only for road, congestion costs amount to some €9 billion¹⁵⁰.

7. Road transport congestion makes air quality in Belgium to be a cause for severe concern. As the European Environment Agency report for the year 2016 shows, there is a significant health burden due to poor air quality with 75,800 years of life loss (YLL) attributable to fine particulate matter concentrations (with 6.7 YLL/1000 residents)¹⁵¹.
8. Belgium's objective to increase the share of low-carbon transport will involve **investing in multimodal mobility** systems, strengthening and improving public transport and **encouraging the use of soft (i.e. zero emission) mobility**¹⁵².
9. The need for considerable infrastructure investment to **adapt roads to soft mobility (cycle lanes, park and ride schemes, etc.)**, to improve the quality and access to mobility-related data, notably to better allocate demand, has also been identified. According to the National Strategic Investment Pact, total investment needs in low-carbon transport could amount to **€27 billion or 0.5% of GDP** per year over the next decade¹⁵³.

CONCLUSION: Progress has been limited concerning **the reduction of congestion and promotion of more sustainable modes of transport**¹⁵⁴. **Some progress** has been made on investment-related economic policy on sustainable transport¹⁵⁵. In Wallonia, the mobility and infrastructure plan for investment in cycle path, water transport and increasing the quality and security of the existing road network was adopted in April 2019. In Flanders, the **Flemish transport administration committed to invest €600 million** in improving the traffic flow, and in cycling and water borne transport. Meanwhile though, Belgium still scores poorly in terms of road infrastructure¹⁵⁶.

2.2. Country-Specific Recommendations

(23) To foster the economic recovery, it will be important to front-load mature public investment projects and promote private investment, including through relevant reforms, which would also help industrial transition. As expressed in its 2021-2030 National Energy and Climate Plan (NECP), **Belgium has significant investment needs in sustainable transport**, in particular to tackle congestion and electric mobility¹⁵⁷.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on infrastructure for sustainable transport.

2.3. National Energy and Climate Plan

3. Bulgaria

3.1. Country Report

1. There is scope for **significant energy savings** via targeted investments in the industrial, **transport** and residential sectors and for increased investments in clean energy infrastructure¹⁵⁸.
2. Bulgaria is among the Member States with the **lowest perceived quality of transport infrastructure**¹⁵⁹.
3. The **poor road safety** record warrants urgent implementation of more effective measures. There were 96 deaths per million inhabitants in 2017 (EU average 49)¹⁶⁰.
4. Bulgaria was among the worst performing Member States in the 2018 **Eco-innovation** index. The main challenges include **improving sustainability practices within the transport sector**¹⁶¹.
5. Air quality in Bulgaria continues to give cause for severe concern. Bulgaria bears a **significant health burden due to poor air quality**, with the highest rate of years of life loss per 100,000 inhabitants, attributable to fine particulate matter (PM2.5) concentrations that are the highest in the EU (EEA, 2019a). The main causes of pollution with particular matter (dust) are the domestic heating sector using solid fuels and **transport**¹⁶².
6. The current **overreliance on fossil fuels** and the inefficient use of energy are creating a number of challenges for sustainability¹⁶³.
7. In road, rail and inland waterways transport, external costs related to **accidents, environment (air pollution, climate change, energy production, noise, habitat damage) are about 7 billion EUR annually**, which corresponds to 6,5% of Bulgaria's GDP. **Road users generate almost 98% of such costs**¹⁶⁴.

CONCLUSION: There has been **limited progress** in focusing investment-related economic policy transport (in particular on its sustainability)¹⁶⁵.

3.2. Country-Specific Recommendations

(26) Transformation efforts for tackling Bulgaria's high energy intensity, significant reliance on fossil fuels, and inefficient use of energy and resources are at a very initial stage. The National Energy and Climate Plan stresses Bulgaria's commitment to decarbonise its economy by 2050 in the context of the European Green Deal (...). **The coverage and quality of transport infrastructure in Bulgaria remains below the Union average (...)**. Significant environmental issues need to be tackled, as they affect sustainable growth and have created additional health risks during the COVID-19 crisis. **Bulgaria is among the Member States with the largest incidence of pollution-related deaths**¹⁶⁶.

FINAL RECOMMENDATION: 3. **Focus investment on** the green and digital transition, in particular on clean and efficient production and use of energy and resources, **environmental infrastructure and sustainable transport**, contributing to a progressive decarbonisation of the economy, including in the coal regions.

3.3. National Energy and Climate Plan

In its NECP, Bulgaria has made a following commitment related to sustainable transport:

- The strategic priority in transport development is, among others, development of intermodal transport by boosting the development and construction of intermodal terminals for combined transport¹⁶⁷.

4. Croatia

4.1. Country Report

1. Croatia is to meet its climate and energy objectives and shape a new growth model. Croatia has also **investment needs in transport**¹⁶⁸.
2. Croatia is set to meet its 2020 **greenhouse gas emissions target** with ease, while additional measures would be needed to meet the 2030 target. Transport remains the sector contributing the most to greenhouse gas emissions (30%), followed by industry (23%) and agriculture (13%)¹⁶⁹.
3. Croatia risks missing its energy savings targets for the period 2014-2020, as legislation gaps are unaddressed. **Energy consumption has risen every year since 2015, especially in transport**, services and industry¹⁷⁰.
4. High **external costs of transport** negatively affect the environment, productivity and health spending. A recent study (European Commission, 2019m) estimated the total external costs of transport for road, rail and inland waterways in Croatia at **6.9% of GDP** in purchasing power parity terms, compared to 5.7% at the level of EU. Almost half of the external costs are related to **accidents**, which are well above EU average. **Improving road safety** would reduce lives lost in traffic accidents, but also economic losses and healthcare costs, benefitting labour productivity. It would also help **improve the sustainability of Croatia's cities and communities**¹⁷¹.

CONCLUSION: No significant progress has been made on sustainable urban transport.

4.2. Country-Specific Recommendations

(23) Croatia should promote investment in growth-enhancing sectors, contributing to the green and digital transitions. (...) Investment should support Croatia's decarbonisation and energy transition targets outlined in Croatia's National Energy and Climate Plan. There is particular scope and opportunity for Croatia to invest in **sustainable urban and railway transport**, energy efficiency, renewable sources of energy and environmental infrastructure¹⁷².

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on **environmental infrastructure, sustainable urban and rail transport**, clean and efficient production and use of energy and high-speed broadband.

4.3. National Energy and Climate Plan

In its NECP, Croatia has made a following commitment related to cycling:

- Promotion of intermodal and intelligent transport and development of alternative fuels infrastructure at local and regional level by introduction of public city bicycles systems (with and without electrical drive) and construction of the accompanying cycling infrastructure¹⁷³.

5. Cyprus

5.1. Country Report

1. **Investment lags behind** in areas that could strengthen Cyprus' economic structure and increase its potential growth, such as digital transformation, R&D, renewable sources of energy, **sustainable transport** and the circular economy¹⁷⁴.
2. Key challenges remain in relation to environmental sustainability. The country's **weak environmental performance** is a major concern. **Sustainable mobility is key** for Cyprus owing to the large and growing share of transport emissions¹⁷⁵.
3. **Measures to promote sustainable transport are only at an initial stage**¹⁷⁶.
4. **Schools focus** on competences for sustainable development is being developed. At pre-primary, primary and secondary level schools integrate environmental and social topics for **sustainable development**. Environmental programmes include topics on global warming, climate change, energy, **urban development, and means of transport**¹⁷⁷.
5. Long-standing needs for investment in environment, energy, digitalisation and innovation remain unaddressed, and could impede Cyprus' growth potential in the future. In particular, **investments in water and waste management, energy efficiency and sustainable transport are long overdue**¹⁷⁸.
6. Steering the transition to a greener and more sustainable economic growth leading to climate neutrality calls for a long-term comprehensive strategy. Future economic growth would need to go hand in hand with decisive efforts to promote sustainable transport¹⁷⁹.
7. Ensuring sustainable and green mobility system is key for Cyprus due to the **large and growing proportion of transport in CO2 emissions**. Transport, which currently accounts for **40% of final energy demand**, is the most energy intensive sector in the economy (see Box 4.5.1). The increasing share of transport in CO2 emissions also jeopardises the meeting of the 2020 and 2030 climate and energy targets¹⁸⁰.
8. Cyprus is among the Member States with the **highest greenhouse gas emissions per capita** at 11.6 tonnes of CO₂ equivalent per capita in 2017, compared with the EU average of 8.8 tonnes. Moreover, emissions increased significantly by 56% between 1990 and 2017 – among the highest in the EU. Emissions in Cyprus are almost equally split between sectors inside the EU Emissions Trading System (ETS) (52%) and sector outside of it (non-ETS sectors) (48%). They are dominated by energy production, which amounted to 33% of total emissions in 2017, closely followed by transport with a share of 21% of total emissions¹⁸¹.
9. Transport emissions are steadily growing and constitute 21% of Cyprus' total emissions. **The use of private cars is well above the EU average**, while the use of public transport is very low (3% of total trips)¹⁸².

10. To tackle this challenge, **sustainable public urban and inter-urban transport is essential**. The implementation of the Sustainable Urban Mobility Plans for all cities as well as the National Transport Plan should contribute to the necessary modal shift from road transport (and in particular private vehicles) to public transport and to sustainable and clean modes. Further efforts are needed to reduce the current modal share of cars (over 90%) and to **increase the use of sustainable and clean modes**¹⁸³.

CONCLUSION: There has been **limited progress** on sustainable transport.

5.2. Country-Specific Recommendations

(23) To maintain the country's appeal to tourists, it is necessary to address challenges related to the green energy transition, effective waste and water management and the protection of nature and biodiversity. While significant investments have already started, more investments in these areas need to be front-loaded. Cyprus faces important challenges in reaching its 2030 target for greenhouse gas emissions not covered by the EU emissions trading system. These challenges need to be addressed by planning and adopting additional measures in a timely manner in accordance with the country's National Energy and Climate Plan. Such measures will **require investments, in particular in areas like renewable energy, energy efficiency and sustainable transport, which can also help to provide a robust green stimulus**¹⁸⁴.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on clean and efficient production and use of energy, waste and water management, sustainable transport, digitalisation, research and innovation.

