



ACTION PLAN FOR MAAS IMPLEMENTATION STRATEGY IN FUA KOPRIVNICA (CROATIA)

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ACTION PLANS FOR NEW INNOVATIVE LOW-CARBO)N
MOBILITY SOLUTIONS & IMPROVED AIR QUALITY IN	1FUA 05/2022







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Development of action plans for new innovative mobility solutions & improved air quality in FUAs

The objectives of the Dynaxibility4CE project for Koprivnica are rather clear. With this project, it is a continuation of the Central Europe Low Carb project, where Koprivnica started the work on the expansion of the public transport system to the Functional Urban Area of the City of Koprivnica.

By doing that, it continues a good practise and efforts that are one of a kind in Croatia. Koprivnica is developing its public transport system, and slowly expanding it to the Functional urban area of the City of Koprivnica.

This Action plan is the first step in creating the basics for the successful integration of the current public transport services that are currently operating in Koprivnica and expanding them to the FUA area.

The document will provide information on what will be the first steps, the requirements of the users and operators and other important parts that are needed in order to implement a fully functional and integrated public transport system with MaaS as a tool that integrates and helps to manage the whole system.





Executive Summary

City of Koprivnica is a small community that is making large efforts in developing a city that is sustainable in every aspect. Sustainable mobility is one of them and public transport services are the backbone of every sustainable transport environment in an urban area. Koprivnica has started its public transport services recently, starting with the public bike system in 2014/2015 and the public bus system in 2016/2017. Prior to that, there were no public transport services in Koprivnica, which mean that there were no companies that were dealing with public transport, nor the city municipality had a dedicated department for the development of public transport service. Until today, the system has slowly been organized, started to function, and became a regular part of the Koprivnica urban service landscape.

During 2020, the City of Koprivnica and its surrounding municipalities started to work on the idea of expansion of the public transport services to the surrounding municipalities into an area called FUA Koprivnica (Functional urban area of Koprivnica). The expansion of the services will include the expansion of the public bus and public bike system to the surrounding municipalities, together with the needed infrastructure, in line with the increase of the number inhabitants, from the initial 31000 to the 64000 of the FUA Koprivnica area.

Since the system is starting from a clean sheet of paper, the correct management, usage of modern technologies and cost effectiveness is the key for the success of the new system. Therefore, together with the expansion of the public transport system, the introduction of a MaaS system for the FUA Koprivnica area is planned.

The MaaS system has to give the possibility to manage the overall public transport system as a whole, making it easier to manage, which is the key in developing a successful system. The reason why such a small area is considering the implementation of a MaaS system is the progress and availability of ICT solutions that have made these kinds of technologies affordable and attainable.

This Action plan is one of the first documents that would lead to developing new steps and enabling requirements that a MaaS system should have. The steps and measures in this document are tailor made steps that are specific to the FUA Koprivnica area and the infrastructure and the overall position that the public transport service is in.





1. Introduction

As a municipality that has a rather short history of running a public transport system and with only 31.000 inhabitants, City of Koprivnica has been focused on implementing a usable and functional public transport system. Since the very first implementation of the public transport system in 2016, the municipality has always been struggling to keep the system going.



Figure 1: First two lines of PT system

Many factors have contributed to that, like, for instance, the lack of interest of general population to use any forms of public transport due to the shire fact that a public transport system did not exist, and that the general population does not have a habit to use public transport. Also, starting a public transport system from the start is not easy and it requires a lot of resources and dedication. Also, a system in its infancy needs to have a strong political dedication that sometimes is hard to be established.

The response to these and many more obstacles that are not listed is innovation and change in a direction of making the system sustainable through managing costs and offering tailor made solutions. MaaS is one of these "tailor made solutions" - it offers the possibility to combine the different public transport solutions that are in place at the moment, ease the use of the public transport solutions and in general, make first steps in "digitalizing" the public transport system.





