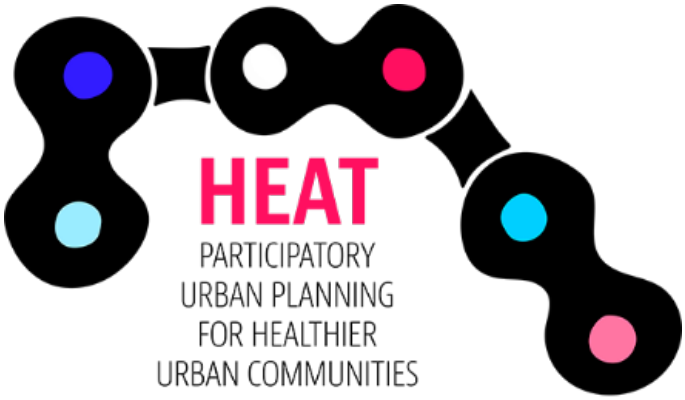

HEAT TOOL TRAINING AND CALCULATIONS IN PROJECT CITIES AND REGIONS

The project is co-financed by the Central Baltic Programme 2014-2020

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1 Preface

In the HEAT project, the task in the work package 2 *Involvement of other sectors* is to give for project partners training and guidance in the WHO HEAT (Healt Economic Assesment Tool) tool use and ensure the actual calculations. The HEAT calculation allows demonstrate the paybacks for the investments in biking infrastructure.

In the HEAT calculation, it is important to gather the needed information for the calculation, and to understand the calculation results. At the same time, an economic analysis of increased biking provides an argument for future investments. Stakeholders and local and regional decision makers should be actively involved in these processes.

Together with project kick-off meeting in May in 2019, introductory HEAT tool trainings/workshop were organized. During the days, experts had their presentations about HEAT tool and its use and all project partners got basic information about the HEAT tool and needed information.

The local workshops on HEAT Tool calculations were held face-to-face in Turku and Tartu and members of Cykelfämjandet and Jurmala could participate these. Two trainers from WSP Finland Ltd. were at the place and all the basic information about the tool was reviewed. However, most of the time was reserved for the personal guidance of the project staff members and use of the tool in each respective city. In Tartu some of the stakeholders also attended the afternoon session. Jurmala City participants couldn't take part in the Tartu workshop and they were guided via Skype to do the calculations.

After the workshops cities/areas gathered more information and the personal guidance was done via Skype and email. All partners got their calculation made until May 2019 and the calculation processes and results where presented and discussed in the project partner meeting in May in Jurmala. The background information and actual calculations results of all partners are garthered in this report.

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2. Jurmala

2.1. Description of the city

2.2. Chosen values

Approach of Heat calculation in Jurmala based on the objective of promoting and supporting development of cycling activities in the city. Jurmala plans to increase the number of cycling lines and roads.

As input values Jurmala uses results of Survey of Jurmala city residents made October – December 2018 by research center SKDS where city residents were asked about cycling frequency and answers were compared to similar surveys 2014 and 2016.

Additionally in summer 2018 in Jurmala on main streets where placed traffic counting cameras where besides cars cameras counted pedestrians and cyclists. Whereas the counting took place in the summer, when the city is full of foreign tourists and cycling season is on, number of cyclists is high.

Number of inhabitants (number of people aged 20-64) at the beginning of the year 2018 is 29 332 persons. Yearly average cycling trip per person, per day in this year is 0.10 kilometers. This number will increase to 0.2 kilometers per person, per day by 2027.

2.3. Results of the calculations

Heat calculations results in economic impact of physical activity of inhabitants of Jurmala aged 20-64 of 10,85 million Euros in ten years.

2.4. Usage of results and future needs

Results of Heat calculation decision makers in Jurmala municipality want to use as a planning instrument, which will help decision makers decide for investments in development of cycling infrastructure in the city. Heat gives the opportunity to calculate monetary outcome for money spent for public infrastructure for cyclists.