5.3. National Energy and Climate Plan

In its NECP, Cyprus has made following commitments related to cycling:

- Policies and measures for the period up to 2023 include upgrading of infrastructure for pedestrians/ cyclists / public transport, development and implementation of a holistic parking policy. The modal share of cars in Cyprus is currently over 90% and based on the plans and studies that have already been completed; a modal share of 75% car, 13% public transport, 12% walking/ cycling can be achieved and is set as a national target¹⁸⁵.
- Deputy Ministry has a goal to develop alternative forms of tourism, (such as sport, walking, cycling and religious tourism) with the aim of increasing the number of visitors to Cyprus and also reducing the seasonality of tourism¹⁸⁶.

6. Czech Republic

6.1. Country Report

1. The National Investment Plan **does not sufficiently address sustainable mobility**, given the increasing greenhouse gas emissions from transport¹⁸⁷.
2. Investments in low carbon and energy transition are still rather low¹⁸⁸.
3. The regional transport networks have **low interoperability and multimodality** of different types of transport systems¹⁸⁹.
4. **Road transport** is becoming one of **the main consumers of energy** in Czechia, but the investments in low-carbon technologies and vehicles remain low¹⁹⁰. The reduction of energy consumption in industry was counteracted by its increase in transport¹⁹¹. While in 1995, transport accounted for only 11% of all energy consumption, by 2017 it had reached 27%, though this was still below the EU average of 31% (see Graph 3.5.2). **Almost 95% of all consumption in the sector is due to road transport**¹⁹².

CONCLUSION: The progress on focusing investment-related economic policy on transport, notably on its sustainability, taking into account regional disparities has been limited¹⁹³.

6.2. Country-Specific Recommendations

(20) Czechia's National Energy and Climate Plan reports **important investment needs to tackle successfully the climate and energy transition and move towards climate neutrality**. This is particularly the case for the promotion of renewable energy resources, energy efficiency, infrastructure and parts of the transmission system. (...) Air pollution is also a perennial problem. At the same time, pollution taxes are very low. There also seems to be a low awareness about the wider benefits of energy efficiency. **The shift to electromobility has been rather slow and road transport is becoming one of the main consumers of energy**. Transport taxes are low and not based on the CO2 emissions. The electric vehicle charging infrastructure is still embryonic¹⁹⁴.

FINAL RECOMMENDATION: 3. **Focus investment on the green and digital transition**, in particular on high-capacity digital infrastructure and technologies, clean and efficient production and use of energy, and **sustainable transport infrastructure**.

6.3. National Energy and Climate Plan

In its NECP, Czech Republic has made following commitments related to cycling:

- The National Programme Environment is geared towards supporting alternative modes of transport (e.g. carsharing, bikesharing, alternative drives, or non-motorised modes of transport)¹⁹⁵.
- Implementation of the National Cycling Development Strategy 2013–2020 aims to improve the coordination of the development and the conditions for the use of this environmentally-friendly non-motorised transport¹⁹⁶.

7. Denmark

7.1. Country Report

1. **Road congestion** is projected to increase around the larger cities, and there is a need to decarbonise the transport sector¹⁹⁷.
2. Denmark faces challenges to **reduce emissions** from transport and agriculture¹⁹⁸.
3. Denmark's commitment to become **carbon neutral by 2050** at the latest will require substantial investments. Denmark's ambitious climate target will require **public and private investments** across the economy, with the energy, **transport**, agriculture and some other sectors particularly prominent¹⁹⁹.
4. Denmark's final **energy consumption** increased in 2018 for the fourth consecutive year, a trend that has been particularly stark in the industry, road transport and international aviation²⁰⁰.
5. Investment in the transport infrastructure is needed with the objective to decarbonise the transport sector, **reduce air pollution** and reduce congestion particularly around Copenhagen. The government is set to negotiate an agreement on infrastructure investments, which takes climate and environmental issues into account, e.g. through **investment in public transport and cycling**²⁰¹.
6. Besides investments, a successful transformation to the low-carbon economy will require **reforms and modernisation** in production, consumption, **transportation** and many other elements in the Danish economy²⁰².

CONCLUSION: There has been **some progress** on **sustainable transport** to tackle road congestion.

7.2. Country-Specific Recommendations

(17) Denmark's National Energy and Climate Plan reports important investment needs to tackle successfully the climate and energy transition. The largest investments are required for the installation of new renewable energy capacity, while significant investment needs are also identified in households (energy efficiency and conversion of heat supply), **sustainable transport**, industry as well as biogas and district heating. Denmark's climate policy objectives aim to reduce greenhouse gas emissions by 70 % by 2030, compared with 1990, and achieve climate neutrality by 2050 at the latest. (...) **Transport is Denmark's largest source of greenhouse gas emission, making further policy action in this area particularly pertinent**²⁰³.

FINAL RECOMMENDATION: 2. **Focus investment on** the green and digital transition, in particular on clean and efficient production and use of energy, **sustainable transport** as well as research and innovation.

7.3. National Energy and Climate Plan

In its NECP, Denmark has made following commitments related to cycling:

- The Government will negotiate an infrastructure agreement, which will consider climate and environmental issues to a much higher degree. This requires investments in public transportation and cycling, among other things²⁰⁴.

- The parties agreed to prioritize bicycling, which supports and further develops green mobility. The parties agreed to allocate 50 million DKK in 2020 to fund half the cost of municipal bicycling projects. As such the scheme will promote investments for a total of 100 m DKK towards promotion of cycling²⁰⁵.

8. Estonia

8.1. Country Report

1. Environmental sustainability remains a challenge due to high carbon and energy intensity. **Estonia is likely to miss its 2030 greenhouse gas emission targets. The sectors which produce the most emissions are transport and buildings.** Both are energy-intensive, and transport in particular relies on carbon intensive sources²⁰⁶.
2. National or local transport networks remain a challenge and additional **focus** should be put on prioritising the **development of sustainable modes of transport**²⁰⁷.
3. Estonia's **transport system remains environmentally unfriendly** and few incentives are provided to change preferences. The total external cost of inland transport in Estonia is estimated at €1.5 billion annually, corresponding to 5.3% of Estonia's GDP. 51% of this is environmental costs (EU average 44%). **Road users generate 96% of these costs**, of which 2/3 are caused by passenger transport. The transport sector is the **main contributor to lower air quality** in Tallinn. Around **500 premature deaths** per year in 2016 were attributable to exposure to fine particulate matter (PM2.5)²⁰⁸.
4. The number of people moving to the capital region from the rest of the country has slowed down, but the **number of daily commuters has increased**. There is an intense internal mobility towards other larger urban and functional urban area. The number of commuters to urban settlements is increasing, which puts additional **pressure on public transport and traffic**. The quality of secondary road networks (in particular local roads) remains low due to underinvestment in road maintenance. Without investing more into connectivity, the attractiveness of the more remote areas will remain limited²⁰⁹.
5. Estonia faces **increasing macroeconomic and social costs from extensive reliance on carbon-intensive energy** in key sectors of the economy. While energy production has a high carbon content, the problem is compounded by the high energy intensity of buildings and **transport**²¹⁰.
6. In 2017, energy-related emissions accounted for 89% of Estonia's total **greenhouse gas emissions**, and emissions from carbon-intensive oil shale represented 69% of energy-related CO₂ emissions. In terms of energy consumption, residential buildings (heating and electricity) account for 33% of final energy consumption, and **transport accounts for 29%**²¹¹.
7. The **energy consumption of transport has increased compared to 2004**. Overall, several sectors are not making enough effort to decarbonise. Action to improve energy efficiency in buildings and the transport sector has been insufficient and has not led to significant improvements²¹².
8. Having less carbon intensive transport and more energy efficient housing sectors will require considerable investment. Estonia's transport sector has a large negative environmental footprint due to the stock of relatively old cars the most environmentally unfriendly new vehicle fleet in the EU and high dependence on fossil fuels (98%). This makes Estonia one of the **worst performers on the relevant sustainable development goals 7, 12 and 13**²¹³.
9. Moving towards more **sustainable transport** and housing can bring **considerable savings**, in particular **for low income households**²¹⁴.

CONCLUSION: There has been **no progress** in focusing investment-related economic policy on sustainable transport²¹⁵.

8.2. Country-Specific Recommendations

(20). As notably reflected in its National Energy and Climate Plan, Estonia's sustainable growth relies on progress towards decarbonisation through **lowering carbon intensity** in the energy, **transport** and building sectors, restructuring the oil shale industry and improving resource productivity, including implementing circular economy business models. Estonia's resource productivity is one of the lowest in the Union, while energy consumption levels are above the EU average. (...) **Estonia's transport infrastructure faces some shortcomings in terms of connectivity and sustainability. Rail and intermodal transport remain underdeveloped. Greenhouse gas emissions from road transport have increased in recent years**, and renewable energy in transport remains below the national targets. (...) Promoting investment projects that take into account environmental and climate considerations is key to a sustainable economic recovery and reducing regional disparities²¹⁶.

FINAL RECOMMENDATION: 3. **Focus investment on** the green and digital transition, in particular on digitalisation of companies, research and innovation, clean and efficient production and use of energy, resource efficiency, and **sustainable transport, contributing to a progressive decarbonisation of the economy.**

8.3. National Energy and Climate Plan

In its NECP, Estonia has made following commitments related to cycling:

- To reduce the share of urban car use by improving conditions for walking, cycling and use of public transport, and the use of smart solutions for various new services, in particular the provision of short-term bicycle and car rental services²¹⁷
- To make the shift towards increasing the use of public transport and non-motorised means of transport, and also managing and reducing demand²¹⁸.

9. Finland

9.1. Country Report

1. Finland is broadly on track to reaching its 2020 climate targets, but its objective of reaching carbon neutrality by 2035 will require an ambitious set of new measures. In this respect, **decarbonising energy-intensive industries and the transport sector** appear as key objectives. Sizeable investment in low carbon and energy transition as well as in sustainable transport infrastructure is being considered²¹⁹.