The public transport system in Koprivnica is currently going through an expansion phase, where the plan is to expand the current public transport services that are in place in Koprivnica, like the public bus transport system and the public bike and e-bike transport system to the functional urban area of the City of Koprivnica.



Figure 2: eBike terminal from Koprivnica

Therefore, a move has to be made in the direction of establishing a MaaS system, and the first step into that direction was to make the new stakeholders (FUA members), transport providers and political decision makers aware of the MaaS option through an Action plan that was made on a participatory basis with the contribution of all FUA stakeholders.

2. Planning and policy framework

Koprivnica is a small to medium sized city located in the Northwester part of Croatia. This part of Croatia is relatively densely populated but polycentric, with no clear major city that would prevail as an attraction HUB (Koprivnica 31000, Čakovec 27000, Varaždin 47000 inhabitants) all in a 50 km radius.

Koprivnica has gone through a major expansion in population in the late 30 - 40 years that was encouraged by the immigration into the city, mostly from the surrounding rural areas and with the enlargement by incorporating surrounding, mostly rural areas into the City administrative structure. The last expansion was done 20 years ago, and it enlarged the city population by approximately 10 %, but the administrative area grew by 50%. This had a big impact on the modal split of the general Koprivnica population, even though there were no official data. Because of the centralisation of the public services and the development of economic activities in the central area of Koprivnica, more and more vehicles





entered the inner-city area of central Koprivnica. This situation was transferred to the existing municipalities that broader Koprivnica.

Also, a major contributor to the relatively negative modal split and the high influx of people in Koprivnica was the strong economic activity in Koprivnica and the development of large economic systems that were developed in the last 50 years i.e., Podravka group that at the peak of its size employed 7.000 people in a city of 23.000 inhabitants.

Our functional urban area is not legal in a sense that there is a clear statistical or territorial division that would state it legal and be recognized by the national authority, but it is more an expression of interest of the surrounding municipalities in cooperating to create a sustainable transport system and solutions that would slowly solve the transport problems of the area and that would promote sustainable means of transport.

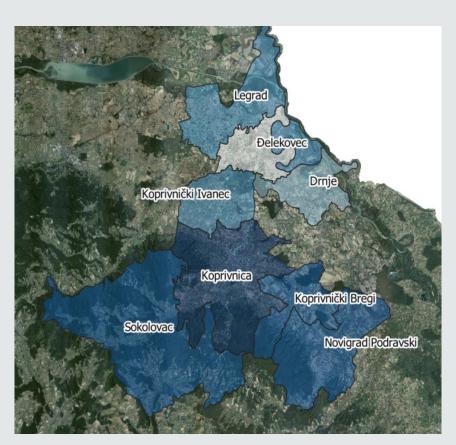


Figure 3: FUA Koprivnica area





Even though there are no clear data on that, according to that definition, the presumption is that the City of Koprivnica and the 11 surrounding municipalities are creating an FUA. The FUA has in total 62464 inhabitants.

Local authority	no. of inhabitants
Općina Koprivnički Bregi	2.403
Općina Novigrad Podravski	3.161
Općina Peteranec	2.848
Općina Hlebine	1.407
Općina Virje	5.197
Općina Drnje	1.863
Općina Sokolovac	3.964
Općina Rasinja	3.818
Općina Koprivnički Ivanec	2.361
Općina Legrad	2.764
Općina Đelekovec	1.824
Grad Koprivnica	30.854
Total	62.464

As a conclusion from the above listed information is that Koprivnica and its FUA area are a small, scarcely populated area that does not fit into the classic concept of MaaS, where in order for MaaS to work, you would need a large, populated area in order for the service to have a meaning and to be effective. Therefore, in this document, a more tailor approach had to be made to fit the requirements of a small area that does not have a large population.

City of Koprivnica as a municipality has started to promote sustainable mobility 20 years ago, when first glimpses appeared in the City authority documents and regulations. The first major document was the Agenda 21 document where sustainable mobility was set as one of the key points of the further development of the City.





