

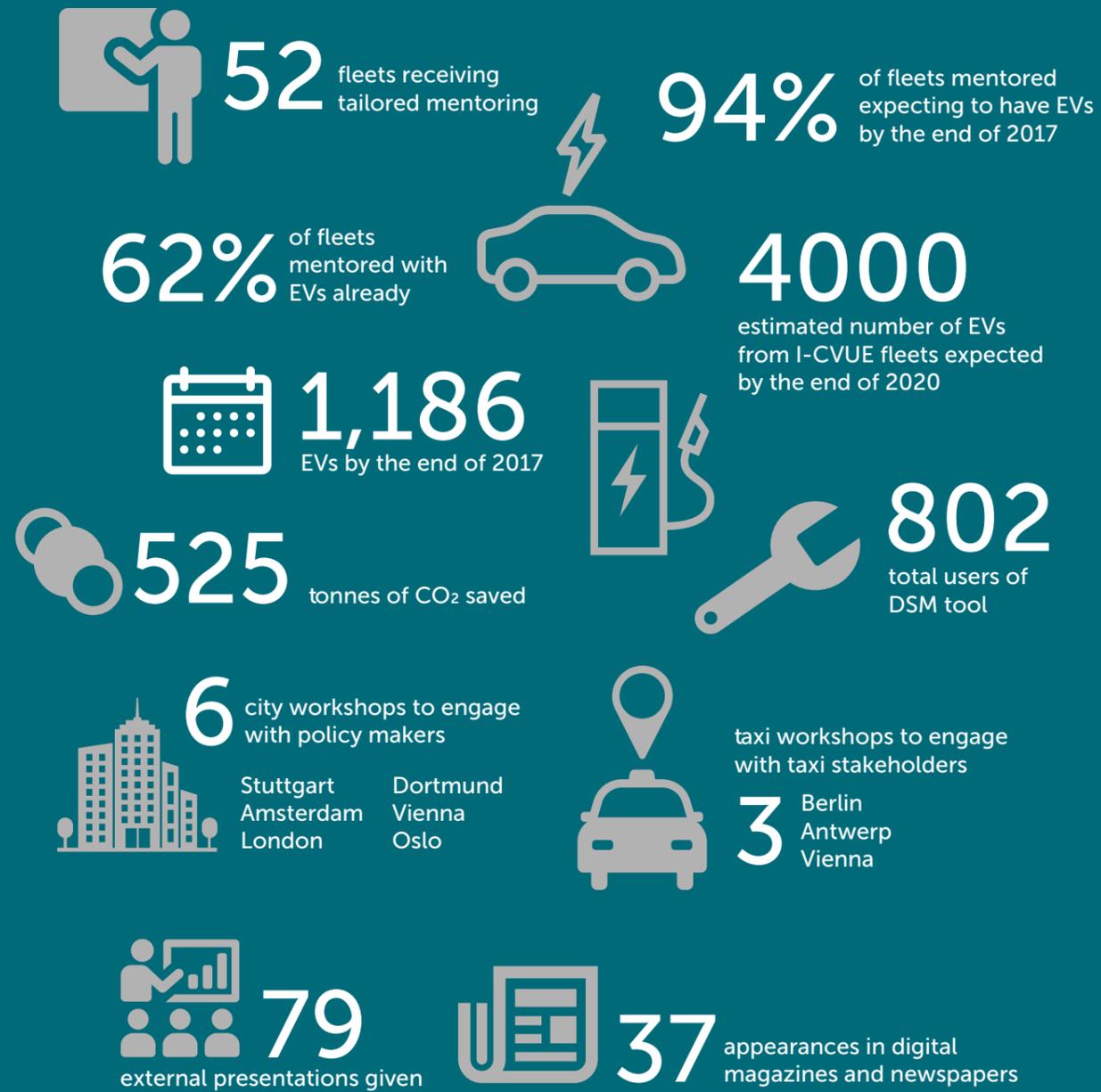


Incentives for Cleaner Vehicles in Urban Europe

Public Report
May 2017



I-CVUE Results



CO-FUNDED BY THE INTELLIGENT ENERGY
EUROPE PROGRAMME OF THE EUROPEAN UNION

FOLLOW US ON



Contents

Team	4
Foreword	5
Introduction	6
Fleet Mentoring	7
Main achievements	9
Challenges experienced	11
Insight gained	12
Mentoring after the project	13
Boundary conditions analysis	14
Challenges faced	16
Conclusions	17
Insight gained	18
Decision making web-tool	19
How it works	19
Insight gained	21
Project conclusions	22
Main achievements	23
Main recommendations	23
Further information	24

Team

Project Team

- **Energy Saving Trust (EST)**
(UK) coordinator of project
- **Automobil Club Assistencia SA (ACASA)**
(Spain)
- **Austrian Energy Agency (AEA)**
(Austria)
- **Robert Bosch (Bosch)**
(Germany)
- **Coventry University**
(UK)
- **Deutsches Zentrum Fuer Luft (DLR)**
(Germany)
- **Electric Vehicle Union (EVU)**
(Norway)
- **FIER**
(The Netherlands)
- **IRU Projects (IRU)**
(Belgium)
- **Transport for London (TfL)**
(UK)

Project advisory board:

- **Barcelona LIVE**
Angel Lopez
- **Fleet World**
Alex Grant
- **LeasePlan**
Ronald de Haan and Gunter Glück
- **LeasEurope**
Richard Knubben
- **Rijkswaterstaat (RWS)**
Peter Wilbers

Foreword

Electric vehicles are an increasingly common sight on our roads. The I-CVUE project, which brought together 10 partners from six EU Member States, has developed tools and guidance to help fleet operators and public authorities upgrade their vehicle fleets.

I-CVUE was co-funded by the Intelligent Energy Europe (IEE) programme, which allocated the lion's share of its 727 million Euro budget to projects that would help to realise the EU2020 targets on energy and climate. These projects supported greater energy efficiency and uptake of renewable energy, in fields such as sustainable transport and mobility.

As part of the STEER programme area, 65 transport projects were co-funded with around 105 Million Euros, supporting more than 500 organisations in 27 Member States and in two non-EU countries. The IEE programme is now coming to an end, but its legacy lives on in several other EU funding programmes.

The main objective of the I-CVUE project was to reduce CO₂ emissions in urban areas by increasing the uptake of electric vehicles in large urban fleets. Fleet mentoring was provided to more than 50 public and private fleet owners across six countries, allowing them to develop a business case for the uptake of electric vehicles. As a result, the project managed to put more than 1000 electric vehicles on the road.

An added benefit of the project was the mentoring provided to fleets of taxis, which stimulated the engagement of local authorities as a measure to improve local air quality.

Two decision-making IT tools (icvue.eu/webtools) were developed by the project. The first one, the "decision support tool", allows fleet owners to compare vehicles powered by diesel, petrol, batteries or plug-in hybrids, and to decide on a strategy for replacement. This tool is among the most complete on the market, and factors in the total costs of ownership.

The second tool, the "policy measure analysis tool", is oriented towards policy makers, enabling them to evaluate the effectiveness of various incentives that have been applied in other regions of Europe before they apply them in their own region.

I-CVUE collaborated closely with two related EU projects for the organisation of events, FREVUE (frevue.eu) and ZeEUS (zeeus.eu).

