Empowering e-fleets for business and private purposes in cities

Programme: STEER

Project number: IEE/12/713/SI2.644746

e-Mobility Fleet Schemes and Market Potentials in Austria

Date: 06/03/14

Main author(s): Carla Piñeiro – INOVA
e-mail: c.pineiro@inovaportal.com
Karin Steinwender – FGM-AMOR
e-mail: steinwender@fgm.at

Project coordinator: Aida Abdulah – CHOICE
e-mail: abdulah@choice.de

ebridge-project.eu

Co-funded by the Intelligent Energy Europe Programme of the European Union

Table of contents

Index of figures

Index of tables

1. Executive Summary

Electric mobility is a highly promising technology that can help addressing severe global challenges such as climate change and fossil fuel dependency; it can contribute to reduce local CO_2 emissions and noise pollution coming from transport and enable synergies with smart grids and so favour a greater percentage of renewable energies production.[1]

The large potential of electric vehicles in urban fleets includes (a) improving electric mobility markets through niche development, thus accelerating mass market adoption of electric vehicles; (b) supporting the achievement of energy and climate protection goals; and (c) contributing to tackling global recession by revitalising the industrial fabric and fostering innovation, growth and job creation.

For that reasons Austria is pushing electric mobility. The Austrian government understands electric mobility to be an intermodal mobility system of railway, e-commercial vehicles, e-busses, and e-passenger cars, e-scooters, and e-bicycles. The set-up of intelligent power supply grids and charging infrastructures is to be an important prerequisite. Attractive combinations with public transport are to offer tailor-made electric mobility facilities. Mobility has to be affordable for the Austrian citizens also in the future. Any motivation of individuals as well as fleet operators to use clean and low-emission vehicles for the transport of persons and cargo needs to be intensified.

Therefore, a common strategy for electric mobility[2] of three Austrian ministries (Agriculture and Forestry, Environment and Water Management (BMLFUW), Transport, Innovation and Technology (BMVIT) and Economy, Family and Youth (BMWFJ)) has been approved in June 2012. It covers measures in all fields of e-mobility and the production of clean energy.

A series of R&D-projects had been supported as well as 8 model regions for electric mobility with different key aspects of the implementation of e-mobility. After the first hype at the beginning of the decade now the mood has grown sober. However, e-mobility still has a strong support by the Austrian Climate and Energy Fund (Klima und Energiefonds) with the programme klima:aktiv mobil, the National Action Programme for Mobility Management, with a target of 250,000 electric vehicles by 2020.

The province of Vorarlberg was the first Austrian model region for e-mobility which started with the VLOTTE project. VLOTTE[3] started in 2008 and within the project, the following milestones could be reached: 357 e-cars, charging infrastructure throughout Vorarlberg, fast charging possibilities on hot spots, comprehensive mobility package with important partners (e.g. public transport, ÖAMTC…). Beside other activities, VLOTTE supported the purchase of e-cars.

Austria was among the pioneer countries in Europe where modern car sharing emerged. But in contrast to Switzerland and Germany, car sharing in Austria remained almost static for the last 15 years. However, the introduction of electric mobility on the one hand and the entry of new market players (EMIL, Flinkster, Caruso) on the other hand have reactivated the sector.

Electric mobility in Austria has been steadily gaining in importance over the last few years, mainly because the reduction of greenhouse gas (GHG) emissions continues as a national priority with specific reduction targets for the transport sector. However, the ambitious goals

[1] Council of the European Union. 2010.

[2] Electromobility in and from Austria. the common path!, June 2012

3 www.vlotte.at

set in 2010 were far too optimistic and have to be adapted. Nevertheless, e-mobility remains a key issue in the Austrian environmental policy.

Austrian gross domestic product (GDP) of EUR 301 billion in 2011 represents 2.38% of EU 27 GDP[4].

With a population of 8.4 million (2012), Austria represents 1.68% of total European population (500.35 million)[5] and 20.39% of this population lives in urban metropolitan areas (more than 500,000 inhabitants in 50 km).

The Austrian modal share shows that 61% of the trips were made by car and/or motorbike (2001) and 62% of the trips are due to leisure/other (2012).

With a car fleet of 4.5 million vehicles in 2011, Austria has the twelfth largest European carpool representing 1.9% of the total EU fleet.[6]

[4] Eurostat, (2013a). GDP at current market prices.

[5] Eurostat, (2013b). Population on 1 January.

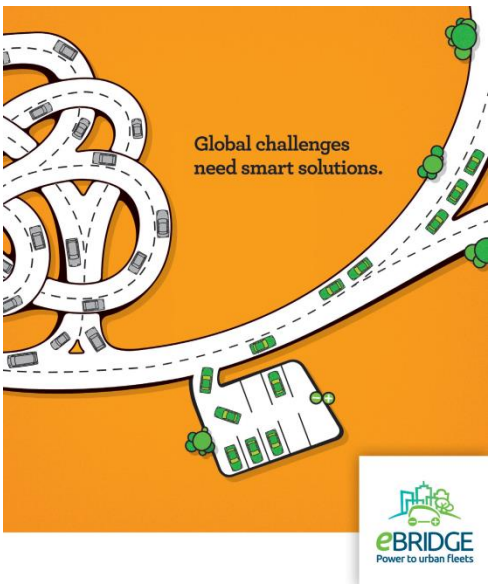
[6] European Automobile Manufacturers' Association (ACEA). Pocket guide 2013.

2. Introduction

2.1 The eBRIDGE Project

eBRIDGE is a co-funded EU project to promote electric fleets for urban travel in European cities. The project aims to bring innovation and new technologies to make today's mobility cleaner, more efficient and sustainable.

During eBRIDGE, alternatives to current mobility patterns will be explored in order to analyse whether electric mobility is a feasible option to make cities cleaner and more sustainable.



Although electric vehicles fulfil all the requirements to be among the most important players in urban transport systems of the near future – they are clean, efficient, silent and incur low running costs – significant barriers to a wider diffusion and use of electric vehicles remain to be addressed, including low user acceptance and higher purchase costs compared to conventional cars.

Against this background, eBRIDGE aims to demonstrate how the introduction of electric vehicles in fleets for business and private urban travel can efficiently contribute to the improvement of market conditions for the electric mobility sector.

Seven case studies with heterogeneous starting conditions assure a broad-spectrum outcome. Berlin (Germany), Milan (Italy), Lisbon (Portugal), Vigo (Spain), Valencia (Spain), a selection of Austrian municipalities and Carmarthen (Wales) are developing actions to optimise operational fleet performance, test and launch solutions to increase the convenience and ease of use of car sharing offers and finally, raise awareness among the target groups and further relevant stakeholders through engaging marketing approaches on the suitability of electric mobility for urban transport and commuting.

The eBRIDGE team involves technical experts, academics, associations, public administrations, mobility providers and public transport and car sharing operators:

- choice GmbH (Coord.), Germany
- DB FuhrparkService GmbH, Germany
- Mobility Institute Vorarlberg, Austria
- Forschungsgesellschaft Mobilität – Austrian Mobility Research gem. GmbH, Austria
- I Nova Consultores en Excelencia e Innovación Estratégica, S.L., Spain
- Galician Cluster of Automotive Companies, Spain
- Movilidad Urbana Sostenible S.L., Spain
- Comunitat Autònoma de les Illes Balears, Spain
- Fondazione Legambiente Innovazione, Italy
- Azienda Trasporti Milanesi S.p.A, Italy
- Occam, Portugal
- Câmara Municipal de Lisboa, Portugal
- Cardiff University, United Kingdom

2.2 Scope of the report

The goal of the "Work Package 2: Market Analysis" is to analyse the current situation and trends of electric fleets in the eBRIDGE targeted regions by assessing information about all context relevant issues such as market overview, best practice, legal framework, policy, and environmental impacts.

Beyond this, the work package will assess the market potential of electric mobility, mainly for fleet offers, constituting the baseline for the project.

The present report "e-Mobility Fleet Schemes and Market Potentials – AUSTRIA" gathers these results for Austria and particularly Lower Austria, Vorarlberg and Styria, two of which act as Austrian case study sites.

2.3 Methodology

In the course of the work package, data from Germany, Austria, Spain, Italy, Portugal and United Kingdom have been gathered and analysed for the period 2008-2012.

The overall goal has been to establish a theoretical baseline on electric urban fleets of every participant country. A factsheet on transferability at a European scale is based on this report series.

Relevant data regarding national carpool such as registrations, power train type, registered EVs models, car sharing hot spots, main charging operators, as well as main national policy and R&D aspects e.g. incentives and favouring policies have been collected and analysed.

Additionally, a brief assessment of the market potential of electric vehicles including identified national barriers and drivers is provided.

Finally, the assessment of the Vorarlberg, Lower Austria and Styria case study facilitates the comparison of the local and national levels, showing to what extent the Austrian energy and climate targets are on track.

The methodology is based on four steps as shown in Figure 1. First, the relevant aspects of urban mobility and electric fleets were defined in the data collection template. The contents of the report were likewise defined and main timelines drafted.

In the last step, the results of the data analysis and complementary sources have been gathered in the present report.

Figure 1 Time Plan Methodology

Source: Own diagram

3. Electric Mobility in Austria

3.1 Starting point

Austria is one of the leading countries in the field of electric mobility.

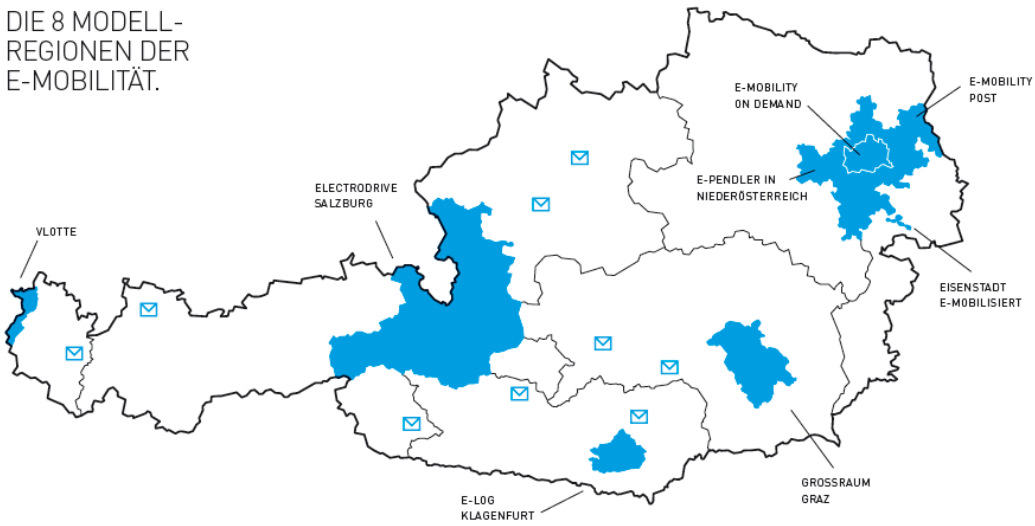
In 2010 the Federal Ministry for Transport, Innovation and Technology (BMVIT) stated a goal of a 20% share of electric (including hybrid) vehicles on the Austrian roads by 2020. In a more recent publication "Implementation plan: Electromobility in and from Austria" it was only stated that "a significant number of vehicles can be registered up to the year 2020", without specifying a concrete market share.