2. **Sustainable infrastructure investment** is being planned, notably to increase labour mobility. A new national transport system will be developed in 2020-2021 under the lead of a parliamentary steering group²²⁰.
3. Finland's increased ambition needs to be translated into a significant step-up of mitigation policies, including those for emissions in sectors not covered previously. Although the energy mix of the country is already 80% carbon-free, the energy supply sector still represents 31% of the **total emissions**, ahead of **transport (20%)**, manufacturing (12%) and buildings (7%)²²¹.
4. Moving towards more sustainable transport and housing can bring along considerable savings. As transport alone accounts for one fifth of Finland's emissions, it will play a key role in reaching carbon neutrality. The new government has set an ambitious target of halving transport emissions by 2030²²².

CONCLUSION: Limited progress has been made **on sustainable transport**, as investment in sustainable infrastructure is being planned.

9.2. Country-Specific Recommendations

(20) The planned move towards climate neutrality by 2035 also reflected in Finland's National Energy and Climate Plan will require **substantial investment, particularly in** electricity networks and **in sustainable transport**. A new national transport plan for 2021–2032 is being developed under the lead of a parliamentary steering group²²³.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on clean and efficient production and use of energy, **sustainable and efficient infrastructure** as well as research and innovation.

9.3. National Energy and Climate Plan

In its NECP, Finland has made following commitments related to cycling:

- A programme for the promotion of walking and cycling will be implemented. In 2020–2022, EUR 41 million will be reserved for the planning work and project promotion related to walking and cycling. In connection with the network development projects, an amount of EUR 10 million of the total funding will be allocated to meet the infrastructure needs of walking and cycling²²⁴.
- To ensure that projects promoting walking, cycling and public transport are prioritised in urban transport planning and project funding²²⁵.

10. France

10.1. Country Report

1. The required transformative policies involve lasting behavioural change of the population at large. In France, the combined transport, building and agriculture sectors account for 64% of greenhouse gas emissions²²⁶.
2. Without additional measures, France risks missing its 2030 emission targets, mainly due to transport, building and agriculture sectors²²⁷.
3. Substantial investment is needed to reach the ambitious climate targets. The Institute for Climate Economics (I4CE) estimates that by 2023, an additional €15 to 18 bn of investments per year in housing (energy efficiency), renewable energy and clean transports are necessary to put France on a downward trajectory towards carbon neutrality²²⁸.
4. The living area has also an impact on energy poverty, as transport expenses tend to grow with urban sprawling²²⁹.

10.2. Country-Specific Recommendations

(21) To foster the economic recovery, it will be important to front-load mature public investment projects and promote private investment, including through relevant reforms. This could be identified in European Green Deal priorities, in particular in **low-carbon transport initiatives**, renewable, energy and building renovations. Together with the digital transformation of the economy, this could help bring short-term stimulus to the recovery and the medium-term aftermath of the COVID-19 crisis and put France on a sustainable long-term climate neutral path while promoting technological leadership. Preparatory work for recovery measures could rely on France's National Energy and Climate Plan, projects of common interest and **infrastructure development plans**²³⁰.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on sustainable transport, clean and efficient production and use of energy, energy and digital infrastructures as well as research and innovation.

10.3. National Energy and Climate Plan

In 2020 the EC made the following recommendations for France:

1. France should focus investment on the green and digital transition, in particular on sustainable transport, clean and efficient production and use of energy and digital infrastructures as well as research and innovation (Point 3)²³¹.
2. To foster the economic recovery, it will be important to front-load mature public investment projects and promote private investment, including through relevant reforms. This could be identified in European Green Deal priorities, in particular in low-carbon transport initiatives, renewable, energy and building renovations. Together with the digital transformation of the economy, this could help bring short-term stimulus to the recovery and the medium-term aftermath of the COVID-19 crisis and put France on a sustainable long-term climate neutral path while promoting technological leadership. Preparatory work for recovery measures could

rely on France's National Energy and Climate Plan, projects of common interest and infrastructure development plans (Recital 21)²³².

11. Germany

11.1. Country Report

1. **Stronger investment in sustainable transport** and electricity infrastructure is crucial to meeting climate, energy and environmental targets²³³.
2. Overall, Germany performs well in achieving the Sustainable Development Goals. Some **deterioration** can be observed in **sustainable transport (SDG 9)**²³⁴.
3. **Weak domestic investment** has resulted in bottlenecks in taking up renewable energy sources and in making transport and mobility more sustainable²³⁵.
4. The **Climate Package** is expected to increase the cost of pollution, **lower costs for less-polluting transport modes**²³⁶.
5. Public transport investment, **creation of new cycling routes**, modernisation of ports and inland waterways, support to rail transport (Deutsche Bahn), digitalisation and development of new motor fuels (e.g. based on hydrogen) are among the initiatives listed²³⁷.
6. Germany needs more **modern, cleaner and better performing mobility solutions** to meet environmental and climate targets and improve productivity and the quality of life²³⁸.
7. As a strong innovator, with a strong transport-vehicle manufacturing basis and well-developed infrastructure, **Germany has the capacity to be at the forefront in offering clean, safe and modern transport** and mobility solutions²³⁹.
8. **Strengthening private and public investment in clean and sustainable mobility solutions**, notably e-mobility, is high on the political agenda. Such investment should usefully first focus on urban mobility, where the problem of **air pollution, noise emissions, congestion** and road safety is particularly urgent, and where autonomy-constraints are less of a concern²⁴⁰.
9. Furthermore, the federal government provides additional €900 million in the years 2020 to 2023 for measures to **expand the cycling infrastructure cycle path network, bicycle parking systems, storage facilities or cycle superhighways**), and provides financial assistance to pilot projects²⁴¹.
10. While Germany's national energy and climate plan lists a number of **policies, the lack of detail and integration** creates uncertainty about the overall government strategy for decarbonising the transport sector²⁴².
11. **Nature-based solutions** hold strong climate mitigation potential and are a vital and cost-effective complement to decarbonisation in the energy, transport and industrial sectors in Germany²⁴³.

CONCLUSION: The progress on the sustainable transport has been limited. The transport sector has done particularly badly at cutting emissions of both **greenhouse gases and local air pollutants**, which has led to a gap in meeting Germany's Effort Sharing Decision target. Despite very high external cost of road transport, Germany records a high use of passenger cars while at the same time the competition within the rail passenger sector remains low. The Climate Package of Autumn 2019 included a number of promising measures, including support for creating charging infrastructure of electric vehicles, increased subsidies for electric, hybrid and fuel cell vehicles, public transport investment, creation of new cycling routes, modernisation of ports and inland waterways, support to rail transport. However, the impact and the implementation of these needed and overall well-conceived measures still remain to be seen²⁴⁴.

11.2. Country-Specific Recommendations

(20) Despite recent initiatives, meeting short- and medium-term decarbonisation targets and 2050 climate neutrality targets remains a challenge. (...) Germany's transformation to a climate neutral economy will **require sizeable private and public investment over a sustained period in renewable energy, electricity infrastructure, energy efficiency, circular economy and sustainable transport**, among others. (...) **Clean mobility can be promoted through appropriate regulatory measures and with stronger and faster investment in sustainable transport infrastructure and clean mobility solutions**²⁴⁵.

FINAL RECOMMENDATION: 2. Focus investment on the green and digital transition, in particular on sustainable transport, clean, efficient and integrated energy systems, digital infrastructure and skills, housing, education and research and innovation.

11.3. National Energy and Climate Plan

In its NECP, Germany has made the following commitments related to cycling:

- The development of express cycle paths and cycle tracks along main roads will be continued. The 'Stadt und Land' (town and country) special programme will deliver equal opportunities for bicycle traffic, e.g. by providing secure and modern parking facilities and expanding the infrastructure for cargo bikes. For this purpose, grants for investment measures by the states and municipalities are to be made available for the first time, for the creation of cycle traffic networks (creation and expansion of cycle highways, conversion of traffic lanes into protected bike paths, construction measures to speed up cycle traffic, traffic measures such as the green wave where appropriate, intuitive road guidance measures through signage and markings and safe system alterations, in particular of intersections etc.), for secure and modern parking facilities and bicycle parking garages, for the construction of cycle paths along main roads, and for developing the necessary infrastructure and creating favourable conditions for cargo bikes²⁴⁶.
- The various infrastructural improvements will also support the trend towards an increasing use of electric bicycles or other new forms of mobility²⁴⁷.
- The introduction of new traffic signs (green arrow for right turn on red for cyclists only, express cycle path, cycle zone, ban on overtaking of single-track vehicles such as bicycles by multi-track vehicles and 'cargo bike' symbol), extension of the testing clause (trials of traffic-regulating or protective measures irrespective of the danger situation) and the opening up of more one-way streets for cyclists in the opposite direction²⁴⁸.

12. Greece

12.1. Country Report

1. The 2019 country report reviewed investment performance and identified **priority areas for public and private sector investment** in order to promote long-term growth and reduce regional disparities. These areas included **sustainable transport**²⁴⁹.
2. Partly due to the economic crisis, **progress in promoting environmental sustainability has been limited** and Greece now faces specific challenges in the fields of energy, transport and protection against natural disasters. It is necessary to establish a framework in which environmental sustainability goes hand in hand with economic growth and institutional reforms is key²⁵⁰.
3. **The transport sector is responsible for the largest share of total final energy consumption** in Greece. Its external costs to society (i.e. costs related to **accidents, air pollution**, etc.) are estimated at around **6% of the country's GDP**²⁵¹.
4. The Greek transport system, which is largely road-based, lacks competitiveness and **scores low on carbon emissions performance, road safety and service quality**²⁵².
5. To address the above challenges, the authorities, with the support of the European Commission and the European Investment Bank, have prepared a **National Transport Master Plan for Greece**. The Plan provides the basis for **sustainable transport infrastructure and service development** in Greece over the medium to long-term horizon, covering both organisational and institutional interventions and investments in transport infrastructure²⁵³.
6. **Air pollution has significant health impacts**. Here, investments in more sustainable transport and a shift to green energy can yield large improvements²⁵⁴.
7. A recent study published by the European Commission estimates the total external costs of transport for road, rail and inland waterways in Greece at **€13 billion annually**, which corresponds to 6% of Greece's GDP. This includes external costs related to **accidents, environment (air pollution, climate change, the costs related to energy production, i.e. the well-to-tank emissions, noise, habitat damage)** and **road congestion**. Environmental costs make up 40% of the total, while 36% of the costs are related to road congestion. The figures on external costs do not include infrastructure costs, which for land transport modes amount to almost €4 billion annually (including fixed infrastructure costs)²⁵⁵.

