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## **Main topic: P3 - TAILOR-MADE MOBILITY SOLUTIONS FOR HAPPY REGIONS**

### **Short Description:**

The livability and attractiveness of cities can be improved by smarter transport choices. A change from current car-dependent lifestyles towards the use of less polluting and more sustainable transport modes, such as cycling, is needed. The Life Cycle Highway is a four-stage approach to develop cycle highways.

### **Main part:**

Cycle highways are smart solutions to provide a functional connection between places where people work and where they live. The Life Cycle Highway is a four-stage approach to help cycle highway professionals to develop new or improved cycle highways. The Life Cycle Highway is the result of the transnational cooperation of 9 Northwest-European partners in the CHIPS project that developed a four-stage approach to turn cycle highways into a smart and sustainable mobility product.

**Stage 1** involves **planning** the cycle highway where the focus is on the potential use of the new infrastructure and the impact for the region. For this first planning stage a Virtual Planning tool has been developed that will help governments on determine potential cycle highways based on the density of residents and business within a certain distance.

In the **second design and build stage** we distinguish different criteria to design a cycle highway. This stage involves readability research with virtual reality and a Cycle Highway Assessment Tool that will be used to obtain a comparative analysis of the status of a cycle highway based on different qualitative and quantitative criteria.

In **stage 3** we focus **selling and promoting** the cycle highways. We have developed a training programme to convince local decision makers to leverage cycle highway investments. We will also share different behavioural change campaigns (which are the result of a European barrier survey on cycle highways with more than 3000 respondents) to promote cycle highways to increase the amount of users.

The **last stage** is **monitoring** the cycle highway where several indicators, such as CO<sub>2</sub> reduction and the increase in modal share and users, are used to evaluate and monitor the impact of cycle highways. A monitoring dashboard is developed as a transferable tool for evaluating a cycle highway.

With the Life Cycle Highway we've created an overview of the stages of cycle highways to help policy makers, mobility managers and employers to find the right tools and methods to turn cycle highways into a high quality mobility product. This presentation will not only help governments and other related organizations to optimize their cycle highways. It will also demonstrate specific tools and concrete lessons for governments who intend to start investing in bicycle infrastructure.

### **What is new?:**

Cycle highways are high quality and functional bicycle connections or routes for fast and direct commuting over medium distances, mainly between suburbs, high employment zones or rural areas and cities. Together with the electrification of bicycles, they offer an innovative and powerful travel choice in commuter transport. Within the CHIPS-project we developed this four-stage approach in order to achieve the development of cycle highways as a mobility product. With this approach all the tools and methods for the different stages of cycle highway development are combined into one life cycle.

### **What is transferable to other cities and regions?:**

By bringing together three frontrunner regions and four ambitious follower regions, CHIPS will for the first time create a transnational platform for developing a common vision and produce effective tools and strategies to make cycle highways a strong alternative for the car in commuter traffic. The life cycle highway is designed to be transferrable and it will bring the right tools and methods (eg. The Cycle Highway Assessment Tool or Virtual Planning Tool) to other cities and regions, whether they are new to start investing in cycle highways or whether

they want to upgrade their existing cycle highway network.

**What are outcomes and conclusions?:**

Cycle Highways can increase the number of cyclists on cycle highways for functional connections by a factor increase between 1,5 and 3. The Life Cycle Highway will provide policy makers, city planners, employers and commuters in Europe with a proven, well documented, viable and sustainable alternative to car-dominated commuting approaches. The involvement of companies that offer bicycle highway related products and services will lead to innovations, increasing turnover in cycle highway related businesses. Every region has the potential to benefit from a cycle highway network, the Life Cycle Highway Tool will help cities and regions to unlock that potential.

**Who are the main target groups?:**

The main target group is policy makers, city planners, employers and commuters. Cycle highways are smart solutions to provide a functional connection between places where people work and where they live. Cycle highways are built to give commuters a faster and better connection by bike to work. Employers are involved since they benefit from more cyclists among their employees. With campaigns the switch from car to bike using the cycle highway will be achieved. For policy makers and city planners who encourage cycling and want to create direct and functional connections with cycle infrastructure this approach would help them further.

**Please supply a link to the project if available.:**

[www.cyclehighways.eu](http://www.cyclehighways.eu)

A Cycle Highway is a mobility product that provides a high quality functional cycling connection. As backbone of a cycle network, it connects cities and or suburbs, residential areas and major (work)places and it satisfies its (potential) users. A definition of a Cycle Highway according to CHIPS. The 4 phases of the Life Cycle Highway. Life Cycle Highway. The Life Cycle Highway Explained. The CHIPS project partners have created a four-stage approach to develop cycle highways. tage 1 PLAN involves planning the cycle highway where the focus is on the potential use of the new infrastructure and the impact for the region. A cycle highway facilitates citizens to move by bicycle from one place to another. The life-cycle approach to strategic planning. Arnolde C. Hax and Nicolas S. Majluf. WP #1493-83. October 1983. -1

It is derived from the fact that a product's sales volume follows a typical pattern that can readily be charted as a four-phase cycle known as embryonic, growth, maturity, and aging. The managerial implications of the product life-cycle have been widely documented. Although normally the stages within the product life-cycle are characterized by their corresponding sales growth, it is important to understand how often financial characteristics impact each stage, such as profit and cash-flow. The implications of the product life-cycle become central for the implementation and development of strategies in those industries. See the Typical Project Development Life Cycle chart at the beginning of this chapter. 100.3.1.1 Typical Planning Stage Studies. Corridor Management Plan. A study of an extended length of highway that carries out a high-level needs assessment, problem definition, option generation and option evaluation. Definition: Further development of the primary options generated in the planning stage to support an evaluation of the options and a recommended option for subsequent design stages. Preliminary drawings are developed using accurate base mapping with appropriate contour intervals and should be based on an initial design criteria sheet. The drawings are suitable for communicating the project intent at public information sessions. cycle carbon emission from transportation system. 2. To develop a model for a Life Cycle Inventory Sensitivity Analysis based on input-output. structural decomposition analysis framework 3. To make a comparative study of life cycle carbon emission of transportation systems in. The Japan Highway Public Corporation (JH) prepares traffic Data of Tohoku Expressway 1976-1997 and Average Daily Traffic (ADT) by section. The traffic was categorized into three major vehicle classes; passenger car, bus, and truck. 8. The amount of life cycle emission for Tohoku expressway can be estimated by applying the calculated emission factors in Table 2.2 to the project data. The results are shown in Table 2.3. Life-cycle assessment analysis is one of the presently accessible methods to determine the effects of construction processes on the environment. It is a technique to evaluate the performance of a product, activity or a process from the perspective of its environmental influences in every step. The LCA is authorized and supervised by ISO 14040 for carrying out the various assessment processes. Figure 4 graphically illustrates this life-cycle method of a highway pavement. Treloar et al. Hence, there is a need to develop quantitative methods of analysis. As shown in Table 1, all assessment tools have particular benefits and drawbacks, and recognizing these will facilitate decision makers to use them properly. 4. Pavement Life-Cycle Sustainability.