

20th EURO Working Group on Transportation Meeting, EWGT 2017, 4-6 September 2017,  
Budapest, Hungary

## Analysis of using electric car for urban mobility, perceived satisfaction among university users.

María Eugenia López-Lambas\*, Andrés Monzón, Gabriel Pieren

*TRANSyT-UPM - Universidad Politecnica de Madrid  
Calle del Prof. Aranguren, 3, Madrid 28040, Spain*

---

### Abstract

Cities, businesses and governments have recognized the value of Electric Vehicles (EV) in building a cleaner, smarter and more sustainable future. This study is focused on users' perception of EV and its impact on users' mobility.

The main problem EV users report is its limited autonomy compared to Petrol-Fuelled Vehicles (PFV), a factor causing range anxiety to users.

A 3-months experiment has been conducted in the UPM in order to study the academic population. The sample size is 48 people, equally distributed between men and women, students and workers and private car and public transport users. Every user used the EV for a day and was controlled and evaluated through a customized on-line survey, where different aspects were rated on a scale from 1 to 5.

The main outputs of the analysis of results are:

- The general experience of EV drivers has been positive (4,5).
- Lack of noise (4,9), acceleration (4,7) and safety (4,6) are the best rated variables.
- Autonomy (2,8) and autonomy accuracy (3,8) are the worst rated variables.
- 95% of users would pay more for an EV than for a PFV.
- Younger people have a higher average consumption than older people.

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

Peer-review under responsibility of the scientific committee of the 20th EURO Working Group on Transportation Meeting.

*Keywords:* electric car; perceived satisfaction; range anxiety

---

\*Corresponding author: +34 -913-366-658  
E-mail address: [mariaeugenia.lopez@upm.es](mailto:mariaeugenia.lopez@upm.es)

## 1. Introduction

Shortly after the Industrial Revolution, the invention of the internal combustion engine and the mass manufacture of automobiles revolutionized the transportation of people and goods (Otto, 1877). Since then, the ease of getting cheap and readily available fuel combined with the affordable price of mass-produced vehicles has radically changed the world we live in and the air we breathe.

The number of cars on earth currently exceeds one billion and is forecasted to reach the two billion mark soon because of the rapidity with which the emerging countries are increasing their car ownership (Sperling and Gordon, 2009). This revolution in the mobility of goods and humans has led us to a severe addiction to crude oil as more than 90% of transport fuels are derived from this commodity (Sperling and Gordon, 2009).

In addition, the transport sector contribution to greenhouse gas (GHG) emissions has increased from 14,9% in 1990 to 23,2% in 2014 (Eurostat, European Environment Agency), intensifying the unease over the imminent climate change induced by anthropogenic GHG emissions.

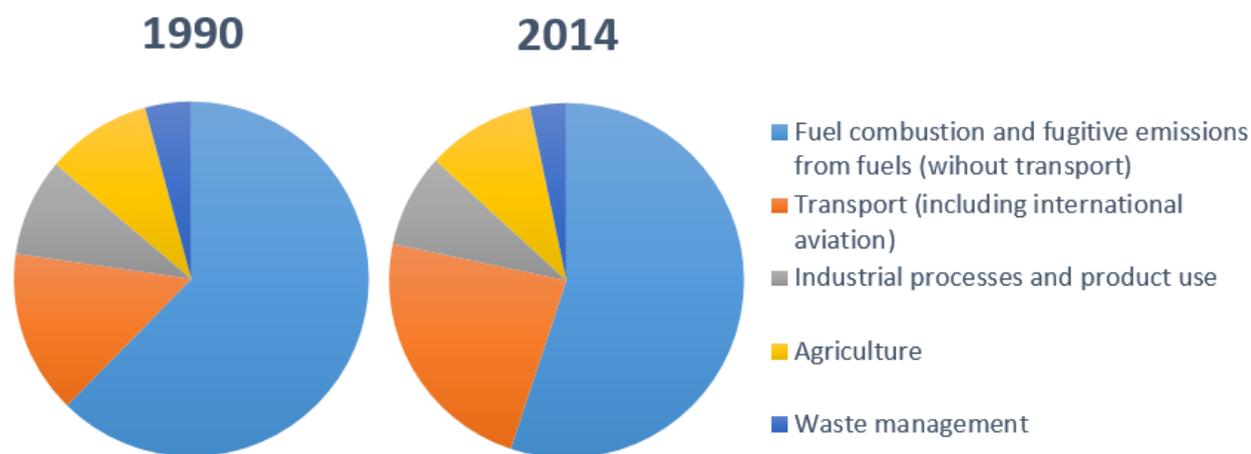


Fig. 1. Greenhouse gas emissions, by source sector, EU-28, 1990 and 2014 (Eurostat, European Environment Agency).

The crude oil addicted transportation culture has hence two main problems. The input problem is the declining fuel supply, since at current demand conventional oil reserves are forecast to run out by 2035 (King 2010). The output problem are, among others, the increasing GHG emissions.

As a matter of fact, temperature levels on the earth's surface have risen by between  $0.74 \pm 0.18^\circ\text{C}$  over the last 100 years, according to the Intergovernmental Panel on Climate Change and a further increase of between 1.1 and  $6.4^\circ\text{C}$  is likely this century (IPCC, 2007) as the rate of warming doubled (Trenberth, 2007).

This rapid climate change is largely attributable to anthropogenic GHG emissions – carbon dioxide ( $\text{CO}_2$ ), methane ( $\text{CH}_4$ ), and nitrous oxides ( $\text{NO}_x$ ) (Walker and King, 2009).

Technological innovations have the potential to reduce GHG emissions in the transport sector. These innovations include advancement in vehicle design and drivetrain engineering and alternative fuels. A focus should be placed on ways to use our current fuels more efficiently in the short-term while studying the replacement of fossil fuels by renewable energies in the mid and long-term (King 2010).

Given the limitations of oil resources and the aim to reduce  $\text{CO}_2$ -emissions in the transportation sector, battery electric vehicles (BEVs) are regarded as one of the most promising solutions to enhance the sustainability of today's transportation system (King 2010).

The objective of this study is to understand users' perception of BEVs and compare its impact on environment and users' mobility and costs with other conventional transport modes.

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات