



EU COMMUNITY
INTELLIGENT ENERGY EUROPE
Promotion & Dissemination Projects
Electric City Transport – Ele.C.Tra

D.6.5 Feasibility Study for Malta

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

01 July 2013 – 31 December 2015

Work Package 6

POST-OPERAM

Task:

Feasibility study fulfilment

Scientific Coordinator:

Genoa

WP Coordinator:

Zagreb



Electric City Transport – Ele.C.Tra.

Deliverable Title: Structure template for Feasibility Study (D.6.5) for all non-pilot cities

Partner Responsible: ZAGREB

Work Package 6: POST-OPERAM

Submission Due Date: 30/9/2015

Actual Submission Date: 30/11/2015

Dissemination level: PU

Abstract:

This document includes the main aspects regarding the development of Feasibility Studies (D.6.5) for all non-pilot cities

Document Information Summary

Deliverable Number:	6.5
Deliverable Title:	Feasibility Study for all non-pilot cities
Editor:	MIEMA
Work package no:	6
Work package leader:	ZAGREB
Work package participants:	Non-pilot cities
Main Target Audiences:	Partners
Version/Revision:	V1
Draft/Final:	Final
Keywords:	Non-pilot



DISCLAIMER

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

Grant Agreement Number: IEE/12/041/SI2.644730 – Ele.C.Tra

Start Date: 01 July 2013

Duration: 30 months

Document Approval

Approved by	Date
Steering Committee:

TABLE OF CONTENTS

1. SHORT OVERVIEW OF THE STATE OF THE ART..... 5
 Public Transport System in Malta..... 5
 Definition of Electromobility 6

2. SWOT ANALYSIS OF THE INTRODUCTION OF ELECTRA MODEL 8
 2.1. SCOOTER SHARING SYSTEM 8
 2.2. PRIVATE OWNERS OF E-LIGHT VEHICLES10
 Technology aspect.....11
 2.3. BUSINESS OWNERS OF E-LIGHT VEHICLES12

3. GUIDELINES FOR THE INTRODUCTION OF ELECTRA MODEL17
 3.1. POLITICAL AND LEGISLATIVE SUPPORT17
 3.2. CONSTRAINTS FOR THE DEVELOPMENT OF THE ELE.C.TRA MODEL18
 3.3. POSSIBLE SOLUTIONS FOR THE CRITICAL ISSUES.....20

4. SYNTHESIS OF THE POTENTIAL USERS’ NEEDS22
 4.1. SCOOTER SHARING SYSTEM24
 4.2. PRIVATE OWNERS OF E-LIGHT VEHICLES25
 4.3. BUSINESS OWNERS OF E-LIGHT VEHICLES26

5. POSSIBLE BUSINESS MODELS FOR THE IMPLEMENTATION OF ELECTRA29

6. ECONOMIC AND FINANCIAL ASPECTS OF THE MODEL30
 6.1. SCOOTER SHARING SYSTEM30
 6.2. PRIVATE OWNERS OF E-LIGHT VEHICLES30
 6.3. BUSINESS OWNERS OF E-LIGHT VEHICLES30

7. THE APPROPRIATE TECHNOLOGY AND INFRASTRUCTURE32

8. THE IMPACT OF THE SUGGESTED SCENARIOS ON THE ENVIRONMENT.....33

9. PLANNED ACTIVITIES FOR THE INTRODUCTION OF E-LIGHT VEHICLE SHARING SYSTEM.....34

Concluding Remarks.....36



1. SHORT OVERVIEW OF THE STATE OF THE ART

DESCRIPTION of the situation in your city.

You can consider your non-pilot questionnaire contents (fulfilled during the meeting in Rafina), updated data and information

The Maltese Islands are situated in the middle of the Mediterranean Sea, 93 km off the south of Sicily and 288 km in the north of Africa. The archipelago consists of three islands: Malta, Gozo and Comino with a total population of over 400,000 inhabitants occupying an area of 316 square kilometers.

The Maltese GDP is Eur 17,490 Per capita which places it just above the middle of the list of European Union. Malta joined the EU in 2004 and it has been admitted into the Eurozone since the 1st of January 2008.

Solar energy is the only naturally occurring source of energy in Malta and it also relies on imported fossil fuels. Its thirst for energy is quenched by the combustion of crude oil and other fraction of petroleum. The likelihood of the existence of oil in Malta's territorial waters has encouraged the Maltese Government to opt for oil exploration.

The dependence on oil has increased by 53% between 1990 and 2004. In 2008 the renewable energy market was still at an early stage during which only solar energy and biofuels were accounted to be used. According to the European Commission, Malta has a potential for both solar and wind.

MIEMA's participation in the Ele.C.Tra project addresses the possibility of utilising innovative means of transport to which Maltese commuters can resort. As indicated by the name of the project, the initiatives being proposed are powered by electricity.

Subsequently the project is aiming to increase the use of electric scooters in urban areas through short sharing, while contributing to the 2020 goals. It is envisaged how a modal electric scooters share can acquire an amount equal to 1% of house-work/school daily trips (= about 4.700 daily trips in less in a urban area with 1 million of inhabitants).