The decision-making tools developed by I-CVUE are available on the European Alternative Fuels Observatory website (www.eafo.eu/i-cvue).

The project's activities are continuing after the end of the grant funding, with ongoing fleet mentoring activities in Spain, the Netherlands and the UK.



Olav Luyckx
Project Advisor

Executive Agency for
Small and Medium-sized
Enterprises (EASME)

INTRODUCTION

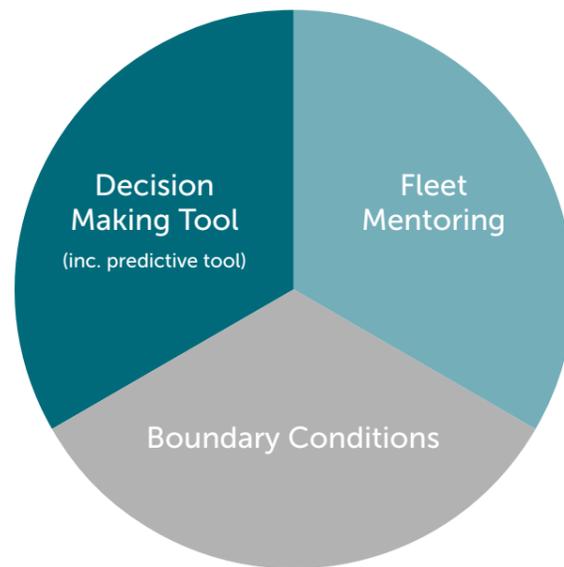
The aim of Incentives for Cleaner Vehicles in Urban Europe (I-CVUE) was to create better conditions for large scale electric vehicle (EV) adoption in order to create a more sustainable energy future, through:

- » Supporting the uptake of plug-in vehicles across Europe
- » Reducing CO₂ and other hazardous emissions in urban environments
- » Increasing the number of EVs in fleets

The main objectives of the project were to:

- Replace 1,000 traditionally fuelled vehicles with EVs
- Create business cases for fleets by carrying out a total cost of ownership (TCO) analysis along with emission data and information on the expected commercial benefit of substituting traditionally fuelled vehicles with their electric counterpart
- Create a framework to support regional authorities in the design and set up of incentive programmes tailored to the specific socio-economic conditions of their city, region or country
- Develop a web based decision making tool for policymakers and fleet operators

The key impact indicator of I-CVUE was to reduce CO₂ emissions by increasing the number of EVs within fleets. The overall goal of I-CVUE was to put 1,000 additional EVs into fleets during the lifetime of the project in order to reduce greenhouse gas (GHG) emissions, as using EVs in fleets reduces the consumption of fossil fuels for transport and as a result reduces the local GHG emissions.



BATH & NORTH EAST SOMERSET COUNCIL

FLEET MENTORING

The project worked with 52 organisations and provided them with free, tailored support to build a business case for EVs based on the TCO model.

Each fleet was provided with ongoing support along with a report to outline the recommendations provided. With mentoring support from I-CVUE partners; EST, FIER, ACASA and AEA, the fleets were able to make an informed decision on the potential benefits of EVs.



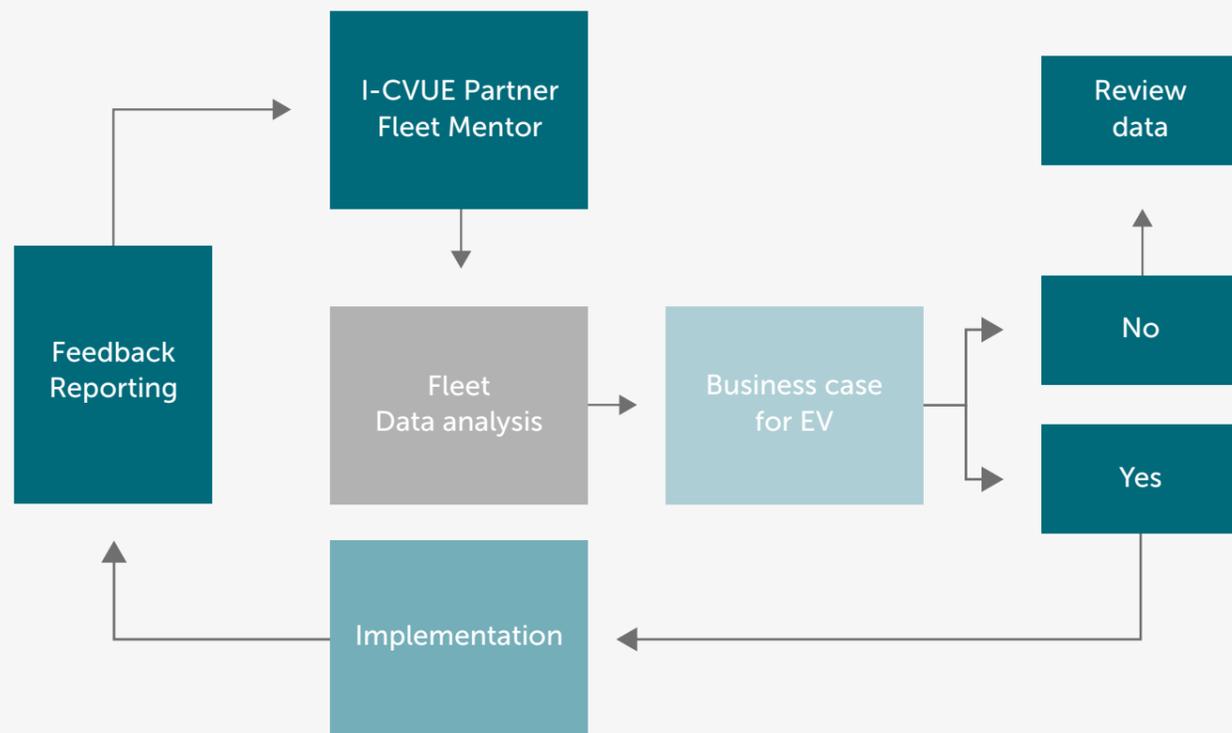
I-CVUE CLIENT – TMB BARCELONA

In addition to directly supporting fleets, the I-CVUE project was able to support the taxi industry by running workshops in Berlin, Antwerp and Vienna to promote the use of EVs in city taxi fleets. This work was led by I-CVUE partner IRU.

A number of partners will continue to offer mentoring in their own countries to provide TCO analysis of EVs versus conventional vehicles going forward. Also, to promote this activity and build capacity across Europe for further mentoring, I-CVUE has worked with other organisations to provide guidance on how to implement fleet mentoring. This will support the uptake of EVs across Europe in countries not represented by an I-CVUE partner and increase the awareness of the possibilities of including EVs in urban fleets.



MENTORING PROCESS



MAIN ACHIEVEMENTS

Throughout the project, a wide range of mentoring activity has successfully taken place across Europe. The mentoring model was initially established in the UK but has been successfully implemented in a number of European countries thanks to I-CVUE. Prior to I-CVUE, there had been little promotion of EVs to fleet operators. I-CVUE was able to break new ground in countries where there was little awareness of the benefits and features of EVs.

Over the duration of the project, awareness of the mentoring support grew, via presentations at events, articles in specialist magazines and local newsletters, and through interaction with stakeholders, such as charge point providers/consultants.