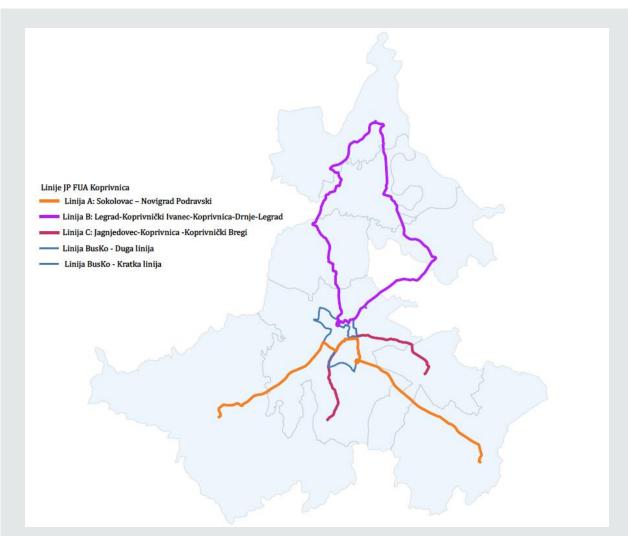


Figure 4: Proposal of new lines in Koprivnica FUA area

After that, in 2014/2015 Koprivnica has developed the SUMP, that was one of the first ones in Croatia. As a document that is going deeper into the development and specification of sustainable mobility measures, public transport has been set as a major priority in the document. Following the document, City administration has developed a number of local policy documents, like the "Establishment of the public transport system in Koprivnica" in 2016., "Intermodality study of the public transport system of the City of Koprivnica" in 2017. and the latest document "SUMP for the FUA Koprivnica region" in 2020.

All of these documents have segments of MaaS concept in their core, starting from the basic idea and the need to merge different public transport options into one in order to make it more efficient to manage and in order to make it more user friendly.





3. Key results and findings

During the development of the action plan, there were two workshops held with following stakeholders;

- Representatives of the municipalities that are the part of the FUA area
- Representatives of the City of Koprivnica stakeholder
- Representatives of the operator of the public transport system

Beside the workshops, there were regular bilateral meetings, meeting of the NTF and the local task force group.

Main conclusion from the meeting and the discussion could be categorized into two categories that are important for the development of such a complicated system like the MaaS system;

a) No national support or initiative

Currently in Croatia there is no national support or initiative regarding MaaS. No municipality in Croatia uses a system that could be transferred in the local context of the City of Koprivnica and the FUA Koprivnica. Also, there is no support from the national government regarding guidelines or national legal framework where such initiatives like MaaS are supported. On the other hand, there are funds available, not specifically for MaaS but more for the implementation of innovative transport systems.

b) Large differences between local rural and urban requirements

During the discussion that have been led in the workshops and the meetings, large differences between the requirements of the needs of the rural part of the FUA Koprivnica area and the urban part of the FUA Koprivnica area. In the urban areas of the FUA Koprivnica area, as accepted, the digital literacy is higher than in the rural parts of the FUA Koprivnica area, so the need for a much simpler interface is needed so as the need for more education on the functionalities of the potential MaaS apps and other digital interfaces.





4. Action Plan towards MaaS in FUA Koprivnica

In order to plan measures for the implementation of a MaaS system in FUA Koprivnica, a lot of information had to be processed and taken into account. The City of Koprivnica staff that was involved in the Dynaxibility4CE project together with the FUA representatives has gone through a series of workshops, bilateral meetings, and overall discussions on how the future MaaS system in the Koprivnica FUA area should look like.

A special consideration was on the requirements of the surrounding municipalities of the FUA area, that are rather specific due to their rural characteristics. This is not only a problem in terms of a wide geographical area, but also in terms of the rural demographics and the level of readiness to accept new technologies. On the other hand, the more urban area of the FUA Koprivnica, has different specifics and requirements, due to the different population density and the technology acceptance level than in the rest of the FUA area.