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3. Tartu

3.1. Description of the city

Tartu is a city in the southeast of Estonia with a population of 100,000. Tartu lies on the banks of the river Emajõgi and has about 154 square kilometers of land area. The Emajõgi River, which is one of the longest rivers in Estonia flows for 29 km within the city limits. In the first documented records, Tartu is already known since 1030. In the Middle Ages, Tartu was an important trade center, a member of the Hanseatic League, and a key holder of eastern trade in northern Europe.

University of Tartu, founded in 1632, gave new life to Tartu as a university city and an educational and cultural center.

Tartu is Estonia's second largest city and about 4/5 of the residents of Tartu are Estonians. Tartu is a regional center of South Estonia with a population over 350,000 in the hinterland. However, Tartu can be considered the cultural and educational capital of Estonia. The top universities of Estonia are situated here: University of Tartu, the Estonian University of Life Sciences and the Tartu University Hospital. Tartu University Hospital is considered to be the heart of Estonian medicine. Every year more than 20,000 students are study in Tartu, among them foreign students from about 80 countries.

In the historic and architecturally classicist heart of the city, education, business and everyday life intertwine traditionally, however, in the newer part of the city, there are distinctive industrial zones, campuses and the high-value residential areas.

There are numerous parks and green spaces in Tartu. The Estonian main highways railway divisions and international flight connections cross here as well.

During last 10 years, developing light traffic infrastructure has been a hot topic and object of investments for Tartu. Development of light traffic streets network has been going on with the help of local NGO-s. A special commission has been created and the coordinator of light traffic streets networks was hired by the City Government to ensure the development of light traffic streets network.

Recently the bicycle rental system as the extension of the public transport system has been launched very successfully as well with almost a third of Tartu citizens as active users.

3.2. Choosen values

The values that were pointed out above in the description of the city are, on the one hand, the remarkable number of students and medical and scientific workers, and on the other hand, the construction of a thoroughly planned light traffic streets network during the last decade. To support these chosen values, Tartu has selected for its HEAT calculation the 5 km long light traffic street that will be built to connect 5 different city districts, hereinafter it will be called the HEAT STREET.

The HEAT STREET runs its course on the banks of river Emajõgi. Tartu has planned the HEAT STREET so that it connects different parts of the city (residential area, industrial area, city center, natural green area). The calculations made during planning showed that the usage of this street could go up to 5000 persons per day.

As one end of the HEAT STREET leads to the city center where the regional and overstate bus station is situated, the HEAT STREET serves as a connection of different needs of mobility. Besides the transportation needs, the HEAT STREET serves as a sporting track for the active as well.

In Tartu, the light traffic streets beside the Ringtee road and the light traffic tracks that lead to neighboring parish centers are extremely popular sport tracks. The HEAT STREET also connects the city center with Karlova district, which is a rapidly developing local commercial and service hotspot in the previous industrial area. There is no need for imagination to see that when built, the HEAT STREET will attract a large number of runners, pedestrians, cyclists, etc. It is a good opportunity to calculate the effect on the health of citizens when realizing this plan.

3.3. Results of the calculations

The HEAT STREET has been planned to be a new connection between places of interest and residential areas. The usage of this street has been calculated to be 5000 people daily. This means bicycle trips and walking trips per person per day should be 10 km. The time scale for the calculation is 10 years. The proportion of new trips is 75%. As the spots of interest are visited by citizens daily anyway, the proportion of reassigned trips is 20%. Proportion shifted from public transport is 15%, as the public transport has a remarkably good network in Tartu and it is comfortable for the users. Such a long street for Tartu (5 km) will have quite a long building period and it might be divided into some parts. This may affect the take-up time for active travel demand, which might be about 5 years. Due to the planned dimensions of the HEAT STREET, it will have free

flow traffic conditions. The total economic impact of the HEAT STREET turned out to be 97,500,000 €.