How ambitious the 20% goal was can be demonstrated by looking at the total number of registered vehicles in Austria. At the end of 2013 only 0.045% of the registered vehicles were electric and only 0.27% of the registered vehicles were electric or hybrid. That is a far cry from the initially pursued 20%[7]

- 2009: 0.0%
- 2010: 0.0%
- 2011: 0.2%
- 2012: 0.1% purely electric
- In 2013 only 0.2% of newly registered vehicles were purely electric.

The introduction of EVs is supported by a broad development programme by the Austrian climate and energy fund through R&D oriented lighthouse projects[8] and 8 model regions for e-mobility with different key aspects.

Figure 2 The 8 Austrian model regions for e-mobility[9]



[7] http://www.statistik.gv.at/web_de/static/fahrzeug-bestand_am_31._dezember_2013_vorlaeufig_062059.pdf

[8] For more details see: http://www.klimafonds.gv.at/unsere-themen/e-mobilitaet/leuchttuerme/

[9] Climate and energy found, annual report 2012, http://www.klimafonds.gv.at/assets/Uploads/Geschftsberichte/Geschftsbericht-2012.pdf

In 2008 the **VLOTTE** project was the chosen project of a nationwide bid and the province of Vorarlberg became the first Austrian pilot region for e-mobility.

Within the VLOTTE project a “mobility card” has been developed which included full operational leasing for an e-car, free charging at all public charging stations, public transport pass for the whole region and membership of the Austrian touring club. The whole electric energy has been brought up by additional, renewable power plants. By the end of 2011 there were 357 electric vehicles on the street and a charging infrastructure with 87 charging points (3 of them for fast charging).

Within the follow-up project, the goal was to establish “e-sharing-stations” with pedelecs, scooters and e-cars. However, the trial was not successful.

After a very enthusiastic start the feet are now back on the ground. In the first half of the year 2013, only 11 new e-cars have been sold in Vorarlberg.

An overview of all model regions as well as the most important research projects in Austria is given in chapter 3.6.

Besides these model regions, a number of projects to foster e-mobility have been launched. Worth to mention are the following ones:

eMORAIL - Integrated eMobility Service for Public Transport with the goal to create innovative, costly and environment friendly solutions for commuters (by combining public transport with e-vehicle sharing).

EMIL - an e-car sharing project in Salzburg and currently the only commercial car sharing offer with electric cars[10].

E-Caruso is a national R&D-project where tools for peer-to-peer car sharing with electric cars have been developed and tested.

CESLA, a SI-AT cross-border project, aimed at the introduction of ultra-light e-vehicles in the areas close to the border in Slovenia and Austria. Various e-vehicle prototypes have been developed and presented to the public on various occasions. It turned out that the customers are still keen on cars and car property and thus the main event in Southern Styria in spring 2012 (conference and roadshow) focused also on e-cars in order to meet the customers’ demands. CESLA can be seen as a forerunner in terms of e-mobility.

The amount of electric vehicles in use has grown continuously since 2008 (see Figure 7) up to 2070 full electric vehicles. However, in comparison to the effort made to support electric vehicles, the results are quite sobering.

[10] carsharing.at (Zipcar) removed its e-cars from their fleet and newly Flinkster started his service in Vienna by the end of 2013 and offers a few e-cars.

3.2 General Aspects of Mobility

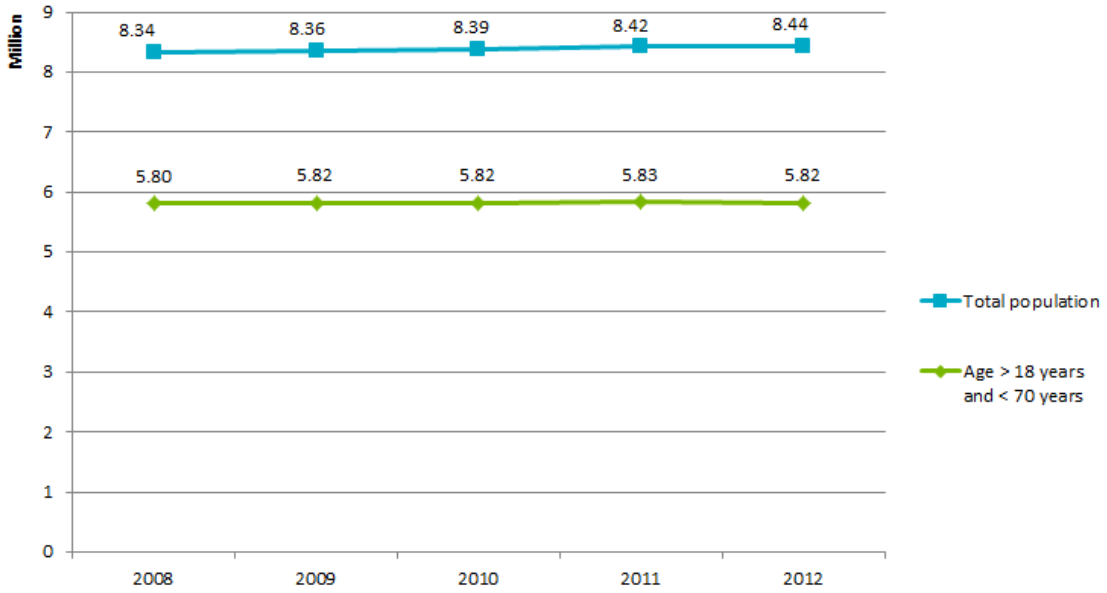
DEMOGRAPHY

Austria recorded a total population of 8.44 million inhabitants in 2012. The average age of population has been increasing in the last decades, being 42.4 in 2012 and so the fifth oldest in EU-27. The EU-27 average age in 2012 was 41.5 years.[11]

Figure 3 classifies Austria´s population for the period 2008 to 2012 in two categories: total population and working population (aged between 18 and 70 years).

From 2008 to 2012 the total population has increased by 1.25% however the working population only has increased by 0.25%.

Figure 3 Demographic trends



Source: Own graphic based on Statistik Austria - Austrian Statistical Office (2013)

More than 20% of Austrian´s population lived in Vienna in 2012 (≥ 500,000 citizens in 50 km, ≥ 1,000 inhabitants/km^2), which is the only metropolitan area in Austria. Vienna's residents have increased by 0.67% from 2008 to 2012. In 2013, only eight cities have between 50,000 and 300,000 citizens.

While Vienna has more than 1.7 million inhabitants, all other cities in Austria are rather small. Only five cities have more than 100,000 inhabitants. Apart from Vienna, the potential for commercial car sharing is limited in Austria.[12] [13]

[11] Eurostat (2013c) Population structure and Age.

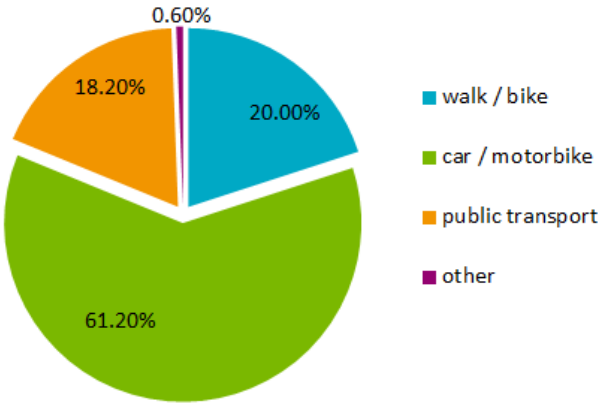
[12] *Brinkhoff, T. City Population (www.citypopulation.de)*

[13] *Statistik Austria - Austrian Statistical Office (2013)*

MOBILITY PATTERNS

The Austrian modal share shows that in 2001[14] most of the trips (61.2%) were accomplished by individual motorised means (car/motorbike), 20% walked or cycled, almost the same percentage (18.2%) used public transport.

Figure 4 Modal share 2001



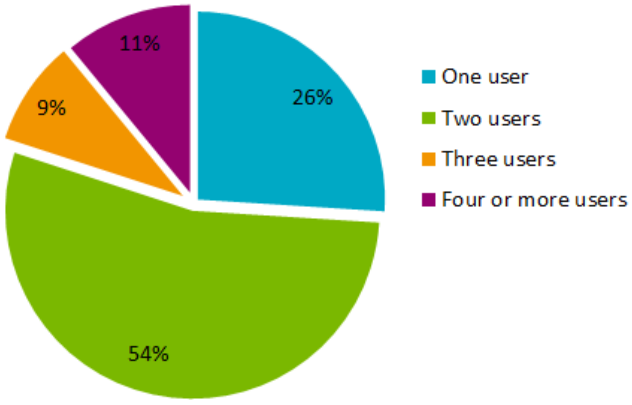
Source: Own graphic based on BMVIT - Federal Ministry for Transport, Innovation and Technology (2011)

In 2012, the reasons for travelling can be split in work/studies trips (38%) and leisure/other trips (62%)[15].

The number of average trips per person and day in 1995 was 3.7 and the average distance per trip was 9.55 km[16].

In most households in Austria (54%) there are two persons using one car on a regular basis. In approximately 25% there is only one user, in 20% more than two drivers.

Figure 5 Car user per household (2011)



Source: Electromobility in Austria, Umweltbundesamt - Federal Environment Agency (Vienna, 2012)

[14] Information about more recent years is available for Lower Austria and Vorarlberg only. A new survey have been done in 2013, results will be available in 2014.

