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Editorial

Sustainable Transport: The Role of Clean Energy, Mass Rapid Transit, Non-motorized Mobility, and Challenges to Achievement

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Abstract

Sustainable transport is an important concept to reduce dependence on fossil fuels and to realize a cleaner and more sustainable future. This is achieved through the use of clean energy, low emission vehicles, efficient use of resources, and transportation planning that considers the needs of the environment and society. Therefore, the use of clean and renewable energy sources, Mass Rapid Transit (MRT), and non-motorized mobility continues to be encouraged to support a sustainable transportation system. However, there are several challenges that must be overcome to achieve a truly sustainable transport system, including the costs of switching to low emission and clean energy vehicles, the lack of infrastructure to support sustainable transport, and the need for public awareness and education about the benefits of sustainable transport.

Keywords: Sustainable transport; MRT; Biofuel; Clean energy; Non-motorized mobility

1. Introduction

Transportation is a part of life that allows people and goods to move quickly and efficiently. However, transportation growth has come at a price with environmental degradation, air pollution, and climate change [1]–[3]. A sizable portion of the greenhouse gas emissions that contribute significantly to climate change are caused by the transportation sector. As the globe works to lessen its reliance on fossil fuels and move toward a cleaner, more sustainable future, the issue of sustainable transportation is becoming more and more significant today.

The concept of sustainable transport refers to a transportation system designed to meet the needs of present and future generations without compromising the ability of future generations to meet their own needs. More specifically, sustainable transport refers to the use of transport modes and systems that minimize negative environmental, social, and economic impacts while meeting individual and societal needs [4]. Therefore, the goal of sustainable transport is to create a transportation system that is accessible, affordable, efficient and environmentally friendly.

2. Principles of Sustainable Transport

Sustainable transport is intended for the mobility of people and goods while reducing environmental impact. This is achieved through transportation system planning that considers the environment and the needs of the community, including the use of clean energy, low emission vehicles, and efficient use of resources. [5]–[7]. There are several key principles of sustainable transport, as presented in **Figure 1**.

3. The Role of Clean Energy

Electric Electric Vehicles (EVs) and Hybrid Electric Vehicles (HEVs) are examples of clean energy applications. EVs are completely powered by electricity, which can be generated from renewable sources, such as hydro, solar, wind and all renewable energy sources that produce electricity. Meanwhile, the HEVs combines an internal combustion engine with an electric motor