3.4. Usage of the results and future needs

This calculation result is excellent. It helps to understand that developing light traffic streets and especially this street has a big effect on the health of citizens that can be calculated into material value (Euros). This result helps to show that the city's strategic aim (46% of the whole traffic will be light traffic by 2035, i.e. cycling and walking) is well chosen when taking into account both the financial side and the health side. Implementing the HEAT tool methodology helps to more clearly understand the indirect influence constructing light traffic objects has to the budget of the city. This circumstance helps to keep light traffic investment objects as a high priority during the compilation process of the city investment strategy and development plan. The HEAT calculation methodology allows in a better way explain to the public the light traffic planning solutions that will be realized and thus gather wider feedback from the citizens.

3.5. Local seminar on HEAT calculations

The local seminar on HEAT calculation was held on 22 March 2019. The politicians, urban planners, designers, representatives of local NGO-s and local officials took part in it. Using the HEAT tool turned out to be popular as it is not too complicated to use. In the seminar, a general overview of the HEAT tool methodology and international examples of HEAT tool calculations were introduced. The Tartu example calculation was provided collectively, nearly every participant with their personal smart device followed the calculation process. After the joint calculations, a discussion about using the HEAT tool in planning and designing processes followed.

4. Turku region

4.1. Description of the area

Southwest Finland has 27 municipalities and the traffic system plan is updated in the whole area. There is more exact plan made for Turku city region and the plans are updated at the same time. More detailed plan is required to the Turku city region because the the transport and traffic is more heavy. Region includes 13 municipalities. However HEAT calculations were made to core area of Turku city region which includes five municipalities, Turku city and four neighbor municipalities. Core area has a joint public transport and the area can be considered dens and urban even though it also includes rural areas.

4.2. Choosen values

6th of March a local workshop about HEAT – calculations were held with only few participants from Regional Council of Southwest Finland, Valonia, Turku City and Southwest Finland's Centre for Economic Development, Transport and the Environment
Calculation area, values and data was chosen in the workshop. It was also decided to use the basic values of Turku city already put to the HEAT tool even though traffic accidents and air quality might vary a little in neighbor municipalities.

Data for the calculations was collected from The National Travel Survey 2016, Statistics Finland (population growth) and the Traffic strategy 2035+ of Southwest Finland.
Main data were kilometers travelled per inhabitant/ day /transport, population growth based on estimation from year 2015 and the goals of modal share in Turku city region.

Turku city estimation was also that they use 5 to 10 € /year / inhabitant to cycling infra and other measures promoting cycling so we tried to use the investment cost value based on 5 €/ person/year. However we noticed that it is very difficult to put a price tag for all the measures for cycling. Also when using that kind of value in the larger area the results may become distort. In the final calculation, investment cost is left out.

Modal split goals used in the HEAT calculation were strong estimations based on the Traffic strategy 2035+ of Southwest finland because exact goals were not set. Goals were somekind of mixture of averages and realistic assumptions. Several tables and charts were tryed out before final estimated goal for modal split was set.

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Parameters used in the HEAT calculations were as such:

Input values:		
Time scale:	11	years (2019 – 2030)
Impacts:	ALL	PA/AP/Crash risk/Carbon/ALL
Population type:	general pop.	general population/cyclists
Population (20-64 years):	169600 / 172700	citizens
1. Cycling amount (per person per day, yearly average):	0,193	km/min/trips
2. Cycling amount (per person per day, yearly average):	0,31	km/min/trips
1. Car amount (per person per day, yearly avarage)	2,072	km/min/trips
2. Car amount (per person per day, yearly avarage)	1,627	km/min/trips
1. Public transport amount (")	0,153	km/min/trips
2. Public transport amount(")	0,298	km/min/trips
Adjustments:		
Propotion excluded:	20	%
Temporal and spatial adjustment:	not changed	%
Take-up time for active travel demand:	8	years
Proportion of new trips:	5	%
Propotion for transport:	60	%
Proportion in traffic:	20	%
Traffic conditions:	Free flow	
Change in crash risk:	not changed	%

4.3. Results of the calculations

In the final calculation goals for modal share in the core area of Turku city were set as such:

- cycling 10 %
- walking 26 %
- public transport 10 %
- car (as a driver) 34 %
- car (as a passenger) 17 %
- other 3 %

At the moment modal share of cycling in the core area of Turku city is proximately 8 % and modal share of car usage proximately 59 %. With this kind of goals total economical impact would be 20 900 000 € in 11 years.