[15] Umweltbundesamt - Federal Environment Agency, Vienna, "ELECTRIC MOBILITY IN AUSTRIA, Determinants of the decision to purchase alternatively fueled vehicles: A discrete decision experiment" (2012)

[16] BMVIT - Federal Ministry for Transport, Innovation and Technology, Transport in Figures 2011

The number of cars is especially high in rural areas, but also in the suburbs of medium-sized cities. In these areas also the number of persons per household is higher (family size is bigger), as well as car density. In rural areas, 86% of the residents use their car almost every day, the remaining 14% at least several times a week. The lowest car density (per inhabitants) can be found in Vienna.

Occupancy rates vary by purpose of journey, being lowest for commuting trips and naturally higher for leisure and holidays trips. So, 80% of the commuting car trips were made by the driver alone, and only 14% had one passenger.

Running errands trips show more balanced vehicle occupancy rates.

The 59% of the holidays and leisure car trips are made with one passenger; only 14% of the trips had just the car driver in the car.

3.3 The Austrian Carpool

VEHICLE FIGURES

Total vehicles registered

The number of passenger cars and light transport vehicles has increased steadily from 4.28 million in 2008 to 4.58 million in 2012.[17] In this period, passenger cars have increased by 6.98%. Light commercial vehicles have an annual increase by approximately 10,000 vehicles (almost steady for the last three years).

Of all registered vehicles, in this period, 92.7% were passenger cars.

Figure 6 Total vehicles registered 2008 - 2012

Source: Own graphic based on Statistik Austria - Austrian Statistical Office, Vehicle inventory (2012)

[17] No data available for light transport vehicles 2008 since where was no such classification until 2010. Until 2009 only classification in class N (up to 3.5 t would be N1) is available. From 2010 onwards there is a separate figure for N1 (up to 3.5 tons) vehicles available.

Vehicle powertrain type

In 2012, 0.26% of the total vehicles registered were alternative fuelled vehicles; with 99.74% being conventional fuelled vehicles.

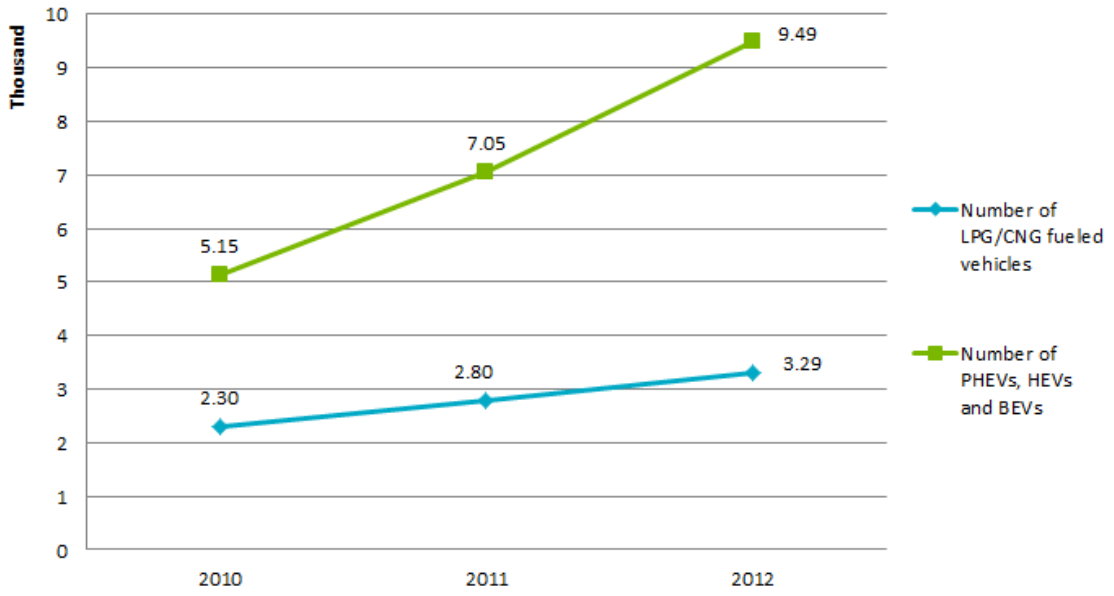
Among the alternative fuelled vehicles a big percentage, 74.23% (0.19% of the total), were plug-in hybrid electric vehicles (PHEV), hybrid electric vehicles (HEV) and battery electric vehicles (BEV). 25.77% (0.07% of the total) were liquefied petroleum gas (LPG) and compressed natural gas (CNG) vehicles.

LPG and CNG registered vehicles experienced a bigger increase in the years 2008 and 2009. However the vehicles are listed only together with hybrids for these years, thus no definite figures can be mentioned.

In the following years – 2010 onwards, battery electric and hybrid vehicles increased much more than LPG and CNG powered vehicles. From 2010 to 2012 the number of registered electric and hybrid vehicles has almost doubled (from 5,145 to 9,489 vehicles).

In the same period, LPG and CNG propelled vehicles increased by about one third (from 2,297 to 3,294).

Figure 7 Total vehicles powertrain type 2010 - 2012

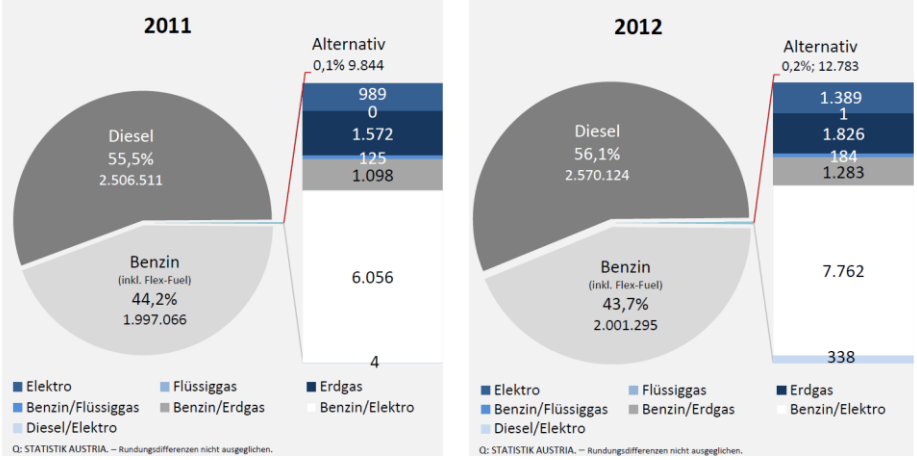


Source: Own graphic based on Statistik Austria - Austrian Statistical Office, Vehicle inventory (2012)

In 2012, 362 e-cars were registered and total fleet was 1,389 EVs. Currently about 0.2% of the newly registered cars are electric.

In Austria funding for e-cars gets started, e-car prices will decline and the assortment is about to expand. The number of e-cars on Austria's roads will increase continuously.

Figure 8 Vehicles powertrain, detail information for years 2011-2012

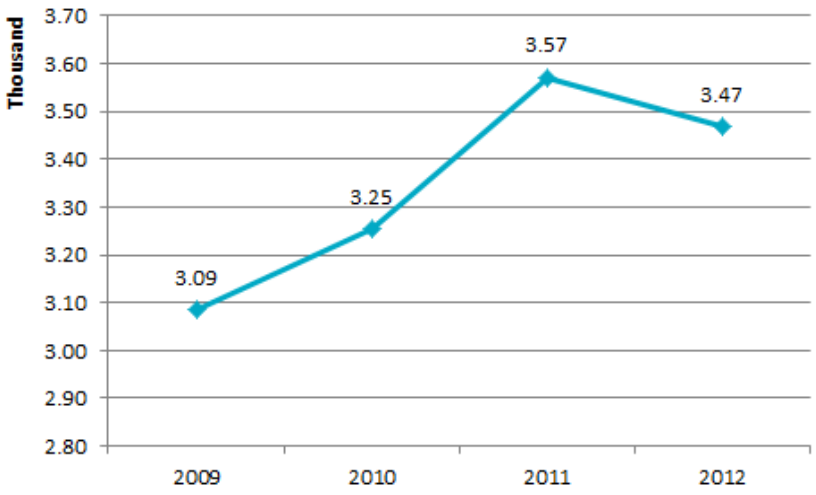


Source: Statistik Austria - Austrian Statistical Office (2013)

Leasing market

The number of leased & rented passenger and light commercial vehicles has significantly grown from 3,086 in 2009[18] to 3,469 in 2012, representing 12.41% increase.

Figure 9 Leasing market 2009 - 2012



Source: Own graphic based on Data Technology Betriebsberatungs GmbH & Co KG, "Volatile markets: The Austrian leasing market in 2012" (2013)

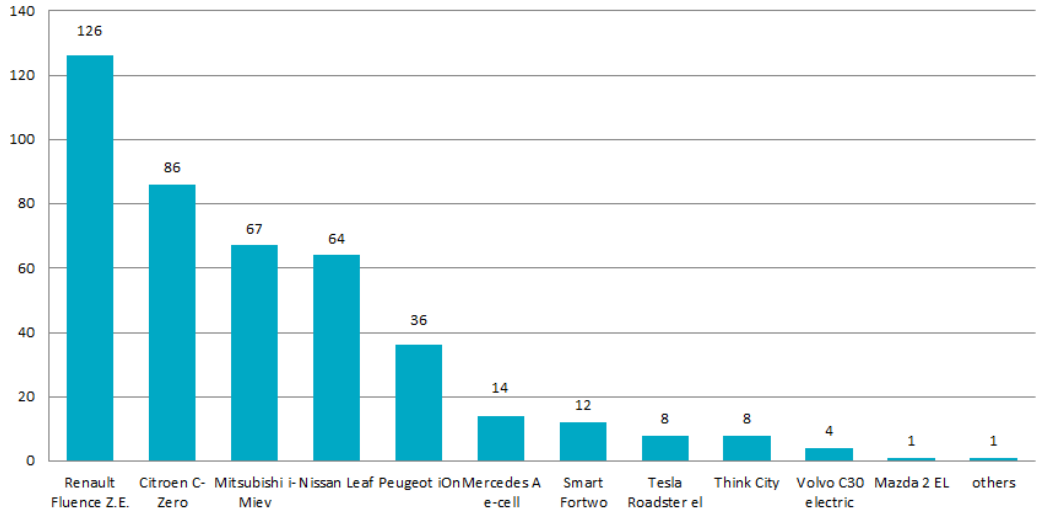
Selection of most registered EVs per supplier & model

Based on the new vehicle registrations in 2012, Figure 9 shows a selection of the most registered EVs. Renault Fluence is leading the registrations market in 2012 with a market share of 30%, followed by Citroen with C-Zero (20%). Mitsubishi (i-Miev) and Nissan (Leaf) are sharing place three – each of them approximately 15% market share. Peugeot iOn has reached rank five of the top-sold EVs, whilst the other models are also-rans.