CONCLUSION: There has been **limited progress** in focusing investment-related economic policy on **sustainable transport** and logistics.

12.2. Country-Specific Recommendations

(24) Rekindling Greece's economy will also require tackling some long-term weaknesses and tapping into potential future opportunities. **Sectors with significant investment needs include transport and logistics**, where support is particularly needed for rail, road safety and **upgrading intermodal hubs**, as well as solid waste and urban waste-water management where environmentally sustainable investments are needed. Greece's transformation to a climate neutral economy will also require sizeable private and public investment over a sustained period. (...) Preparatory work for medium-term recovery measures can benefit from investments planned under Member States' National Energy and Climate Plans, projects of common interest lists, and **infrastructure development plans**²⁵⁶.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on safe and sustainable transport and logistics, clean and efficient production and use of energy, environmental infrastructure and very-high-capacity digital infrastructure and skills.

12.3. National Energy and Climate Plan

In its NECP, Greece has made the following commitment related to cycling:

- Promoting the use of bicycles (implementation and improvement of infrastructures), parking policy, change to the supply chain model (cargo bikes, collective transport, operating hours, etc.), policy for reducing the use of private cars (ban on parking/traffic in specific areas, etc.), promoting the use of micro-mobility vehicles, strengthening multimodal mobility, improving park and ride spots, improving ICT-based infrastructures and promoting sustainable and safe transport systems²⁵⁷.

13. Hungary

13.1. Country Report

1. **Greenhouse gas emissions from transport have increased** strongly over the last five years and emissions are projected to continue increasing under current policies. Identifying investment needs in green technologies and sustainable solutions, and securing adequate funding will be key to delivering on the climate and energy objectives and shaping a new growth model²⁵⁸.
2. Rising demand is expected to put further pressure on **the low quality of transport infrastructures**. Strong economic growth has increased the volume of road transport by 14% between 2012-2018 (measured in ton-kilometres) while the number of passenger cars rose by 22%. As a result, road congestion has increased²⁵⁹.
3. The **high number of road accidents** is a burden on the economy and society. The number of road fatalities per car or per kilometres driven remains among the highest in the EU. The quality of roads and the vehicle fleet play a key role in this poor safety record. The **low protection of pedestrians, cyclists and motorcyclists is a particular cause for concern**; their 40% share in road fatalities is well above the EU average of 29%. Thus, low road safety may deter individuals from soft transport modes that could otherwise ease road congestion and air pollution²⁶⁰.
4. **Rural areas** suffer from **weak transport links**²⁶¹.
5. **The main sources of air pollution** include residential solid fuel combustion, agriculture and **transport emissions**²⁶².
6. Transport externalities are sizeable, particularly affecting the environment. The estimated total **external costs of transport** for road, rail and inland waterways amount to **6% of Hungary's GDP**. They include costs related to **accidents, environment (air pollution, climate change, the costs related to energy production, i.e. the well-to-tank emissions, noise, habitat damage)** and, road congestion costs. Accident costs make up 43% due to the high number of road fatalities, and about a third of the costs relate to the environment²⁶³.
7. A stronger role for other alternative fuels, shared mobility, public transport and a **modal shift would help to address the environmental burden** from transport²⁶⁴.

CONCLUSION: Limited progress has been made in focusing investment-related economic policy on research and innovation, low-carbon energy, **transport infrastructure**, waste management and energy and resource efficiency, taking into account regional disparities²⁶⁵. **Some progress has been made in low-carbon transport**²⁶⁶.

13.2. Country-Specific Recommendations

(26) Hungary's National Energy and Climate Plan identifies investment needed to tackle the climate and energy transition. Together with investment in digitalisation and the green transition, these will make the Hungarian economy more sustainable and resilient once the country recovers from the crisis. (...) **The persistent breaches of air quality standards have severe health and environmental repercussions.** The main sources of air pollution include residential solid fuel combustion, agriculture and **transport emissions. Road congestion has been a growing challenge** until the outbreak of the COVID-19 pandemic, entailing negative economic impacts and increasing greenhouse gas emissions and air pollution²⁶⁷.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular clean and efficient production and use of energy, **sustainable transport**, water and waste management, research and innovation, and digital infrastructure for schools

13.3. National Energy and Climate Plan

In its NECP, Hungary has made the following commitment related to sustainable transport:

- We plan to reduce GHG emissions in the transport sector by increasing the blending ratio of biofuel, supporting the spread of electric motor vehicles and by encouraging the use of low-emission transport solutions²⁶⁸.

14. Ireland

14.1. Country Report

1. The Climate Action Plan represents a muchneeded breakthrough and a stepping stone in the transition to a climate neutral and circular economy. **Ireland has lagged behind so far in tackling climate change. Greenhouse emissions in the transport, building and agriculture sectors are high and on a rising trend**²⁶⁹.
2. The return to economic growth and the suburban sprawl has led to a **high share of workers commuting daily from outside the main cities.** This has aggravated congestion in recent years and resulted in increasing CO2 emissions and costs²⁷⁰.

CONCLUSION: There has been **some progress focused on** facilitating investments related to climate change, energy transition, **sustainable transport**, water, digital infrastructure, affordable and social housing.

14.2. Country-Specific Recommendations

(21) The restart of the economy requires that Ireland make progress with regard to its ambitious environmental, climate, energy and infrastructure investments. Ireland has lagged behind so far in tackling decarbonisation. **Greenhouse gas emissions in transport and buildings are high and have remained on a rising trend.** Ireland will fall short of the 2020 energy efficiency and renewable energy targets. Ireland is dependant on energy imports and is among the Member States with the highest prices for electricity, which could negatively impact both the environment and business competitiveness. **Ireland's transformation into a climate-neutral economy will require sizeable private and public investment, over a sustained period, in, inter alia, renewable energy, electricity infrastructure, energy efficiency and sustainable transport.** The Climate Action Plan constitutes a credible initiative to reverse the emissions trajectory. An effective and sustained implementation of its policies and measures will be required to translate ambition into concrete results²⁷¹.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on clean and efficient production and use of energy, **sustainable public transport,** water supply and treatment, research and innovation and digital infrastructure.

14.3. National Energy and Climate Plan

In its NECP, Ireland has made the following commitments related to cycling:

- Expanding the network of cycling paths and "Park and Ride" facilities²⁷².
- "A New Transport Policy for Ireland 2009-2020" sets out key modal share targets for achievement by 2020. These targets are aimed at reducing work-related commuting by car as a modal share of 65% to 45% and accommodating car drivers on other modes of transport such as walking, cycling, public transport and car sharing to the extent that commuting by these modes would rise to 55% by 2020 (or through other measures such as e-working)²⁷³.
- In order to continue to build on this momentum and to encourage further modal shift nationally, over €110m in capital funding is being directly allocated to develop cycling and walking infrastructure in the Greater Dublin Area, Galway, Limerick, Cork and Waterford over the period 2018-2021. A further €135m capital funding is allocated over this same period for investment in Sustainable Urban Transport projects, and these will include projects that will provide either direct or indirect improvements for urban cycling²⁷⁴.
- Budget 2020 provides funding of €707 million for capital investment in public transport in 2020, in four key areas: smarter travel and sustainable urban transport; heavy rail safety and development; public transport infrastructure; and walking and cycling²⁷⁵.

15. Italy

15.1. Country Report

1. Sustainability-related reforms and investment represent an opportunity for Italy. It is on track to reach its 2020 climate and energy targets, although more efforts are needed for longer-term goals. **Transport emissions have increased strongly over the last five years and constitutes a key challenge for reaching the 2030 target.** On the other hand, **air quality, sustainable mobility**, climate adaptation, prevention of hydrogeological and seismic risks, and water and waste management **remain challenges**²⁷⁶.
2. Improving energy efficiency in the building sector, **promoting sustainable transport**, circular economy in lagging regions and climate risk prevention is **key for Italy's green transition**. Investments in energy efficiency in (residential) real estate are needed to achieve climate change targets. **Investment in sustainable transport can contribute to reduce GHG emissions and improve air quality**²⁷⁷.
3. Three infringements are open for **air pollution** against Italy. It is estimated that 3.3% of the Italian population (2.0 million inhabitants) lives in areas where EU air quality standards are exceeded. Particularly severe concerns are raised about significant negative health impacts of fine particulate matter levels but the health burden (in terms of years of life lost) for other indicators (O₃, NO₂) is also above the EU average. Air pollution also affects soils, vegetation surfaces and waters, with the Po Valley having some of the highest exceedances in 2016. **Decarbonising transport is key to reducing greenhouse gas emissions.** It is estimated that the cost of transport externalities amounted to 6.8% of Italy's GDP in 2016. In 2017, transport accounted for 23% of these emissions, due to road traffic (over 80 % of trips made by private car) and inefficient combustion²⁷⁸.
4. There is a **potential for developing sustainable urban mobility**. Italy has started adopting urban sustainable mobility plans (PUMS). Their approval by October 2020 is a pre-requisite for accessing national funds and loans. By the end of 2019, 35 PUMS were approved (with only two metropolitan cities — Bologna and Genoa), 35 were finalised but not yet approved and 88 were under preparation²⁷⁹.

15.2. Country-Specific Recommendations

(21) Investment in support of the green transition will be particularly important to support recovery and increase future resilience. (...) Green deal investments are also key for reducing the impact on human health from air pollution in Italian cities, especially in the Po Basin. For instance, implementing **sustainable mobility initiatives**, such as renewal of local public buses, represents an example to **address both congestion and air pollution**. (...) **Addressing environmental and climate change challenges, such as** hydrological risks, **sustainable urban mobility**, energy efficiency, circular economy and industrial transformation, represent an opportunity to improve productivity while avoiding unsustainable practices. At the same time, investing into such projects can contribute to creating jobs and sustaining the post-crisis recovery²⁸⁰.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on clean and efficient production and use of energy, research and innovation, **sustainable public transport**, waste and water management as well as reinforced digital infrastructure to ensure the provision of essential services.