4.4. Usage of the results and future needs

Turku area results were based on strong assumptions. There is no accurate goal for biking, walking or public transport of modal share. All three very different modal types are put together and they are referred as sustainable transport. Turku area has a target goal for sustainable transport but during this process it came very clear that Turku area will require exact goals for each transport. After the goals are set regionally, we can promote the decisions to municipalities with help of HEAT-tool.

4.5. Local seminar on HEAT calculations

Local seminar of HEAT-calculations was held on 24th of May. Same event worked as an interactive workshop and stakeholder meeting. Proximately 200 participants were invited all over the region: local municipality officials from different sectors, corporations, politicians and different organizations such as sports and health associations. Proximately 60 participants took part in the event. Turku area HEAT-calculations were presented in the workshop.

5. Stockholm region

5.1. Description of the area

Public health benefits from current levels of cycling in Stockholm County compared to reaching the 20 percent mode share goal by 2030

The purpose of this study is to calculate the public health effects of cycling in Stockholm County in 2019 and to compare it to the potential public health effects which would be achieved by reaching the regional goal of a 20 percent mode share for cycling by 2030. The study has been undertaken as part of the European interregional Central Baltic project HEAT - Participatory Urban Planning for Healthier Urban Communities, and has been conducted by Cykelfrämjandet in collaboration with Region Stockholm's Bicycle Office.

Stockholm county is home to over 20 percent of Sweden's population as well as the nation's capital, Stockholm City. The county consists of 26 municipalities and has a population of 2 344 124 people. In the most recent travel survey conducted by Region Stockholm, the regional county council, cycling had a seven percent mode share. In its 2014 Cycle Plan, Region Stockholm set a goal of 20 percent mode share for cycling in the county by 2030 and an investment plan of ca. 2.300 billion SEK (ca. 260 000 000 EUR).

5.2. Choosen values

We have calculated the public health effects of cycling at current levels and if Stockholm county were to reach a cycling mode share of 20 percent by 2030 using HEAT. We have chosen to conduct two single-case HEAT assessments using the parameters physical activity, air pollution and crash risk. In this type of assessment the tool calculates changes in mortality that are achieved as a result of changes in the level of physical activity as well as exposure to air pollution and crash risk. The results show how many lives are saved as well as what these lives are worth from a socio-economic perspective, based on the Value of a Statistic Life (VSL) in Sweden. The assessment is based on data from Statistics Sweden, Region Stockholm's (then the Stockholm County Council) travel survey from 2015, the county prognosis 2018-2060 and Region Stockholm's Cycling Plan from 2014 (then Stockholm County Council).

The travel survey shows that the cycling mode share was 7 percent and that the average travel distance by cycle was 0,89 km per person and day. A 20 percent cycling mode share therefore entails approximately 2,54 km per person and day (20/7=2,857 and0,89*2,857 = 2,54).

HEAT is programmed for adult populations. HEAT uses 20-64 year olds as the age group for calculating the effects of cycling. The population of 20-64 year olds in Stockholm County was 1 408 069 people in 2018. According to Region Stockholm's county prognosis for 2018-2060 this age group will increase to 1 613 746 by 2030. We have also calculated the county specific mortality rate for the age group 20-64 year olds, based on the amount of deaths amongst the age group in 2018 (mortality per 100 000 for 20-64 year olds in Stockholm county 2018 = 143,175). The county prognosis 2018-2060 gave us the prognosis for deaths amongst the age group in 2030 and we could thereby calculate the predicted mortality rate for the group in 2030 (mortality per 100 000 for 20-64 year olds in Stockholms county in 2030 = 123,935).