The caution with EVs seems to be also a matter of the small offer on attractive vehicles on the market.

[18] No data available for 2008.

Figure 10 Selection of most registered EVs 2012



Source: Own graphic based on Statistik Austria - Austrian Statistical Office (2013).

ENVIRONMENT

The EU has called for the need to drastically reduce world greenhouse gas (GHG) emissions, with the goal of limiting climate change below 2°C. Overall, the EU needs to reduce emissions by 80 to 95% below 1990 levels by 2050, in the context of the necessary reductions of the developed countries as a group, in order to reach this goal.

European Commission analysis shows that while deeper cuts can be achieved in other sectors of the economy, a reduction of at least 60% of GHGs by 2050 with respect to 1990 levels is required from the transport sector, which is a significant and still growing source of GHGs. By 2030, the goal for transport will be to reduce GHG emissions to around 20% below their 2008 level.

Accordingly, the White Paper on Transport (2011) establishes as first goal to halve the use of conventionally fuelled cars in urban transport by 2030; phase them out in cities by 2050; achieving essentially CO_2-free city logistics in major urban centres by 2030. [19]

Moreover, the European Union's ten-year growth strategy, Europe 2020, established a set of targets including climate, energy and sustainability targets. The EU targets are translated into national targets in each EU country.

In the specific case of Austria, the national target related GHG for 2020 is to reduce GHG by 16% with respect to 2005[20].

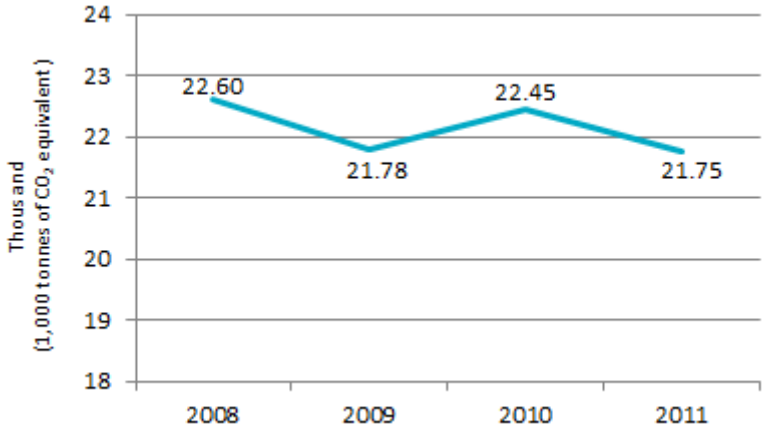
The total GHG emissions transport in MT CO_2 units[21] shows a decreasing trend between 2008 and 2011, with slight increases and decreases, being the total drop in this period of 3.78%.

[19] European Commission (2011a) WHITE PAPER - Roadmap to a Single European Transport Area: Towards a competitive and resource efficient transport system (2011) COM/2011/0144.

[20] European Commission (2011b) Europe 2020 Targets.

[21] This indicator shows trends in the emissions from transport (road, rail, inland navigation and domestic aviation) of the greenhouse gases regulated by the Kyoto Protocol.

Figure 11 Greenhouse gas emissions from transport 2008 - 2011



Sources: Own graphic based on Eurostat (2013d) Indicators Theme 6 Climate Change and Energy

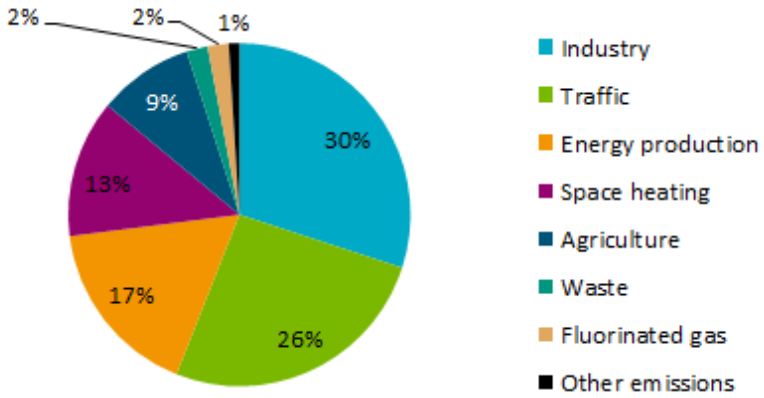
The following figure shows that the share of traffic contributing to the greenhouse gas emissions in 2011 amounted to 26%[22]. It is obvious that traffic is the second largest producer of greenhouse gas emissions.

The biggest increase in greenhouse gas emissions since 1990 (up to 2011) has been registered in the traffic sector, with an increase of 7.7 million tons CO_2 equivalent or a plus of 55% (whilst industry, the second sector with an intense rise, registered a plus of 15.2% or 3.2 million tons CO_2).

From 1990 to 2011 the greenhouse gas emissions in the traffic sector augmented from 14.1 million tons to 21.8 million tons CO_2 – being the highest increase in all sectors. In 2011, passenger traffic amounted to 12.2 million tons CO_2 and freight traffic to 8.9 million tons CO_2.

Compared with 2010 the emissions in 2011 have declined (by 3.1% or 0.7 million tons CO_2), which was caused by a decline in the fuel consumption due to the jump of the fuel price and the improvement in efficiency of fleets. A further reason for the reduction is the implementation of biofuels, helping to save 1.6 million tons CO_2 in 2011[23].

Figure 12 Greenhouse gas emissions 2011



Source: Umweltbundesamt - Federal Environment Agency (2013)

[22]Umweltbundesamt, Klimaschutzbericht - Federal Environment Agency, Climate Protection Report (2013)

[23] Lebensministerium - Ministry of Agriculture (2012)

Main pollution source is road traffic, responsible for 96.6% of the greenhouse gas emissions of the transport sector. Thereof 40.9% are deriving from freight and 56% from passenger traffic. The remaining 3.1% are allocated to train, shipping, national air traffic…

In November 2011 the climate protection law (Klimaschutzgesetz, KSG) was approved. Therein sectoral limits are defined. In an adaptation from 2013 the limits were adapted and fixed up to 2020.

The transport sector registers the biggest gap compared to sectoral targets of the climate protection law.[24]

Regarding electricity generation, CO_2 emissions per kWh show a decreasing trend since 1990 with a significant drop in 2009 and reaching the previous levels in 2010.

Figure 13 CO_2 emissions per kWh from electricity generation 2008 - 2010

Source: Own graphic based on CO_2 Emissions from Fuel Combustion Highlights, IEA (2012)

3.4 Charging Infrastructure

A charging infrastructure analysis is challenging as there does not seem to be a definitive directory where all e-charging stations located in Austria are included. The e-connected website operated by Climate and Energy Fund (Klima und Energiefonds) recommends several e-charging platforms[25]:

- The Kelag Group (Kärntner Elektrizitäts-Aktiengesellschaft) operates the Internet platform http://ev-charging.com where many E-Charging stations in Austria are listed. This directory includes 1,380 stations in Austria and is by no means complete although the platform is widely supported by organizations such as klima:aktiv and ÖAMTC. In this directory 30 E-Charging stations are listed for Vorarlberg, whereas the VLOTTE project sums up 156 E-Charging stations.
- The VLOTTE project links to the finder http://lemnet.org/
- On the platform http://www.elektrotankstellen.net operated by Euro Solar-Austria more than 3,299 E-Charging stations are listed.

[24] Umweltbundesamt, Klimaschutzbericht - Federal Environment Agency, Climate Protection Report (2013)

[25] http://www.e-connected.at/content/e-tankstellenfinder, (10.2.2014)

Table 1 Charging stations in the Austrian provinces according to the different platforms			
Province	EV-Charging.com	Elektrotankstellen.net	Other source
Vorarlberg	30	59	156[26]
Tirol	59	95	
Salzburg	102	244	192[27](goal by end of 2014)
Kärnten	274	240	
Steiermark	141	398	
Burgenland	59	265	
Oberösterreich	272	509	
Niederösterreich	342	1353	
Wien	82	136	126[28]
TOTAL	**1,361**	**3,299**	**474**

Source: Own table based on e-charging platforms (10.02.2014)

The numbers of e-charging stations listed on different platforms differ significantly. This is due to the fact that there are no central data source and platforms such as elektrotankstellen.net also list semi-public and private E-Charging stations. A common central data source for all regions in Austria/Europe with defined quality criteria would make searching for E-Charging stations a lot easier.

MAIN OPERATORS

In 2012, the charging infrastructure was owned mainly by private companies with an electric utility profile. Six main operators installed approximately 326 charging points.

Table 2 Main charging operators				
Operator	Stations	Charging Points	Fast Charging Points	Profile
Vorarlberger Kraftwerke AG (VKW)	139	259	3	Electric utility
Salzburg AG	40 (Salzburg)	-	-	Electric utility
KELAG	> 30 (Carinthia)	-	-	Electric utility
ÖAMTC	-	33	-	Automobile club
SMATRICS	-	29	-	Electric utility
WIEN ENERGIE	45	-	-	Electric utility

Source: Own table based on VKW; Salzburg AG, KELAG, ÖAMTC, SMATRICS, WIEN ENERGIE (2013)

[26] http://www.vlotte.at/inhalt/at/vlotte_stromstellen.htm, (10.2.2014)

[27] http://www.e-connected.at/userfiles/201312%20KeyFacts_ElectroDrive%20Salzburg.pdf, (10.2.2014)

[28] http://www.e-connected.at/userfiles/201312%20KeyFacts_e-mobility%20on%20demand%20Wien.pdf, (10.2.2014)

3.5 Austrian Fleet Hot Spots

MAIN LOCATIONS FOR CAR SHARING

Especially in the model regions the number of e-charging stations is increasing and getting denser. When looking at the VLOTTE project one can see that there are not only stations in urban areas but also in rural areas such as Vorderwald/Bregenzerwald, which for itself is a model region for renewable energy.

The table below shows the main Austrian car sharing cities to consider due to the number of car sharing operators. Car sharing is concentrated very much on the capital Vienna. The other cities are much smaller and car sharing is much less developed.

As it has been shown, the charging infrastructure in Vienna is comparatively underdeveloped. So it's quite challenging to establish e-car sharing in Austria, since either the preconditions for car sharing are not good or the charging infrastructure is insufficient.