Therefore, the process of planning the measures in the Action plan had to take into account the following basic parameters:

- large demographical differences in the scope of the FUA area
- different levels of technological literacy
- different needs of the population
- state of infrastructure
- future funding opportunities for the establishment of the expanded FUA area and the implementation of specific modules of the expended transport services, like MaaS

Also, something that has been proven as a big problem is the lack of similar and comparable system in Croatia and the lack of overall guidance on a regional and national level. The latter has proven to be especially aggravating, since there is basically no support from the national level at this moment. There is a lack of support in financial terms and also in the inability to be a part of a much larger system that includes some services that the state offer, like the railway services.







Figure 5: Preparation activities

I. Preparation

I.I. Policy development

In order to be able to implement the MaaS concept into the FUA Koprivnica area, several preparatory requirements had to be undertaken, among them the strategy on how to expand the City of Koprivnica transport system in the FUA area. That strategy was developed in the scope of the "City of Koprivnica FUA". The City of Koprivnica Action plan is a document that is refereeing to the functional urban area of the City of Koprivnica, which consists of the City of Koprivnica and seven municipalities that are surrounding the administrative area of the city.

Even though the City of Koprivnica is extreme pull factor for the inhabitants from the surrounding areas, there are no transport connections in context of public transport between the City of Koprivnica and the rest of the FUA and no, which is very important, no existing communication regarding the developments of transport plans that could affect the FUA Koprivnica area.

The Action plan has analyzed the travel patterns in the FUA area, what are the available travel solutions that currently exist, what is the status of these travel solutions, analyzed the demand for such transport and based on these conclusions, offered different solutions how to improve the sustainability of transport in the FUA area. The main focus was on finding ways how to expand the current public transport services that the City of Koprivnica has, the public bike system, the public e-bike system and the electric bus system on to the FUA area. The document has proposed several scenarios based on the financial limitations of such an endeavor. The proposals are to expand the public bike and e-bike systems to the rest of the FUA area. Also, the proposal is to expand the e-bus system but not in a conventional public transport system, but specifically in cooperation of the school bus system that is currently operating in Koprivnica, but also in the FUA area.

The document is also proposing some infrastructural development that could ease the usage of sustainable transport solutions, mainly connecting the cycling-pedestrian infrastructure inside the FUA area in order to have an undisturbed flow of sustainable means of transport between municipalities in the FUA area. The document has also tackled the organizational requirements that are needed in order for the system to work.





I.II. Organizational set-up

Defining the administrative and operative set-up of bodies inside the city organization and in-house companies that are in charge of leading the process of implementing. During the present years in developing a public transport system, one of the biggest mistakes was the lack of coordination and the division of clear roles and responsibilities among the actors that have participated in the process. Sometimes, it was the case that there was no transfer of responsibilities from the departments that have set-up and organized the system to the operational entities that should have been in charge of running the system. During that period, many mistake were made and the latter situation has slowed down the progress of implementing the public transport system.

Therefore, at the start of the implementation of the MaaS system, a clear division of responsibilities has to be set-up between different departments and entities in different periods of implementation in order to prevent this kind of situation.

Roles and responsibilities:

Managing departments and organizational units:

City of Koprivnica

- Department for
economy,
finances and
European affairs

City of Koprivnica –

Department for
construction,
municipal services
and property
management

Municipal utility company Komunalac, Koprivnica

Figure 6: Responsible stakeholders

<u>City of Koprivnica - Department for economy, finances and European affairs</u>, role: In charge of leading the development of the Action plan, close involvement in order to find financing possibilities in the future to implement the system at a low cost as possible.





