Deliverable 10.6

Guideline handbook for web based education of different professionals handling EVs

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List of Abbreviations

CA	Consortium Agreement
DoW	Description of Work (Annex I of Grant Agreement)
EV	Electric vehicle
WP	Work Package
OEM	Original Equipment Manufacturer (e.g. Nissan, Renault, BMW, Daimler)

1 Executive Summary

The topic of this deliverable is web-based public education. One of the outcomes of Green eMotion is a public education website accompanied by a printed guideline handbook available in different languages:

- Link to Educational Green eMotion web site: http://education.greenemotion-project.eu
- Link to handbook in English, German and French:
  http://education.greenemotion-project.eu/library.aspx

The Guideline Handbook front page in English

The handbook and website have been targeted at users and stakeholders who are not directly involved in the electric car industry. This includes such groups as potential EV-owners, fleet operators, motorists, cyclists, teachers, planners and policy makers. The web site is open to everyone and can be automatically translated into 81 languages.

The web site contains a number of animated and live action videos (http://education.greenemotion-project.eu/library.aspx) as well as pictures and electronic quizzes to make the user experience both pleasant and educational.

The key findings of the deliverable are:

- o Training of professional personnel is generally handled well by the OEM's and such content is not suitable for the public website
- o In contrast a number of groups exist among the general public who seem to have much more need for education
- o The education needs identified by the project team are collected in a guideline handbook
- o The really new thing is a publicly accessible, multilingual education website that allows anybody to improve and test their knowledge about electric vehicles

2 Introduction

2.1 Background

New technologies require training and education for a large number of different stake holders.

Especially electric vehicles (EV) and new battery systems require instructions and standardisation in:

- Vehicle maintenance
- Handling in non-OEM workshops
- Spare part / aftermarket part services
- Transportation of batteries and EV
- Customer manuals
- Vehicle to grid technology
- Well to tank emissions
- Total cost of ownership
- Public and private charging infrastructures
- Rescue workers and paramedics
- Driver licence / public education

Manufacturers concentrate on their vehicle technologies and are responsible for the implementation of the EV in serial production. The corresponding education is accomplished by the manufacturer. Renault for example will also train firemen, police and dealers in every European country where they have a project. Renault will also analyse safety requirements of maintenance and operation on EVs and propose guidelines for non-OEM workshops.

Among the non-OEM after-market personnel, there is considerable need for further education. For example, the handling of batteries states the need for precautions through the spare part chain and in the workshop itself. In non-OEM workshops, especially fault finding in an EV requires special precaution, as these operations need to be performed with the battery pack electrically connected to the remaining vehicle. Also non-OEM workshop personnel needs training in which operations they can perform as usual (e.g. repair on brakes, tyre exchange) and which operations that need special equipment (e.g. fault finding, HV parts replacements).

Agencies like public bodies, approval authorities, technical institutes, etc. should focus on basic education in handling of high voltage systems and education related to the surrounding infrastructure. Nevertheless it is reasonable that all involved parties participate in the appropriate application. It should be insured that all people have access to a proper and suitable education to conduct their daily work and/or transportation under safe and risk free conditions.

A guideline handbook was generated gathering information about basic education needs for different stake holders in regions with EV deployment. The handbook is building on existing material from different stakeholders, regional regulations and European standardisation etc. The guideline handbook is translated into English, French and German and can be downloaded from the Educational Website (http://education.greenemotion-project.eu/library.aspx).
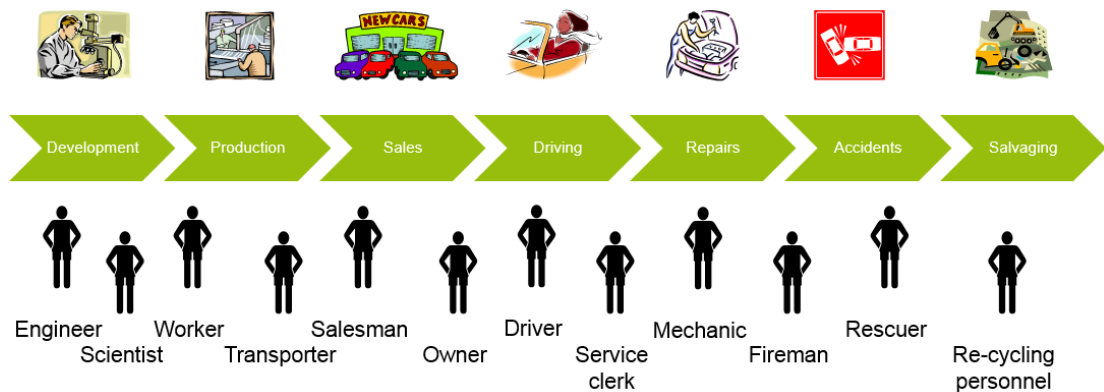
The necessary information material for the relevant user groups identified can be found on the public education web site.