15.3. National Energy and Climate Plan

In its NECP, Italy has made the following commitment related to cycling:

- To launch a program for promotion of alternative mobility which puts in place instruments for encouraging:
 - development of mobility for cyclists through cycle paths;
 - promotion of shared mobility (bike, car and motorbike sharing with low or zero emissions);
 - integration between sustainable mobility services (for example, parking structures for bicycles or car and bike sharing services close to public transport stops) and interchange parking²⁸¹.

16. Latvia

16.1. Country Report

1. **Reducing energy consumption in transport** and housing are Latvia's **key climate policy challenges**. Latvia's greenhouse gas emissions per capita are among the lowest in the EU. This is because its energy consumption per capita is lower than the EU average and the share of renewable energy is among the highest in the EU. However, in order to meet its 2030 target for greenhouse gas emissions, it will need to break the current trend of **increasing energy consumption in transport** and housing²⁸².
2. **Improving transport infrastructure within and around Riga** would both facilitate labour mobility and help curb growing energy consumption from passenger cars. **The growing use of passenger cars is among the chief reasons for growing carbon emissions** in the transport sector. Moreover, Latvia is currently developing a new transport model that it hopes will help direct public investments where they can have the most impact²⁸³.
3. The **increase in greenhouse gas emissions** in non-ETS sectors is driven mainly by **increasing use of passenger cars**. According to estimates of Latvia's Ministry of Economics (2019b) estimates, in 2017, emissions from non-ETS sectors accounted for roughly 4/5 of all greenhouse emissions. Among those, transport and agriculture were the largest contributors to total greenhouse gas (GHG) emissions and, **responsible for 30% and 25% of all emissions**, respectively. Moreover, **over the past 5 years the transport sector has seen the fastest increase in energy consumption**. Given that it relies almost exclusively on fossil energy, its contributions to the increase of GHG emission is broadly proportional to its increase in energy consumption. Conversely, **improving transport sector's energy efficiency has the largest potential to reduce greenhouse gas emissions among all sectors**.²⁸⁴
4. The growing use of passenger cars is a major driver of increasing energy consumption. At about 80% of all trips made, **the share of passenger car usage for transport is among the highest in Europe**. Over the past four years the car-kilometres driven by passenger cars have increased by nearly 30%²⁸⁵.
5. **The green transition in Latvia would require investments in transport**, buildings, renewable energy, and related education and skills²⁸⁶.

CONCLUSION: There has been **some progress** on transport, in particular on its sustainability.

16.2. Country-Specific Recommendations

(21) Latvia's environmental sustainability rests on **making progress towards improved energy efficiency**, implementing its National Energy and Climate Plan, **including in particular in transport and buildings**, and mainstreaming environmental sustainability considerations in other economic sectors, in particular in agriculture and forestry. **Improving intermodal transport infrastructure within and around Riga would both facilitate labour mobility and help curb growing energy consumption from passenger cars**²⁸⁷.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on research and innovation, clean and efficient production and use of energy, **sustainable transport and digital infrastructures**.

16.3. National Energy and Climate Plan

In 2020 the EC made the following recommendations for Latvia:

1. Latvia should focus investment on the green and digital transition, in particular on research and innovation, clean and efficient production and use of energy, sustainable transport and digital infrastructures (Point 3)²⁸⁸.
2. Latvia's environmental sustainability rests on making progress towards improved energy efficiency, implementing its National Energy and Climate Plan, including in particular in transport and buildings, and mainstreaming environmental sustainability considerations in other economic sectors, in particular in agriculture and forestry. Improving intermodal transport infrastructure within and around Riga would both facilitate labour mobility and help curb growing energy consumption from passenger cars (Recital 21)²⁸⁹.

17. Lithuania

17.1. Country Report

1. **Environmental sustainability in Lithuania is low overall**, the main contributing factors being low resource efficiency, high pollution levels from fossil fuel consumption in transport, and little progress on the circular economy. Increasing environmental sustainability requires a clearer commitment and targeted and smart public investment in green technologies. In addition to manufacturing, **Lithuania could benefit from better incorporating environmental considerations into other sectors**, notably **transport and agriculture**²⁹⁰.
2. **Public investment is still needed** to boost the energy transition, increase resource efficiency and **make transport more sustainable**²⁹¹.
3. The **transport sector represent almost 40% of all greenhouse gas emissions**. This puts the transport sector at the centre of decarbonisation efforts, to ensure 2030 climate change targets are met. **The transport sector remains the largest emitter GHG emissions**. At present, transport represents 12% of gross value added in Lithuania, compared to 4% in the EU. Since 2008 emissions from this sector have almost doubled along with the size of the sector. **Cars remain the main mode of transport**²⁹².

4. To contribute to the country's energy transition, **investment needs to be scaled up**. More investment is required for waste management, solar and wind energy generation, networks modernization to integrate renewables, **green transport** and construction sectors²⁹³.

CONCLUSION: Progress in the area of sustainable transport **has been limited**.

17.2. Country-Specific Recommendations

(22) As regards the green transition, **total greenhouse gas emissions in Lithuania remain largely unchanged since 2010**. Lithuania's resource productivity is one of the lowest in the Union and circular (secondary) material use is well below the Union average. In line with Lithuania's National Energy and Climate Plan, improving the energy performance of buildings thanks to energy efficiency and renewable energy solutions, modernising heating systems and **improving the sustainability of the transport sector, would significantly contribute to decarbonising the economy**. Targeted public and private investments aimed at tackling those issues, and others with a significant environmental and health impact, can promote growth and resilience, and help ensure a sustainable recovery from the crisis²⁹⁴.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on the coverage and take-up of very-high-capacity broadband, on clean and efficient production and use of energy, and **sustainable transport**.

17.3. National Energy and Climate Plan

In 2020 the EC made the following recommendations for Lithuania:

1. Lithuania should focus investment on the green and digital transition, in particular on the coverage and take-up of very-high-capacity broadband, on clean and efficient production and use of energy, and sustainable transport (Point 3)²⁹⁵.
2. As regards the green transition, total greenhouse gas emissions in Lithuania remain largely unchanged since 2010. Lithuania's resource productivity is one of the lowest in the Union and circular (secondary) material use is well below the Union average. In line with Lithuania's National Energy and Climate Plan, improving the energy performance of buildings thanks to energy efficiency and renewable energy solutions, modernising heating systems and improving the sustainability of the transport sector, would significantly contribute to decarbonising the economy. Targeted public and private investments aimed at tackling those issues, and others with a significant environmental and health impact, can promote growth and resilience, and help ensure a sustainable recovery from the crisis (Recital 22)²⁹⁶.

18. Luxembourg

18.1. Country Report

1. **Investment remains relatively weak in sustainable housing and transport infrastructure**, research and innovation, and digitalisation, especially in the business sector²⁹⁷.
2. The country is the **EU's highest greenhouse gas emitter per capita**. With existing measures, it would fall short of its 2030 target for reducing greenhouse gas emissions. This highlights the **considerable efforts needed** to deliver on Luxembourg's climate and energy objectives, in **particular in the transport and housing sectors**²⁹⁸.
3. Cross-border flows of workers have an impact on the transport systems of both Luxembourg and the neighbouring regions. **At peak hour, transport conditions for cross-border workers may become challenging**. In terms of transportation mode, **85% of cross-border commuters travel by private car**, 6% by bus and 9% by train²⁹⁹.
4. **Transport is the main source of emissions (47%)**, reflecting Luxembourg's position as logistical hub and the impact of its large crossborder commuting workforce³⁰⁰. As such, improving the situation in the transport sector can significantly contribute to Luxembourg's climate performance (see subsection above), but also alleviate tensions on its economy, as road congestion affects the country's attractiveness and has social and economic spillovers³⁰¹.
5. The **car remains the dominant means of transport**, and the country has the highest number of passenger vehicles per inhabitant in the EU (Eurostat, 2019b). Over **70 % of commuters use cars**, compared to 19 % who use public transport (102), contributing to road traffic congestion in the Grande Région at peak hours³⁰².
6. **Traffic congestion affects the economy**, including through time losses and impacts on air quality, can eventually damage Luxembourg's attractiveness and productivity, and may have social impacts. Luxembourg is among the **member states with the most time lost in road congestion** (36.9 hours per capita in 2017, up from 31.1 in 2014). Despite improvements over the last decades, Luxembourg's **air quality continues to give cause for concern** and has consequences on public health and the environment as a whole. **Shortterm measures to cut emissions from existing vehicles have been identified as a priority**. Traffic congestion can damage the country's attractiveness and productivity, and have social spillovers, as it contributes to exacerbate inequalities, with poorer households having to set aside more time to access their place of work. A recent study estimated **the total negative externalities of transport (including accidents, congestion, air pollution, climate, noise, energy production, and habitat damage) in Luxembourg reached 7.5% of GDP in 2016, which is the highest in the EU** (EU average is 5.7%)³⁰³.
7. Luxembourg continues to take action to **encourage a more sustainable mobility**, although a **comprehensive strategy** articulating transport policies with other policies **is lacking**. Luxembourg's Sustainable Mobility Strategy, Modu 2.0, aims at reducing the economic and environmental impact from congestion, while transporting 20% more people by 2025 than in 2017³⁰⁴.

CONCLUSION: Some progress has been made on economic policies related to investment on **improving sustainable transport**. Significant investments have been realised and **are to be continued** to improve the transport system³⁰⁵.

18.2. Country-Specific Recommendations

(19) The recovery should be supported by advancing **ambitious green investments in the short term**. **Key sectors can be, in particular, sustainable transport**, including rail, sustainable

construction, in particular in relation to the energy efficiency of buildings, both existing and new, and renewable energy. These would help to provide a robust green stimulus, and support Luxembourg in bridging the gap to its 2030 targets on greenhouse gas emissions reduction, energy efficiency and renewable energy, as well as in preparing the ground for climate neutrality³⁰⁶.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on sustainable transport and buildings, clean and efficient production and use of energy, contributing to a progressive decarbonisation of the economy.