While Zipcar or its predecessor respectively offers car sharing since 1997, but did not grow for the last 15 years, the other operators just entered the market recently.

Table 3 Main locations for car sharing and their operator

	Vienna	Graz	Salzburg	Inns-bruck	Lower Austria all cities	Vorarlberg all cities	Klagenfurt /Villach	Linz / Wels
Zipcar (Carsharing.at)	111	12	8	7	6	9	2	7
Car2Go	700							
Flinkster/EMIL	50	1	18					

Source: Own table based on projects and own sources (2013), see links

Only in the provinces of Vorarlberg and Lower Austria there is a small car sharing offer in cities with less than 50,000 inhabitants at all. Far the most car sharing cars are in Vienna.

Besides the commercial offers, peer-to-peer car sharing is promoted by Caruso Carsharing and Carsharing 24/7. Since this market is just nascent, no official or reliable data are available on this innovative form of car sharing.

MAIN BUSINESS CAR SHARING OPERATORS

Table 4 Main business car sharing operators

Operator	Fleet			Technological key aspects				Locations
	Operator	Total fleet	No. of EVs	Booking	Access	System	Payment	
CARSHARING.AT[29]	Zipcar, Inc. (private company)	200	0	Phone Internet	Smart card	Station-based	Credit card Invoice	Austria
CAR2GO	Car2Go Österreich GmbH (private company)	700	0	Internet (only instant booking)	Smart card	Free-floating	Credit card Direct debit	Vienna

[29] Before August 2012, Denzel Drive.

FLINKSTER	DB Mobility solutions Austria (Deutsche Bahn) (state-owned company)	50	3	Internet Phone Smartphone	Smart card	Station-based	Credit card	Vienna
EMIL	Salzburg AG (state-owned company)	18	18	Internet Smartphone	Smart card	Station based	Credit card Invoice	Salzburg

Source: Own table based on CARSHARING.AT, CAR2GO, FLINKSTER, EMIL (2013), see links

CarSharing AT, CAR2GO and Flinkster are the main car sharing operators, mainly offering conventional cars.

EMIL – electric car sharing is a cooperation of REWE International AG and Salzburg AG and it is funded by the Federal Ministry for Transport, Innovation and Technology (BMVIT) through the Climate and Energy Fund (Klima und Energiefonds) programme.

3.6 Research & Development

KEY RUNNING R&D PROJECTS ON ELECTRIC VEHICLES

Table 5 Key running R&D projects on electric vehicles

Title	Key areas covered	Nº of EVs	Coordinator	Partners	Years	Budget	Funding
EMPORA & EMPORA 2	Focus on the user approach, intelligent charging infrastructure, innovative systems for data management, billing and customer management were re-linked and specially adapted for the application area electric mobility, energy-efficient routing system, etc		Verbund (public body)	22	2010 – 2014	26 million EUR	Climate and Energy Fund of the Federal Government
CESLA Cross-border implementation of environmentally friendly ultra-light vehicles in Slovenia and Austria	Encourage the development of the market and the use of ultra-light vehicles in the Slovenian-Austrian border area	-	TECES, Research and Development Centre of Electrical Machines (private company)	6	2009 – 2012	0.87 million EUR	European Regional Development Fund (ERDF)
VIBRATe Vienna Bratislava e-mobility	Create in the Twin City region Vienna - Bratislava an infrastructure of standardized charging stations	20	Verbund (public body)	5	2011 – 2013	1.25 million EUR	European Regional Development Fund (ERDF)

REZIPE Renewable Energies for Zero Emission Transport in Europe	Methods for reducing the emissions CO_2, NO_x and fine dust by introducing zero emission vehicles in urban environments.	11	Municipal Authority of the provincial capital Klagenfurt (public body)	10	2010 - 2013	1.46 million EUR	European Regional Development Fund (ERDF)
eMORAIL	Integrated mobility system linking public transport (train) with e-mobility (9 e-cars and 6 e-bikes)	9	ÖBB Holding AG (public body)	15	2010 - 2013	5.03 million EUR	Climate and Energy Fund of the Federal Government

Source: Own table based on Climate and Energy Fund of the Federal Government (2013)

DEMONSTRATIVE E-FLEET PROJECTS – THE 8 MODEL REGIONS FOR E-MOBILITY

Table 6 Demonstrative e-fleet projects

Project	Key areas covered	Nº of EVs [30]	Coordinator	Partners	Start	Funding Budget	Funding
VLOTTE	Change of mobility behaviour in Vorarlberg and implementation of e-cars as well as charging facilities	357	Illwerke VKW	5	2009	5.2 million EUR	Climate and Energy Fund of the Federal Government
ElectroDrive Salzburg	Establish an area-wide charging infra-structure with re-newable electricity and to promote electric vehicles.	199	Electro Drive Salzburg GmbH	9	2009	1.9 million EUR	Climate and Energy Fund of the Federal Government
Greater Graz (Grossraum Graz)	Creation of leasing offers for electric vehicles like pedelecs, scooter, segways, car sharing, bike sharing in addition to the provision of renewable energy.	199	Holding Graz	14	2010	1.6 million EUR	Climate and Energy Fund of the Federal Government
Eisenstadt E-activated (Eisenstadt E-mobilisiert)	Establish attractive offers for e-mobility through multiple use and to convert the local taxis to electric propulsion.	30	Eisenstadt e-mobilisiert GmbH (51% Energie Burgenland, 29% Freistadt Eisenstadt, 20% Raiffeisen Leasing)	17	2010	0.56 million EUR	Climate and Energy Fund of the Federal Government

[30] 4-wheelers. All model regions also support 2-wheelers

E-LOG Klagenfurt	A peripheral distribution centre in the outskirts of Klagenfurt should be developed with a fleet management of 200 light utility e-vehicles.	200	IPAK International Project Management Agency Klagenfurt on Lake Wörthersee GmbH	8	2011	1.6 million EUR	Climate and Energy Fund of the Federal Government
e-mobility on demand Vienna	The lead partner coordinates all activities in the region of Vienna like procurement, charging infrastructure, additional offers as well as e-carsharing and its locations.	107	Neue Urbane Mobilität Wien GmbH (NeuMo)	10	2010	1.3 million EUR	Climate and Energy Fund of the Federal Government
E-Mobility Post	The model region has its focus on greater Vienna. The Austrian Post wants to integrate 1.157 electric vehicles in its fleet.	309	Österreichische Post AG	-	2011	3.3 million EUR	Climate and Energy Fund of the Federal Government
e-commuter in Lower Austria	The project focuses on commuters and creates new mobility packages including vehicles, charging stations, renewable energy and consulting.	27 (105)	EVN	3	2011	1.3 million EUR	Climate and Energy Fund of the Federal Government

Source: Own table based on projects 'web page (2013) and www.e-connected.at

3.7 Policy Framework

KEY REGULATIONS REGARDING ELECTRIC VEHICLES

In Austria, neither EVs nor car sharing is defined by traffic regulations. Although some municipalities want to support EVs and/or car sharing by giving them privileges (e.g. free parking), it is difficult to find a proper solution to make an exception. The reticence towards the idea of supporting EVs by privileges may also be explained by the fact that the support may only be justified as initial support. It may be difficult to cancel these privileges in the future and therefore politicians tend to give financial incentives to support EVs.

Klima und Energiefonds - Climate and Energy Fund

Eight model regions in Austria were established in order to test e-mobility in practice. Currently the focus is on exchanging experience between these model regions.

Micro public transport in rural areas

Small local systems of public transport in rural areas shall improve mobility offerings for the users.

Smart City

Vision of “Zero Emission City“ or “Zero Emission Urban Region“ with a high living standard. Integrated mobility planning and intelligent traffic solutions are applied in practice.

Mobility management for leasure time and tourism | Mobility management for cities, communes and regions

Environmental measures in the area of mobility for tourism. Electric vehicles, electric bikes and E-Charging stations are supported in that programme.

Table 7 Key regulations regarding electric vehicles

Regulation	Key aspects being regulated	Public body/ authority
Funding lump-sum	Support the market introduction of e-vehicles, especially for fleets, SMEs, Cities, authorities, regions, community facilities and associations	Klima:aktiv mobil
No NOVA (=standard consumption tax in Austria) nor motor vehicle tax	Fiscal incentive in order to boost e-mobility	National government
Advantages in every-day life	Only minor privileges for EVs: free parking in Eisenstadt for EVs, free charging in many places	Various

FINANCIAL INCENTIVES

Table 8 Financial incentives

Sector	Key incentives	Date of release	Public body/ authority
E-mobility model region	Aiming at an overlapping model intention with regional and widespread approaches covering all topics of e-mobility	2008 - 2013	Climate and Energy Fund of the Federal Government (Country level)
No motor-related vehicle tax for e-vehicles	For pure electric vehicles, the motor-related vehicle tax is ceased	21.12.12 onwards	Federal Ministry of Finance - BMF (Country level)
Vehicles with alternative propulsion and e-mobility	Aiming at the conversion of fleets in local authorities and companies. Purchase or conversion of up to 10 alternative propelled vehicles (max. 3,5 tonnes), or up to 50 e-bikes De-minimis co-financing: up to 200,000 EUR within 3 years. Co-financing for companies is limited to 30% of the eligible costs and for local authorities to 50% of the eligible costs.	Start: 2013	Kommunalkredit Austria AG (Regional level)

No NOVA for e-vehicles	No Fuel consumption/pollution tax (NOVA) has to be paid for purchasing an e-vehicle (in Austria max. 16% NOVA)	01.01.13 – 31.08.14	Federal Ministry of Finance - BMF (Country level)
Reduced insurance rates	Assurance companies offer 10 to 20% reduction for electric vehicles	N.A.	-[31]
Lower Austria PV charging station sponsorship	Municipalities in Lower Austria, according to format co-financing up to 75% of the net-investment costs, up to max. 7,500 EUR	Until end 2013	Country of Lower Austria (Regional level)
Klima:Aktiv sponsorship for companies	Company measures in companies exceeding the general klima:aktiv funding will be funded. Combined measures and additional awareness measures are desired and will have positive influence on the funding height.	04/2013	klima:aktiv, Ministry of Life, KPC (Country level)
Additional funding by the federal states	Some federal states support the purchase of EVs by an additional funding with different and changing conditions.[32]	-	-

Source: Own table based on Kommunalkredit Austria AG, Climate and Energy Fund of the Federal Government and Federal Ministry of Finance (2013)

Some provinces in Austria give additional financial support for electric cars. One example is:

Salzburg Klima und Umweltpaket (Salzburg climate and environmental package)

Incentive for up to two electric vehicles per applicant. Incentive ranging from 2,000 to 4,000 EUR, depending on whether electricity is produced from renewable sources.[33]

[31] Insurance companies, individually, not regulated by law.