3 Development of the guideline handbook and educational website

3.1 Target groups

One major concern of the project team was to pinpoint the right target groups for the communication effort. The target group had to be defined in order to select the relevant topics and to direct the messages to users at the appropriate skill level.

The first version was based on a life cycle approach identifying relevant audiences by their function throughout the life cycle of the vehicle spanning from development, through production to purchase, use and finally salvaging. This approach is shown in Figure 1.

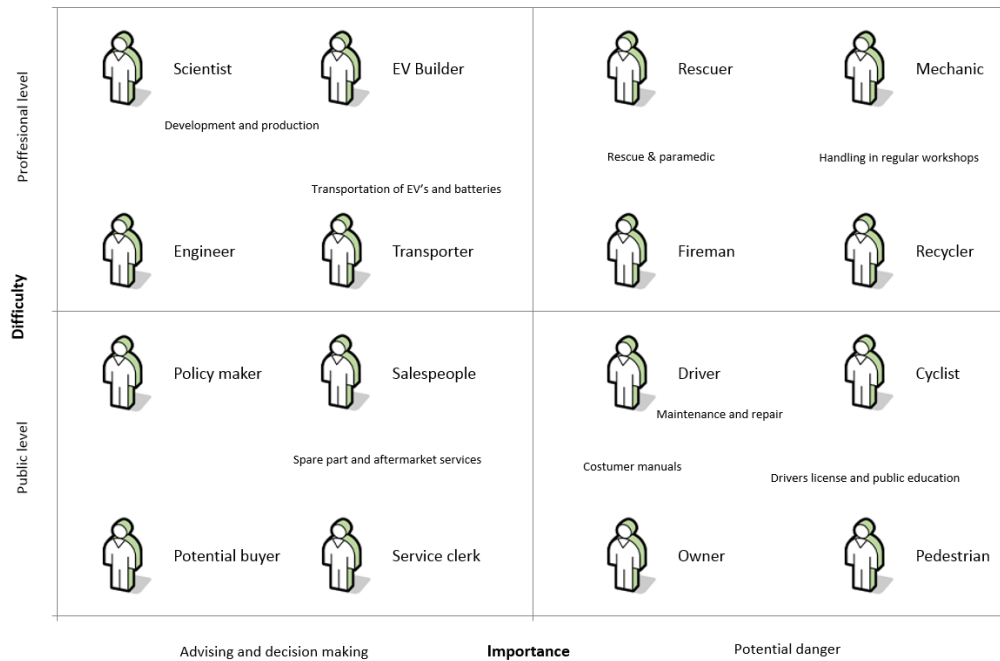**Figure 1: First version of audience pictured in a life cycle perspective (dismissed)**

The project team found that Figure 1 was focusing too much on job functions which are peripheral to the actual use of electric cars. In particular the potential owners as well as other road users were seen as more important than engineers and scientists.

Therefore the target group was modified and put in a four quadrant framework according to their assumed skill level and the importance of their involvement. This is shown in Figure 2.

When discussing the different skill levels in Figure 2 the project team found that it is important to distinguish between training and education. Furthermore the website should focus on education, not on training.

Training is defined as the continuous competence upgrading activities performed as a necessary part of maintaining a professional staff. This is a specific task for the OEM's and therefore the project team should not be attempting to alter these routines. The impression of the team is that training is already widely done by the existing service organizations.

Education is here defined as easy accessible public information that will help improve the general knowledge level and reduce anxiety about new technologies such electric mobility.

Figure 2: Second version of target audience pictured in an importance/difficulty matrix (dismissed)

As a consequence of this the project team early decided to avoid the word training and instead use the word education.