» Over 1,000 EVs deployed

From a detailed evaluation of the project, we can see that an extra 1,186 vehicles are either on the road now or are due to be replaced before the end of 2017, as a result of the support and influence of I-CVUE. This is a great achievement and proves that with appropriate guidance and favourable boundary conditions, EVs can and will work.

» Raised awareness of EVs

Whilst not all fleets have gone on to purchase large numbers of EVs, mentoring has been successful in raising awareness of EVs in fleets. There has been direct contact with fleets, both those participating in the project and those who have been exposed to the project through other means. From the learnings of the mentoring process a large number of articles and presentations informing fleets about the benefits of EVs have been made available.

» Impartial guidance, based on TCO analysis

The core of fleet mentoring is to determine whether there is a business case for fleets to electrify their operations by replacing gasoline and diesel vehicles with EVs. Some organisations will do this for publicity or sustainability reasons but in most instances a sound business case needs to be demonstrated for the shift to happen.

I-CVUE advice was independent and impartial, and was successful in providing a business case, demonstrating that through the analysis of vehicle costs on a TCO basis, there can be cost benefits to adopting EVs. It is however worth noting that in some instances a business case for EVs was not always identified particularly in certain countries where the boundary conditions were not as favourable, despite the general rise in uptake of EVs.

In Spain we found that economical analysis was a key consideration because purchase costs of EVs are more expensive than conventional petrol or diesel vehicles. For this reason it was important to include the typical real world costs such as fuel, insurance and maintenance in order to determine the TCO over the life of the vehicle as well as the purchase price. In addition, for the fleet's involved, the calculation of CO₂ emissions was very important to meet corporate sustainability responsibilities, particularly for public bodies. Lower costs over the life of the vehicle and lower emissions provided a win-win for the companies.

» New markets opened

An unexpected success of the project was the role that I-CVUE played in introducing EVs to the taxi industry. Taxis were not in the original scope but early on in the project we identified a need to reach this market. Increasingly the taxi market is seen as an opportunity for large scale change.

Given the fleet focus of I-CVUE we were not going to be able to make significant strides in the European taxi market. However, as an organisation heavily involved in the taxi industry, project partner IRU successfully ran three international workshops to demonstrate the benefits of EVs to taxi fleets, local stakeholders and politicians. Taxi workshops took place in Berlin, Antwerp and Vienna. These workshops achieved three things:

- An introduction to EVs for key stakeholders involved in policy, fleet purchase and taxi operations. The I-CVUE project allowed us to test the requirement for future support for this important market.
- The workshops provided a platform to raise awareness of the benefits and features of EVs in the taxi market. Using case studies from other countries, I-CVUE provided the audience with a compelling business case for taxis to shift to EVs.
- Finally, the workshops provided a dissemination opportunity for the I-CVUE project and our project goals were shared with a wider audience.

CASE STUDY

DUTCH MINISTRY OF INFRASTRUCTURE AND THE ENVIRONMENT – RIJKSWATERSTAAT

Rijkswaterstaat (RWS), also a project Advisory Board member, had a challenging fleet to mentor.

RWS is an organisation responsible for management and maintenance of the Dutch national road and water infrastructure and works from different locations across the Netherlands. To fulfil this task they have a large fleet of vehicles, of which a significant portion are shared vehicles for company use.

RWS has already invested in making their fleet more environmentally friendly. Currently there are a couple of electric vehicles, plug-in-hybrid EVs (PHEVs) and even some fuel cell EVs (FCEVs) in their fleet. This makes the fleet of RWS one of the largest and most interesting fleets mentored in the I-CVUE project.

By analysing a full month of car data – primarily driven distances – it became clear that up to 30% of the shared fossil fuel powered fleet could be replaced with EVs.

The I-CVUE indicated exactly which types of cars could be replaced, without any range issues. The EVs in the fleet were also analysed and the results show that, with the right support and guidance, there is potential for a higher usage of EVs in the fleet.

Within one year RWS will replace approximately 400 vehicles. 25% of the vehicles replaced in 2017 will be EV's. The conclusions and advice of the I-CVUE mentoring process have played a significant role in the decision-making process of RWS.



CHALLENGES EXPERIENCED

» Identifying a business case

Not all countries have a developed charging structure, or offer a fair range of vehicles to buy, or incentives for EVs. Consequently, the business case was at times challenging to identify and in countries where there was little support for EVs, this led to fleets being hesitant to take a lead in the market. Making the government and the auto industry aware that EVs are 'here to stay' is important for fleet managers to feel empowered to increase the number of EVs in their fleets.

» Identifying an appropriate mentoring approach

Flexibility became a key factor to the success of the mentoring support. Challenges were faced around obtaining fleet data, internal fleet strategy changes, selection of alternative vehicles to be included in the process and availability of company staff (sales officer, human resources, fleet manager). The project adopted a flexible and tailored approach for each fleet it worked with.

» Identifying suitable fleets

The project partners found that engaging with smaller fleets was a success. Certain sectors were also much more receptive on a local level such as the public sectors in the UK, Spain and the Netherlands.

» Effects of oil prices

The project ran through a period of stable and relatively low oil prices which did not help in demonstrating the benefits of EVs in some markets. In addition, issues of vehicle supply, concern over residual values, inconsistent and short term incentive policies, varying tax regimes and some poor publicity all contributed to heightened levels of doubt amongst (urban) fleet operators. In many ways time has resolved these issues. Fuel prices have been creeping up and boundary conditions have improved in most markets with new incentives introduced across Europe, in countries such as Germany and Austria.

In some cases the incentives have been reviewed and realigned, including in the UK and the Netherlands. For example, benefit in kind tax incentives for plug-in-hybrids (PHEVs) have been removed or reduced and this has had a negative impact on uptake of these vehicles. This decision was made because there was mounting concern about PHEVs being taken up due to low tax liability but not charged and used on electric power, but rather as an inefficient gasoline vehicle. However, overall the conditions for pure EVs are becoming more favourable, particularly in the light of the challenge of local air quality, which in most countries is a problem in urban areas. The poor air quality in urban areas is largely due to increased diesel adoption in recent years. This has climbed up the political agenda with governments being challenged to tackle air quality with the diesel scandal highlighting the problem. Air quality will be a strong driver in encouraging governments to improve the uptake of EVs.

INSIGHT GAINED

- Fleet decisions are mostly made at a local level. The mentoring support found that within pan-European and global companies, there was limited coordination of fleet decision-making. This was evident within one of the project partner's fleets – Bosch. Although Bosch is a global company it operates its fleets in the different countries in very different ways.
- Fleets are a major market and will make rational decisions based on robust analysis of TCO. TCO analysis should be included in all of the decisions regarding the acquisition of new vehicles in all fleets.
- Companies show an interest in piloting a lower number of vehicles first before committing to large numbers.
- The market and supply chain is not always forthcoming with support for EVs. Much of the leasing industry and even manufacturers themselves are not as proactive as they need to be to promote electro-mobility.
- With the business fleets leading the introduction of EVs and other new technologies it is essential not only to develop the first buyer's market, but also to develop the second hand EV market in order to increase the residual value and thus decrease the depreciation, since the latter represents approx 40% of the TCO.
- Incentives and (personal) tax make a significant difference to EV adoption. This was particularly evident in the fleet market.
- There are still many myths amongst fleets and individuals about EVs and more information and education is required.
- EVs present massive opportunities for decarbonising road transport and improving local air quality. The latter of these will become a key driver in encouraging uptake and whilst this was not at the top of the agenda for most of the duration of the project, it is now a top priority for local and national governments.

