

3rd Conference on Sustainable Urban Mobility, 3rd CSUM 2016, 26 – 27 May 2016, Volos, Greece

A “Greening Mobility” framework towards sustainability

Evangelos Bekiaris^a, Maria Tsami^{b*}, Maria Panou^c

^aDirector, CERTH/HIT, 6th Km Charilaou-Thermi Rd., Thermi, 57001, Thessaloniki, Greece

^bResearch Associate, CERTH/HIT, 6th Km Charilaou-Thermi Rd., Thermi, 57001, Thessaloniki, Greece

^cHead of Sector A: Vehicle & Driver- Transport Safety- Accessibility, CERTH/HIT, 6th Km Charilaou-Thermi Rd., Thermi, 57001, Thessaloniki, Greece

Abstract

In terms of the present paper, the clean vehicles vision, operation and necessity are being discussed pointing out the need to raise awareness to citizens and keep them informed about the potentials of newer technologies and clean vehicle usage. The approach is based on a concise analysis of the current policies and applications, examining a number of case studies that can be considered as coming close to the notion of “green mobility” and are treated as best practices. By identifying the greening mobility necessities, this research concludes on proposing a greening mobility framework to “clean” transportation and support the global vision to accommodate seamless, efficient, personalized and user friendly travel services and promote sustainable travel options.

© 2017 The Authors. Published by Elsevier B.V.

Peer-review under responsibility of the organizing committee of the 3rd CSUM 2016.

Keywords: clean transport, Electric Vehicles, greening mobility

* Corresponding author Tel.: +30 2310 4984 88; fax: +30 2310 498 267. E-mail address: tsami@certh.gr

1. Introduction

Transportation seems to be the key area of intervention in order to improve fuel quality and reduce greenhouse gas emissions considering that the EU target is to reduce these emissions by 80% till 2050. Greening mobility is therefore the ultimate transport challenge towards sustainability while it is labeled green, implying that will significantly reduce greenhouse gas emissions. Facing this global sustainability challenge arises the need to adopt an environmental friendly mobility culture by using new technologies and fuel options.

The approach followed in terms of the present paper is based on a concise analysis of the current studies, policies and applications with emphasis on examining a number of case studies that can be considered as coming close to the notion of “green mobility” and are treated as best practices. Based on the state-of-the art review and the future mobility challenges, we underline the Greening Mobility Necessities (GMN) of the future sustainable transport environment. GMNs frame the proposed Greening Mobility Framework (GMF) that aims to “clean” transportation by providing strategic guidance to create an informed public that is positively disposed to EVs.

2. Background

Electrification of road transport has become a major trend (Dijk et al. 2013) and Electric Vehicles (EVs) are becoming increasingly widespread (Al-Alawi and Bradley, 2013; U.S. Department of Energy, 2015). EVs contribute on reducing transport pollutants, having greater efficiency of the prime mover and enabling significant benefits in an urban mobility context (with low vehicle speeds, low power requirement, short trips). Bekiaris and Tsami (2015) stated that “Electric vehicles can significantly reduce global and local emissions and are part of the future vision for global mobility, not only for the reduction of CO₂ emissions and elimination of greenhouse gas but also for their potential to accommodate seamless, efficient, personalized and user friendly travel services and to raise awareness for sustainable travel options and lifestyle. We need to think for the future and open ground to cleaner travel options”. EVs hold the potential to reduce oil dependency and decarbonize road transport (Department of Energy and Climate Change, 2013) and are the main contributors on the development of a Greening Mobility era of transport towards sustainability.

A lot of research has been made on EVs awareness and usage. Bunce et al (2014) conducted research to investigate responses of EV drivers in UK to recharging plug-in battery electric vehicles. Responders assessed their attitudes and experiences before they obtained their EV and after driving the EV for 3 months. This research underlined an interesting difference in drivers’ awareness of the environmental impact of driving and recharging an EV before and after the trial in relation to CO₂ emissions and the energy cycle.

Research has also been conducted in the field of examining attitudes and perceptions towards EVs amongst potential buyers. In a recent study conducted in the US (Krause et al., 2013) urban resident drivers were questioned about their knowledge of EVs. The results shown a high number of misconceptions over operating costs, recharging time, purchase price and driving range. Moreover, the majority of the sample (70%) underestimated the extent of fuel savings. In a similar survey conducted in UK, over 70% of participants perceived an inconvenience on recharging the car and felt threatened by the possibility not to be able to cover the required travel distances with an EV (Smart, 2010). Similar findings have been found in Sweden (Gärling, 2001) and Belgium (Lebeau et al., 2013) about recharging time along with financial cost of electricity, and driving range. On the other hand, EV drivers point out the advantages of powering an EV over refuelling conventional vehicles and cost savings of EVs powering (Graham-Rowe et al., 2012; Kurani et al., 2008). The Smart survey (2010) shown that potential EV consumers are willing to buy an EV if only the public charging infrastructure was improved and underlined the necessity for local councils to invest in infrastructure.

Recently many countries have adopted policies (i.e. tax incentives for the purchase), to increase electromobility, aiming to eliminate pollutant emissions from traffic and improve the air quality, especially in urban areas (Ferrero et.al., 2016).

EVs can help to reduce transport emissions; however, the user behavior has a significant impact on energy savings. Franke et.al. (2016), conducted research on ecodriving EVs, aiming to understand EV drivers' ecodriving strategies along with the potential challenges for optimal user - energy interaction. Ecodriving aims at optimizing energy efficiency (McIlroy and Stanton, 2015; Stillwater and Kurani, 2013) and thus changing driving behavior in favor of ecodriving is considered a crucial energy challenge. Results of that research shown that ecodriving support systems need to facilitate anticipatory driving and help users locate and maintain drivetrain states of maximum efficiency.

3. Legislation

Greening mobility is a global priority. The “White Paper”, European Transport Policy for 2010: Time to Decide, was the first significant EU report that underlined the necessity to reduce transport generated CO₂ by reducing dependence on carbon based fuels (European Commission, 2001). Still many legislative documents and directives support the vision of green transportation, in order to provide guidance on and underline the necessity of greening mobility. Table 1, represents a list of indicative legislative documents.

Table 1. Legislative documents

The Kyoto protocol to the United Nations framework convention on climate change [COM(2007) 551; 2007]

Download English Version:

<https://daneshyari.com/en/article/5125035>

Download Persian Version:

<https://daneshyari.com/article/5125035>

[Daneshyari.com](https://daneshyari.com)