As a further consequence the map of target audience was modified again. Some groups added were school teachers, policy makers.

Removed from the original scope were:

- Engineer
- Scientist
- Autoworker
- Salesman
- Mechanic (OEM)
- Fireman
- Rescuer
- Recycler

Added to the list were:

- Cyclist
- Pedestrian
- Eye witness
- Mechanic (non-OEM)
- Motorist association
- Teacher

- Advisor
- Developer
- Planner
- Policy maker
- Fleet manager

The final matrix of target audience is pictured in Figure 3.

Figure 3: Final target audience pictured in a four quadrant framework

The revising of the audience list resulted in a much more focused website that does not collide with existing professional training activities. The DOW was changed accordingly.

3.2 Educational content

Just like the target groups were shaped to make a more focused and relevant effort, so was the topics also altered and adapted during the course of the project. An early version is shown in Figure 4 where a number of highly specialized and difficult issues are addressed. These were categorized as Level 3 topics and were mainly targeted at professionals in 3rd and 4th quadrant of Figure 2.

	Driving an EV	Owning an EV	Working under the hood	Surrounded by EV's
Level 1	How to drive safely without sound/noise Pre-heating the cabin Pre-ride checks	Washing the EV Easy maintenance Why you should read the manual	Electrical safety Cable identification Checking and replacing fuses	Information for pedestrians and cyclists How to rescue people from crashed EV's How to put out an EV fire
Level 2	How to obtain good mileage and range Using regenerative braking Charging levels and modes	Economy, cost of ownership Storing the EV without harm to the batteries How does temperature impact the EV's performance	Identifying and understanding batteries Understanding electric drives Electrically Driven Auxiliaries	Climate impact of EV's Transportation of EV's and batteries Recycling EV components
Level 3	Identifying correct sockets and plugs Utilising smart grid and roaming	Impact of tyre pressure, load and wind What happens in the event of a crash	Repair tools and methods for mechanics Diagnostics/OBD	

Figure 4: Early table of contents for the educational website

However through the discussions and research done in the project it became clear that high level training should not be part of the website. Simply because this is and should be handled by the OEM's directly. It is very important that professional level technical information is stored and updated correctly so that it is always accessible and no outdated documents flow on the Internet. Furthermore in professional training it is vital that audiences have the necessary basic skills so that the information is understood correctly and not misused. We felt that this could not be ensured properly on a public website.

Our final decision on topics for education is shown in Figure 5. We use the same four quadrants as in Figure 3 with the four headlines:

1. Before you decide…
2. On the road…
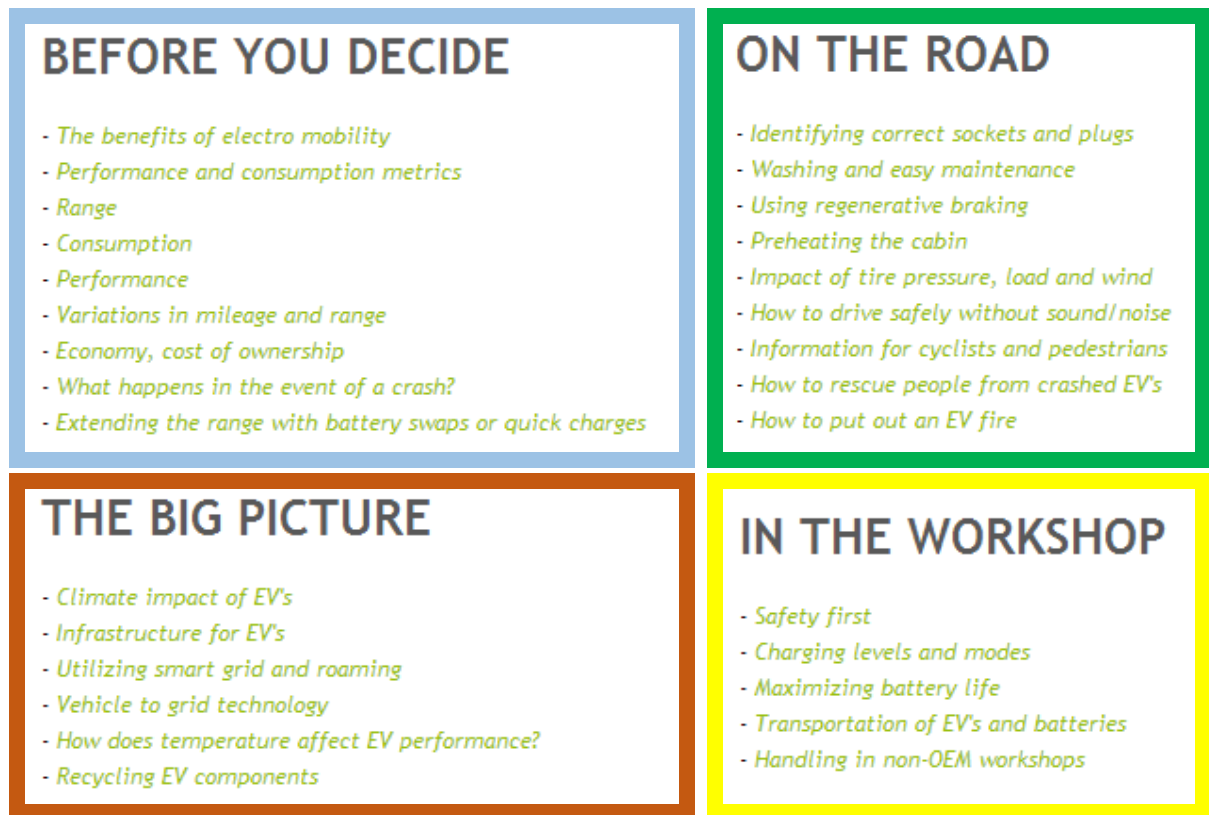3. The big picture…
4. In the workshop…

Figure 5: Final table of contents pictured in the four quadrant framework

3.3 Synchronization between partners

The partners in WP10 have different specific competence areas. In combination they cover all aspects needed to fulfill the education needs. However most of the skills initially present in the project team was targeted as a professional audience. To direct our messages more toward the common user we integrated into the team the Department of Human Ressources at DTI.

Figure 6: Skills of the project team in relevance to education

The Department of Human Resources Development is specialised in interactive learning solutions, e-guides, work instructions, learning games and quizzes. These were exactly the skills needed to address the finally selected target audience (Figure 3).

3.4 Web Platform

A number of Learning Management Systems were evaluated and discussed in the project team.

The decision was to go with a relatively basic server system that does not track individual users but only collects user statistics on a general level. Tracking of users would be necessary in a professional training scheme but not for public sites. The system actually supports password users but our main objective was to make the system easy to access and easy to update. So no password or registration is required for users on the website.

The name of the chosen system is Umbraco 4 (see Figure 7).

Figure 7: Umbraco 4 system for managing educational website

The solution works on all platforms including IOS-devices. It includes one-way information pages and user feed-back with Forms with Contour. It has link to social networks (Facebook, Twitter, Linked-In) permits user login and newsletter-module if needed. The user can download of pdf, PowerPoint etc...

Navigation is easy using the top menu bar (Figure 8) which is always visible to the user.

Figure 8: Top menu bar for easy navigation through the website

3.5 Video material

Video streaming comes from a dedicated video server to ensure the necessary capacity. Videos are also uploaded to Youtube.

3.5.1 Live action videos

A number of live action videos featuring participants of the project and some invited people were produced within the project. Each video has a specific topic as shown in Figure 9.

The topics were choosen based on the experience of the project team. This includes experience from previous EV projects as well as talks with salespeople and current EV users.

"An electric cars in the family" was selected because people are often unsure whether an EV can fullfil the needs of their entire family. The video shows two real families who have choosen EV's and are glad they did.

The next video theme "Everyday life with an EV" was selected because people are often unsure about the everyday useability of EV's. Some people think it must be complicated to operate, some think it could be dangerous. The video shows how safe and uncomplicated it really is.

Finally the video "Testing electric vehicles" was choosen because people are often sceptical about official statements concerning the EV's performance. The video shows how thoroughly the project team tested the EV's and also tries to explain why EV range naturally varies according to the driving conditions.