“ THE I-CVUE SUPPORT WAS PERFECTLY IN LINE WITH THE NEEDS AND PRIORITIES OF MY ORGANISATION AND REALLY INCREASED MY AWARENESS AND KNOWLEDGE OF THE BUSINESS CASE FOR ELECTRIC VEHICLES. ”

Judit Göndöcs, Sustainability Manager, Canon Austria

MENTORING AFTER THE PROJECT

- I-CVUE has demonstrated that there is a need for fleet mentoring support throughout Europe. With I-CVUE benefitting from EU funding it was able to fill a gap in the market. In the same way that this service has been funded by the UK government for UK-based fleets for some years, there is an argument for other local and national governments to invest in the same way. The market does not always step in but there are business opportunities for partners to take this on.
- In Spain, I-CVUE has developed a sustainable product that ACASA will offer to interested fleets in the Catalonia region and the whole of Spain as a result of their agreement with Bureau Veritas. Knowledge generated through the project will be used as a proven methodology to promote electric mobility within companies.

For example, FGC (public train company) is interested in calculating their carbon footprint, including I-CVUE methodology, as a key aspect to reduce CO₂. If everything goes to plan, the project will be delivered in January 2018. Also, in Austria, AEA will be continuing to provide fleet support to fleets they are currently working with.

- Fleet mentoring will continue in the UK and the Netherlands and all the project partners involved in the mentoring are confident of new cross border opportunities for working with fleets in Europe and beyond.
- Finally, to promote the business opportunity, a capacity building workshop held in March 2017 in Brussels was a successful tool in providing a stepping stone for other organisations involved in sustainable transport to take on the model of fleet mentoring in their own countries. In addition to I-CVUE partners, this could take the potential reach of the fleet mentoring on to Portugal, Switzerland, Greece and Croatia.

“ THE I-CVUE MENTORING SUPPORT FROM EST PROVIDED OBJECTIVE ANALYSIS OF THE BUSINESS NEED AND TOTAL COST OF OWNERSHIP FOR THE BUSINESS CASE ALONG WITH IDENTIFYING AND HIGHLIGHTING OPPORTUNITIES AND CHALLENGES TO SUPPORT DRIVER BEHAVIOUR. THE SUPPORT ALSO SHOWED THE POSITIVE IMPACT ON AIR QUALITY AND THE ENVIRONMENT. ”

Anthony Meehan, Corporate Sustainability Officer, Bath and North East Somerset Council

BOUNDARY CONDITIONS ANALYSIS

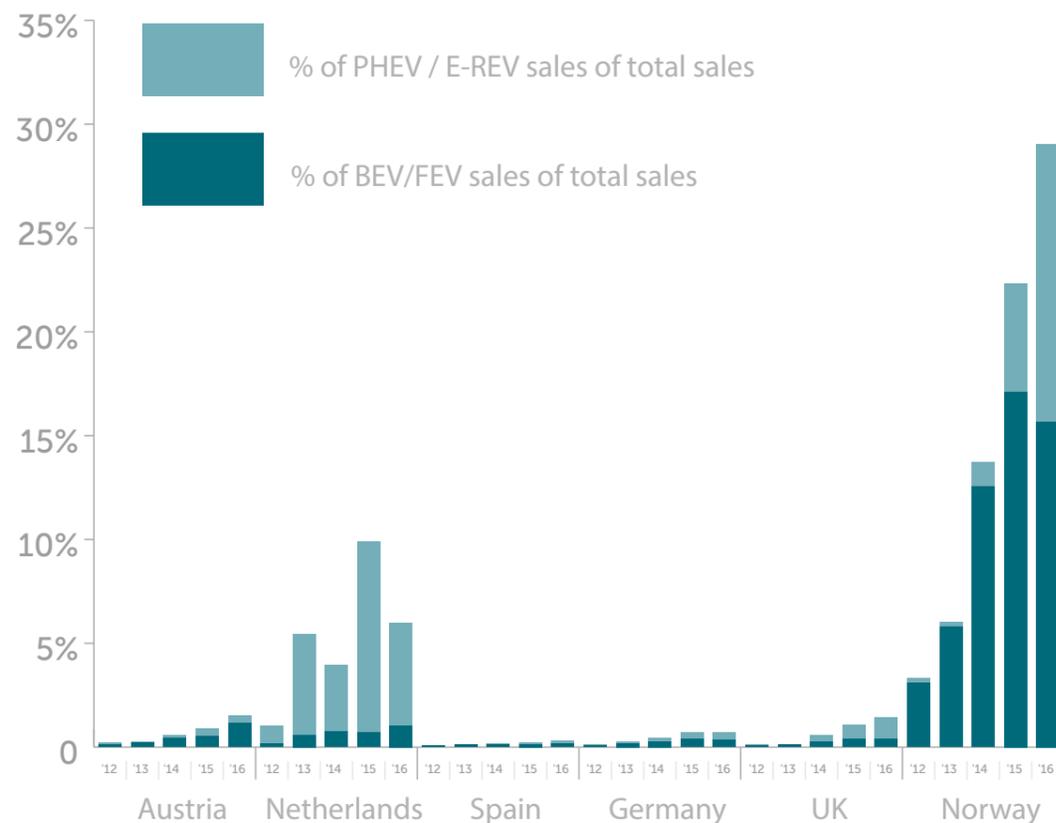
Research and analysis was carried out on the different boundary conditions in a number of countries and regions, in order to assess their effect on the uptake of EVs by fleets, with the aim of sharing best practice.

In doing this, a catalogue of the boundary conditions within countries/regions was created. The four main conditions identified were:

- » Financial incentives
- » Non-financial incentives
- » Public charging infrastructure
- » Regional/local conditions

The objective was to engage actively with fleet operators, municipalities and ministries to help support best practice policies to accelerate uptake of EVs in fleets.

The analysis focused on regions with different EV incentives, programmes and levels of EV uptake. These were in Spain, the United Kingdom, Germany, the Netherlands, Austria and Norway.



SUCCESS OF EV UPTAKE

The analysis was carried out in a number of stages:

Stage 1

A stable and comparable platform was created for each region that would enable the assessment of best policies and incentives on a regional basis. To do this, workshops were held with project partners to define the boundary conditions that required mapping.

Stage 2

Analysis of these results was carried out and the relationships between the different incentives and the uptake of EVs was researched. The analysis and results were updated during the project several times to ensure that the latest market developments were taken into account. The knowledge gained during the mentoring of fleets has played an important role in feeding into these results.

