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SUSTAINABLE URBAN E-MOBILITY TO TOWARDS INCLUSIVE CITIES

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Abstract

Mobility is experienced differently by different groups of people, and their specific needs should be considered by applying a participative approach and involving users and actors concerned. Furthermore, an integrated and holistic approach should be applied, allowing people to be aware of the interdependencies of actions taken in one area on others (environmental, economic, social and governance).

A lot of cities and urban settlements in the last decade have contributed to safe and safer cities, especially pedestrians, users of public transport, cyclists and other public activities, with the design of space and new streets, and especially by the redesign of space and existing streets. The approach to space, urban mobility is changing, planners and urban planners are emerging with new ideas, who, together with the technical professions of traffic and construction engineers, are launching new forms of design that help safe, safe, humane urban living. In this paper will be given guidelines for accelerating transformational change towards sustainable urban mobility through innovative and integrated electric mobility solutions.

The paper will also analyze the segment of engineering education in e-mobility and innovative solutions in e-mobility.

1. INTRODUCTION

During the last decade, many governments have announced new climate change mitigation commitments that include national or regional commitments to reduce their carbon emissions in the 2025-2035 timeframe. The underlying government planning efforts and national actions do tend to be linked with a major transformation in the transport sector toward advanced efficiency technology with a shift to lower-carbon energy sources. Many governments have announced that their original goals will not be met for a variety of reasons, amongst which one of the most important is the lack of skilled and trained personnel with a sufficient level of knowledge in this area. In the last decade, many cities and urban settlements have contributed to sustainable, safe and safer cities, especially pedestrians, users of public transport, cyclists and other public activities, through the design of space and new streets. The approach to space and urban mobility is changing, planners and urban planners are emerging with new ideas, together with the technical professions of traffic and construction engineers, are launching new forms of design that help safe, safe, humane urban living. It is necessary to increasingly form safe mobility zones in urban areas and urban planning system space and area for E mobility. It is necessary to share knowledge and skills across mobility and in particular the increasing supply of E-mobility means in the area of innovation, policies, technologies and investments.

2. MOBILITY

Mobility is defined as the potential for movement and the ability to get from one place to another using one or more modes of transport to meet daily needs. Mobility directly results from social activities such as living, working, relaxing and production, trade and consumption (for goods) [1]. Mobility is experienced differently by different groups of people, and their specific needs should be considered by applying a participative approach and involving users and actors concerned. Furthermore, an integrated and holistic approach should be applied, allowing people to be aware of the interdependencies of actions taken in one area on others (environmental, economic, social and governance).

2.1. E-Mobility

E-mobility represents the concept of using electric powertrain technologies, in-vehicle information and communication technologies and related infrastructure to enable electric propulsion of vehicles and fleets. E-mobility is the principle of using electric drive for a wide range of transport and transport. E-mobility is the concept of using electric powertrain technologies, information, and communication technologies in all means of transport and transport related to infrastructure that enables smooth and independent movement, which includes E scooters, E bicycles, E scooters, E cars, E buses, E trucks, E SUV vehicles, E ships and E aircraft. A common characteristic of all E means of transport and transport is that they are fully

or partially powered by electricity, that they have means of storing energy and that they get their energy mainly from electricity (network) through charging stations.

E mobility, and in general low-carbon mobility, is one of the main targets of the European Union's policies dedicated to a green transition. EU policies are promotion of sustainable mobility, and E-mobility in particular. The European Union has long identified E mobility, in the wider context of sustainable mobility, as one of the priorities for the decarbonization of transport in all Member States. E-mobility has been considered as a key transition to overcome the fossil fuel dependency of the EU's transport systems. In accordance with the undertaken initiatives and strategies, the process of E-mobility based on renewable energy sources and the replacement of dirty technologies in the transport system is progressing in the EU countries. E-mobility is an important strategic vector of action to achieving the set goals for zero carbon dioxide emissions. It can be efficiently achieved by gradually employing electric vehicles that will use renewable and clean energy sources.

3. LAND USE TO SUPPORT URBAN E MOBILITY

A lot of cities and urban settlements in the last decade have contributed to safe and safer cities, especially pedestrians, users of public transport, cyclists and other public activities, with the design of space and new streets, and especially by the redesign of space and existing streets. Strategic for support urban mobility and towards inclusive cities It should be carried out through the following activities:

- Create liveable urban spaces.
- Close the knowledge gap.
- Deploy and scale green, safe, and inclusive mobility solutions for people and goods.
- Accelerate market opportunities.
- Promote effective policies and behavioural change.

Adopting the UN Sustainability Goals in particular sustainable cities and communities' development of transport and mobility will be systematically and permanently focused on the development of mobility in the EU, and to stand out in this area as a driver of the process of sustainable transformation towards a low-carbon economy and creating a comfortable living environment focused on citizens and their real needs. Also, when planning space, it is necessary to be guided by integrated space planning in the context of sustainable urban mobility, i.e. that space planning must be oriented from the space for motor vehicles towards the space for human pedestrians and cyclists and citizens who use public transport in their activities in movement and mobility [2, 3].

