ACTION PLAN

for Association for promotion of electrical mobility

University of East Sarajevo (UES)

Partnership for Promotion and Popularization of Electrical Mobility through Transformation and Modernization of WB HEIs Study Programs

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Content

1. ABSTRACT

Due to increasing environmental pollution and climate changes, many governments all around the world take serious actions and measures to overcome this issue. A final goal of all these measures, plans and strategies is reducing carbon emissions. It is identified, that one of the major sources of carbon emissions is transportation sector, which traditionally relies on fossil fuels. Therefore, a proper transformation of this sector towards less carbon emissions and decreasing its negative impacts on the environment, is very necessary.

A successful planning and implementation of national actions for carbon emission reduction depend on the presence of qualified professionals and experts with a good understanding of new low-carbon technologies. In line with that, it is very important to invest in education and professional development, to enable successful "green" transformation of the existing transportation sector.

One of the most effective solutions for this transformation is electrical mobility (EM). The adoption and development of EM requires experts in this field, who can actively participate in this transition from the conventional to the hybrid and electrical vehicles. The EM is a very wide complex multidisciplinary field, and it is not well covered in education systems, i.e., study programs, especially in the Western Balkan Countries (WBC), including Bosnia and Herzegovina (BIH). To provide experts in this area, it is necessary to modernize the study programs at the Higher Education Institutions (HEIs), through introduction of EM in existing or new courses, which ensures that future graduates gain enough competences and skills related to this new field.

With respect to the above needs, the specific goals of the project "Partnership for Promotion and Popularization of Electrical Mobility" (PELMOB) for all partner WBCs, are:

- **Modernization of study programs**: Modernization of curricula for bachelor and master studies according to the Bologna requirements and national accreditation procedures and rules, will be performed. New courses in the EM field, including different related fields necessary for understanding of the EM concept, will be developed at the WBC HEIs. The aim is to develop 10 enhanced and new EM courses (subjects), distributed in WBC partners – 3 in BIH, 3 in Kosovo*, 2 in Montenegro, and 2 in Albania.
- **Establishment of EM laboratories**: Purchase of the laboratory equipment and establishment of 10 new laboratories for EM in the WBC HEIs, will be done. These laboratories and equipment will be used for practical exercises within the new courses, seminar works, projects, final theses, scientific research, etc.
- **Foundation of EM associations**: Establishment of 10 associations for promotion of EM in WBC partners, that will include members from all relevant stakeholders – schools, universities, enterprises, local communities, and citizens, will be performed. Various events, such as workshops with popular lectures related to the EM, public expositions of the electrical vehicles, raising awareness about positive impacts of the EM on the environment, etc., will be organized. The main goal of these associations is to promote the EM and all its advantages and benefits to the complete society. It is plan within this project to create 10 EM associations, then to organize minimum 10 local workshops with the stakeholders in the field of EM, to develop and adopt 10 action plans for these associations, to create various promotion materials, etc.

To improve current situation regarding the EM in BIH, it is necessary to adopt legal frameworks and regulations, following the recommendations and experiences from EU countries. The focus should be to ensure and regulate environmental protection, electric vehicle charging infrastructure and any other aspects in this field. The main entities responsible for regulation of the EM in BIH are:

- Ministry of Transport and Communication of BIH
- Ministry of Foreign Trade and Economic Relations of BIH
- Entity Ministries of Environment and Tourism, FBIH, RS, DB
- Entity Ministries of Traffic and Communication, FBIH, RS, DB
- Entity Ministries of Energy, Mining, and Industry, FBIH, RS, DB
- Environmental Protection and Energy Efficiency Funds of FBIH, RS, DB
- Public Enterprises Elektroprivreda BIH, RS, DB
- Associations for EM within chambers of commerce FBIH, RS, DB
- Associations of authorized representatives and car dealers within chambers of commerce FBIH, RS, DB
- Auto-Moto Clubs.

2. SURVEY ON EM AWARENESS IN BIH

As a part of the PELMOB project activities, a survey on the awareness of the EM in BIH has been realized. A questionnaire consisting of 14 questions/statements was prepared. The goal of this survey was to investigate the awareness of the community in BIH about the usage of EM, its potentials, and benefits.

The first step of the survey considered socio-demographic questions – gender, age, educational qualifications, and occupation of the participants. The purpose of the initial section was to explore the participants experience and willingness about the ownership of electric vehicles.