<u>City of Koprivnica - Department for construction, municipal services and property management</u>, role: In charge of implementing the MaaS system, in cooperation with the provider of the services and external experts

<u>Municipal utility company Komunalac, Koprivnica</u>, role: In charge of operating the MaaS system. Maintaining the system, upgrading and all of the actions needed in the implementation phase of the system

I.III. Capacity building

Knowledge regarding the introduction of a innovation into an existing system has always a big problem, especially for small municipalities that do not have enough internal resources. Capacity building is an ongoing process that requires more time than direct financial expenditures. Even though the City of Koprivnica staff that was working on the development of this Action plan has gathered some knowledge regarding MaaS, additional steps have to be taken in order to have other parts of the entity on board also.

II. Planning and implementation of measures

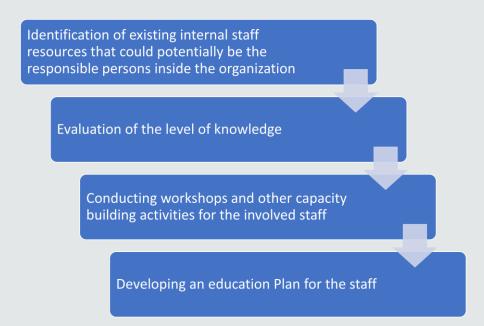


Figure 7: Planning and implementing measures

II.I. Development of planned measures

City of Koprivnica is currently running two "services" that are considered to be public transport services for Koprivnica - due to the fact that they serve to transport a large deal of people in the administrative area of the City of Koprivnica. As previously stated in this document, City of Koprivnica has been running





a bus service from 2016/2017 that is based purely on electric buses. Currently there two lines of electric buses that commute on the administrative are of the City of Koprivnica. The service has proven to be successful among the younger population, mostly students of the local University and among the elderly people. The operator of the bus system is the local municipal utility company Komunalac.



Figure 8: BUSKO bus system

The other service that has been running in Koprivnica since 2014. is public bike system that consist of conventional bicycles and e-bikes. There are currently 9 stations of public bikes across the City of Koprivnica, with in total 80 conventional and electric bikes. The operator of the public bike system is the municipal utility company Komunalac, Koprivnica.



Figure 9: BICKO bike system

The goal in the future is to expand the current public bus and public bicycle system to the full reach of the FUA Koprivnica area. The expansion of the system is considered to start in late 2023, early 2024. Parallel with the expansion of the public bus and public bicycle system, the following processes will occur:





- expansion of the public bus system to the FUA Koprivnica area
- expansion of the public bicycle system to the FUA Koprivnica area
- development of the needed infrastructure in the rest of the FUA Koprivnica area
- implementation of a 2 stage MaaS system

The MaaS system of the FUA Koprivnica area will be implemented in a two-stage process. The reason why there will be a two-stage process is that the public transport services are not developed in the rest of Koprivnica FUA area, only in its core, the administrative area of the City of Koprivnica and at the first stages the operator in charge of implementing the system will not have any information regarding the data and overall requirements from the rest of the FUA Koprivnica area. Therefore, to gradually develop the system, a systematic and careful approach towards the implementation of the MaaS system is needed - implementation of the system on the core of the FUA Koprivnica (City of Koprivnica area) and later the expansion of the MaaS services to the rest of the FUA area.

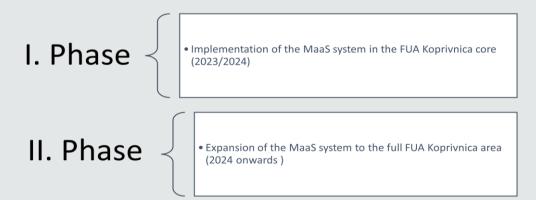


Figure 10: Two phase approach

In defining the framework of the Koprivnica FUA MaaS service, four main elements of the system have to be established in order to have a fully functioning MaaS system.

II.II. Public transport service integration and expansion

In order for the MaaS system to be functional and effective, a full integration of the existing public transport services in Koprivnica has to take place. Currently, two services are in operation - the City of Koprivnica public bus system "BUSKO" and the City of Koprivnica public bike system "BICKO". Both of the systems are in function, and currently serve to the citizens of the City of Koprivnica. The expansion of the system to the FUA Koprivnica area is planned for 2023/2024.