[32] An overview is given by the Austrian touring Club: https://www.oeamtc.at/?id=2500%2C1137548%2C%2C

[33] http://www.e-connected.at/content/f%C3%B6rderm%C3%B6glichkeiten-%C3%B6sterreich
http://www.arboe.at/auto-motor-radfahrer/rund-ums-auto/elektromobilitaet/

4. Market Potential

4.1 Main Drivers and Constraints[34]

Petroleum products are the main energy source for the traffic sector (95%) in Austria. The privately owned car is the less efficient means of transport with an average energy consumption of 0.56 kWh per km.

In general terms and at European level, the main market barriers for the successful integration of electric mobility into European transport systems include technological, infrastructural and cost-related aspects. Finding integrative solutions to overcoming the current challenges concerning battery technology, standardisation of the recharging infrastructure, interaction with electricity generation systems and cost and business case of large scale introduction is crucial for the development of the electric mobility market in the short and long term. The increased demand for EVs, along with the sharing of best practice and extensive public and organisational awareness-raising activities, will help encourage infrastructure and technological investments and reduce costs. However e-mobility in motorised individual transport will become prominent only from 2017 onwards (WEM – with existing measures). In the upcoming years the offer concerning e-vehicles will expand.

The most significant effect can be reached by awareness raising measures as well as increasing the range of the e-cars. In addition an expansion of the infrastructure for e-cars (number of charging stations) is necessary.

Solely an increasing variety of e-cars on the market will have no effect on the number of e-cars sold.

In the specific case of Austria, the following drivers and constraints can be mentioned:

Table 9 Drivers and Constraints Electric Mobility

Potential Drivers	Constraints
• Awareness raising measures • Silent driving • Development of the charging infrastructure • High fuel costs for conventional cars • Increase of the range • Lower purchase costs for e-cars • Delivery services (high potential) • Environmentally friendly • Being a trendsetter when purchasing an e-car • Sharing an e-car for lowering the costs • Tax benefits for environmentally friendly cars • Less or no parking fee with an e-car in the city centre • New sharing concepts to support co-modality	• Substantially higher purchase costs (in comparison to conventional cars) • Expected declining cost motivate people to wait • Lack of experience • Teething problems; not yet technically mature • Range anxiety • Cold winters / lack of innovative heating concepts • Unclear resale value • Only a limited number of e-cars is available on the market • Not suitable for long-distance hauling • Network of charging stations is still weak

Source: Own table based on Umweltbundesamt - Federal Environment Agency, Wien, "ELECTRIC MOBILITY IN AUSTRIA, Determinants of the decision to purchase alternatively fuelled vehicles: A discrete decision experiment" (2012)

[34] Source: Umweltbundesamt - Federal Environment Agency

5. Local Assessment

5.1 Starting Point

VORARLBERG

In 2008, Vorarlberg was awarded funding to set up the first e-mobility model region in Austria. It is subsidized with 4.7 million EUR by Austria's Climate and Energy Fund for phase one and 551,000 EUR for phase two beginning in 2010.

Instead of purchasing an electric car, the customer gets a "mobility card" for approximately 350 EUR a month (exact price depends on vehicle type).The mobility card includes, apart from the car lease, maintenance costs of the electric parts, a free pass for the Vorarlberg public transit system, and free charging at public charging stations. After four years the car can be purchased by the customer for a residual value of 25% of the initial purchase price. A key for the park-and-charge system gives access to all park-and-charge stations in Switzerland, Austria, and Germany along with additional benefits.

LOWER AUSTRIA

Ecoplus, the Business Agency of Lower Austria, backed by the Lower Austrian departments of the economy and the environment, has set up the Lower Austrian e-mobility initiative. The e-mobility initiative of Lower Austria is both first and central point of contact as well as the know-how hub for all matters involving e-mobility in Lower Austria.

The e-mobility initiative of Lower Austria informs and assists innovative companies, entire regions and municipalities, but also all Lower Austrian citizens interested in the topic of electric mobility. The e-mobility initiative sets up and supports regional and communal pilot projects, aids Lower Austrian companies in their efforts to develop, manufactures and markets electric mobility-related products and services in Lower Austria. They are also active in the creation of a suitable framework (grants, infrastructure etc.) for future electric mobility applications and enhance the acceptance of e- technology among the general population.

STYRIA

In 2009, subsidies for electric vehicles had been introduced in Styria and after one year 1,700 more e-bikes, 100 more e-scooters and some e-cars were running. In order to accelerate the development of e-mobility and above that of a "new mobility", an integrative concept is elaborated including optimisation of multimodal transport (a rail system and biofuel driven busses will be combined with a car sharing and car rental model, with a growing share of e-cars) and the use of renewable energies for transport (Styrian Government is supporting cogeneration on the basis of biomass as well as photovoltaic systems in order to cover the growing demand of e-vehicles for electricity only by renewable energy sources).

Graz had been also focus on the optimization of the regional transport system and the integration of 500 electric two-lane and 2,000 single-lane vehicles from 2011 to 2013 with a funding of 1.6 million EUR. The installation of 140 charging stations with 950 charging points was planned. The additional energy demand would be partially supplied with new photovoltaic units. In total, a yearly saving in CO_2 emissions of approximately 1,000 tons is expected.

Additional activities by the Graz city council include a subsidy of 1,500 EUR for electric vehicles for taxis or social and delivery services. Vehicles for driving schools are eligible for

up to 1,000 EUR. The “Municipal Energy Concept Graz 2020” includes a section for electric mobility and sets a target of 15% of new registrations for electric vehicles by the year 2020.

5.2 General Aspects of Mobility

DEMOGRAPHY

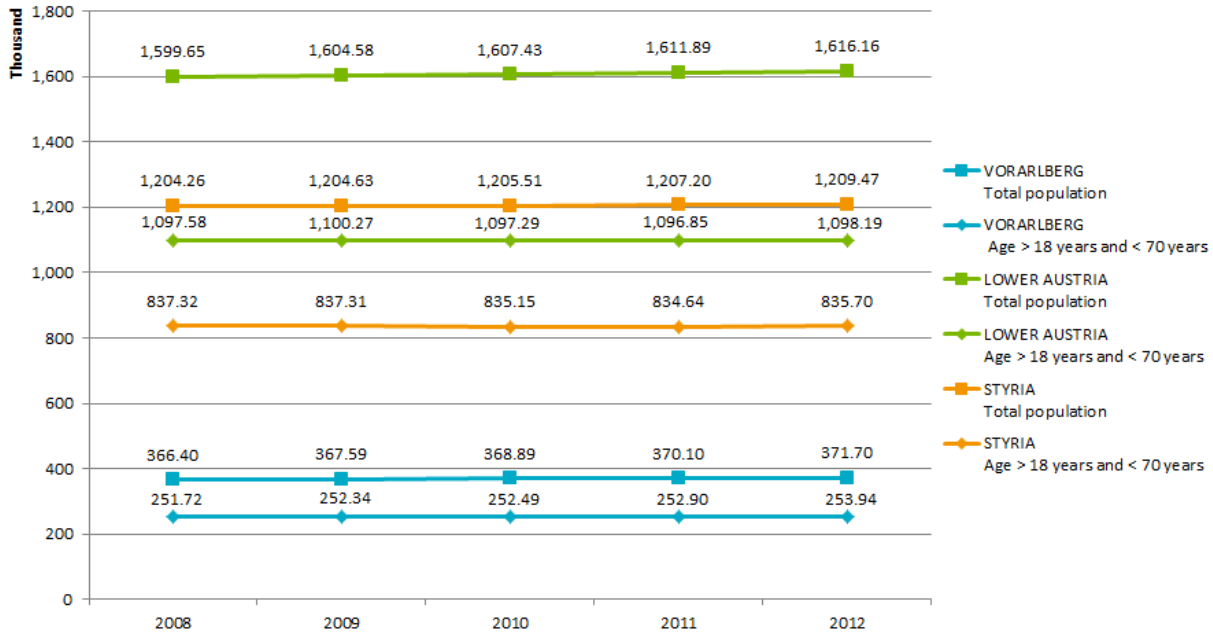
In Figure 13, two different figures concerning population of Vorarlberg, Lower Austria and Styria are displayed (for the years 2008 to 2012): total population and population aged between 18 and 70 years (old enough to get a driving license).

Vorarlberg´s population aged between 18 and 70 years has increased by 0.88% from 2008 to 2012 total population has grown by 1.45%. This fact underlines the aging trend. The average age in Vorarlberg increased from 39.6 years in 2010 to 40.2 years in 2012. In 2012, slightly more than two third of the population was working population (68.32%). This percentage has decreased since 2008 (68.70% working population).

Lower Austria´s population aged between 18 and 70 years stayed almost the same (rose by 0.06% only) from 2008 to 2012, whilst the total population has grown by 1.03%, this point confirms a slightly aging trend. In 2012, around two third of the total population was working population (67.95%). This percentage is similar to previous years, being the average for the period 68.29%.

Styria´s population aged between 18 and 70 years has decreased by 0.19% from 2008 to 2012, whilst the total population has grown by 0.43%, this development confirms the aging trend in Styria. In 2012, about two third of Styria’s population was working population (69.10%). This percentage of the share of the working population is steadily decreasing; whilst 2008 it was 69.53%, it went down to 69.14% in 2011 and further decreased in 2012.

Figure 14 Demographic trends



Source: Own graphic based on Statistik Austria - Austrian Statistical Office (2013)

MOBILITY PATTERNS

In 2008, 90% of the Vorarlberg´s population travels Monday to Friday whilst 81% travel during the weekend. 54% of the trips on Monday to Friday were done by their own vehicle (car/motorbike), 33% walked or cycled and the remaining 13% used public transport. The weekends are showing a different scenario: The use of the private car / motorbike increases significantly (61%), use of public transport goes down (only 5%). Walking / cycling is almost similar to the percentage during the week (34%).

In the same year, 87% of Lower Austria´s population travels Monday to Friday and 78% during the weekend. 64% of the trips on Monday to Friday were done by their own vehicle (car/motorbike), 23% walked or cycled and the remaining 13% used public transport. On weekends, only 2% are using public transport, whilst 69% of the trips are done by car or motorbike (5% more than during the week) and 31% of the trips are walked or cycled (8% more than during the week).