The second part of the survey included questions about the EM transition. The third part analysed the support for different government and companies' investments and incentives for the EM. Also, the survey considered the knowledge of the participants about of the EM concept and identified many gaps in the education about the EM. The survey addressed major issues related to the EM as well.

The almost equal interest about the EM is among male and female participants of the survey. Major interest was observed among participants in the age group of 20-30 years, with lower interest in the 31-40 age group, those younger than 20 years, and the least among those older than 50 years. These results may reflect specific characteristics and preferences of different demographic groups. Various age groups may have different priorities, needs, and interests regarding the EM.

After analysis of the educational and professional qualifications of the participants, it can be concluded that the participants with academic level of education were more interested in the EM. From the professional and occupational perspective, it can be concluded that the participants dealing with new trends and technologies have the largest interest in the EM. This includes students, professors, and engineers from different branches. Business professionals and self-employed individuals expressed interest at a percentage lower than 10 %. Other occupations did

not show statistically significant interest. The survey showed that over 96 % of participants do not own or use the electric vehicle. More than 50 % of participants stated that it is unlikely that they will buy or use the electric vehicle shortly. Only 11 % of the participants considered to buy the electric vehicle soon. The main concerns can be outlined as follows:

- Lack of charging stations and proper charging infrastructure for longer journeys.
- Electric vehicles will not have a significant role.
- Small number of charging stations, slow charging, short range per charge.
- Instability of infrastructure in general, at home, at work, and on roads.
- Poor range compared to standard vehicles with internal combustion engines (ICE).
- Hybrid vehicles are a desirable option.
- High price, non-availability of chargers, and high battery replacement cost.
- High cost, issues with vehicle maintenance and charging, questionable reliability, etc.
- There are larger air polluters than cars.
- Electric vehicles with their batteries cause more harm than ICE vehicles.
- Lack of subsidies and credit support.
- Poor battery lifespan test results.
- Limited usability of electric vehicles due to the lack of service, parts, chargers, and many other things associated with this type of vehicles.
- Insufficient information about this type of vehicles.
- Lack of fast charger network.

The EM transition can introduce real challenges and issues for the electrical grid and power supply capabilities. Increased demand for electrical energy due to the charging of the electric vehicles require serious and systematic improvements and expansions of the electric power infrastructure, leading inevitably to the increase of electricity prices.

It can be concluded that most of the participants prefers sharing, i.e., renting electric vehicles, rather than buying and owning them. This is based on safety concerns related to the electric vehicles, their high cost, and limited access to secure parking or charging locations.

Except their high cost, the possible maximum range of electric vehicles is another concern and question for the participants of the survey. Furthermore, safety concerns and the lack of legal regulations in this field are important issues. It can be emphasized that topics related to the EM need to be presented to the users and professionals based on scientific and professional facts, to try to eliminate many doubts and concerns.

In supporting the EM transition, the role of the local communities has been identified as the central one. Based on the survey, the municipality should initiate, and support issues related to greenhouse gas emissions reduction, climate actions, and air pollution reduction.

Most customers believe that the local community should provide affordable transportation and improve conditions for walking, cycling, and transit. Additionally, investing in publicly accessible charging stations, incentives for “electric vehicle ready” retrofitting of buildings and workplaces, and investing in cycling infrastructure that supports the adoption of E-Bikes has been identified as very important.

The following aspects should be considered, when it comes to the concepts that current and future users need to know, to increase their awareness of the EM:

- Safety and security of the electric vehicles.
- Reliability of the electric vehicles.
- Environmental impact of the electric vehicles.
- Battery charging requirements for the electric vehicles.
- Battery charging time for the electric vehicles.
- Autonomy of the electric vehicles.
- Benefits of the electric vehicles.
- Common issues with the electric vehicles.
- Characteristics of the motors in the electric vehicles.
- Impact of weather conditions on the electric vehicle performance.

To popularize electric vehicles among society, the focus should be on education about EM, understanding the EM functionality, increasing knowledge about the technical aspects of vehicle use, and additional equipment. Also, it is very important to inform potential users about issues related to the actual costs of driving the electric vehicle. The main concerns regarding the electric vehicles could be identified as:

- Insufficient number of charging stations.
- Insufficient charging station performances.
- Limited battery range for the electric vehicles.
- Fear of low-quality electric vehicles.
- Increased costs of charging vehicles.
- High ownership costs.
- Unclear regulations regarding the EM.
- Tax exemptions or privileges.
- Fear of hazardous materials used in the production of the batteries.
- Fear of battery explosions.

