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# Transportation Research Part D

journal homepage: [www.elsevier.com/locate/trd](http://www.elsevier.com/locate/trd)

## Promoting electro mobility in Spain. Public measures and main data (2007–2012)



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### ARTICLE INFO

#### Keywords:

Electric vehicle  
CO<sub>2</sub> emissions  
Low carbon transport

### ABSTRACT

This paper offers systematic and innovative information to the usage of electrical vehicles (EVs) in Spain between 2007 and 2012. Five different EV categories are analyzed. The data is broken down by provinces and regions.

Likewise, the study analyzes the evolution of EV use as well as the percentage of EVs in each category with regards to the total number of vehicles in a given category, with the percentage of EVs per 10,000 habitants. In addition to this, the paper provides detailed information about the legislation promoting the use of EVs, both in the European Union (EU) and in Spain.

The article includes an assessment of the promotional measures used for EVs for their growth rate. Finally, the authors provide a number of recommendations about the type of efforts to be undertaken by the authorities of Spain and the EU to increase the use of EVs.

In Spain, the development of the electrical vehicle stock has increased annually for each of the categories. Nevertheless, the relationship with the total number of vehicles, EVs have failed to reach 1% in any of the categories. The ratio number of EVs per 10,000 inhabitants has increased in each of the provinces, with more than twenty provinces (44%) having a ratio that surpassed 1 EV/10,000 inhabitants in 2012.

### 1. Introduction

Electric vehicles (EVs) could reduce the consumption of fossil fuels and the emissions of greenhouse gases (GHG) while at the same time eliminate other pollutants from the atmosphere (Siang and Wei, 2013; Perujo and Ciuffo, 2010; Sioshansi et al., 2010; Camus et al., 2011). Hannan et al., (2014) offer a recent and useful review of these alternative vehicles. Electric vehicles can help reduce GHG emissions, improving the air quality in cities and, thus the health of their populations because they only emit natural byproducts and not exhaust fumes (Mierio et al., 2006; Ma et al., 2012; Hannan et al., 2014) so for climate change, local air pollutants in congested inner-cities, and noise some advantageous effects can be observed for EVs (Jochem et al., 2016). However, some authors have criticized this finding (Sioshansi and Miller, 2011; Ji et al., 2012). In areas such as the European Union (EU27), EVs could also contribute to reducing its external dependency upon fossil fuels. Spain is a clear case of this dependency with a 99.7% of its fossil fuel being imported in 2012 (Cores, 2013).

These arguments support part of the energy and environmental decisions made by the EU27. The Europe 2020 strategy for a smart, sustainable and inclusive growth, in its Flagship Initiatives “Resource efficient Europe” and “Innovation Union”, aims at tackling social challenges such as climate change, energy and resource scarcity, while enhancing competitiveness and meeting energy

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<https://doi.org/10.1016/j.trd.2018.01.022>

security with a more efficient use of resources and energy (European Commission Communication, 2010). In line with this strategy, the White Paper “Roadmap to a Single European Transport Area – Towards a Competitive and Resource Efficient Transport System” called for breaking the oil dependence of transportation and set a 60% GHG emission-reduction target from transport by 2050 (European Commission, 2010).

Together with this, in EU27, promotional strategy for electric mobility is included in the European Green Cars' Initiative, which is part of the European Economic Recovery Plan. Both initiatives emphasize the importance of the cooperation between public and private organizations (European Commission Communication, 2008).

Thus, there is an important set of measure to promote the use of EV but researchers face two challenges. The first is the dispersion of current legal initiative focused on promoting the use of EVs. The second is a lack of detailed stat about the number of EVs.