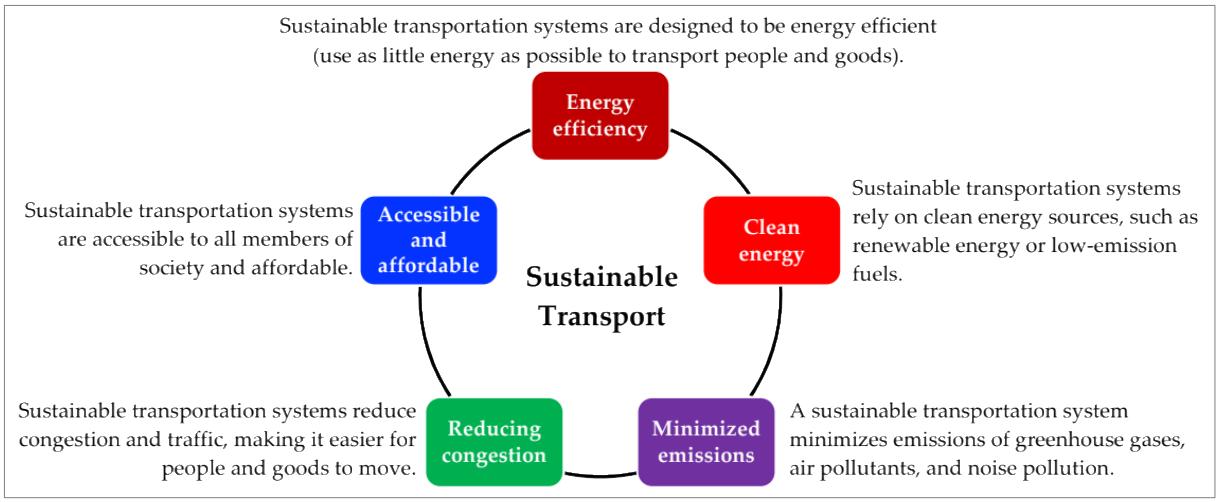

Figure 1. Key principles of sustainable transport

to improve fuel efficiency and reduce emissions. Apart from EV and HEV, Fuel Cell Vehicle (FCVs) is also a candidate for a clean and low emission propulsion system to support a sustainable transportation system [8]. Biofuels are also a very important part of a sustainable transportation system development project. Biofuels can be produced from plants, such as corn, sugarcane, and other plants that contain oil or cellulose, both edible and inedible plants [9]. There are several types of biofuels, including ethanol, biodiesel, and biogas. Ethanol is generally made from corn or sugar cane and can be used as a mono or blended fuel with gasoline in spark ignition (S.I.) engines. Biodiesel is made from vegetable oil or animal fat and is used in compresses ignition (C.I.) engines, as mono or blended fuel with diesel. Biogas is produced by the anaerobic digestion of organic matter for S.I. and C.I engines.

4. The Role of Mass Rapid Transit

The Mass Rapid Transit (MRT) plays an important role in promoting sustainable transportation by offering a more efficient, affordable, and environmentally friendly alternative to using private cars. MRT systems, such as the subway, light rail, and commuter rail, can transport large numbers of people quickly and safely, reducing traffic congestion and air pollution [10]. The MRT also aids in lowering energy consumption and greenhouse gas emissions as well as increasing accessibility and mobility for people without cars, fostering fairness and social inclusion. In order to combat the negative effects of urbanization and support sustainable development, the MRT system should be improved and expanded.

5. The Role of Non-motorized Mobility

Non-motorized mobility, such as the use of bicycles, walking, and rollerblading, also contributes greatly to promoting sustainable transport. They are environmentally friendly, as they produce no emissions and require no fuel, reducing carbon footprints, and improving air quality. They are environmentally friendly since they emit no pollutants, hence lowering carbon footprints and improving air quality. They are inexpensive and convenient, especially in densely populated places, and assist to minimize traffic congestion and associated social and economic consequences [11]. Non-motorized transportation encourages physical exercise, improves public health outcomes, and lowers healthcare expenditures. As a result, encouraging and investing in non-motorized mobility infrastructure can result in more sustainable transportation systems that benefit both humans and the environment.

6. Challenges to Achieving

Despite the benefits of sustainable transport, there are several challenges that must be overcome to achieve a truly sustainable transport system. The cost of switching from conventional oil-based energy to clean energy and low emission vehicles is a major challenge for many countries. Today's EVs, HEVs, and FCVs are generally still more expensive than gasoline-powered vehicles. However, as technology continues to develop, the

Total Cost of Ownership (TCO) of these environmentally friendly vehicles is decreasing. Another challenge relates to the availability of infrastructure, such as charging stations for electric vehicles, for example, not yet widely available in many areas, making it difficult for people to own and operate electric vehicles. In addition, many public transport networks are not designed to support sustainable transport such as bicycle and electric scooter lanes. Therefore, it takes public education and individual awareness of the importance of healthy transportation to reduce environmental impact.

7. Conclusion

Sustainable transport is an important concept to reduce dependence on fossil fuels as well as to provide clean, affordable and healthy transportation services. Planning and implementing a good transportation system can reduce environmental impacts, such as cleaner energy use, low emission vehicles, MRT, non-motorized mobility. MRT is able to move people and goods in large numbers and presents equality compared to other modes of transportation. Non-motorized mobility, besides being cheap, also improves health. Biofuels, such as ethanol, biodiesel and biogas, are also important components to support sustainable transportation. Biofuels are renewable, produce lower emissions than traditional fossil fuels and can be produced domestically. However, there are several challenges that must be overcome to achieve a truly sustainable transport system, including the costs of switching to low emission and clean energy vehicles, the lack of infrastructure to support sustainable transport, and the need for public awareness and education of the benefits of sustainable transport.

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