Other than these specific variables we have used HEAT's default values. These are derived from evidence-based research and are described in the methods and user guide from the WHO for the tool.

5.3. Results of the calculations

The study shows that the current levels of seven percent cycling mode share results in the prevention of 53 premature deaths per year, which corresponds to a value of 2.210 billion SEK (211 000 000 EUR). If cycling in the region reaches the 20 percent mode share goal by 2030, 149 premature deaths would be prevented per year, corresponding to a value of 6.244 billion SEK (596 000 000 EUR).

Public health effects of cycling in Stockholm County (premature deaths prevented per year)		
	Current levels	**Scenario 2030**
Physical activity	54	154
Air pollution	-1	-3
Crash risk	-0,5	-2

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Total (premature deaths prevented / yr)	53 (rounded to closest integer)	149

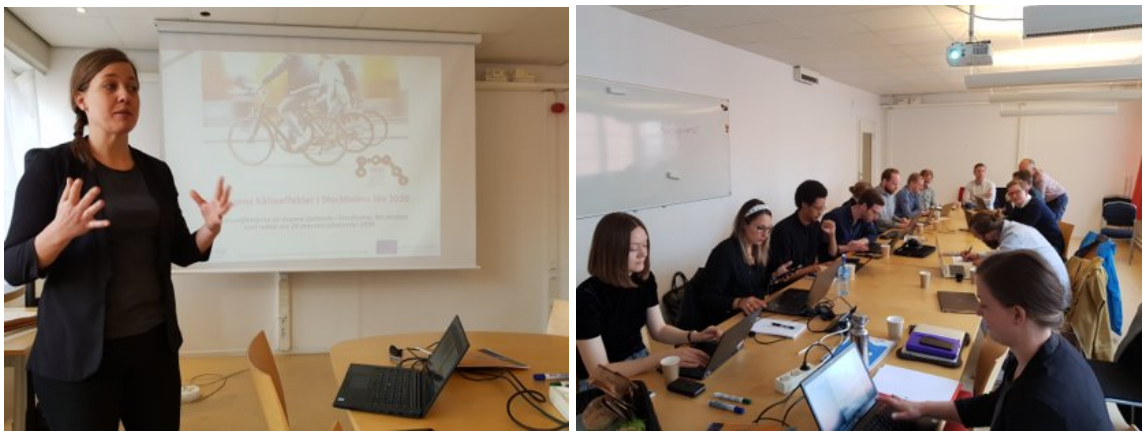
5.4. Usage of the results and future needs

Amongst other purposes, the study results can be used to assist in prioritizing and drafting plans for potential interventions for urban- and traffic-planning. The results can for example be used in the revision process of the regional cycling plan being undertaken in 2019. In the regional cycling plan from 2014, the cost of expanding and updating the cycling network to make a 20 percent mode share feasible were estimated to amount to ca. 2.300 billion SEK (ca. 260 000 000 EUR). The study shows that reaching the goal of at least 20 percent cycling mode share by 2030 would entail considerable health benefits and socio-economic gains.

5.5. Local seminar on HEAT calculations

The results of the assessment were presented in a seminar and workshop for Region Stockholm's Cycling Planners' Network on May 10th, 2019. The Network was divided into two groups, with one morning and one afternoon session. In total the sessions were attended by 17 municipal and regional cycling planners, 2 staff members from Region Stockholm's Cycling Office, 2 staff members from Cykelfrämjandet and 1 traffic and public health consultant. The HEAT sessions consisted of a presentation of the assessment, including methods and results, as well as a workshop for the cycling planners to try the tool out for themselves.