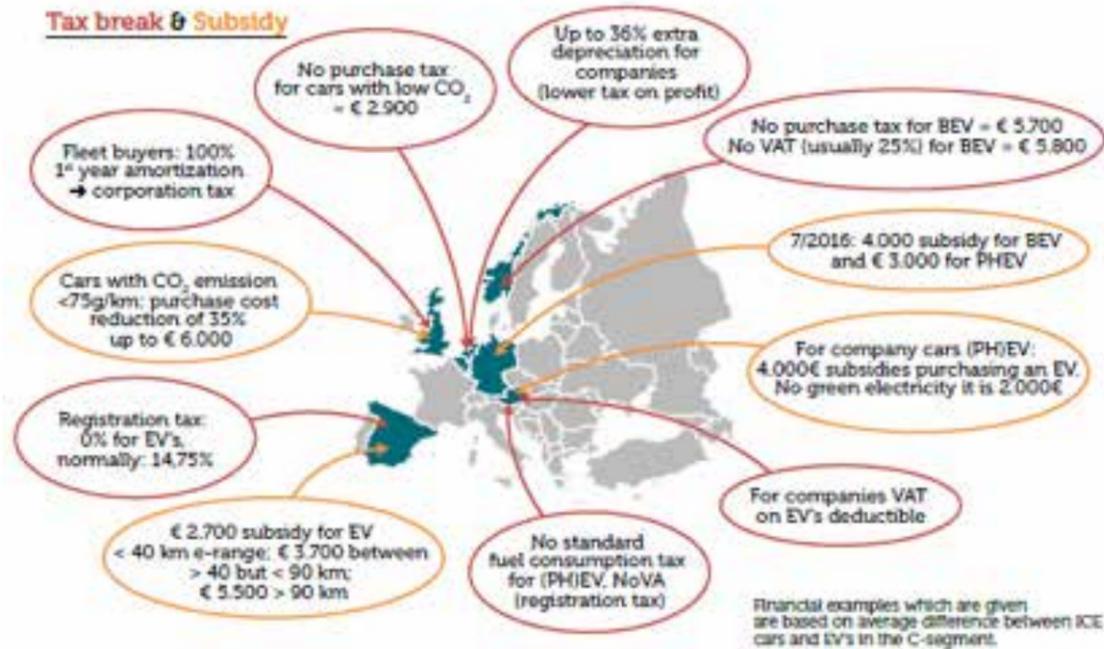
The results of the boundary conditions analysis have been shared with stakeholders, including; national, regional and local city authorities, as well as experts on mobility, and fleet managers through workshops, presentations and smaller one-to-one meetings.

As well as the different national incentives, there are also important local incentives which have a significant impact on the uptake of EVs. Cities are working to tackle these e-mobility issues in different ways, adjusting incentives to local motivations, ambitions and conditions. I-CVUE gathered this information from each city to look at the effects and benefits.

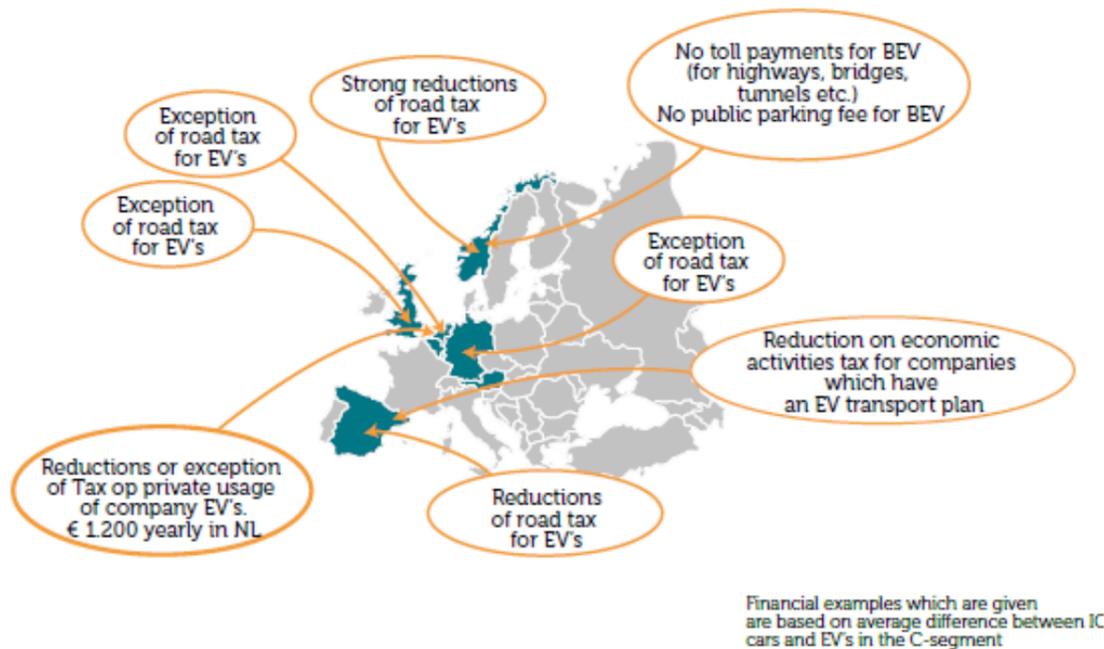
I-CVUE organised two workshops in Amsterdam and Stuttgart where city officials attended. Knowledge and experience was transferred from the I-CVUE partners to the cities, and between these cities themselves. The city workshops created the opportunity for an open dialogue between the cities about new/innovative incentives and the real effect of different incentives.

During the Stuttgart workshop, a decision making web-tool was presented to city officials. The tool, created by the project partner DLR, predicts the effect of certain incentives in cities. The feedback from the meeting was very positive.