18.3. National Energy and Climate Plan

In its NECP, Luxembourg has made the following commitments related to cycling:

- The ‘Clever fueren’ scheme supports the purchase of electric vehicles, electric motorcycles and bicycles through direct grants³⁰⁷.
- At company level, employees who choose a means of transport other than a car should not be further disadvantaged. A ‘mobility budget’ tax benefit will be introduced which is equivalent to that for company cars and thus offers an alternative to the company car. Alternatively, the following measures may form part of or complement the mobility budget:
 - support for the construction of secure bicycle storage facilities within activity zones;
 - financial aid to companies for the installation of charging points³⁰⁸.

19. Malta

19.1. Country Report

1. Malta’s efforts to **cut greenhouse gas emissions, promote sustainable mobility and increase energy efficiency** do not seem to match the scale of the challenges it faces. With current policies, emissions are projected to continue increasing, putting Malta far off track in relation to its 2020 and 2030 targets. If Malta is to reach these targets it will be necessary **to break the current trend of increasing emissions from transport** as well as from the heating and cooling of buildings³⁰⁹.
2. The road transport sector generates significant negative externalities, which are exacerbated by demographic and economic growth. The external cost of road transport in Malta is estimated at around **€400 million annually**, approximately 4% of GDP. This figure includes external costs related to **congestion, accidents, and environmental damage (air pollution; climate change; and the costs related to energy production, i.e. well-to-tank emissions, noise, habitat damage)**. All of these external costs **frequently affect the quality of life** of Maltese residents. In recent years, Malta has experienced **increasing road traffic volumes**, mainly because of the rapid growth in population, the economy and tourism. The transport sector is responsible for around **a quarter of total greenhouse gas emissions** in Malta. Air pollution related to transport also generates considerable social impacts. **Worsening road congestion** is the result of heavy reliance on passenger vehicles for transportation and sharp increases in the number of licensed motor vehicles. Poor transport infrastructure and road quality are also considered one of the island’s **drawbacks in investment attractiveness**. While the

development of road infrastructure remains a government priority, it is unclear to what extent planned road projects will contribute to **enabling modal shift**³¹⁰.

3. The road transport sector generates significant negative externalities, which are exacerbated by demographic and economic growth. The external cost of road transport in Malta is estimated at around **€400 million annually**, approximately 4% of GDP. This figure includes external costs related to **congestion, accidents, and environmental damage (air pollution; climate change; and the costs related to energy production, i.e. well-to-tank emissions, noise, habitat damage)**. All of these external costs **frequently affect the quality of life** of Maltese residents. In recent years, Malta has experienced **increasing road traffic volumes**, mainly because of the rapid growth in population, the economy and tourism. The transport sector is responsible for around **a quarter of total greenhouse gas emissions** in Malta. Air pollution related to transport also generates considerable social impacts. **Worsening road congestion** is the result of heavy reliance on passenger vehicles for transportation and sharp increases in the number of licensed motor vehicles. Poor transport infrastructure and road quality are also considered one of the island's **drawbacks in investment attractiveness**. While the development of road infrastructure remains a government priority, it is unclear to what extent planned road projects will contribute to **enabling modal shift**³¹¹.
4. The 2020 budget introduces a number of environmental measures including additional schemes to **encourage the purchase of bicycles**, scooters and pedelecs³¹².

CONCLUSION: Progress in ensuring sustainable transport and reducing traffic congestion **has been limited**³¹³. In line with the National Transport Plan 2025, investment is being focused on a number of measures to **encourage a modal shift** from the private car to collective sustainable and alternative low carbon transport mode through the use of harbour ferry connections for travel within Malta. There are some promotion of incentives to reduce private vehicle use in an attempt to reduce congestion, which remains the main transport issue. **Incentives are also going to cycling**, electrification of cars, intelligent transport systems in the SUMP.

19.2. Country-Specific Recommendations

(20) Malta's transformation into a climate-neutral economy will require sizeable private and public investment over a sustained period of time. Investment to reduce greenhouse gas emissions, described in its National Energy and Climate Plan, and **to address other negative environmental externalities, in particular in** sectors like construction and **transport**, can help achieve the dual objectives of economic recovery and sustainability. (...) **Further investment on sustainable transport can ensure viable alternatives to the use of private cars**³¹⁴.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on clean and efficient production and use of energy, **sustainable transport**, waste management, research and innovation.

19.3. National Energy and Climate Plan

In its NECP, Malta has made the following commitment related to cycling:

1. Malta's objective is to have a national safe cycling route network which will be intersecting local transport hubs. It is expected that in 2020 a National Bicycle Strategy, which shall include the provision of additional cycle lanes and increase connectivity to these routes, will be developed.

Through the investment of bicycle and pedelec sharing operating companies, Malta registered a steady increase in the use of these modes for commuting purposes, and this encouraged the Government to invest more in related infrastructure, including Safe Cycling Routes³¹⁵.

20. Netherlands

20.1. Country Report

1. The government is working on turning the national infrastructure fund into a **mobility fund**, with a **more integrated investment approach across different modes of transport**³¹⁶.
2. The perceived quality of the infrastructure for all transport modes is very high. According to the World Economic Forum's Global Competitiveness Report 2019, the Netherlands scores **very well on the quality and connectivity of its transport infrastructure**³¹⁷.
3. However, road congestion makes up a significant part of the external costs of transport activities. A recent study published by the European Commission estimates the total external costs of transport for road, rail and inland waterways in the Netherlands at **€31 billion per year**, which corresponds to 4% of GDP. They include external **costs related to accidents, environment (air pollution, climate change, costs related to energy production, i.e. the well-to-tank emissions, noise, habitat damage)** and, only for road, **congestion costs of around €11 billion**. Congestion costs therefore amount to around 35% of total external costs, compared to around 29% for accident costs and around a third of the total for environmental costs.
4. **GHG emissions** in energy and transport were in fact higher in 2018 than in 1990³¹⁸. Environmental sustainability is pushing all sectors in the economy to take appropriate action. The farming, housing, infrastructure and transport sectors will need to adapt to the reassessment of the country's **nitrogen policy**, by making improved choices on environmentally harmful emissions³¹⁹.
5. The Netherlands is one of the **frontrunners** in the EU in **decarbonizing its transport sector**³²⁰.

CONCLUSION: There has been **some progress** in focusing investment-related economic policy on **addressing transport bottlenecks**³²¹. The government agreement set out a clear path with measures to address the increasing traffic on the road, rail, water and in the air. However, **room for further improvement remains**³²².

20.2. Country-Specific Recommendations

(21) Investment in initiatives from the Netherlands' Climate Agreement and National Energy and Climate Plan to address climate change and promote the energy transition can make a key contribution to wider societal goals, including the need to ensure sustainable and resource-efficient economic growth³²³.

FINAL RECOMMENDATION: 3. **Focus investment on** the green and digital transition, in particular on digital skills development, **sustainable infrastructure** and clean and efficient production and use of energy as well as mission-oriented research and innovation.

20.3. National Energy and Climate Plan

In its NECP, Netherlands has made the following commitments related to cycling:

1. Using public transport and the bicycle will be more appealing, use of shared mobility will increase and people will work in a more flexible manner (and increasingly from home). This will reduce the need for work-related traffic and thus the daily pressure of traffic jams on the infrastructure and the environment³²⁴.
2. Efforts are under way in association with employers and public transport companies to reduce emissions resulting from people commuting to work, including establishing specific agreements in the Environment and Planning Act and by focusing more on fully accessible travel via shared cars, public transport and by bicycle. In the Climate Agreement (2019) it was agreed that at least 1,000 employers would commit before 2030 to at least a 50% CO2 reduction of business mobility in 2030 compared to 2016. We are also aiming for 200,000 extra bicycle commuters³²⁵.
3. Various measures are aimed at making alternatives (such as bicycles and public transport) more appealing compared to cars, for example by making co-financing available to increase the number of bicycle parking facilities at train stations. In the long term, work is under way on the transformation of the Infrastructure Fund, so that mobility rather than modality is central when considering investments³²⁶.

21. Poland

21.1. Country Report

1. Economic growth prospects depend on investment in several policy areas. Decarbonising power generation, improving the energy efficiency of buildings and **investing in more sustainable transport can put the economy on a more environmentally sustainable development path**³²⁷.
2. Despite substantial investments in urban mobility, nearly half of the inhabitants of urbanised areas have no direct access to public transport. The fast development of areas surrounding towns and cities in the past years has boosted the **commuting demand to levels that are not met by existing public transportation**. A 2-km average distance to the nearest public transport hampers its use and lowers the mobility of those inhabitants that cannot use cars. Heavy reliance on individual **transport increases carbon and non-carbon emissions, worsens road safety and creates congestions**, which, together with **underdeveloped infrastructure for cycling** and walking, **degrades the quality of life in cities**. Most Polish cities have adopted sustainable urban mobility plans, but implementation is lacking. Urban transport investment projects often produce conflicting results and are not aligned with certain municipal policies, such as environmental, health and land use planning policies. Nor are they complemented with **operational measures to reduce motorised traffic**³²⁸.
3. Developing a coherent long-term vision for improving the environmental sustainability of Poland's development model is of crucial importance given the difficult starting point. **Greenhouse gas emissions have increased** slightly in recent years, **especially in the transport sector**³²⁹.

4. The low-carbon transition is also a challenge for sectors such as transport or energy-intensive industries. The **transport sector** remains a growing source of concern as **sectoral emissions and energy consumption have increased** in recent years. The transport sector is also the second largest contributor to the **air pollution** problem in Poland. The transport policy thus faces the challenge of ensuring improvements in connectivity, in particular **green public transport options**, while lowering greenhouse gas emissions and the associated pollution³³⁰.

CONCLUSION: Progress in focusing investment-related economic policy on transport **has been limited**. In particular, there is not enough progress in **transferring passenger traffic in urban areas** from individual to public transport and **sustainable forms of mobility**.