Public Transport System in Malta



Malta's public transport system had been an outmoded structure for decades. Its itineraries were inflexible, failing to accommodate to modifications in the demography. Due to the aforementioned inefficiency, there has been a dramatic increase in the reliance on personal automobiles. The latter expedited a cutback in the utilization of public bus transportation. According to statistics, figures dropped from 59.2 million in 1979 to 30.2 million passengers in 2009. Consequently the engagement of the Malta Intelligent Energy Management Agency (MIEMA) in the ELECTRA project, has the target of recognizing occurrences which endure untenable maneuverability; The aforementioned takes place either due to the lack of access of public transport or the thorough use of vehicles depending on intramural combustion engines.

The Ele.C.Tra project plans to confront such concerns through the evolution and employment of a Greener Transport Model relying on electric scooters and plausible charging systems. In Malta's case, this inventive method of transportation, will have the consequence function of improving travel times between point of supply and leading office/industrial centres. The fundamental distinctiveness of this model will circle around the usage of a competent web-based scheme which improves the use, chartering and charging of an electric scooter.

Definition of Electromobility

Electric mobility represents the concept of using electric powertrain technologies, in vehicle information, communication technologies and connected infrastructures to enable the electric propulsion of vehicles and fleets. Powertrain technologies include full electric vehicles and plug-in hybrids, as well as hydrogen fuel cell vehicles that convert hydrogen into electricity. Electric mobility efforts are motivated by the need to address fuel efficiency and emission requirements, as well as market demands for lower operational costs.



For the purpose of this Action Plan, besides BEV, the technology recognized under the electric mobility term includes; Plug-in Hybrid Electric Vehicles (PHEV), Hybrid Electric Vehicle (HEV) and Hydrogen Fuel Cell Electric Vehicles (FCEV). To the original list of vehicles it was felt that range-extender electric vehicles (REEV) should also be included due to the fact that the new type of REEV includes a fully fletched battery similar to those found on BEV, but which are aided with petrol / diesel and, sould it be needed, can drive trains for longer distances..



2. SWOT ANALYSIS OF THE INTRODUCTION OF ELECTRA MODEL

This part of the report focuses on the Strengths, Weaknesses, Opportunities and Threats of zero emission two wheeled transport in the context of the local implementations and situations.

It was discovered how there are various elements contributing to the viability of the Ele.C.Tra transport model in each region. Here we are taking stock of each SWOT for private users, leasing and private businesses. In this way the Ele.C.Tra consortium aims to come up with a combination of strengths and weaknesses to overcome the threats and opportunities.

The SWOT analysis is being coupled with the ELE.C.TRA model to identify those methods which can be applied to reduce the congestion on the Maltese roads and the emissions of carbon dioxide (CO₂), nitrogen oxides (NO_x) and fine dust (PM₁₀) in urban environments. The realm of the ELE.C.TRA model will include the deployment of zero emission scooters and their combination with renewable and clean energy sources. The vehicles are tested in pilot project implementations in six European cities.

2.1. SCOOTER SHARING SYSTEM

STRENGTH	WEAKNESSES
<p>Former experiences with ride or car sharing</p> <p>Already existent knowledge about research in automotive and engineering</p> <p>Potential for reducing air pollution</p>	<p>Lack of parking spaces</p> <p>No co-operation between bicycle transport and public transport</p> <p>Charging takes too long</p> <p>Cost of Batteries still very high</p>

<p>significantly</p> <p>Availability of Charging points and GIS map</p> <p>BEVs charging infrastructure is easy to network</p> <p>High innovation and advanced environmental awareness</p> <p>Ability to charge vehicles with RES</p> <p>Beneficial for Power Station</p>	<p>Return on investment could be longer than the lifetime of the batteries</p> <p>Lack of economies of scale</p> <p>Low vocational skills</p>
<p>THREATS</p>	<p>OPPORTUNITIES</p>
<p>There are no clusters of this kind</p> <p>Overwhelming use of cars used for home-to-work traffic during rush hour</p> <p>High costs may discourage EV uptake</p> <p>Range Anxiety</p> <p>Bad reputation of the old BEV technology</p>	<p>Maltese people are willing to share an electric ride rather than buying an electric scooter</p> <p>Some already existent experience of local industry in the globalized economy</p> <p>A rise in positive attitude towards electric mobility and reduction of pollution.</p> <p>It is one of the prime topics of discussion in the local media.</p> <p>In Malta, most vehicles are occupied only by the driver.</p>

--	--

2.2. PRIVATE OWNERS OF E-LIGHT VEHICLES
 (INCENTIVES FOR PRIVATE E-LIGHT VEHICLES USERS)

STRENGTH	WEAKNESSES
<p>Former experiences with e-mobility implementations</p> <p>Academic knowledge and research in automotive and engineering faculties</p> <p>Local cooperation culture – creating enterprise clusters</p> <p>National importance of your city/region to have</p> <p>Potential for improving air quality significantly</p> <p>Local utility offers in renewable energy</p>	<p>Number of public parking (multistorey park decks and underground garages)</p> <p>No co-operation between bicycle transport in public transport (incl. pedelec/e-bikes)</p> <p>Charging Times</p> <p>Cost of Batteries</p> <p>The use of such private business initiatives may lead to unfeasible costs related to the ownership of a car (which is not being used)</p>
THREATS	OPPORTUNITIES
<p>Apart from another electric automotive company there are no other clusters of this kind</p>	<p>High Vehicle culture</p> <p>Contribution to climate change targets</p> <p>Experience of local industry in the</p>