AN ELECTRIC CAR IN THE FAMILY

EVERYDAY LIFE WITH AN ELECTRIC CAR

TESTING ELECTRICAL VEHICELS

Figure 9: Live action movies recorded in WP10 of the project

3.5.2 Animated videos

For illustrational purposes a total of 4 animated videos was produced by the help of a cartoonist. This type of video was used because it is quick to produce and convey the message in a lightly entertaining and informative way. The topics of the animations were as shown in Figure 10.

We found that,

- Many people see EVs as the complicated alternative but fail to realize the actual cost and complexity associated with producing fossil fuels. This issue we have visualised in the video "From well to wheels". See the video here.

- Many people see pan European travelling in EVs as pure science fiction but do not realize that present day mobile phones use the same kind of technology when traveling across borders. This we have visualized in the video "Utilizing smart grid and roaming". See the video here.

FROM WELL TO WHEELS

UTILIZING SMART GRID AND ROAMING

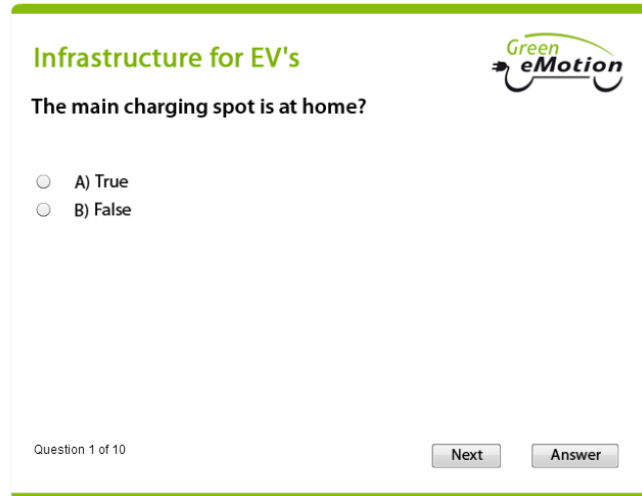**Figure 10: Animated videos produced for educational purposes in WP10**

The final video will be titled: Winter driving with an EV, to be released in fall of 2014.

3.6 Quizzes

After each chapter in the web based education site there is a possibility to take a test. The test result will show whether the learner understood the principal messages of the previous chapter.

TEST YOURSELF

Back

Infrastructure for EV's

The main charging spot is at home?

○　A) True
○　B) False

Question 1 of 10　　　　[Next]　[Answer]

Figure 11: Example of a quiz question with a true-or-false answer option

In total there are 28 quizzes like the one shown in Figure 11.

3.7　Handbook

The purpose of the Handbook is to identify education needs and linked these to the website content.

The target audience of the handbook is mainly teachers, consultants, managers, fleet owners, planners and policy makers. The general public can go straight to the website.

The handbook itself can be downloaded here:
http://education.greenemotion-project.eu/media/9603/UK-Guideline%20Handbook-web.pdf

Figure 12: The purpose of the guideline handbook is to pinpoint education needs and direct attention to the educational website

3.8 Translation

To support as many languages a possible a Google translate bar (Figure 13) was placed directly on the website. This allows for automatic translation into 81 languages. The translation was checked by native Danish, German, Bulgarian speakers and it was found be surprisingly good quality. Although automatic translation still has its limitations this Google Translate bar definitely is capable of making the website understandable in practically any language.
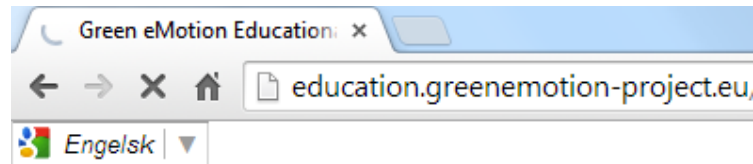

Figure 13: Google Translate bar placed on the website

The guideline handbook was translated manually into German, French.

3.9 Promotion

To promote the project a Facebook community was established. On the Facebook page you can see the videos and link to the educational website.

Figure 14: Facebook community promoting Green eMotion

4 Conclusion

The project team has successfully created a new public educational website that allows a broad scope of users not necessarily affiliated with the EV industry to improve and test their knowledge on electro mobility.

With the website 6 short videos have been created to convey some of the most important messages about EVs to the public in an entertaining way.

A guideline handbook has been published to link different education needs to the website.