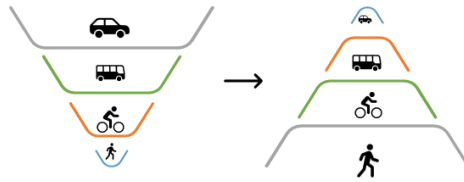


Figure 1. Integrated spatial and urban mobility planning [4]

The aim of the integrated and innovative action to advance sustainable urban mobility is to strengthen European territorial cooperation, focusing on modern urban challenges, through the use of innovative methods and tools, in order to establish integrated action plans that support sustainable mobility [4]. Today, the needs of urban mobility are:

- addressing the challenges of air pollution and urban noise pollution,
- redesigning the mobility model,
- the establishment of new infrastructure that supports innovative mobility,
- continuous restructuring of the public sector in the part of sustainable development of urban environments,
- Cooperation of all city actors to adopt new mobility practices.

3.1 Mobility Hub Concept in Urban Areas

Mobility Hub represent a new concept that offers the potential to 'trigger' change by establishing a visible and very different concept of mobility. Understanding the common process and common solutions adopted by cities would undoubtedly be good to know, capture, codify, and 'package'. Cities must transform their mobile infrastructure and services and the habits society has for moving in and around their cities. Packaging seeks to bring together three things that are not usually addressed commonly in cities: 1. a deep understanding of social wants and needs (the world of community managers); 2. what technical approaches could solve these problems (the engineering world) and 3. what business model and financing options can be used to support implementation (finance). It seeks to encompass functionally common, interoperable, component-based solutions for these needs. Because it is functionally common (as opposed to physically similar), it bypasses the typical concern with 'one-size-fits-all' solutions that cities often impose on the industry. This enables cities to adapt functionally common proven solutions to their unique context. The Mobility Hub concept is based on lessons learned from the example of the City of Milan, as one of the leading cities within Sharing Cities [5], with more than 40 Mobility Hub at different stages of the life cycle process.



Figure 2. Mobility Hub as a 5-minute city [6]



Figure 3. Mobility Hub (Island) Sarajevo (Skenderija) [6]

4. GOVERNANCE OF SMART AND SUSTAINABLE MOBILITY IN URBAN AND SUBURBAN AREAS

The approach to space, urban mobility is changing, planners and urban planners are emerging with new ideas, who, together with the technical professions of traffic and construction engineers, are launching new forms of design that help safe, safe, humane urban living. The new EU Transport Strategy (Sustainable & Smart Mobility Strategy) [7] is fundamental and will, if successful, change the European transport sector completely with impacts on many other aspects of life such as the economy, environment, and health. The objectives new EU Transport Strategy are (Figure 1):

- ✓ Sustainable mobility.
- ✓ Smart mobility.
- ✓ Resilient mobility.



Figure 4. Objectives the New Transport Strategy EU, (2020)

Main topics on the new transport strategy are:

- ✓ Electric mobility,
- ✓ Digitalization,
- ✓ aviation,
- ✓ Sustainable Urban Mobility Plan,
- ✓ Automated driving,
- ✓ Road safety, and
- ✓ Infrastructure.

5. ENGINEERING EDUCATION IN E-MOBILITY

The introduction of new technologies in middle–developed countries (like Western Balkan countries) is still in the development stage, with the very poor economic, technical and educational environment for their application. The education system is not sufficiently developed and adapted to new challenges and is extremely incompatible in terms of supporting the achievement of the green transition goals in the field of E mobility. It is necessary in engineering education to acquire adequate competencies and skills in the field of E-mobility and develop adequate laboratories and practical classes for E mobility. Currently, there are no other available national sources of funding that could significantly increase the developmental level of the WB HEIs (Higher Education Institutions) [8]. Most common education gaps in the everyday use of electric vehicles can be considered from the technical, social, economic, ecological, legal and safety aspects.

- Social Issues: lack of or insufficient knowledge or an inadequate level of education about so-called new mobility culture, that is on benefits of electric vehicles in urban transport system; limited awareness of the privileges of using electric vehicles; lack of proper promotion of the electric vehicles uses.

- Legal Issues: lack or insufficient knowledge about the use of vehicles in electric sharing systems and technical or legal issues related to this.

- Economic Issues: lack of or insufficient knowledge related to the real costs of driving the electric vehicle; lack or insufficient knowledge related to appropriate tax reliefs or other discounts and applicable low-carbon mobility programs.

- Environmental Issues: lack of or insufficient knowledge related to the possibilities of improving the quality of life and the impact on sustainable development due to the

application of EM in practice; limited awareness of the carbon footprint and clean transport zones.

- Safety Issues: lack or insufficient knowledge related to the safety of using electric vehicles, i.e., issues of connecting the vehicle to the charger; concerns about the possibility of electric shock.

It is necessary for engineering education to improve and develop the existing curricula in the field of E mobility, especially in the part Ecological and sustainable design of road traffic, Electro Mobility and Hybrid Technology, Organization and exploitation of Electrical Vehicles, Intelligent Technologies for the Internet of Vehicle, Energy Storage Systems for Electric Vehicles, Electric Vehicle Systems Architecture and Standardization Needs. The aim of the improved study programs is to include different disciplines such as environmental sciences, sustainable transport, and electrical and traffic and transport engineering [8].

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