<p>High percentage (72%) of cars used for home-to-work traffic during rush hour (7.30 a.m. -8.30 a.m.). Most of these vehicles are occupied by only one person.</p> <p>BEV market uptake cannot be assured</p> <p>Limited National Budgets that hinder incentives</p> <p>Not reaching the BEV-on-the-road target by 2020</p>	<p>globalized economy</p> <p>Positive attitude towards everything that suggests pollution reduction.</p> <p>It is one of the main topics of discussion on all local media.</p> <p>Exposure to the latest R&D developments</p>
--	---

In order to address the challenges laid out above, we must start to re-think mobility. , E scooters, for example, can be part of the solution. The man in the street asks himself whether it is still economically viable to own one or two vehicles or whether it is more feasible to share the second vehicle rather than own it.

It is envisaged how the Maltese municipalities will also need to provide their contribution in achieving the final goal. This could incorporate reserving parking zones, the provision and installation of appropriate signage and the addition of more bike lanes.

Technology aspect

The overall solution incorporates a web-app management platform which provides the full lifecycle relating to the charging of electric scooters.



The Ele.C.Tra web-app provides geographical information about the points and the status of the various charging points. Moreover, a secure e-account can enable drivers to pre-book charging slots by securely authenticating themselves. This authentication may rely upon RFID when they drive-up to the charging stations.

This type of technology integrates itself with a secure payment gateway for card processing as well.

2.3. BUSINESS OWNERS OF E-LIGHT VEHICLES

(USE OF VEHICLES WITHIN THE BUSINESS OBJECT) i.e. on the public transport turn stalls, internal deliveries)

The Ele.C.Tra transport model also looks at the viability of employee incentive schemes for scooter-sharing and green modes of transport. This measure encourages a green travel plan for each business which will incorporate scooter-sharing and the take-up of greener modes of transport. These are intended to reduce carbon emissions within the Maltese industrial sector while showcasing this mode of transport to the man in the street.

Strengths	Weaknesses
------------------	-------------------

<ul style="list-style-type: none"> • A cost efficient alternative mobility mode, especially in workplaces where car parking is a problem • A mobility mode which is cheaper than the leasing of parking spaces in industrial areas • Reduces traffic, Carbon Dioxide and parking problems • Safer in terms of less traffic and vehicles on the road • Enhanced transport infrastructure in terms of traffic distribution • If any worker has issues with the functionality of his car, then he can arrive on time • Less dependence on the price of fuels • Improved economic stability vis-à-vis instability of the price of crude oil • Increased punctuality in the Maltese case of rush hour 	<ul style="list-style-type: none"> • Effectiveness is correlated to the geographical distribution of workers • Not as flexible as having your own car at your disposition • If the scooter is out of order then it can lead to more workers being stuck • Application requires strong backup from the owners of the business • Requires publicity and governmental backup • The time required for one's journey would be extended. This can be both boring and tiring. • The use of such private business initiatives may lead to unfeasible costs related to the ownership of a car (which is not being used)
---	---

<ul style="list-style-type: none"> • Punctuality and less stress can contribute to a better working force/team • Provides efficient link among public transits, destinations and origins 	
<p>Opportunities</p>	<p>Threats</p>
<ul style="list-style-type: none"> • Economies of scale exploitation can lead to minimum operating costs • General trends and attitudes towards environmental friendly mobility • Increasing energy prices • Expanding work ethics • Workers which cannot be feasibly serviced through public transit can be engaged in the work force • Savings on parking slots • Punctuality 	<ul style="list-style-type: none"> • Uncritical adoption without studying special conditions and needs of a region will lead to unsuccessful implementation • Lack of governmental support • Lack of correlation with transportation authorities and reluctance at policy level • Absence of a regulatory framework for e scooter initiatives • Insufficient exposure of the concept • Pessimistic public attitude and hesitance • There are not sufficient statistics and

	studies upon the implementation of such systems
--	---

*The of the use of e scooters in private business Initiatives relies on the stakeholders' perspective. The Ele.C.Tra model bases itself on the use of communication activities through press releases, our website, surveys and other related media.

Economies of Scale

The Ele.C.Tra transport model may contribute to the creation of economies of scale. The feasibility of this transport model is directly proportional to the number of commuters. It boils down to the cost reductions per person for each trip. Such a factor is strongly correlated to geographical factors.

Subsequently, the Government of Malta is enabling and promoting the use of electric scooters and vehicles in bus lanes. Moreover, one should mention the concern about the public's safety on the pavement. In this light, the authorities should produce the corresponding legislation to safeguard everyone's mobility – on the road, in the bus lanes and on the pavements.

Promotion – Cultivation of new approach to mobility

The success rate of this new mode of transport depends upon the horizontal activities related to this subject. Thus, it is required that the targeted companies are divided into a number of target groups and then further subdivided in aim of addressing the target group accordingly. The appropriate dissemination of the psychology behind public business initiatives can be carried out through our website, horizontal activities and the dissemination of leaflets.