EXAMPLES OF NATIONAL PURCHASE INCENTIVES

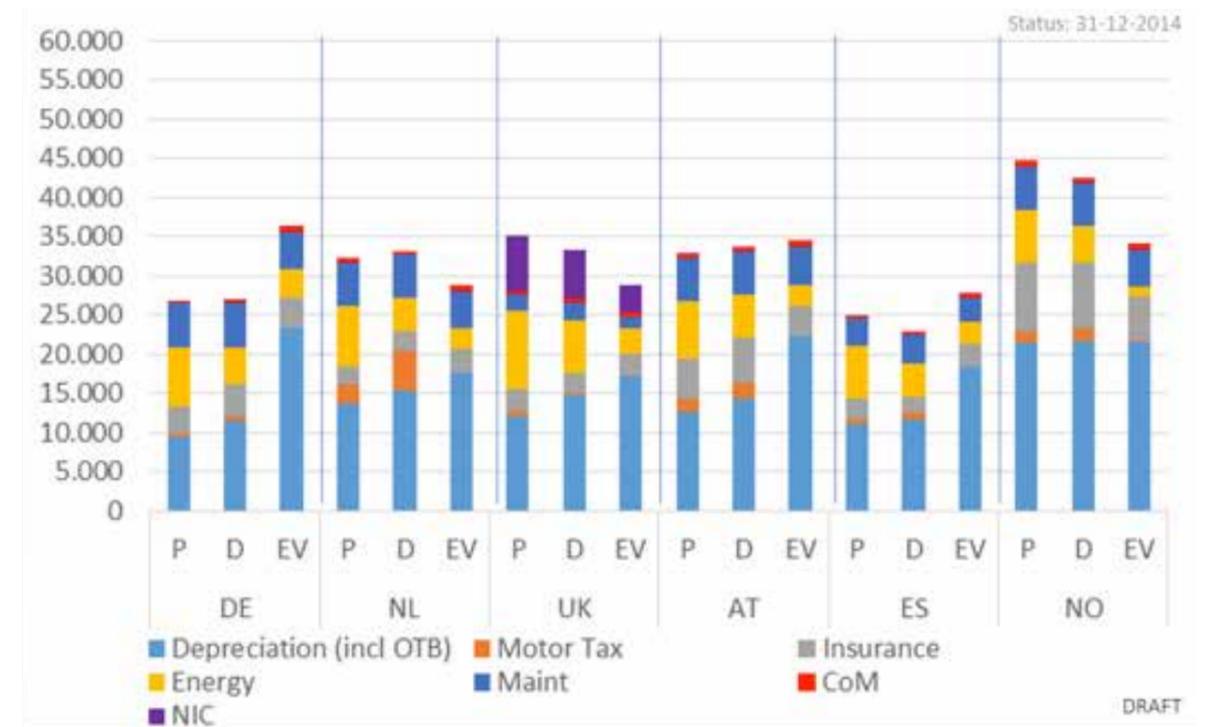


EXAMPLES OF NATIONAL OPERATIONAL INCENTIVES



CHALLENGES FACED

One of the challenges faced was comparing and measuring the real effect of the different financial incentives. The results of these incentives were considered from the perspective of real TCO. This was done for certain scenarios with different types of vehicle segments, private and company ownership and different mileages, etc. The following graph demonstrates the TCO over a four-year period of company ownership.



TCO OF A C SEGMENT, COMPANY OWNERSHIP, 24.000KM/Y, 4 YEAR OWNERSHIP. (DE: GERMANY, NL: NETHERLANDS, UK: UNITED KINGDOM, AT: AUSTRIA, ES: SPAIN, NO: NORWAY)

CONCLUSIONS

Many EU countries are working to stimulate the sales of EVs. The financial incentives used vary widely from the exemption of road tax, purchase subsidies and lowering purchase tax to the exemption of VAT. In a number of countries these financial incentives are combined with operational incentives, for example access to bus lanes, free public charging and free parking.

The effect of incentives is visible in most countries, but at the same time, the relative growth in sales of EVs is still limited. It leads in most countries to an EV sales rate of lower than 1%, with some exceptions, like in the UK, of 2%, of which 0.6% is pure EV (combined figures of business and private market). There are two more extreme exceptions, Norway (22% in 2015) and the Netherlands (10% in 2015). In the Netherlands there are high sales of the business market, but low sales of pure EVs. In Norway the sales of EVs are mainly pure EVs, with most of them being sold in the private market.

» Norway

Norway is the best performing country in terms of EV sales, not only seen within the countries focused on in the I-CVUE project, but also worldwide. The combination of strong financial incentives makes EVs significantly cheaper than diesel or gasoline vehicles, especially for private ownership, where the VAT exemption for EVs creates a large benefit. The other incentives like toll-road exemption, free parking and free charging are also very strong, influential factors.

Up until 2015 there was a large growth in the uptake of EVs, but since the beginning of 2015 the growth of PHEV sales has significantly increased too. This was due to changes in PHEV incentives, such as the tax benefits. Now one out of three new vehicles sold in Norway is an EV. We have seen that the VAT exemption in Norway has a strong impact on the private market, not only for new sales but for the pre-owned market also as the vehicle is able to maintain a higher residual value. The VAT exemption in Norway is approved by the European Free Trade Association via a detailed 'State aid analysis' and has an effect on other countries within Europe where they are exporting used EVs to Norway. This results in a higher residual value, but less EVs on the roads in places such as Germany and the Netherlands for example.

» The Netherlands

In the Netherlands, there are more incentives targeted at the business market than the private market especially with a significantly lower benefit-in-kind tax scheme. This is a different policy when compared to other countries. In those countries where the incentives are open for both business as well as private usage, there is also a limited success in the uptake in the private market because of the low incentives and high costs. Norway is an exception, and focuses successfully on the private market.

There are several countries with limited success on the stimulation of the uptake of EVs in the private market. The barriers are still too great for customers to overcome and be motivated

to buy an EV. In the Netherlands there is an advantage that there is already a lowered purchase tax, which is comparable to Norway.

In the Netherlands there is a well-developed charging infrastructure, however in other countries the charging infrastructure is less developed, and this increases the 'hassle' of driving an EV, which can be a 'showstopper'. At the same time there is also room for improvement in the Netherlands with regards to coverage, availability and the prices of public charging points.

» Spain

There are a number of financial incentives in Spain. These include a lower registration tax on EVs (compared to 15% tax for conventional vehicles). As in most other countries, EVs in Spain are exempt from paying road tax. There were financial incentives applicable for environmentally friendly vehicles (including fuel efficient vehicles), resulting in a purchase subsidy. Since 2016 only EVs are eligible for this subsidy. Even when these financial incentives are included in the TCO calculation, the EV is still significantly more expensive than conventional fuelled vehicles, by our calculations. The growth in the sales figures of EVs is significant, but still relatively low when compared to the other countries, such as Norway and the Netherlands.

» Austria

We see a different financial incentives structure to support the uptake of EV sales in Austria. EVs and PHEV are supported by purchase subsidies, both private and company ownership. In most countries VAT is deductible on all vehicles; however we see that this is not the case in Austria, with the exception for EVs. This is one of the most significant incentives introduced at the beginning of 2016, and caused a significant increase in EV sales. This is comparable to the effect of VAT exemption in Norway, except that in Austria

it benefits company ownership and in Norway it benefits private ownership. Next to these national incentives the regional incentives also play a big role in the uptake. Depending on the region or city, subsidies for the purchase of EV's and charging infrastructure are available. In addition, free parking and free charging are other incentives adopted by several cities in Austria.

» Germany

The German market is different again to the other countries in the I-CVUE study. Last year a purchase subsidy was introduced for €4,000 for EVs and €3,000 for PHEVs. Even with this purchase incentive included, the calculations made in the I-CVUE study show considerably higher purchase costs and TCO costs for EVs than their conventionally fuelled equivalents. Like other countries there are several local incentives, but the effect is limited. Most of them were increasing to several hundred euro's purchase subsidy. This has a minimal impact on the total costs.

» United Kingdom

The UK has seen a steady growth of new EV sales, and in 2016, 1.5% of new vehicles sold were EVs. Although there are a number of financial incentives, many of them focus on the tax benefits, as well as a large purchase subsidy, resulting in a competitive TCO cost for an EV. Although the slow charging network is not as good as those in the Netherlands or Norway, there is a good, fast charging network coverage.



THE RECOMMENDATIONS THAT RESULTED FROM THE ANALYSIS OF THE IMPACT OF DIFFERENT INCENTIVES WERE VERY MUCH OF INTEREST TO ME.



City representative

CASE STUDY

THE NETHERLANDS

In the Netherlands there is a high uptake of EVs within companies for several reasons, mainly due to financial incentives in the personal tax area, with at least 96% of the EV sales being made by companies. The private ownership of EVs is relatively low in the Netherlands (4%).

“Motie Groot” is a proposal from Mr. Groot, a member of parliament of the Dutch national government, to make EVs for consumers more attractive. The “Formule E Team” (consortium of Dutch (e)mobility organisations) was asked

to investigate the opportunities to increase the uptake of EV’s for consumers. For this a taskforce was assembled.

For the international comparison, the Motie Groot taskforce used the outcomes of the I-CVUE study. The project partner FIER supported the taskforce providing the knowledge of the different types of incentives of other countries, and the effect they have. This support and input from the I-CVUE project was considered very valuable by the taskforce and played a key role in the report.