Before the expansion to the FUA Koprivnica area, a full integration of the system is needed. Operator of both of the systems is the municipal utility company Komunalac Koprivnica, so there will be no problems regarding the administrative operations. Efforts have to be made in the direction of internal organization of the administration and combining resources that are currently split between the public bike and public bus system. A common office will be organized in order to handle the everyday operations of the system.





Next step is the expansion of the integrated public transport system to the FUA Koprivnica. This includes the systematic expansion of the current infrastructure, which includes new electric buses, charging stations, public bikes and e-bikes, new bus stops, cycling lanes and auxiliary services like MaaS and all other infrastructure that is needed in order for the system to be functional. The extent of the enlargement i.e. the exact number of vehicles, charging infrastructure, etc. will be agreed after the completion of the first phase of the implement of the system.

The operator of the system will be municipal utility company Komunalac Koprivnica (MUC Komunalac Koprivnica). MUC Koprivnica is a company that is owned by the municipalities that are a part of the FUA Koprivnica, therefore, there will be no need for concessions or tender, because the role of the operator will be directly awarded to the MUC Komunalac Koprivnica.

II.III. ICT development and integration

Most important step in this process is the development of single application or an online interface that can be used by users to access information about the modes and to control. Since there is no such infrastructure currently active in Koprivnica, the whole system will have to be developed from the beginning. The system will be developed by external expert, due to the lack of such infrastructure inhouse.



Figure 11: MaaS interface

The minimal requirements for the system will be the ease of use, functionality, tailor-made solutions taking into account the rural - urban characteristics of the FUA Koprivnica area. The system will take into account existing successful systems in order to avoid potential mistakes during the development and later usage.

II.IV. Preparation for a Mobility package implementation

Mobility package is a possibility for the consumers to pre-pay for a specific amount (in time or distance) of a combination of mobility services. In a nutshell, the main objective of the mobility package is to bundle all of the services into one. Currently, there are 4 levels of integration;

• Level 0 = no integration. This basic level refers to the situation in which separate services are provided for different means of transport.





- Level 1 = integration of information. At this level, travel information is provided through (multi-modal) travel planners, which may or may not include information on routes and costs. The added value level 1 holds for users is that it facilitates the choice regarding the time of day, the route, or the mode of transport to be used.
- Level 2 = integration of finding, booking, and payment. At this level, MaaS facilitates the finding, booking, and payment of individual trips. The added value of level 2 is that users can find, book, and pay for their trip at a single service point (e.g., through an app with a pre-registered credit card).
- Level 3 = integration of transport services into passes and bundles. At this level, MaaS does not just cover individual travel movements; the service also meets the full daily mobility needs of individuals and families by offering different means of transport through bundles and/or passes. The added value of level 3 is that MaaS now offers users an alternative covering all their daily mobility requirements. Thus, it also constitutes an alternative for individual car ownership.
- Level 4 = integration of societal goals. At this level, MaaS extends beyond liaising between the demand for and supply of mobility. Supply and demand are now combined with goals such as reducing the use of cars or promoting liveability in the cities

The mobility option occurs at the latter stages of integration, i.e. Level 3. Integration, where transport services are integrated into passes and bundles and the MaaS concept is making a large impact on the usage of cars in a certain area, meaning that there is a positive trend in favor of the usage of public transport services in comparison with the individual motorized transport.

City of Koprivnica is at level 0, since there is no integration between the existing public transport services. The goal of this action plan is upgrade between levels as the maturity of the new FUA Koprivnica transport system increases. Therefore, as the public transport system of the FUA area will progress, so will the levels of integration.

Ultimately, the goal is to progress to the integration level 2., where payment of the service that is integrated is possible.