Technology Level



The initiatives being proposed by the Ele.C.Tra model are directly attributed to the present technology level of the scooter and GIS technologies. The modes of transport mentioned above utilize these cutting edge technologies so as to overcome the limitations of conventional mode of transport. In addition, the coverage of Internet and a GSM network will aid in most situations

Regulatory changes

The regulatory framework behind this transport infrastructure would need significant adaptation to the mentioned applications. Hence, studies on revisions on the present and proposed systems are of utmost importance in order to obtain a seamless operation between the various modes of transport – road traffic, e scooter lanes, those on the pavement and the parking slots for the sharing of a vehicle.

Funding

The implementation of this mode of transport requires a financial backup. Such help can catalyze the attainment of goals. The Government and the relevant authorities should support the creation of innovative ways to finance these initiatives.



3. GUIDELINES FOR THE INTRODUCTION OF ELECTRA MODEL

3.1. POLITICAL AND LEGISLATIVE SUPPORT

Within the context of the Ele.C.Tra e-scooter model it is foreseen that the Maltese Government needs to further support the use and deployment of electric mobility. One has to comprehend how this type of mobility is not limited to private and personal transport, but also applicable to public transport and to the transport of goods. It will mean a way of how we carry out transport activities, how to plan transportation and transport infrastructure as well as changing habits that in the future will no longer be sustainable.

The Government of Malta has formulated the Malta National Electric mobility Platform where commitment towards electric mobility and zero transport emissions in Malta are clearly defined.

The main role of the authorities is to promote and facilitate the use of electric mobility in Malta as a daily mode of transport. The transport infrastructure should not be viewed just as a new marketing position but also as the optimum mode of transport. Moreover, the stakeholders must be involved in order to avoid or solve any teething problems.

The Maltese National Support Group suggested that each company or workplace should have a representative for green transport. In this way the representatives can form clusters which support zero emissions scooters so as to contribute to the main objectives of the ELE.C.TRA model in the form of concrete plans.

This measure can contribute towards a very ambitious framework for the setting up of new projects which can assist the daily commuters and private businesses to put in place the necessary infrastructure while exposing Malta to the latest cutting edge electric scooters.



3.2. CONSTRAINTS FOR THE DEVELOPMENT OF THE ELE.C.TRA MODEL

The Ele.C.Tra model presents a technology that suits our necessities. Subsequently the authorities and the energy agencies must make sure that electric scooters become a success story. In the light of the above, we must make sure that electric mobility is also pushed in other countries by giving the right signals to the industry in order to keep up with their effort in making Battery BEVs both more efficient and available at a price that is affordable to consumers.

The framework required to embrace Battery Electric Vehicle does not only consists of a favorable electric car charging system but also an improvement in commuting behaviors such as journey planning and public acceptance of the this innovative mode of transport.

This means that the attitude towards electric mobility must overcome the setback of the higher costs of Battery Electric Vehicles. This may require the deployment of business models aimed to overcome the key challenges that are being addressed by the Ele.C.Tra model.

Similarly to other innovative technologies, when a new item is introduced on the market, the cost of cutting edge technology is usually relatively higher when compared to more conventional ones. This occurs in anticipation of the necessary economies of scale that are reached.*2

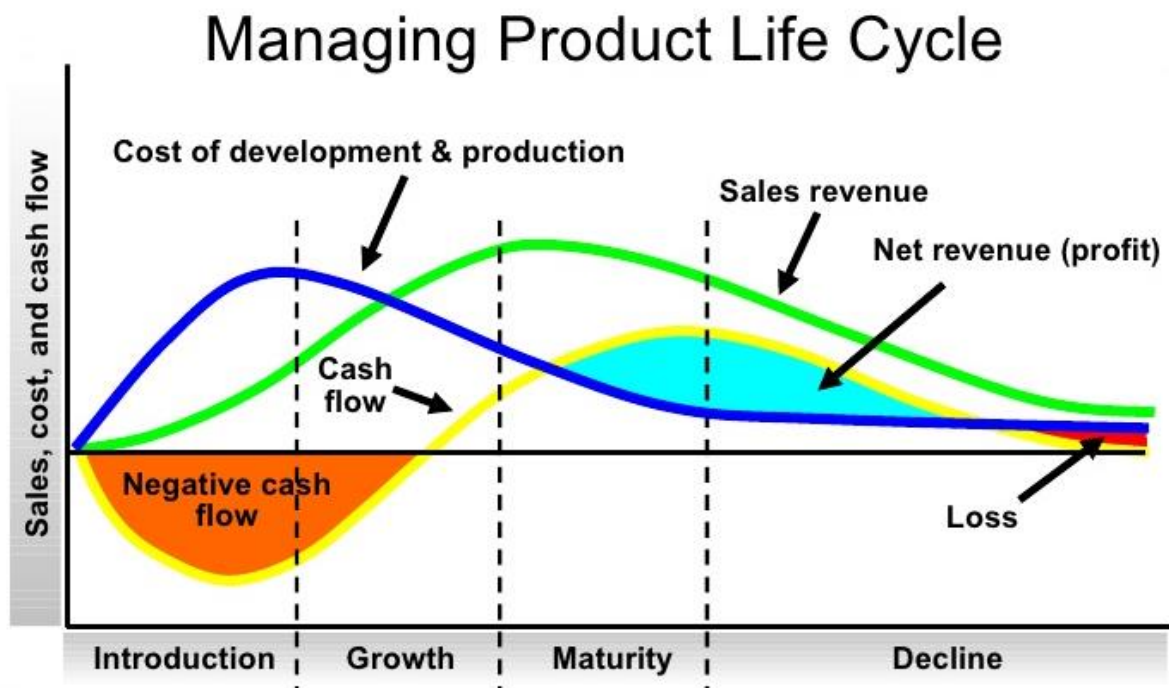


Figure 1 Cradle to Grave - how to keep the integrity of Product Definition through its life cycle