3. GOALS OF EM DEVELOPMENT

The main goals for promoting the development of the EM, through professional and academic initiatives, are:

- **Research and development**: Promotion of the research and development in the field of the EM and all related disciplines should be established through support for academic institutions, laboratories, research projects, organizations, and businesses.
- **Education and training**: The goal is to properly educate the future experts in the field of EM, by providing support for academic programs focusing on the EM.
- **Cooperation with industry stakeholders**: A collaboration of the WBC HEIs with industrial partners from the EM field is very important to facilitate the knowledge transfer, research findings, and technological innovations in this field.

- **Promotion of sustainable and "green" transportation**: The promotion of the usage of the renewable energy sources and electric vehicles, which ensure low-carbon economy and positive impacts to the environment, is very important.
- **Public awareness of the EM advantages**: Different activities, such as conferences, events, seminars, campaigns, etc., should be organized to raise public awareness about the benefits that EM brings to the whole society and nature.
- **Standardization and regulation of the EM**: The great effort should be made to adopt and arrange proper legal framework and standards which regulate the EM.

For BIH, there are several important limitations for development and adoption of the EM. A most of the country area is covered by mountains, which cause sometimes severe problems in all kinds of transportation. Also, BIH is not a member of the EU and has a significantly lower standard, which prevents people to buy and use electric vehicles that are generally more expensive than conventional ICE cars. It is necessary to develop and implement different national plans for EM, focusing on building more charging stations for the electric vehicles.

In BIH, over 60 % of electricity is produced by coal-fired power plants. Therefore, the usage of renewable energy sources with all their advantages should be promoted, such as hydroelectric power, solar energy, and wind. Also, battery-powered electric vehicles have much simpler propulsion systems with only 1-2 % moving parts compared to the ICE vehicles.

From the examples of the well economically developed EU countries, the EM concept should be promoted as a key component for future transportation, especially in urban areas, such as cities, where air pollution is the largest. Logically, an increase in the market share of electric vehicles will create good real chances for new manufacturers, fostering innovation and technological advancement, leading the society in prosperity. Also, the production of the electric vehicles will make chances for new occupations, leading to the increasing of new working places in different branches.

4. STRUCTURE OF THE ASSOCIATION FOR PROMOTION OF EM AT UES

Within the PELMOB project, one of the specific goals is to establish the association for promotion of the EM, with a task to bring together relevant stakeholders – schools, universities, enterprises, local governments, and citizens. The purpose of this association is to organize various events, such as workshops with popular lectures from the EM field, public expositions of the EM devices, and campaigns for raising awareness about "green" energy transition and the usage of more environmentally friendly EM based transportation. At the University of East Sarajevo (UES) and Faculty of Electrical Engineering (FEE), which is organizational unit within UES responsible for all project activities, the **Association for promotion of EM** is founded on 21st December 2023 (Decision number 03-2099/23 of the FEE Council). The Association will work under new established **Laboratory for EM**, which is also founded on 21st December 2023 (Decision number 03-2098/23 of the FEE Council).

Key activities of this Association will be organization of the workshops for promotion of the EM in local and city communities, development of different strategies for encouragement of the EM on local, city and state level, raising funds for the scientific research in the EM field, giving suggestions and plans for modernization of the HEI study programs, through adoption of new or modification of the existing curricula on bachelor and master study level, etc.

The Association for promotion of EM at UES (FEE) will involve members from different areas:

- Academic community (students, professors, researchers)
- Industry stakeholders (professionals from different branches related to the EM)
- Government institutions (representatives of local, city and state governments)
- Non-government organisations (representatives of organizations dealing with various kinds of promotion of renewable energy and EM transitions.

This Association will act as a link between educational institutions (schools, HEIs), research centres, industry sector, government and non-government organisations and institutions.

The operation of the Association will be regulated by the UES and FEE legal documents, especially all financial transactions.

4.1. Vision and Mission of the Association for promotion of EM at UES/FEE

The EM transition includes not only technical aspects, but also social, economic, and environmental transformations.

The **vision** of the Association for promotion of EM at UES/FEE is devoted to the increasing usage of the EM in local, city and state communities, which is the future of transportation, especially in city areas.