INSIGHT GAINED

» Consistency and long-term stability are crucial

A clear and pre-communicated long-term strategy gives the market the right stimulation and also leads to acceptance at government level.

» Purchase price differences must be minimal

The results indicate that there is a threshold where the sales of EVs will show progressive uptake. The purchase price difference between EVs and comparable petrol/diesel vehicles has to be minimal. Next to the expected lower operational costs, this result is a positive TCO for EVs, which can compensate for the perceived ‘hassle’ of EV ownership. This year (2017) there will be more models with higher ranges in the mid-price-range available than ever before, which is expected to lead to higher uptake rates.

» It’s not just about the purchase price

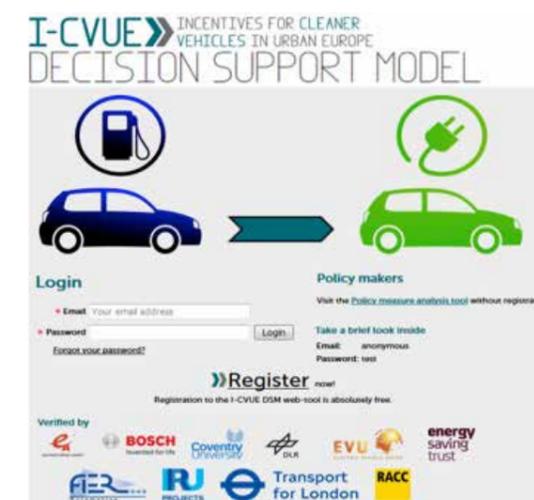
Purchase subsidies and reducing purchase tax are powerful incentives, but alone they will not change the uptake of EVs significantly. Our analysis shows that (even in the case of no purchase subsidies) a powerful, large, visible and general policy that creates advantages for EVs through privileged access to infrastructure (e.g. road use, parking) can play an important role in accelerating sales of EVs. Examples are; less travel time (not stuck in traffic jams), free parking and charging, zero-emission zones and/or the implementation of regional tax on conventional vehicles. The advantages are strongly dependent on mobility patterns, travel time, parking spot occupation etc.

It is clear that incentivising EVs whilst disincentivising conventionally fueled vehicles is a controversial issue. However, incentives are proven to deliver a positive effect on EV adoption and this is a compelling argument to tackle the high cost to society of urban emissions.

DECISION MAKING WEB-TOOL

A web-tool was developed by I-CVUE to support policy makers and commercial fleet operators in making decisions regarding their fleets or policies. The fleet manager web-tool enables users to evaluate business cases for EVs in corporate fleets, whereas the policy maker web-tool allows users to model the effects of different combinations of financial and non-financial incentives for electric mobility.

The tool is available in Austria, Germany, the Netherlands, the United Kingdom and Spain.



HOW IT WORKS

» Fleet Manager Web-tool

This web-tool compares conventional internal combustion engine (ICE) fitted vehicles and EVs with respect to cost and utility. The total cost of ownership (TCO) calculation methodology is one of the most comprehensive available. It considers not only cost items for private individuals (vehicle investment cost, registration cost, energy cost, cost of maintenance and repair and insurance rates), but also includes cost aspects relevant to corporate vehicle owners (profit tax reductions and benefit-in-kind taxes for business vehicle drivers rather than the corporate vehicle owners) or resale values, to name just a few.

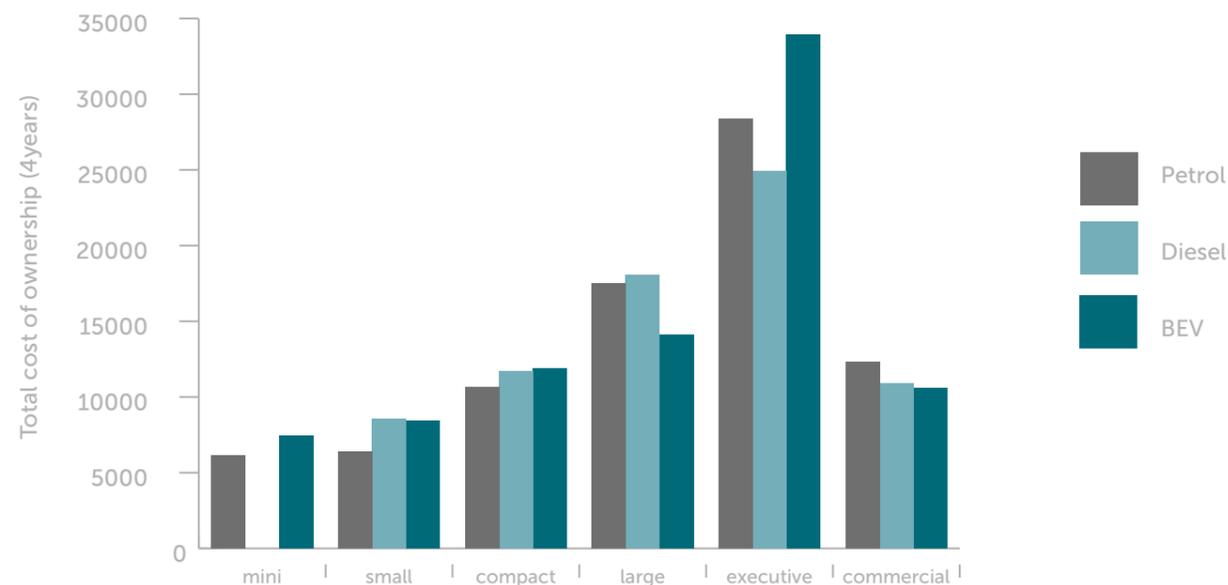
Additionally, a utility-function approach was implemented to consider the non-monetary benefits of vehicle ownership as well as non-monetary incentives for EVs. The web-tool provides country-specific reference data sets for all available input data, allowing an immediate comparison between vehicles of different powertrains from the outset.

A major focus of the tool development was to provide transparency for input data and calculation mechanisms. Thus, the tool allows its users to review all reference data and to make adjustments to reflect individual vehicles and corporate conditions. In order to attract users, an introduction to the key features of the tool at teaser-level of access was created, to enable users to see the benefits of the tool. Due to the large group of users from Germany and Austria, the tool is also available with a German interface, in addition to its English default.

» Policy Maker Web-tool

This web-tool targeted at policy makers is based upon an intuitive single-page interface and features important aspects of monetary and non-monetary incentives for electric mobility. It enables users to gain an understanding of the TCO and value of petrol, diesel and EVs for different vehicle sizes, different types of vehicle usage and different types of ownership in the considered countries (Austria, Germany, the Netherlands, the United Kingdom and Spain) at a glance.

The web-tool demonstrates not only different boundary conditions among the considered regions, but also allows users to transfer different types of incentives from one region to another and model the impact of these changes on the vehicle's TCO. Users can also test effectiveness of different non-monetary incentives with respect to vehicle utility. Furthermore, the web-tool assesses the efficiency of monetary and non-monetary incentives with respect to the uptake of EV sales via scenario analyses. Results are presented visually using graphs to depict the EV sales potential for different vehicle size segments, vehicle usage types and types of vehicle ownership in dependence of the selected set of incentives.