Throughout the studies carried out by the Ele.C.Tra project MIEMA discovered a number of challenges and setbacks of electric mobility. The conclusion reached was that the Maltese scenario is experiencing bigger challenges than other member states such as Germany, France, Spain and the UK. These drawbacks arise from the commuting ranges, traffic infrastructure and large number of hills and troughs which characterize the Maltese streets. Moreover, it was discovered that another difficulty which was noticed in the surveys was range anxiety vis-à-vis lifetime of the batteries when electric scooters are required to go through unpredictable routes. However the scooters' range and availability of charging points will never be a problem for Maltese commuters due to the short distances travelled in Malta and an extensive and effective charging network.

3.3. POSSIBLE SOLUTIONS FOR THE CRITICAL ISSUES

The Maltese Government has developed a policy in order to overcome the previously mentioned setbacks. This policy is aimed at applying various incentives to couple RES's and smart metres with the evolving technologies. In this way the Maltese Government aims to compose an energy cocktail in order to reduce the energetic digestion of fossil fuels.

In this manner the alternative sources of energy and fuel can play a prominent role in Malta's energy scene. This makes part of the Maltese plan to realize the idea of zero emissions as part of the process of composing a practical electric transport network. The latter must be done in an ethical way towards contributing to a sustainable world by which we conserve the environment and the quality of the air so as to ensure a sustainable future for future generations.

As part of this policy Transport Malta and the Ministry for Transport came up with an action plan which describes the national action plan for the electrification of transport in the Malta roads. This strategy has been called the Malta National Electromobility Plan, MNEP. It describes the strategies which will steer the National Authorities support and promote electric mobility.

This Plan defines how the European transport system is experiencing an untamable wind of change. Within this context, Malta finds itself in the phase of catching. In this light, the Government of Malta is conscious about the need for a leap in quality in order to improve the energy digestion of transport while protecting the environment by having modes of transport while solely rely on a combination of renewable sources of energy.

In conjunction with the MNEP, MIEMA is committed to promote the market uptake of EV's amongst private users and private companies. Therefore the MNEP both increases and supports MIEMA's participation in the Ele.C.Tra project.



Additionally MIEMA has a number of projects in the pipeline in order to continue its activities in the transport sector, specifically in the context of the electric scooter. In this manner, through EU cooperation and the exchange of information MIEMA aims to continue to improve the conditions which facilitate the demonstration, use and adaptation of additional EV's. It is envisaged that these activities will be supported through EU funding programmes, National Funds and private investments.

MIEMA devised its priorities in order to increase the application and the relevance of the outcomes of the Ele.C.Tra project during the next Programming Period. This will be further supported by the involvement of private firms, public equivalent bodies and the related authorities to create a PPP cluster.



4. SYNTHESIS OF THE POTENTIAL USERS' NEEDS

In order for a transport planner to synthesize the users' needs, one should measure the actual circumstances so as to fit the commuters' needs. A case in point could be the actual timing of financial subsidies. This arises from the fact that subsidies for electric vehicles help to start the market and attain the critical mass. However, these can only work efficiently if the available electrical vehicles suite the customers' needs.

When lead acid powered electric scooters were first introduced on the market a decade ago, financial incentives were not available to create a mass market. This was because at that point in time these type of scooters were too different from the usual ones.

Commuters usually compare electric vehicles with the conventional I-C-E ones which they already know about.

A decade later, electric scooters are more accepted as a viable mode of transport since they are seen as being similar to conventional ones within the practical context. The situation has improved as a result of correct dissemination and awareness raising campaigns (including pilot projects). Subsequently, financial subsidies also contributed to the enhancement of the position of electric scooters on the market.

When electric scooters shifted from lead-acid batteries to the more efficient lithium ion batteries, financial incentives started becoming more relevant.

This mode of transport was supported by the deployment of various charging points around Malta. These points have been installed in order to cover the public parking areas in Malta and Gozo and urban cores so as to provide a geographical coverage. In order to provide an elevated level of comfort and practicality for the users, the charging pillars have been connected with the grid via a three-phase power high current supply to minimize the charging times and accommodate future high speed charging electric vehicles. In this way a scooter can have a full charge in 20 minutes instead of four hours.



Furthermore, the charging pillars are inter-connected and can be managed across the Internet. In this way the Maltese charging network provides a pre-booking and online payments.

Table 1 Electric mobility implementation plans, and financial incentives on a national level related to electric mobility, in IA-HEV member countries.