In 1995[35], 55% of the Styria's trips were done by their own vehicle (car/motorbike), 30% walked or cycled, 14% used public transport and 1% others means of transport.

Comparing the three cases, the shares are quite similar. More than half of the trips are done by car/motorbike, followed by walking/biking (30 to 35%) and far behind is the use of public transport (less than 15% on working days, 2 to 5% on the weekend).

Table 10 Modal share 2008/1995

Monday-Friday	Vorarlberg	Lower Austria	Styria	Weekend	Vorarlberg	Lower Austria	Styria
Walk / Bike	33%	23%	30%	Walk / Bike	34%	31%	-
Car / Motorbike	54%	64%	55%	Car / Motorbike	61%	69%	-
Public Transport	13%	13%	14%	Public Transport	5%	2%	-
Other	-	-	1%	Other	-	-	-

Source: Own table based on HERRY Consult GmbH, "Mobility in Vorarlberg: Results of traffic behaviour survey 2008" (2009), HERRY Consult GmbH, "Mobility in Lower Austria - results of the national survey of mobility 2008" (2009) and BMVIT - Federal Ministry for Transport, Innovation and Technology (2011)

Regarding reasons for travel, in 2008, 53% of Vorarlberg´s trips on Monday to Friday were done due to leisure/other and the remaining 47% due to work/studies, however, on weekend this trend is more pronounced, being 91% of trips done due to leisure/other.

Quite similar are the data (same year) for Lower Austria, where 58% of trips on Monday to Friday were done due to leisure/other and 42% due to work/studies, being as well this trend more pronounced on weekend, with 90% of trips done due to leisure/other.

[35] Data only available for 1995, source: BMVIT - Federal Ministry for Transport, Innovation and Technology, Transport in Figures 2011

Table 11 Reasons for travel 2008							
Monday-Friday	Vorarlberg	Lower Austria	Styria	Weekend	Vorarlberg	Lower Austria	Styria
Work / Studies	47%	42%	-	Work / Studies	9%	10%	-
Leisure / Other	53%	58%	-	Leisure / Other	91%	90%	-

Source: Own table based on HERRY Consult GmbH, "Mobility in Vorarlberg: Results of traffic behaviour survey 2008" (2009), HERRY Consult GmbH, "Mobility in Lower Austria - results of the national survey of mobility 2008" (2009)

Regarding average number of trips per person and day (2008), for both Vorarlberg and Lower Austria, the average on weekend is lower than on Monday to Friday.

In Vorarlberg, on the weekend, the average trips per person and day on the weekend is lower (2.2 trips) and the average distance is longer (15.7 km) than on a working day (on average 3.2 trips per person and day, 9.6 km average distance per trip).

In Lower Austria case, the average trips per person and day are 2.2 on the weekend and 2.9 on Monday to Friday. It can be said that the average resident travels more often on weekends than during the week (0.7 more trips). The average distance is the same in both cases (15 km per trip).

Table 12 Number of trips and distance 2008					
Monday- Friday	Vorarlberg	Lower Austria	Weekend	Vorarlberg	Lower Austria
Average travels per person (by day)	3.2	2.9	Average travels per person (by day)	2.2	2.2
Average distance per travel (km)	9.6	15.0	Average distance per travel (km)	15.7	15.0

Source: Own table based on HERRY Consult GmbH, "Mobility in Vorarlberg: Results of traffic behaviour survey 2008" (2009), HERRY Consult GmbH, "Mobility in Lower Austria - results of the national survey of mobility 2008" (2009)

5.3 The Local Carpool

TOTAL VEHICLES

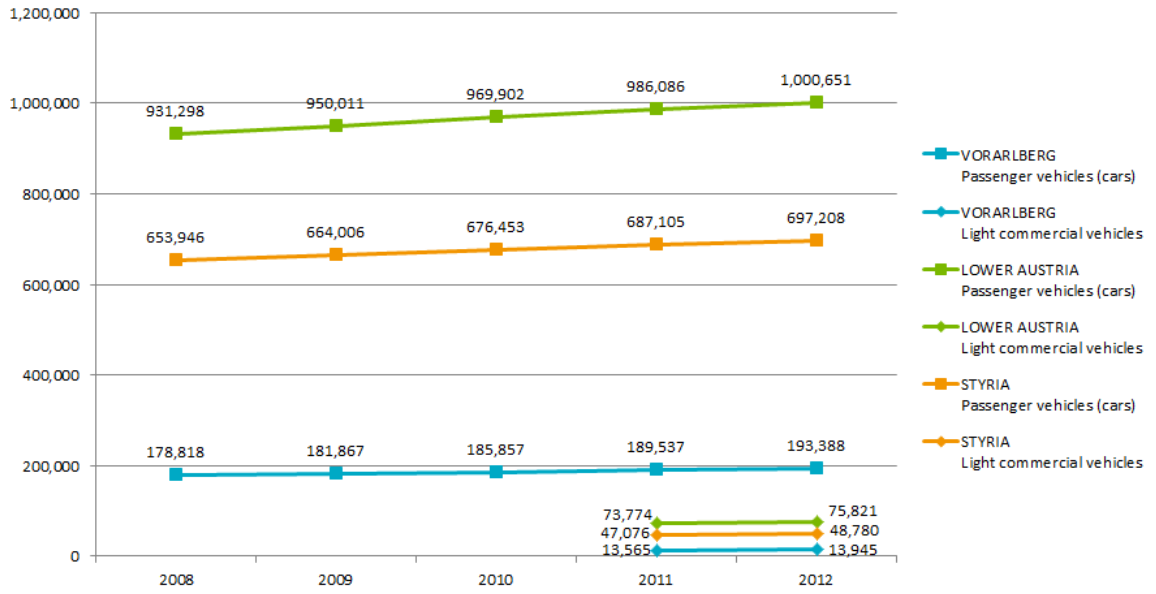
The number of passenger cars and light transport vehicles[36] in Vorarlberg has increased steadily from 178,818 vehicles in 2008 to 207,333 in 2012. Total vehicles registered have increased by 15.95% in this period. In 2012, 93.27% of all registered vehicles were passenger cars.

In Lower Austria, the number of passenger cars has increased from 931,298 in 2008 to 1,000,651 in 2012. Total vehicles registered have increased by 15.59% in this period, the number of passenger cars have increased from 2011 to 2012 by 14,565 vehicles (a plus of 1.48% in only one year). Of all registered vehicles in 2012, 92.96% were passenger cars.

[36] Commercial carrier vehicle with a gross vehicle weight of not more than 3.5 tons

In Styria, the number of passenger cars and light transport vehicles has increased steadily from 653,946 vehicles in 2008 to 745,988 cars in 2012. Total vehicles registered have increased by 14.07% from 2008 to 2012. The ascent of passenger cars from 2011 to 2012 was 1.47%, whilst the increase of the total vehicles for the same year was 1.61%. In 2012, 93.46% of all registered vehicles were passenger cars.

Figure 15 Total passenger vehicles registered 2008 – 2012 [37]



Source: Own graphic based on Statistik Austria - Austrian Statistical Office (2013)

VEHICLE POWERTRAIN TYPE

In 2012, in Vorarlberg, 0.53% of the total passenger vehicles were alternative fuelled vehicles; with 99.47% being conventional fuelled vehicles. Among the alternative fuelled vehicles a big percentage, 83.17% (0.44% of the total), were liquefied petroleum gas (LPG), compressed natural gas (CNG), bivalent fuelled vehicles, plug-in hybrid electric vehicles (PHEV) or hybrid electric vehicles (HEV). 16.83% (0.09% of the total) was battery electric vehicles (BEV). LPG, CNG, bivalent, PHEV and HEV registered vehicles have more than doubled (increased by 155.22%) between 2008 and 2012. In the same period, BEVs have almost quintupled (377.40%).

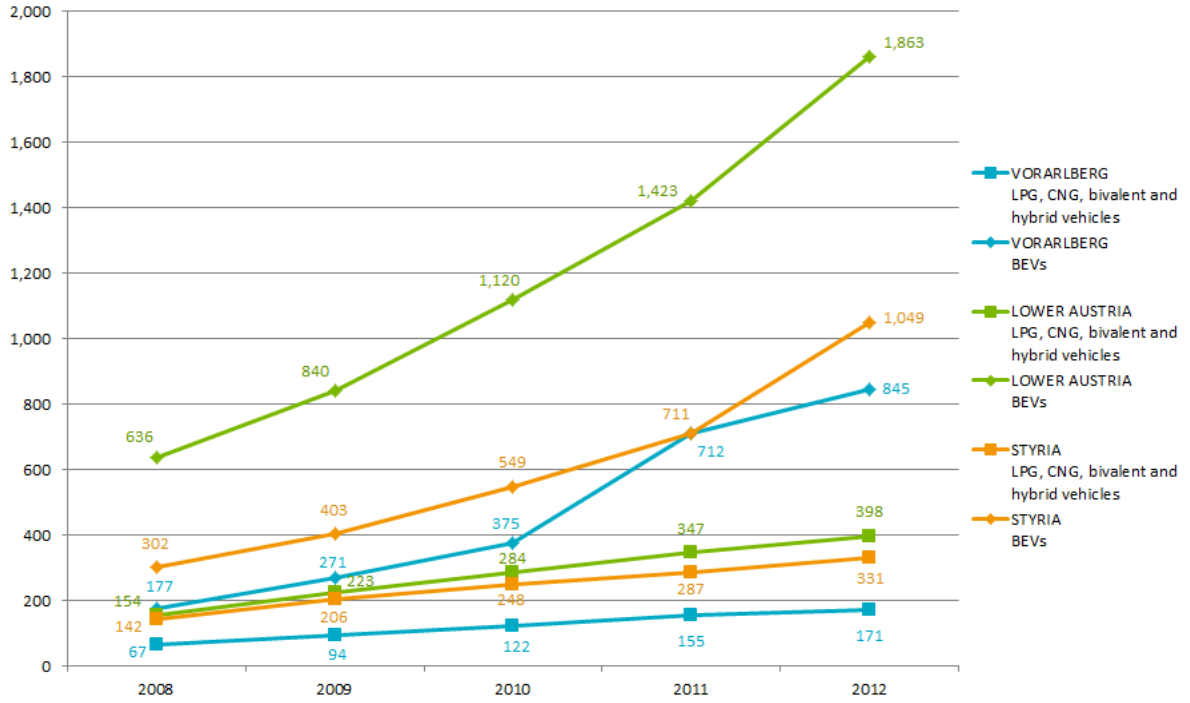
In the same year in Lower Austria, 0.23% of the total passenger vehicles were alternative fuelled vehicles; being 99.77% conventional fuelled vehicles. Among the alternative fuelled vehicles a big percentage, 82.40% (0.19% of the total) were liquefied petroleum gas (LPG), compressed natural gas (CNG), bivalent fuelled vehicles, plug-in hybrid electric vehicles (PHEV) or hybrid electric vehicles (HEV). 17.60% (0.04% of the total) were battery electric vehicles (BEV). LPG, CNG, bivalent, PHEVs and HEVs registered vehicles have far more than doubled (plus almost 160%) between 2008 and 2012. In the same period, BEVs have almost tripled (plus 192.92%).