In order to enhance the understanding of the country-specific impact of policy measures, I-CVUE conducted a survey with fleet managers and industry stakeholders within each country included in the tool. This online survey was designed and conducted to evaluate regional

differences with respect to non-monetary aspects and incentives. Significant differences with regards to the perceived value of non-monetary aspects were found between countries and vehicle ownership types.

INSIGHT GAINED

I-CVUE has gained an in-depth understanding of corporate and private vehicle TCO in five European countries. This knowledge has been made widely available to policymakers and fleet operators through the comprehensive and coherent decision support web-tool.

» Vehicle configuration makes a big difference

The choice of the trim level and conventional vehicle configuration is crucial when comparing costs of conventional and electric vehicles. The outcome of such comparisons varies strongly with the selected trim levels. This is one of the main reasons for the tremendous spread of results for different TCO comparisons found in public media.

» Benefits don't always equate to sales

A further lesson learnt from the vehicle utility analysis is that in all considered countries the sales count of EVs is much lower than what could be expected from the utility values of these vehicles. The reason for this might be a negative image of EVs – an overemphasised perception of vehicle customers with respect to the restricted vehicle range of the still limited range of EV models available.

The I-CVUE web-tool will remain online until the end of March 2018. A full reference data update took place at the beginning of 2017, to ensure the reference data is up to date.

The web-tool can be accessed here:

- Web-tool – dsm.icvue.eu
- I-CVUE website – icvue.eu
- European Alternative Fuels Observatory – www.eafo.eu/i-cvue

PROJECT CONCLUSIONS

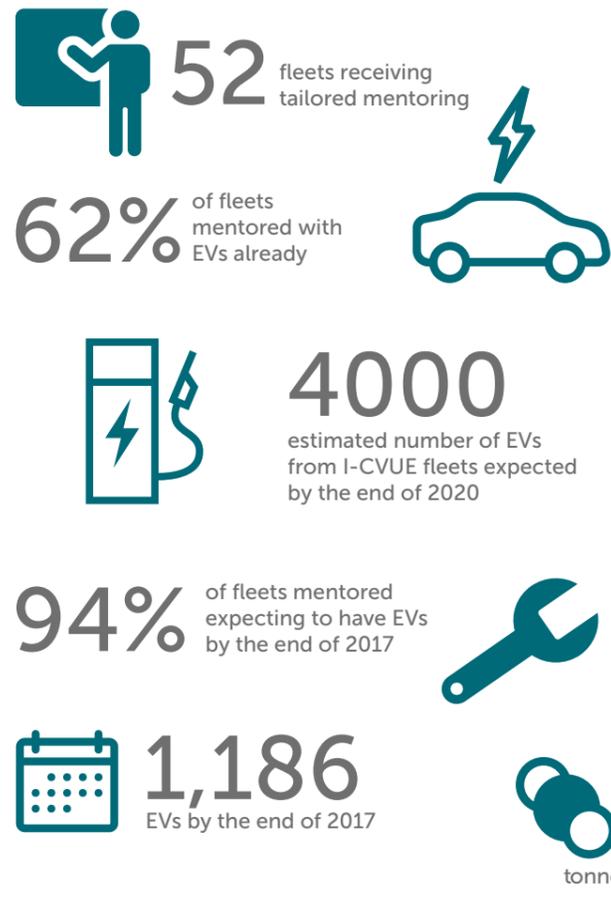
From fleet managers to national policy makers, in the past three years I-CVUE has played an important role in creating a better understanding of what works in the EV mobility area and what doesn't with regards to driving uptake of EVs amongst fleets. The results of the project work with cities conducted during the boundary conditions analysis have influenced decision makers who were looking for advice on this matter.

With the acceptance of the mentoring processes by fleet operators and the in-depth boundary conditions analysis, the decision making web-tool has been developed to be a valuable asset for private and public companies to use in the decision making process when purchasing a new vehicle.

Key learnings:

- » I-CVUE has developed a new methodology for TCO calculations: fleet operators and public tenders should consider TCO and not only purchase costs of vehicles.
- » Calculating the TCO is always more accurate than considering purchase costs only, and is a key aspect for electric mobility: EVs are more economically competitive if operative costs are considered.
- » There was already an understanding that the EV uptake across Europe was developing at a varying pace, but we now know why: impact of the economic (financial) incentives, the importance of non-monetary incentives, and charging infrastructure.

There are global trends in terms of mobility shifts, energy solutions and urbanisation, which are all developing at a high speed. Electric mobility plays an important role in these developments. At a time when cities and countries are trialling different incentives and more electric vehicles are coming to market, it is clear that an innovative project, such as I-CVUE, plays an important role in facilitating discussions, sharing of knowledge and outcomes to the relevant key actors.



MAIN ACHIEVEMENTS

The increase of 1,186 vehicles following the mentoring activities as of 2017 will result in a reduction of well-to-wheel GHG emissions by 525 tCO₂e per year.

The table below shows the number of EVs the fleets that received I-CVUE mentoring will have by the end of 2017. As well as this, it shows the number of EVs the fleet operators estimate to have by 2020. It then goes on to show the number of EVs expected within these fleets by 2020 if there are additional incentive policies implemented by policy makers in the relevant countries.

	Number of EVs by 2017	Number of EVs by 2020	Number of EVs by 2020 with additional policies implemented
Vehicles	1186	4,237	5,330
GHG reduction (in tCO ₂ e/year)	525	1,922	2,418

MAIN RECOMMENDATIONS

The main recommendations that I-CVUE has developed through the insights gained within the project are:

- » **Cost:** For substantial impact on EV uptake:
 - Financial incentives need to:
 - i. Minimize the purchase price premium
 - ii. Create an EV performance advantage over ICE (overcome the obstacles and limitations of EVs)
 - iii. Reach a certain threshold for the uptake-effects of the incentives to become progressive
 - Operational incentives need to:
 - i. Be clearly communicated
 - ii. Offer significant advantages over the use of conventional vehicles
- » **Charging:** A dense network of public chargers is needed for EV drivers, matching their needs and the characteristics of their cars: appropriate locations, available and accessible, affordable prices and appropriate charging speed.
- » **Consistency:** A consistent and long-term stable incentive policy is needed, including an advanced logical incentive strategy.
- » **Communication:** Public bodies and other entities should promote the incentives within their city and/or country.

FURTHER INFORMATION

Reports available from www.icvue.eu

- **Report** – Scenarios of CO₂ reduction of EVs due to incentive policies for commercial fleets and their impact on the total car and van fleet
- **Report** – Regional framework for 5 EU regions
- **Report** – Regional EV development potential
- **Report** – Scenarios for future EV uptake in vehicle fleets for 5 European city authorities

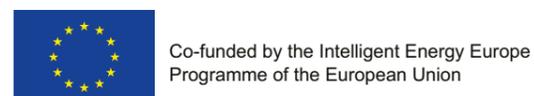
To find out more about I-CVUE:

- **Website** – www.icvue.eu
- **Twitter** – @icvue
- **LinkedIn Group** – I-CVUE: Incentives for Cleaner Vehicles in Urban Europe

PROJECT PARTNERS



ADVISORY BOARD MEMBERS



The sole responsibility for the content of this [webpage, publications etc.] lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the EASME nor the European Commission are responsible for any use that may be made of the information contained therein.



CO-FUNDED BY THE INTELLIGENT ENERGY EUROPE PROGRAMME OF THE EUROPEAN UNION

FOLLOW US ON