	Austria	Belgium	Canada	Denmark	Finland	France	Germany	Ireland	Italy	Republic of Korea	Netherlands	Portugal	Spain	Sweden	Switzerland	Turkey	United Kingdom	USA
National e-mobility implementation plan in place	●	●	●				●			●	●	●	●					
Sales tax level depends on vehicle CO ₂ emission level	●					●		●	●					●	●		●	
Reduced sales tax for energy efficient vehicles	●			●														
Reduced sales tax for low greenhouse gas emitting vehicles					●													
Tax reduction or tax exemption for electric vehicle purchase				●			●	●		●	●	●				●	●	●
Reduced annual tax for low CO ₂ emitting vehicles				●	●	●								●				
No annual (road/circulation) tax on battery electric vehicles							●				●	●						
Reduced income tax for private use of company electric vehicles		●									●						●	
Additional tax on fossil fuels	●				●													
Subsidy/grant for electric vehicle purchase	●							●		●	●		●				●	
Subsidy for installing charging points						●							●				●	●

4.1. SCOOTER SHARING SYSTEM

The volunteers are critical in the demonstration element of this project

– they are the ones who will actually be testing the vehicles and judging from preliminary findings results are encouraging

One of the first volunteers who actually started to test these vehicles is the Minister of Transport and Infrastructure himself, and the first results obtained so far were positive.

An important element of this project is the information and education campaign which will be carried out while the vehicles will be rolled out during the demonstration period. Here, the results gathered during the demonstration – from the volunteers' surveys and data gathered from the vehicles will be disseminated as widely as possible to the target audience and stakeholders. The marketing tools chosen for the campaign are the creation of a specific project website and other websites, TV commercials, short documentary features, printed media, press conferences and press releases as well as billboards.

Electric mobility will assist in paving the way for a new culture of mobility and modern urban and development planning; A number of plans and measures will be put into place to speed up the market entry of BEVs to achieve the Maltese Government ambitious target of putting 5,000 BEVs on the road by 2020, possibly more, in the wake that by 2050, most urban traffic will be without conventional vehicles.

This will also entail the deployment of the appropriate car-charging infrastructure;

Besides private transport, the MNEP will also support the introduction of electric mobility for commercial transport purposes (e.g. urban goods delivery vehicles, local public transport) and two-wheeled vehicles;



Additional support action through a number of schemes and demonstration projects for introducing electric mobility for public transport (e.g. mini buses for local public transport and larger buses using hydrogen Fuel Cells) and

Demonstration projects for the introduction of the Fifth Mode of Transport in the form of automated transport pods;

4.2. PRIVATE OWNERS OF E-LIGHT VEHICLES

In spite of the fact that the latest electric scooters feature substantial cost-saving and low maintenance, most battery-powered vehicles still have a low range of not more than 200 kilometers. In most scenarios this is the last straw to break the camel's back within the context of consumer acceptance of electric scooters. In this light the term 'range anxiety' describes the distress of running out of charge former to getting access to a charging station.

Throughout the Ele.C.Tra project it was discovered how this situation can lead scooter users to cover lower distance than an EV's full range.

Other factors attributing to range anxiety are the variation of the batteries' efficiency with weather or that the battery uses up a significant amount of charge when air conditioning is switched on in the car. Moreover, trying to accelerate the car in a fast way also reduces the efficiency of the battery and the electric motor.

Despitethe fact that Malta is a small island and that we cover an average distance of 400km each week, commuters are still sceptic about the viability of electric scooters. This is mainly attributed to the fact that Maltese commuters are affected and mindset according to their exposure to the state of mind of people making use of electric cars in foreign countries where daily commuters cover more kilometers during each trip.

As a solution to this problem, the Ele.C.Tra consortium came up with a web and mobile app which reduces the drivers' range anxiety by giving information



about the geographical coverage of the closest charging pillars and service stations. Moreover, this software model can give insight about the distance which can be travelled with an electric scooters with the present state of charge.

4.3. BUSINESS OWNERS OF E-LIGHT VEHICLES

The recent instability in the price of crude oil resulted in fluctuations of fuel prices and the awareness about the greenhouse effect. In turn these have forced industries and governments to reconsider electric vehicles in the automotive market place.

Numerous private companies are promoting and applying the use of electric mobility as part of their commitment towards EMS ISO 14,001. Within this context there are various businesses which have shortlisted electric vehicles as the prime movers towards respecting ISO 14,001 since they resolve the problems of Green-House-Gases and particulate matter while ensuring fiscal and operational benefits.

ISO standardisation is aimed at the establishment of ideas which can permit electric mobility while enabling infrastructures all over Europe. It was discovered how competing standards may represent a disadvantage as a technical solution which lead to economic vagueness and additional expenses.

In this light, ISO plays a very important role in the mobility shift of public companies since it focuses on bringing together various standards in order to come up with one accepted solution.

Private businesses can achieve these benefits, the Ele.C.Tra partnership has developed the transport model in aim of implementing green fleets which ensure financial and environmental sustainability without affecting the operations.



As a matter of fact, the market is continuously changing within the technical and managerial aspects. The Ele.C.Tra model may represent a challenge for companies to shift to sustainable practices. But this transport model will deliver companies with the means they can cross to the transformation.