This article focuses on the case of Spain. There are two objectives, with the first being to offer an overview of the current legal framework promoting the use of EVs, both in the European Union, but more specifically in Spain. The second objective offers detailed information for the period 2007–2012. The starting-date coincides with the sales of these vehicles on the general market, and concludes with the last available data when the research was performed. The database differentiates five EVS categories, 52 provinces and 17 regions. To the best of our knowledge, there are no official statistics providing such information as this article offers. The data also considers population density information. The article offers interesting information, not only for research, but also for the electric vehicle industry and for policy makers.

The rest of the paper is structured as follows: Section 2 summarizes legal EU28 and Spanish frameworks. Section 3 shows data. The discussion and concluding remarks are provided in Section 4.

## 2. Legal framework and support policy measures for EVs

Today the legal EU framework <sup>1</sup>for EV's is supported by the three following pillars.

- i. The Renewable Energy Directive 2009/28/EC (European Parliament and of the Council, 2009a), the Fuel Quality Directive 2009/30/EC (European Parliament and of the Council, 2009c), the Clean Vehicle Directive 2009/33/EC (European Parliament and of the Council, 2009b), the Regulations setting CO<sub>2</sub> standards for passenger cars (Regulation N° 443/2009; European Parliament and of the Council, 2009e) and light commercial vehicles (Regulation N° 510/2011; European Parliament and of the Council, 2011) are all key EU legislation regarding the promotion of sustainable, low-carbon fuels and low CO<sub>2</sub> emission vehicles.
- ii. Directive 2009/28/EC by the European Parliament and the Council dated 23/04/2009 for the promotion of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC<sup>12</sup> set a target of 10% market share of renewables in transport fuels.
- iii. The Commission Communication on a European alternative fuels strategy (European Commission Communication, 2013). This document evaluates the main alternative fuel options available to substitute crude oil whilst contributing to reduce GHG emissions from transportation, and suggests a comprehensive list of measures to promote the market development of alternative fuels in Europe, complementing other policies for reducing fossil fuel consumption and GHG emissions from transport.

The main alternative fuel options are electricity, hydrogen, biofuels, natural gas (in the forms of Compressed Natural Gas (CNG), Liquefied Natural Gas (LNG), or Gas- To-Liquid (GTL), and Liquefied Petroleum Gas (LPG).

Together with EU's legal instruments, Member States (MS) have put in force measures related to the use of EVs. A specific legal framework to promote the use of EVs in Spain is supported by the three documents indicated below:

- i. Royal Decree 648/2011 provides aid for domestic users to purchase EVs (Ministerio de Industria, Turismo y Comercio, 2011b). This consists of a bonus up to 25% of the sales price of the vehicle before tax, with a maximum of 6000 euros per unit. This norm is part of the 2010–2012 Action Plan to demonstrate the technical and power feasibility of electric mobility in urban areas between 2010 and 2014. Its aim is to introduce 2000 EVs into the Spanish automobile fleet, as well as to install > 500 charging points for these vehicles in various cities.
- ii. In addition to the document mentioned above, Royal Decree 647/2011 (Ministerio de Industria, Turismo y Comercio, 2011a) regulates the load operator defined by Law 54/1997 of the Electricity Sector (Jefatura del Estado, 1997), as a consumer qualified to sell electricity to recharge consumer vehicles. Load Operators are considered necessary for the quick development of EVs as an industrial product that combines the features of innovative technology that is able to generate a new sector with growth potential and, at the same time, a savings instrument that is energy and environmental efficient. In this Decree, a super-valley rate for recharging EVs in a specific time tracts is also introduced.
- iii. In the Royal Decree 294/2013, the direct grants for the purchase of EVs during 2013 are regulated, under the Comprehensive Strategy for the promotion of EVs in Spain between 2010 and 2014 (Ministerio de Industria, Turismo y Comercio, 2013). This document is an updated version of Royal Decree 648/2011, but with changes with regards to the amount of the subsidy, which offers up to 5500 euros per vehicles, full electric power operated, with a driving autonomy > 90 km.

<sup>1</sup> Table A.1 of Appendix A offers more detailed information relevant to the EU legal framework.

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