The results of the assessment were also published on Cykelfrämjandet's homepage and a press-release on MyNewsDesk, resulting in two local newspaper articles and a Swedish Radio local news article.



May 10, 2019 - HEAT local seminar and workshop with Region Stockholm's Cycle Planners' Network.

Photo: Emil Törnsten

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6. Evaluation and results

6.1 The HEAT Tool Training

The HEAT Tool training and understanding about health and economic aspects of cycling was the core part in the original project idea, and it was among the first actions in the project. The training was planned so that the calculation process would serve personal support during the workshops and online consultation to ensure the results of the calculations.

The training was mostly experienced so that it gave good support during the process and it was possible to discuss the calculations and the results and use of different variations in the calculations. Especially helpful were quick checks with the consultants during the process. All calculations were ready in the agreed time and date. The consultants helped also with the data gathering which was beforehand. The data modified and used in the calculations was gathered from national travel surveys or regional surveys.

6.2. The HEAT Tool calculation results

The results of all cities/regions are gathered here below. Each city or region had their own objectives and target values for the calculation and the results are therefore not comparable, but the amounts of the economic benefits of increased cycling can be seen. In the Turku region, the increase of cycling was estimated the most moderate. The arguments for each city or area can be found in the previous chapters.

		Tartu	Turku Region	Jurmala	Stockholm Region
Economic impact per year (Physical Activity):	**EUR/YEAR**	1 545 000	1 020 000	1 085 000	169 000 000
Economic impact Physical Activity	**EUR**	17 000 000	7 810 000	10 850 000	1 860 000 000
Economic impact Air pollution (negative value)	**EUR**	-358 000	-139 000	0	-34 700 000
Economic impact Crash risk (negative value)	**EUR**	0	-65 500	0	-19 500 000
Economic impact Carbon emissions	**EUR**	26 000	605 000	0	45 700 000
TOTAL ECONOMIC IMPACT:	**EUR**	16 668 000	8 210 000	10 850 000	**1 851 500 000**

It also has to be remembered that the HEAT calculations give only one part of the economic savings. In addition, there are also the indirect costs, the working days lost through illness, healthcare, the decrease of productivity and disability to work that are

not easy to calculate. So the HEAT calculation gives the minimum of economic effects of increased cycling at the chosen rate.

6.3. Local seminar on the HEAT calculation results

In every project partner city or area organized the local seminar where the results of HEAT calculations were presented and discussed. In Stockholm, the participants of the seminar were interested about a short HEAT tool training. Due to this, Cykelfrämjandet had two training days for the traffic planners of the Stockholm region municipalities.

Local seminars on HEAT calculation result have hopefully arisen discussion and awareness of municipal and regional authorities about the health benefits and the economic effects of cycling.

6.4. Webinar on the HEAT Tool

Webinar on HEAT Tool was arranged via Skype on the 21st of November under title "The WHO HEAT Tool – introduction and case examples". The first presentation was kept by nick Cavill from WHO HEAT core group and he gave an introduction to HEAT Tool and its background. He also presented how widely HEAT is used and what is the stage of national HEAT use instructions in certain countries that have used HEAT Tool. After that, the results of the calculation of the project partners were presented and the views on special themes that were important to each project partner. Finally, Oskari Kaupinmäki from the City of Helsinki told their experiences about the Bikenomics method. All the material and recording of the presentation are in the project website.

In Finland and in Sweden, the information about the webinar was delivered through different email lists and via stakeholder group contacting. In addition, in Finland transport related Facebook groups and other social media channel posts were used. Also, Motiva (Finnish national sustainable development company) gave information about the webinar in their own webinar and social media channels.

Altogether 74 participants signed up to the webinar and 57 participants (including project staff and two invited speakers) took part in actual the webinar. The participants came from 36 different organizations; local, regional and national authorities, non-governmental organizations, consultants and other interested in the subject. The variety of the different organization types was a good result. Most of the participant came from Finland, but nearly every third participant came from Sweden.