The Ele.C.Tra model relies on cutting edge technology which enables a feasible way to reduce our emissions. The model aims to exploit the latest technologies while gaining a competitive advantage.

Various companies which are utilizing electric scooters are already in existence thus positioning themselves at the front line of this change while gaining advantage in terms of a dynamic and sustainable context. Such companies find themselves in the limelight since they are in a position to demonstrate the latest generation of electric scooters.

Along the lifetime of the Ele.C.Tra project, MIEMA understood the challenges associated with the adaptation of the Maltese transport network and market with the introduction of electric scooters in private companies. This involved the coupling of the transport model and the app in order to enhance the development of guidelines to come up with a fleet which can be deployed as a carbon reduction measure. In our opinion, this project came at a vital time in the development of electric vehicles and how private companies can benefit from electric vehicles while delivering a successful running of a business.

In order to achieve this transport model it is vital to recognize the fact that benefits from electric vehicles will be another where EVs are a poor solution.*3 In this light it is very important to identify the best solutions for low carbon or electric vehicles which best suit the business needs.

Dr. Thomas Weber from Daimler's describe how electric vehicles play a major role in present and future businesses. This arises the concern on how different technologies need to be in order to be accessible so as to meet various mobility requirements. He went on to say how Daimler is dedicating its effort on the latest common rail combustion engines, hybrid drives and electric propulsion systems in order to meet the commuters needs in a sustainable manner.



In this light he added that “The battery-powered vehicle is just one part of the solution : plug-in hybrids, range extenders and fuel cell vehicles round off our alternative drive system portfolio. This is supplemented by ideas for future-oriented mobility concepts, particularly for urban regions, such as our innovative “ Car2Go” car-sharing model.”



5. POSSIBLE BUSINESS MODELS FOR THE IMPLEMENTATION OF ELECTRA

OVERVIEW OF THE TYPE OF SYSTEM THAT COULD BE MORE ADEQUATE FOR YOUR NON-PILOT AREAS AND WHY

5.1. Public Private Partnership

5.2. Corporative partnership of two or more companies for investment in ELECTRIC VEHICLES (purchasing, delivering and maintaining, ...)

5.3. Autonomous model for purchasing a system for electro charging stations

5.4. Sharing

5.5. Renting

5.6. Leasing

5.7. Demonstration

5.8. Short lease

5.9. Extended lease

6. ECONOMIC AND FINANCIAL ASPECTS OF THE MODEL

The need and urgency to reduce these emissions from Maltese roads is a priority for the Maltese Government (EVs integration into the main system) *4 It is a fact that BEVs will help improve grid efficiency, especially during EV night charging while promoting the idea of carbon neutral transport through the promotion of the uptake of photovoltaic infrastructure.

As the national car-charging infrastructure is taking shape, the network will be extended by the Government according to the increase in demand by both BEV users and owners.

The Government has installed a charging network made up of 90 charging points in various locations across Malta and Gozo.

Concurrently, the Government will also be installing five state-of-the-art solar car ports together with an additional 11 charging points in 2014.

In the meantime, as the Government and all public funded authorities, including public corporations and organizations will slowly switch to electric mobility at an initial rate of approximately 25% of all yearly car purchases, the government itself will install additional charging stations to charge its fleet.

6.1. SCOOTER SHARING SYSTEM

6.2. PRIVATE OWNERS OF E-LIGHT VEHICLES

The Maltese Government wants to arrive to a point where it will no longer need to provide incentives, as the price of BEVs would come down to the price of the conventional car to an extent that it will be able to compete in a free market and that electric vehicles will come into general use while constituting a big proportion of the national vehicle fleet.

6.3. BUSINESS OWNERS OF E-LIGHT VEHICLES

Additionally, a number of pipeline projects are being proposed through which additional BEVs and BEV charging infrastructure will be purchased and deployed. These projects will be funded through a mix of EU funds, National

Funds, soft loans and private investment on the basis of private public partnerships.

For the next EU Programming Period, the MNEP will enter into specific, EU funded projects which allow the involvement of private firms. Participation in such projects similar to the Green Cars Initiative which was carried out on the basis of a public private partnership, will be done accordingly and in line with the priorities of the Government.



7. THE APPROPRIATE TECHNOLOGY AND INFRASTRUCTURE

The set-up of the Malta National Electric mobility Platform is a clear sign by the Government of its commitment towards electric mobility in Malta.

Keeping in mind that power generation in Malta is set to become cleaner with the use of natural gas and the completion of the Malta-Italy inter-connector for the purchase of cleaner generated electricity, the environmental benefits for Malta are bound to leap forward. Coupled with this scenario, the government's effort to increase the deployment of photovoltaic technology will also contribute to the provision of cleaner transport. When charging of electric vehicles takes place in establishments where PV infrastructure is available and the offset of solar energy production against car charging is taken into consideration.

It is also expected that once public transport stabilizes itself; the Intelligent Traffic Management System is fully deployed and functional; and a number of road works are completed, congestion will be lessened, while bus journey times will improve and the percentage use of non car modes increases.

Having said that, private cars would still be heavily depended upon, unless additional public transport services are introduced in the near future and this is another reason why Government will start to look at other solutions to lessen traffic congestion while striving to induce a new mobility culture.