The **mission** of the Association for promotion of EM at UES/FEE is to intensively promote the adoption of the EM in BIH, through various activities, in collaboration with similar existing networks in the region and EU. The focus will be on promotion of the urban transport based on the EM. The EM based urban transport, especially having in mind continuous spreading of the cities and inhabitants, will lead to the reduction of carbon emissions and better environmental conditions.

4.2. The goals of the Association for promotion of EM at UES/FEE

The goals of the Association for promotion of EM at UES/FEE are:

- Promoting the application of the EM in transport.
- Encouraging the application of renewable energy sources and electric/hybrid vehicles.
- Creating ideas and initiatives for new research and development projects in the field of EM.
- Organizing workshops, seminars, conferences, and public discussions, to exchange knowledge and experiences in the field of EM.
- Supporting the development and modernization of study programs related to the EM.
- Education on the EM and its benefits.
- Collaborating with other HEIs, research institutes and industrial partners on promoting and development of the EM.
- Raising funds for the operation of the Association.

4.3. Activities for achievement of the goals of the Association for promotion of EM at UES/FEE

The Association will perform various activities to achieve its goals. Major activities include:

- Utilization of laboratory resources within the Laboratory for EM and other laboratories from UES.

- Organization of workshops, seminars, conferences, and other events for promotion of the EM.
- Organization of special sessions and round tables related to the EM and its latest achievements and technologies, at the scientific conferences.
- Dissemination and promotion of the EM through media and press.
- Organization of students practice in industry sector related to the EM and similar branches.
- Supporting exchange of students and professors between other HEIs and relevant stakeholders (industry and research sector).
- Organization of the invited lectures from professionals dealing with the EM and related disciplines.
- Providing ideas and funds for future projects related to the EM.

5. ACTION PLAN OF THE ASSOCIATION FOR PROMOTION OF EM AT UES/FEE

The Association for promotion of EM at UES/FEE is recently founded (Decision number 03-2099/23 of the FEE Council, date 21st December 2023). The Action plan of this Association is divided in two parts. The first part is short-term action plan (Actions 1, 2). The activities within this short-term action plan will provide the starting point for successful operation of the Association and ensure establishing of its structure. The other part is long-term action plan (Actions 3, 4, 5, 6), which represents a strategic document with comprehensive activities for the sustainable development and operation of the Association.

Table 1. shows a timeline for the Action plan of the Association for promotion of EM at UES/FEE.

Table 1. Timeline for the Action plan of the Association for promotion of EM at UES/FEE

ACTION	TASKS	WHEN	WHO	RESULTS	REMARKS
Action 1. Establishment of the Association	Call for initial meeting for constitution of the Association		UES/FEE	Minimum 20 members (students, professors, representatives of industry, and other stakeholders) accepted the meeting.	
	Initial meeting of the members		UES/FEE, stakeholders	The Association is constituted, the governing body is chosen.	
Action 2. Creating platforms for communication between members of the Association and external stakeholders	Create website of the Association		Governing body of the Association	Website is prepared and published.	
	Create profiles on social media (LinkedIn, Facebook, Instagram, Youtube)		Governing body of the Association	Social media profiles are created.	
Action 3. Management and self-evaluation of the Association	Meetings of the members of the Association	Half yearly	Association members	A meeting is held.	
	Self-evaluation of the Association activities	Half yearly	Association members	Self-evaluation is performed and documented.	
	Creation of the media content	Continuously	Governing body of the Association	Proper media contents are created and published on website and social media channels.	

ACTION	TASKS	WHEN	WHO	RESULTS	REMARKS
Action 4. Education and training	Organization of promoting campaigns for EM	Continuously	Association members	The promotion and campaign materials are published on the website and media platforms.	
	Organization of educational courses, summer schools, trainings, students' competitions	Yearly	Association members	Education courses, summer schools, trainings, students' competitions, etc., related to the EM, are organized.	
	Organization of round tables and panel discussions about the EM	Yearly	Association members	At least one round table and/or panel discussion is organized, with relevant stakeholders.	
Action 5. Research and development	Preparation of the project proposals in the field of the EM	Yearly	Association members, stakeholders	At least one project application is submitted to the relevant project calls.	
Action 6. Preparation and development of national actions and strategies	Organization of the meetings with the representatives of the government and non-government institutions relevant for the EM	As needed	Association members	Meetings with the representatives of the relevant institutions are held.	
	Preparation of the national EM strategies	As needed	Association members, stakeholders	The national strategies for the EM are prepared.	