



European
Commission

TRIMIS

TRANSPORT RESEARCH AND INNOVATION
MONITORING AND INFORMATION SYSTEM

D I G E S T

Issue 5

September 2018

**Subscribe to Free Bi-monthly
Research Alerts**

Source: Harrison, G. and Thiel, C.
(2017) An exploratory policy analysis
of electric vehicle sales completion
and sensitivity to infrastructure in
Europe, *Technological Forecasting &
Social Change*, 114, 165-178.

[https://www.sciencedirect.com/science/
article/pii/S0040162516302104](https://www.sciencedirect.com/science/article/pii/S0040162516302104)

[http://dx.doi.org/10.1016/j.techfore.20
16.08.007](http://dx.doi.org/10.1016/j.techfore.2016.08.007)

**The contents and views included
in the TRIMIS research digest do
not necessarily reflect the
position of the European
Commission.**

Read more about TRIMIS at:
<https://trimis.ec.europa.eu>

How to increase the uptake of electric vehicles



Electromobility will play a key role in future mobility patterns. This study explores how government infrastructure policy can increase the uptake of electric vehicles. Focusing on subsidy scenarios for infrastructure deployment and vehicle purchase, it finds important interactions between powertrain types and infrastructure provision.

Electric vehicles (comprising plug-in hybrid electric vehicles (PHEV), battery electric vehicles (BEV) and fuel cell vehicles (FCV)), offer a potentially substantial contribution to overcoming environmental problems caused by the widespread dependence on conventional petrol and diesel vehicles.

Currently, only plug-in electric vehicles (PiEVs – PHEV and BEV) are widely available. Despite rapidly growing sales, PiEVs have failed to capture a significant share of the passenger car market and continue to be dependent on support measures, such as financial incentives. One reason for this limitation is consumer acceptance of high upfront costs. In addition, consumer concern over the distance PiEVs can travel before recharging is necessary (so-called range anxiety).

Various infrastructural factors can influence the uptake of PiEVs. These include cheaper and more rapid chargers, increased battery capacity and the availability of private charging capabilities. Due to the high cost differential between electric and conventional vehicles, fiscal incentives are required to encourage early adopters to the technology and successful pre-massmarket penetration. From a supply-side perspective, manufacturers are encouraged to invest in low carbon transport technology research and development, which can help bring affordable and efficient electric vehicles to the commercial market.

Adequate recharging infrastructure has been identified as one of the most important parameters for the large-scale deployment of PiEVs. Increasing recharging infrastructure in European countries could result in higher adoption rates.

Continued/...

TRIMIS

TRANSPORT RESEARCH AND INNOVATION
MONITORING AND INFORMATION SYSTEM

D I G E S T

TRIMIS

The Transport and Research and Innovation Monitoring and Information System (TRIMIS) supports the implementation and monitoring of the Strategic Transport Research and Innovation Agenda (STRIA) and its seven roadmaps.

TRIMIS is an open-access information system to map and analyse technology trends, research and innovation capacities, as well as monitor progress in all transport sectors.

TRIMIS is developed and managed by the Joint Research Centre on behalf of the European Commission.

Contact:

European Commission
Joint Research Centre, Ispra, Italy
Email: EU-TRIMIS@ec.europa.eu

How to increase the uptake of electric vehicles

This study explores the impact of government policy on infrastructure and electric vehicle uptake. In particular, it focuses on EC Directive 2014/94/EU on the deployment of alternative fuels infrastructure and its proposals regarding the minimum coverage of PiEV charging infrastructure by 2020. It analyses different policy scenarios to understand how supporting the infrastructure system can influence PiEV uptake within the wider policy context.

The study uses an extensive system dynamics model of the EU automobile market to reflect the relevant users, manufacturers, infrastructure providers and authorities.

The Powertrains Technology Transition Market Agent Model (PTTMAM) was developed to study the interaction between the influences of the market agents on possible technology transition within Europe for each of the 28 Member States in the period 1995 to 2050. The results of the model for tested scenarios produced the following key policy insights:

Purchase subsidies

- High purchase subsidies do not necessarily lead to long-term electric vehicle market success.
- Subsidies benefit available electric vehicle technologies in the short term, even in the absence of other policies.
- Longer duration of subsidies did not make a significant impact. They can provide market impetus in the beginning, but the market growth beyond initial deployment needs to be sustained by market mechanisms other than subsidies.
- Due to technology competition dynamics, offering electric vehicle purchase subsidies before all technologies are available, could lead to technology lock-in and inhibit long-term maturity of less-developed technologies.

Fleet emission regulations

- Having long-term emission target regulations in place is necessary for technology transition.
- Competition for research and development between alternative powertrains seems favourable for fuel cell vehicles when long-term targets are in place, provided that hydrogen is produced via low carbon pathways.
- The most ambitious long-term target benefits PHEV and BEV when subsidies are in place.
- Higher regulatory emission targets appear to reduce sensitivity to charge-point provision.

Continued/...

TRIMIS

TRANSPORT RESEARCH AND INNOVATION
MONITORING AND INFORMATION SYSTEM

D I G E S T

TRIMIS

The Transport and Research and Innovation Monitoring and Information System (TRIMIS) supports the implementation and monitoring of the Strategic Transport Research and Innovation Agenda (STRIA) and its seven roadmaps.

TRIMIS is an open-access information system to map and analyse technology trends, research and innovation capacities, as well as monitor progress in all transport sectors.

TRIMIS is developed and managed by the Joint Research Centre on behalf of the European Commission.

Contact:

European Commission
Joint Research Centre, Ispra, Italy
Email: EU-TRIMIS@ec.europa.eu

How to increase the uptake of electric vehicles



Photo credit: Fotolia

Infrastructure provision

- Success of infrastructure subsidies is strongly linked to the success of other policies and existing competition dynamics.
- Charge-point provision appears to impact PiEV uptake when PiEV stock share is over 5% in the EU, but would appear to be dependent on total stock volume and gross domestic product.
- Electric vehicle take-up is relatively insensitive at target levels below 5 or over 25 PiEV/public charge points.

The study finds important interactions between different powertrain types and with infrastructure provision. For example, strong PiEV policy could inhibit the maturity of hydrogen fuel cell vehicles. Infrastructure provision is important to improve the convenience of PiEVs. Subsidies are only beneficial in the earlier years of market introduction and should cover all technologies. The study concludes that some form of minimal infrastructural targets could be beneficial; but this requires further research to identify the exact levels. Greater infrastructure provision is necessary to improve the convenience of PiEVs as well as an increase in consumer awareness of electric vehicles.