21.2. Country-Specific Recommendations

(24) Polish economy is carbon intensive and **air quality stands among the lowest in the Union, posing major environmental and health concerns**. Planning and adopting ambitious measures aimed at clean energy transition in a timely manner in accordance with the European Green Deal and the National Energy and Climate Plan is thus essential. (...) The recovery could be further supported by **significant investment in sustainable transport infrastructure** to improve connectivity between peripheral areas and centres of economic activity³³¹.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on digital infrastructure, clean and efficient production and use of energy, and **sustainable transport, contributing to a progressive decarbonisation of the economy**.

21.3. National Energy and Climate Plan

In its NECP, Poland has made the following commitment related to cycling:

- Integration of public transport in cities and urban agglomeration areas along with the construction of P&R and R&D parking systems, optimization and integration of urban and agglomeration transport as well as regional passenger transport systems, promotion of pedestrian and bicycle traffic³³².

22. Portugal

22.1. Country Report

1. Portugal faces **significant shortfalls in investment**. Making the economy carbon-neutral by 2050 require significant investment in energy and **transport**³³³.
2. The energy and transport sectors are the main GHG emitters and thus remain key sectors to decarbonise. The **Transport sector accounts for 23% of total GHG emissions and 37% of final energy consumption** (vs. EU average of 30%). Transport is also dependent on oil for 95% of its energy needs. Road is by far the most important subsector and **road emissions**

have been increasing since 2013, in hand with the recovery of the Portuguese economy. Portugal is **directing its policies towards modal shifting** and the electrification of the sector, which depends on investments in infrastructure, such as charging infrastructure and electricity network. Furthermore, Portugal is also promoting and exploring the use of new fuels such as hydrogen³³⁴.

3. Portugal's **overall energy consumption has risen**, mainly due to industry and **transport increasing consumption** (3.4% and 1.8% respectively from 2016 to 2017). Portugal is still below its linear trajectory for achieving its 2020 primary and final energy consumption targets³³⁵.
4. Air quality in Portugal continues to give cause for concern, mainly related to nitrogen dioxide (NO₂). In particular, personal transport exacerbates **seasonal problems with air quality and traffic congestion** in the major metropolitan areas, namely Lisbon, Porto and Braga, leading to health and economic costs. Total external costs of transport for road and rail in Portugal are estimated at €16.9 billion annually, which corresponded to 7.2% of Portugal's GDP in 2016 (63). A comprehensive approach is needed to tackle this matter, bringing together environmental as well as economic and social benefits³³⁶.

CONCLUSION: Progress with focusing investment-related economic policy on transport **has been limited**³³⁷.

22.2. Country-Specific Recommendations

(22) To foster the economic recovery, it will be important to front-load mature public investment projects and promote private investment, including through relevant reforms. Growth enhancing investments to support research and innovation, digitalisation, connectivity and green transition will contribute to the recovery of the Portuguese economy and redirect it towards long-term sustainable growth³³⁸.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on clean and efficient production and use of energy, rail infrastructure and innovation.

22.3. National Energy and Climate Plan

In its NECP, Portugal has made the following commitments related to cycling:

- Promoting shared mobility initiatives such as car sharing, bike sharing and carpooling; providing a system to share vehicles is a solution that increases a fleet's efficiency of use. These sharing systems can encompass cars, bicycles, motorcycles and, most recently, scooters. The use of these shared vehicle systems results in reduced environmental impact and high energy efficiency, as well as a reduction in occupation of public space³³⁹.
- Promoting active mobility in place of individual motorised transport is a growing trend in developed societies, due to the excellent cost-benefit relationship and enormous advantages it offers in fundamental areas for the quality of life – even for people who are not (yet) engaging in active mobility. Promoting the use of bicycles, in particular, must be contemplated in an objective, systematic, transversal and ambitious manner. The progressive availability of e-bicycles makes it possible to expand and generalise the benefits derived from adopting active mobility in society and there are strong reasons to adopt new forms of mobility and improve the use of the transport system. Measures will thus be implemented to promote active mobility and more efficient behaviour, increasing the modal share of bicycle and pedestrian journeys³⁴⁰.

- Providing suitable parking for bicycles at all relevant points (safe, well-located and in sufficient quantity). Bicycle transport must tend to be practical and accessible, on rail transport, river transport and, in some situations, road transport, e.g. in the case of intercity and urban journeys³⁴¹.
- Promoting the adoption of behaviour favouring active modes, particularly the use of bicycles. This will entail an integrated marketing and communications effort – including continuous and consistent awareness campaigns, events and activities that have an impact and education promoting active modes of transport and road behaviour – oriented to encourage a profound shift in attitudes.³⁴²

23. Romania

23.1. Country Report

1. Insufficient investment hampers the potential of the economy to converge to EU levels. The quality and reliability of the road and rail networks is poor. **Investment in sustainable transport, energy and environmental infrastructure (i.e. in waste, wastewater and air pollution) is lacking**³⁴³.
2. Substantial challenges remain regarding air pollution, climate change mitigation and adaptation. Greenhouse-gas emissions not covered by the EU trading system are set to increase, deviating from the 2030 target. **Curbing emissions from transport, buildings and agriculture will be key in reaching the target. Investment in green technologies and sustainable solutions, and securing adequate funding will be key to deliver on the climate and energy objectives and shape a new growth model**³⁴⁴.
3. The condition and reliability of transport infrastructure remains poor, below peers and the EU average. Adequate **multi-modal connection in many urban areas is still to be developed**³⁴⁵.
4. A reliable transport infrastructure strategy and investments would benefit from prioritisation and stabilisation. **Investment gaps exist in sustainable transport**³⁴⁶.
5. Romania has one the **poorest road safety records in the EU**. It registered double the EU average number of fatalities per million inhabitants in 2018, despite a 4% reduction in fatalities since 2017. Contributing factors are **underdeveloped infrastructure, especially for pedestrians and cyclists**, excessive speed and weak enforcement. Investment in motorways as well as in maintenance and upgrades on existing roads would improve safety³⁴⁷.
6. It is necessary to ensure that key measures supported under specific sectoral policies (e.g. energy, **transport**) are fully aligned with/**not detrimental to air quality** objectives³⁴⁸.
7. Several industrial sectors contribute significantly to emissions. Transport, agriculture and manufacturing show a somewhat rising trend. **Transport in Romania produced 24.7% of total CO2 emissions and 16.6% of GHG emissions** in 2017, well below the EU average. In particular, **road transport accounted for over 90% of total transport CO2 and GHG emissions** in the country³⁴⁹.

CONCLUSION: Progress in focusing investment-related economic policy on transport **has been limited.**

23.2. Country-Specific Recommendations

(23) The crisis showed even more clearly that Romania has a critical need to relaunch public infrastructure works in fields such as sustainable transport, clean energy, and environmental and digital service infrastructure. Urban transport suffers from poor sector organisation and the weak administrative capacity of local providers³⁵⁰.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on sustainable transport, digital service infrastructure, clean and efficient production and use of energy and environmental infrastructure.

23.3. National Energy and Climate Plan

In 2020 the EC made the following recommendations for Romania:

1. Focus investment on the green and digital transition, in particular on sustainable transport, digital service infrastructure, clean and efficient production and use of energy and environmental infrastructure (Point 3)³⁵¹.
2. The crisis showed even more clearly that Romania has a critical need to relaunch public infrastructure works in fields such as sustainable transport, clean energy, and environmental and digital service infrastructure. Urban transport suffers from poor sector organisation and the weak administrative capacity of local providers (Recital 23)³⁵².

24. Slovakia

24.1. Country Report

1. Slovakia's growth opportunities lie in a more sustainable and higher value added economy. A smart and **low-carbon transport** and energy system can contribute to **greening the economy**³⁵³.
2. **Environmental pressures** and challenges weigh on Slovakia's sustainable development. The climate transition requires scaled up efforts and **targeted investment**, which implies significant economic and social choices. Air pollution caused by solid fuel burning and **rising emissions caused by transport pose a serious health concern**³⁵⁴.
3. Overall **greenhouse gas (GHG) emissions** are already below Slovakia's 2020 target, but energy intensity is higher than the EU average. GHG emissions have been falling over time and are below the EU per head average. For 2030, Slovakia has announced a more ambitious **reduction of 20% in the non-ETS sectors** (additional 8 percentage points). **This reduction should come mostly from measures related to transport** and buildings improvements³⁵⁵.
4. Slovakia hardly utilises EFSI and EU innovation funds for **clean transport** and sector coupling initiatives³⁵⁶.
5. **The transport system is not sufficiently sustainable.** The amount of traffic and old, more polluting cars exacerbate emissions of **nitrogen oxides** and particulate matter in the major cities, in the absence of a supporting policy framework. This calls for significant improvements in transport system efficiency, targeted **modal shifts and multimodality**, improved

deployment of low- and zeroemissions vehicles, and the further electrification of railways. If completed, sustainable mobility plans for public transport at city and regional level can contribute to these goals with good practices, such as lower speed limits or congestion charges³⁵⁷.

CONCLUSION: Progress in focusing investment-related economic policy on transport, notably on its sustainability **has been limited**³⁵⁸.

24.2. Country-Specific Recommendations

(24) Recovering economic growth will require policy efforts and targeted investments in the coming years to allow Slovakia to seize opportunities for creating a more sustainable and higher value added economy. (...) **Reducing air pollution caused by solid fuel burning and rising transport emissions**, improving the waste management system with innovative collection and treatment solutions, completing drinking water and sewage networks to address sanitary problems, supporting smart grids projects, and moving industry towards the climate neutral and circular economy can help put Slovakia on a path to sustainable economic growth³⁵⁹.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on clean and efficient production and use of energy and resources, **sustainable public transport**, and waste management.

24.3. National Energy and Climate Plan

In its NECP, Slovakia has made the following commitments related to cycling:

- Implementing strategic and conceptual projects implemented in support of non-motorised transport, such as the National Platform for Support of Non-motorised transport, National Cycling Strategy, a study of cycling development, etc. Already existing projects include bike sharing in Slovak cities, the Going to Work by Bicycle programme, etc³⁶⁰.
- Supporting the development of non-motorized transport, in particular cycling, is funded through Integrated Regional Operational Programme³⁶¹.