In Styria (2012), 0.2% of the total passenger vehicles were alternative fuelled vehicles; being 99.8% conventional fuelled vehicles. The major share of alternative fuelled vehicles is battery

[37] No data available for light transport vehicles before 2011

electric vehicles (BEV); they represent a share of 76.01% (0.15% of the total). 23.99% (0.05% of the total) were liquefied petroleum gas (LPG), compressed natural gas (CNG), bivalent fuelled vehicles, plug-in hybrid electric vehicles (PHEV) or hybrid electric vehicles (HEV). This distribution is contradictory to the national and local cases analysed in the previous sections, in which BEVs were the minority. BEVs registered vehicles have far more than tripled between 2008 and 2012 (from 302 vehicles in 2008 to 1,049 vehicles in 2012). In the same period, LPG, CNG, bivalent, PHEVs and HEVs have a bit more than doubled (142 vehicles in 2008, 331 vehicles in 2012).

Figure 16 Passenger vehicles powertrain type 2008 - 2012



Source: Own graphic based on Statistik Austria - Austrian Statistical Office (2013)

MOST REGISTERED EVS PER SUPPLIER & MODEL

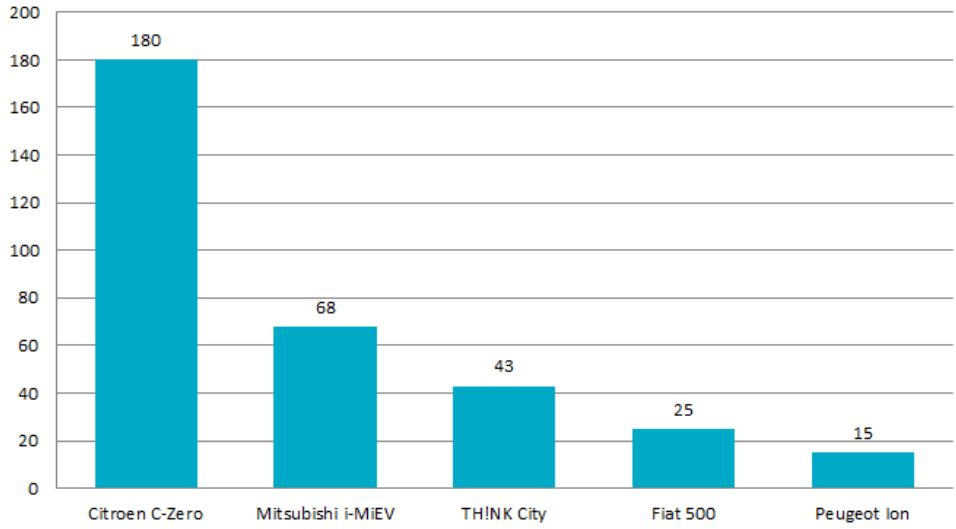
Based on the new vehicle registrations 2012 in Vorarlberg, Figure 16 shows a selection of the most registered EVs with Citröen C-Zero leading by far the registrations market (51.14%).[38]

The following popular models are: Mitsubishi i-MiEV (19.32%), TH!NK City (12.22%), Fiat 500 (7.10%) and Peugeot iOn (4.26%).

Further EV models amount to 5.97% of the EVs registrations: Fiat Panda and Citroen Berlingo (6 units/each), Tazzari Zero and Volvo C30 (2 units/each), Renault Twingo, Mazda 2, Renault Kangoo, Nissan Leaf, Peugeot Partner (1 unit/each).

[38] Data only available for Vorarlberg (VLOTTE project)

Figure 17 Selection of most registered EVs 2012 (Vorarlberg)

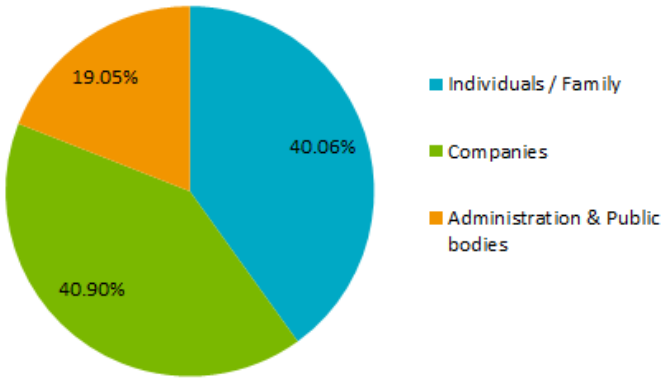


Source: Own graphic based on Status report of e-mobility model region VLOTTE (2013)

EVS OWNERSHIP

Regarding ownership in Vorarlberg (2012), shares of individuals/families and companies are very similar with about 40% each, whilst administration and public bodies' shares represent almost 20% of the total EV ownership.

Figure 18 EVs ownership 2012 (Vorarlberg)



Source: Own graphic based on data provided by Christian Eugster, project manager VLOTTE (2013)

6. References

- ARBÖ Club

  http://www.arboe.at/auto-motor-radfahrer/rund-ums-auto/elektromobilitaet/

- Austrian Economics Publisher GmbH and Datafact-Online

  http://www.automotive.co.at/

- Austrian Mobile Power

  http://www.austrian-mobile-power.at

- Austrian Touring Club

  https://www.oeamtc.at/?id=2500%2C1137548%2C%2C

- BMVIT - Federal Ministry for Transport, Innovation and Technology

  http://www.bmvit.gv.at/en/index.html

- Business Agency of Lower Austria

  http://www.ecoplus.at/

- Business car sharing operators and charging infrastructure operators.

- Council of the European Union (2010). Conclusions on clean and energy-efficient vehicles for a competitive automotive industry and decarbonised road transport. Brussels, 2010.

  http://www.consilium.europa.eu/uedocs/cms_Data/docs/pressdata/en/intm/114617.pdf

- Consultations to Christian Eugster, project manager VLOTTE.

- Data Technology Betriebsberatungs GmbH & Co KG, “Volatile markets: The Austrian leasing market in 2012” (2013)

  http://www.leasingverband.at/

- e-connected, initiative for electric mobility and sustainable energy supply of the Ministry of Climate and Energy Fund (2013)

  http://www.e-connected.at/

- Elektroautos Österreich – Übersicht und nützliche Information - e-cars Austria – overview and useful information

  http://elektroautos.bplaced.net/statistik.html

- Environment Agency Austria

  http://www.umweltbundesamt.at/en/

- European Environment Agency (EEA)

  http://www.eea.europa.eu/es

- European Platform on Mobility Management

  http://www.epomm.eu/

- European Commission (2011a) WHITE PAPER - Roadmap to a Single European Transport Area: Towards a competitive and resource efficient transport system (2011) COM/2011/0144 final.
- European Commission (2011b) Europe 2020 Targets

  http://ec.europa.eu/europe2020/pdf/targets_en.pdf
- Eurostat (2013a) GDP at current market prices (accessed October 2013).

  http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/National_accounts_%E2%80%93_GDP
- Eurostat (2013b) Population on 1 January. (accessed October 2013)

  http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&language=en&pcode=tps00001&tableSelection=1&footnotes=yes&labeling=labels&plugin=1
- Eurostat (2013c) Population structure and Age (accessed October 2013)

  http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Population_structure_and_ageing
- Eurostat (2013d) Indicators Theme 6 Climate Change and Energy (accessed October 2013)

  http://epp.eurostat.ec.europa.eu/portal/page/portal/sdi/indicators/theme6
- Eurostat (2013e) Indicators Theme 7 Transport (accessed October 2013)

  http://epp.eurostat.ec.europa.eu/portal/page/portal/sdi/indicators/theme7
- European Automobile Manufacturers' Association (ACEA). Pocket guide 2013.

  http://www.acea.be/images/uploads/files/POCKET_GUIDE_13.pdf
- HERRY Consult GmbH, “Mobility in Vorarlberg: Results of traffic behavior survey 2008” (2009)
- HERRY Consult GmbH, “Mobility in Lower Austria - results of the national survey of mobility 2008” (2009)
- Hybrid & Electric Vehicle Implementing Agreement (IA-HEV), Austria

  http://www.ieahev.org/by-country/austria/
- International Energy Agency (2013 a) Electric Vehicle Sales and Government Targets 2013

  http://www.iea.org/etp/tracking/electric-vehicles/
- IEA (2013 b) Tracking Clean Energy Progress 2013

  http://www.iea.org/publications/TCEP_web.pdf
- IEA (2012) CO_2 Emissions from fuel combustion 2012. Highlights.

  http://www.iea.org/media/statistics/CO2highlights.pdf
- Klima- und Energiefonds - Climate and Energy Fund of the Federal Government

  http://www.klimafonds.gv.at/
- Kommunalkredit Austria AG

  http://www.kommunalkredit.at/
- Statistisches Bundesamt - Federal Statistics Authority
  - Statistik Austria - Austrian Statistical Office

http://www.statistik.at/

- statcube.at
- www.alles-fuehrerschein.at
- Thomas Brinkhoff: City Population

  http://www.citypopulation.de/Oesterreich-Cities_d.html

- Status report of e-mobility model region VLOTTE (2013)

  www.vlotte.at

- Umweltbundesamt - Federal Environment Agency, Wien, “ELECTRIC MOBILITY IN AUSTRIA, Determinants of the decision to purchase alternatively fueled vehicles: A discrete decision experiment“ (2012)
- Umweltbundesamt, Klimaschutzbericht, Federal Environment Agency, Climate Protection Report (2013)

eBRIDGE: Empowering e-fleets for business and private purposes in cities

ebridge-project.eu

Co-funded by the Intelligent Energy Europe Programme of the European Union