8. THE IMPACT OF THE SUGGESTED SCENARIOS ON THE ENVIRONMENT

Keeping in mind that power generation in Malta is set to become cleaner with the use of natural gas and the completion of the Malta-Italy inter-connector for the purchase of cleaner generated electricity, the environmental benefits for Malta are bound to leap forward.

Coupled with this scenario, the government's effort to increase the deployment of photovoltaic technology will also contribute to the provision of cleaner transport, when charging of electric vehicles takes place in establishments where PV infrastructure is available and the offset of solar energy production against car charging is taken into consideration.

9. PLANNED ACTIVITIES FOR THE INTRODUCTION OF E-LIGHT VEHICLE SHARING SYSTEM

The Government will not just be working on the switch to electric mobility but also on the culture and habits of driving and car ownership.

Irrespective of this, the Maltese Government had set upon itself a committed target to put 5,000 BEVs on Maltese Roads by 2020.

With its Malta National Electric mobility Action Plan (MNEAP), Malta is laying out a phased deployment plan which is spread over the next seven years.

Government commitment towards electromobility is in line with the current Government's Work Programme, where there is a clear commitment that the Government will introduce a number of measures to incentivise both the use of renewable energy sources as well as to promote electromobility. This is in line with the Government's holistic strategy to reduce traffic generated air-pollution and improve air quality levels. This makes part of the proposed measure for 2014 – 2020

Fiscal Incentives in the form of direct payments are a very effective instrument to assist market entry of BEVs as proven in other countries.

The latter are not only important to assist market penetration but are usually requested by OEMs before they even consider to start exporting BEVs in other countries. This is due to the fact that BEVs are generally more expensive than conventional vehicles and BEVs would not be able to compete. Hence OEMs prefer to export BEVs where they can compete on a level playing field. As from January 2014, the Government will be introducing the first direct incentives in the form of scrappage schemes specifically for BEVs. These come at a crucial time when the latest BEVs are being put on the consumer market for the first time. In the past, there were similar initiatives introduced by previous administrations but the technology was not yet fully developed as it is today thus making these incentives futile.

The incentives that will be rolled out as from 2014 will serve as a test of consumers' uptake as well as the reaction of the local market, in particular that

of the car importers to see whether they are willing to start importing the vehicles.

However, one still has to point out that there is still a limited range of BEVs on the market, although it is expected that by the end of 2014, a total of 17 new BEV models would be put on the market.

A number of non-monetary incentives will also be made available for those who will be purchasing BEVs which includes the right to book parking spaces, use of bus lanes as well as incentives on the price of car batteries and subsidies on the cost to charge BEVs at night for owners who do not have the facility of home charging. These measures will be kept in place until the 5,000 BEVs national target is reached.

As was indicated in the 2014 Budget Speech, Government will also be studying the feasibility of additional transport services which, so far, were not considered by previous administrations. We believe that an underground system, light rail, monorail and other related services intended for mass transit might greatly improve the efficiency of public transport in Malta.

However, we also want transport to be cleaner and less polluting. This is to achieve the aim that Government will be looking into introducing the concept of the polluterpays-principle in the transport sector. Through this principle, both transport users and transport operators would be incentivised to opt for cleaner transpor

Concluding Remarks

As part of the Ele.C.Tra project a National Support Group was created so as to aid MIEMA to identify a number of problems within transportation in the Maltese islands. It emerged from this group how statistics about the enormous amount of private cars indicated that there are more than one car per person licensed to drive.

On the other hand, Malta Intelligent Transport Systems (ITS) explained how an advanced system of traffic lights can give priority to buses. With these the same organization that is working on automatic identification of road accidents, can be made possible through surveillance cameras live on Maltese roads. Together these ideas ascertain strides in public transport and in the way traffic moves on our roads.

The overall solution incorporated a web management platform with a physical roll-out of charging units in various localities around the islands to provide the full lifecycle relating to the charging of electric vehicles.

The web-platform relies on geo-located points and returns the status of the various charging points. Through a secure e-account, drivers can pre-book charging slots and securely authenticate themselves via RFID when they drive-up to the charging stations. Utilizing mobile-friendly visualization techniques a user-dashboard was deployed to allow drivers to access booking history, payments and lodge requests. System administrators have access to reporting and statistical data and business-intelligence layers which allow them to optimize the product's offering.

The system is itself integrated to a secure payment gateway for card processing as well as RWE system engines (RWE is one of Europe's five leading electricity and gas companies which provided technology for the charging units).

Ultimately Ele.C.Tra aims to increase the opportunities for a carbon neutral road transportation system by evaluating a number of actions for the



achievement of electro mobility. This will decrease the dependency upon internal combustion engines while improving air quality levels.

In spite of the fact that the public in general is concerned about the range of EVs, in the case of Malta we must remain concentrated on the island's needs. While most people around the world are still disputing the issue of EV's range, this is not a problem in Malta. On the other hand it is postulated how both daily commutes and private companies may both benefit from the present technologies implemented in e-scooters within the Maltese scenario. Conversely, e-scooters are the counter argument for which large displacement cars are not suitable for the Maltese transport network as a result of short ranges travelled, traffic congestion and idle time in traffic since electric vehicles do not consume any energy on idle.