25. Slovenia

25.1. Country Report

1. Further investment in innovation and infrastructure (environmental, transport and energy) remains necessary to keep Slovenia on a sustainable growth path³⁶².
2. **Sustainable transport connections are not sufficiently developed to fully support a carbon-friendly modal shift** or the economic development of less-developed regions. However, investment in sustainable transport is increasing³⁶³.

3. The **carbon intensity of the economy** is rather high, **primarily due to transport**, electricity production, and heating³⁶⁴.
4. Slovenia is faced with challenges to promote sustainable mobility. Slovenia still has a **high use of passenger cars**. In 2017, car trips represented 86.5% of all passenger-kilometres travelled (5 pps above the EU average), with buses and coaches accounting for around 11.7% and trains for only 1.8%³⁶⁵.
5. Air pollution continues to raise concerns. **The main contributing factors to air pollution are: (i) increasing road transport**; and (ii) energy production as well as heat generation from solid fuels. The exposure of the urban population to air pollution by particulate matter is above the EU average. The total (health and non-health related) **costs of air pollution by road traffic** in Slovenia in 2016, were estimated at **€354 million**. In addition, it is estimated that around **916 years of life lost per 100,000 inhabitants** in 2016 were due to exposure to fine particulate matter (PM2.5), which is above the EU average of 800 years lost³⁶⁶.
6. Slovenia will reach the 2020 greenhouse gas emission target but the achievement of the energy-efficiency target is still uncertain. Slovenia has already achieved its Europe 2020 targets for energy efficiency and greenhouse gas emission. However, **energy consumption is above the EU average** and increasing, putting the achievement of the EU 2020 energy efficiency target at the deadline under pressure. According to 2017 data, Slovenia's final energy consumption has been almost unchanged since 2011. This is **mainly due to road transport**³⁶⁷.
7. The transport sector is a large contributor of carbon emissions and air pollutants. In 2017, **transport emissions were responsible for 38% of Slovenia's total CO2 emissions**. This is well above the EU average of 26.5% and these emissions continue to rise. The share of road transport CO2 emissions in total transport emissions also remains high (98% in 2017) compared to the EU average (81% in 2017). **Road transport is also a large emitter of particulate matter (PM10)**, contributing to exceedances of EU limit values. Slovenia has made a commitment to solve this issue. There is also a **high dependency on cars in Slovenia**³⁶⁸.
8. To ensure a **comprehensive approach on sustainable mobility**, including the improvement of energy efficiency and the reduction of emissions, Slovenia has started to implement a broad range of support measures. These measures, proposed in the draft national energy and climate plan for Slovenia include (i) a more **efficient organisation of the mobility system**; (ii) the promotion of public passenger transport and sustainable freight transport, and (iii) **grants for sustainable mobility** and rail transport infrastructure. Further efforts are needed to promote the coordination of measures targeted at inter-city and urban public transport³⁶⁹.

CONCLUSION: There has been **some progress** in the area sustainable transport, in particular rail – Slovenia published an **investment plan** for transport to increase the funding of railways and **sustainable mobility** in the period 2020-2025. However, **the implementation of low-carbon projects in the fields of transport and power generation is lagging behind**³⁷⁰.

25.2. Country-Specific Recommendations

(25) To foster the economic recovery, it will be important to front-load mature public investment projects and promote private investment, including through relevant reforms.(...) Investing in the green transition as described in Slovenia's National Energy and Climate Plan can help bring short-term stimulus to the recovery and the medium-term aftermath of the COVID-19 pandemic. This can involve increasing the current low share of renewables, strengthening the energy infrastructure, **reducing air pollution**, which is above the EU average in Slovenia's towns and cities, strengthening the circular economy, supporting social entrepreneurship, and accelerating the efforts to limit the potential impacts on the regions and sectors most affected by the transition. **The current drop in emissions would be short-lived if insufficient attention is given to clean energy and climate investments in recovery packages**, making Slovenia fall behind on its climate targets³⁷¹.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on clean and efficient production and use of energy, environmental infrastructure, **sustainable transport**, research and innovation, and the roll-out of the 5G network.

25.3. National Energy and Climate Plan

In its NECP, Slovenia has made the following commitments related to cycling:

- Gradually reducing energy consumption by increasing energy efficiency and switching to low-emission vehicles. Since walking and cycling also contribute to sustainable mobility, we will actively promote the construction of cycling and pedestrian infrastructure. Slovenia will thus provide the population with simple, fast, green transport that is non-invasive for the environment and urban centres in the last kilometres. The target is to reduce the number of journeys by private motor vehicle (now 67% of journeys) and significantly increase the number of journeys by foot, bicycle or public transport³⁷².
- Developing the national cycling strategy by 2022³⁷³.
- Intensifying the promotion of walking and cycling and creating better safety conditions for these forms of transport³⁷⁴.

26. Spain

26.1. Country Report

1. **Spain is bound to miss its 2030 CO2 emissions targets**, if it does not implement the ambitious policies outlined in the draft National Energy and Climate Plan. **Transport is the sector where greenhouse gas emissions keep growing most**. Further action would accelerate the transition towards clean and sustainable mobility, as well as the decarbonisation of energy and the increase in energy efficiency, in particular at building and district scale³⁷⁵.
2. Adapting to climate change, ensuring a more efficient water and waste management, **reducing emissions from transport**, further decarbonising energy and increasing energy efficiency are **key challenges for Spain**³⁷⁶.
3. Transport is the sector where greenhouse gas emissions continue to grow most. The total **external costs of road transport** in Spain are estimated to be **€64.3 billion annually**, corresponding to 5.18% of Spain's GDP (2016). This reflects mostly costs associated with road transport such as **accidents and congestion, but also noise, air pollution, climate and habitat damage and fuel production costs**. According to the latest national projections, in the absence of new measures, Spain is expected to miss its 2030 target by 10 pps. (percentage points) for sectors not included in the EU Emissions Trading System, such as transport, buildings, agriculture and waste. However, if the additional measures outlined in the 2019 draft NECP were implemented – such as **encouraging a modal shift for transport** – the 2030 target would be overachieved by 13 pps³⁷⁷.

26.2. Country-Specific Recommendations

(25) **Spain's transformation to a climate-neutral economy will require sizeable investment over a sustained period in renewable energy, sustainable energy infrastructure, energy efficiency and sustainable transport**, among others. (...) Spain should **promote sustainable and efficient transport**, including the reinforcement of public transport services and the rollout of alternative fuels infrastructure, in particular for electric vehicles³⁷⁸.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on fostering research and innovation, clean and efficient production and use of energy, energy infrastructure, water and waste management and **sustainable transport**.

26.3. National Energy and Climate Plan

In its NECP, Spain has made the following commitments related to cycling:

1. Reducing final energy consumption and carbon dioxide emissions by acting on urban and metropolitan transport by means of significant changes in modal distribution, with greater use of the most efficient modes of transport, and less use of private vehicles with low occupation, encouraging shared use, as well as modes of transport that do not consume energy, such as walking and cycling³⁷⁹.
2. Implementing and developing of Workplace Travel Plans (PTT): with measures such as shared transport services within companies, the promotion of bicycles, public transport, remote working, etc³⁸⁰.
3. Promoting the occupation of public land with sustainable mobility criteria, traffic restrictions at times of greater pollution, the promotion of car sharing, the regulation of parking, the promotion of the use of bicycles, the improvement and promotion of public transport, etc³⁸¹.

27. Sweden

27.1. Country Report

1. Identifying investment needs and securing adequate funding will be key to delivering on Sweden's ambitious climate and energy objectives and transforming the Swedish economy to become sustainable and climate neutral by 2045. Recent initiatives for long-term investments have focused on decarbonising energy-intensive industrial sectors and **making transport sustainable by upgrading the different transport modes**³⁸².
2. Improving Sweden's transport infrastructure and making it climate friendly is a key challenge. The objective is to **decrease emissions from domestic transport** (except aviation) by at least 70% by 2030 from 2010 levels, so a comprehensive and relatively fast transformation of the fleet to low emissions vehicles is on the political agenda³⁸³.

3. **Transport is the prime target for emissions reduction.** Transport including international shipping and aviation accounted for 60% of the national carbon dioxide emissions in 2017 with domestic road transport being responsible for 34% (cars represent 23% of total emissions). Domestically transport has fallen behind industry's emission reductions. **Domestic transport remains the single most important source of carbon emissions.** The emissions from domestic transport (aviation excluded) is expected to decrease by at least 70% by 2030 compared to 2010. In order to achieve carbon neutrality, the Swedish Climate Policy Council assessed that the **transport sector needs to be completely fossil-free by 2045.** With current policies, it predicts a reduction in emissions from some 16 million tonnes to 12-13 million tonnes of carbon dioxide equivalents by 2030 while emissions need to be reduced to less than 6 million tonnes in order to reach the domestic 2030 target. Separate analysis by the National Institute of Economic Research confirms that **current policies are insufficient**³⁸⁴.

CONCLUSION: There has been **substantial progress** in the area of sustainable transport as Sweden has maintained its investment³⁸⁵.

27.2. Country-Specific Recommendations

(19) **Transport is the prime target for reducing Sweden's greenhouse gas emissions.** A comprehensive and relatively fast transformation of the fleet to **low-emission vehicles** is on the political agenda. Planned investment in rail infrastructure is important to facilitate a **modal split** and to deliver on Sweden's ambitious climate objective³⁸⁶.

FINAL RECOMMENDATION: 3. Focus investment on the green and digital transition, in particular on clean and efficient production and use of energy, high-tech and innovative sectors, 5G networks and **sustainable transport**.

27.3. National Energy and Climate Plan

In its NECP, Sweden has made the following commitment related to cycling:

1. In 2015, the Government introduced a special grant for sustainable urban environments, the Urban Environment Agreement. The grant is intended for municipalities and county councils and amounts to SEK 1 billion a year for 2018–2029, or SEK 12 billion in total. The Urban Environment agreement is financed via the economic framework of the 2018– 2029 National Transport Infrastructure Plan. The measures are intended to produce energy-efficient solutions with low greenhouse gas emissions and contribute to achieving the environmental quality goal High Quality Built Environment. The grant provides municipalities and county councils with up to 50% Government funding for infrastructure for public transport and, since 2017, for cycling³⁸⁷.

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