III. Monitoring

Monitoring of the developing and implementing the measures is an essential part of the process of establishing a fully functioning MaaS system, and a fully functioning public transport system in general. Therefore, as a part of the Action plan, a monitoring teams and a system will be established in order to keep track with the latest developments and possible adjustments of the system that can eventually occur. Two main actors will be a part of this process:

- City of Koprivnica departments involved in the development of the Action plan
- Public transport operator of the future FUA Koprivnica public transport system.





The staff will have meetings, two times a year in order to report and to discuss the progress of the implementation of the Plan and the proposed measures. They will be responsible to the Major of the City and present a report to the city council in the periods that are mentioned.

5. Conclusions and recommendations for innovative low-carbon mobility planning In FUA

The common interpretation of a MaaS system is that it is a system that is possible to operate successfully only in large, densely populated areas where there is a large demand for public transport services and where there is a larger number of public transport services available and commercial interest overall.

During the Dynaxibility4CE project, the staff that was working on the MaaS Action plan for FUA Koprivnica came to the conclusions that it is possible to implement a functional MaaS service in a small, sparsely populated area if the creators of such a system take tailor made approaches in order for the system to be functional. Also, the availability of ICT companies that can develop such a system is growing day by day, making the technical side of the implementation feasible.

Digital interfaces can be adapted to the requirements of the older demographics, which in the end will be the main users in the rural area. Since there is no commercial interest, due to the low population count, it is preferable that the operator of the public transport services is one company, and preferably in public ownership.

Outside funding, like EU or national sources is preferable, more obligatory, if such a small community like Koprivnica and the surrounding municipalities wish to implement and obtain a MaaS system. Public transport services are sometime a large burden on the scarce budgets of small municipalities. MaaS system will help in managing the system, track costs and income.

As a main conclusion, in larger areas and systems, the emphasis is on the ease of transfer of passengers from one transport mean to another, and by doing that, the MaaS system encourages passengers to use different public transport systems, because it is easy. In smaller areas, this is also the case, but an interesting add on is the fact that the MaaS system in smaller areas is a useful tool that complete the public transport services and acts as a management tool, because it provides information to the technical staff and decision makers on how the public transport performs and where could it be more enhanced.





6. Dissemination and exploitation plans

Dissemination of the FUA Koprivnica Action plan and the latter implementation of the measures will be the role of the operator of the public transport system, current City of Koprivnica public transport system and the future FUA Koprivnica public transport system. The dissemination of the activities will be done via the current platform promet.koprivnica.hr. and the web site of the Municipal utility company Komunalac Koprivnica.



Figure 12: Promet Koprivnica web page I

The dissemination will include all of the elements that are needed in order for the main target groups, that are the end user to get acquainted with the existence of the new technology. A much important part of the dissemination of the service is the education of the users for the new service.





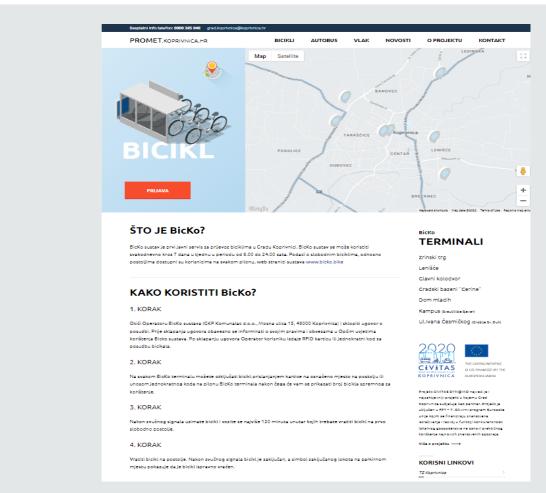


Figure 13: Promet Koprivnica web page II.

Education plan will be developed parallel with the implementation of system. This is due to the fact that certain elements of the system and the timeline of the implementation are not exact, so, there will be adjustments made along with the development and the implementation of the system.