FABRIC

Feasibility analysis and development of on-road charging solutions for future electric vehicles

FABRIC events: Midterm Event

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LIST OF ABBREVIATIONS

ABBREVIATION	DESCRIPTION
AMET	APPLIED MECHATRONIC ENGINEERING & TECHNOLOGIES SRL
ATA	ASSOCIAZIONE TECNICA DELL'AUTOMOBILE CONSULTING & SOLUTIONS SRL
CEA	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
CEN	European Committee for Standardization
CEO	Chief Executive Officer
CIRCE	FUNDACION CIRCE CENTRO DE INVESTIGACION DE RECURSOS Y CONSUMOS ENERGETICOS
cm	Centimetre
CRF	CENTRO RICERCHE FIAT SCPA
CUNA	Commissione Tecnica di Unificazione nell' Autoveicolo
DG	Directorate General
DWPT	Dynamic Wireless Power Transfer
EM Intereference	Electromagnetic Intereference
EMC	Electromagnetic compatibility
EMF exposure safety	Electromagnetic Fields
ENIDE	ENIDE SOLUTIONS .S.L
ERTICO	EUROPEAN ROAD TRANSPORT TELEMATICS IMPLEMENTATION COORDINATION ORGANISATION S.C.R.L.
EU	European Union
EUCAR	European Council for Automotive R&D
EV	Electric Vehicle
EV-Connect	Interconnecting Electric Vehicle Infrastructures Roadmap project
FABRIC	FeAsiBility analysis and development of on-Road chargIng solutions for future electric vehiCles

FastInCharge	Innovative fast inductive charging solution for electric vehicles project
FEVs	Full Electric Vehicles
FKA	fka Forschungsgesellschaft Kraftfahrwesen mbH Aachen
HITACHI	HITACHI EUROPE LIMITED
ICCS	Institute of communication and Computer Systems
ICE	Internal Combustion Engine
ICT	Information and Communications Technology
IEC	International Electrotechnical Commission
IRE	IREN ENERGIA SPA
ISO	International Organization for Standardization
kHz	kilohertz
km	Kilometre
KTH	KUNGLIGA TEKNISKA HOEGSKOLAN
kW	kilowatt
MECT	MECT SRL
OEMs	Original Equipment Manufacturers
PDF	Portable Document Format
POLITO	POLITECNICO DI TORINO
QiE	QI ENERGY ASSESSMENT SL
SAET	SAET SPA
SCANIA	SCANIA CV AB
TECNOSITAF	TECNOSITAF SPA CON UNICO SOCIO
THD	Total Harmonic Distortion
TNO	NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK - TNO
TRL	TRL LIMITED
TUB	Technische Universität Berlin

UNIGE DITEN	UNIVERSITA DEGLI STUDI DI GENOVA
UNPLUGGED	inductive charging for electric vehicles project
US	United States
V2G	Vehicle-to-grid
VEDECOM	FONDATION PARTENARIAL MOV'EOTEC
VOLVO	VOLVO TECHNOLOGY AB
WPT	Wireless Power Tranfer

REVISION CHART AND HISTORY LOG

REV	DATE	REASON
1	4/2/2016	1st version
2	9/2/2016	2nd version updates after internal ICCS review
3	8/3/2016	3rd version including presenters comments/corrections on the minutes

EXECUTIVE SUMMARY

This first release of the D13.4 contains a detailed report on the speeches and discussions that took place during the FABRIC midterm event that was organized by ICCS in Brussels on the 2nd of February 2016 as an One-Day Conference, entitled: "***Wireless Dynamic Charging for FEVs: Challenges and Concepts***". ERTICO-ITS Europe was the co-organiser and host of the midterm event. The next release of this deliverable will be available in M48 of the project duration and will contain information about the FABRIC Final Event and Demonstration.

1. INTRODUCTION

1.1 Introduction to FABRIC

FABRIC addresses directly the technological feasibility, economic viability and socio-environmental impact of dynamic on-road charging of electric vehicles.

FABRIC responds to the need to assess the potential and feasibility of a more extensive integration of electric vehicles in the mobility and transportation system, focusing primarily on dynamic wireless charging which would allow practically all of the drawbacks of on-board battery packs to be avoided. On-road charging would also enable the direct link to renewable energy sources: Ultimately this is the only way to fully decarbonise road transport and hence provide true sustainability from the socio-environmental perspective.

Specifically, by engaging a highly-qualified, expert and comprehensive group of key stakeholders within its consortium, FABRIC will determine and assess the end-user requirements that will determine the potential of success in various application sectors, the technology drivers and challenges that impact the widespread implementation of wireless charging technology, and the technology gaps to be bridged in order to provide rational and cost-effective solutions for the grid and road infrastructures.

Advanced solutions, conceived to enable full integration in the grid and road infrastructure within urban and extra-urban environments for a wide range of future electric vehicles, will be implemented and tested.

Each key issue will be assessed directly and comprehensively, providing insights through experimental evaluations into the relevant technologies, investigating the present and future opportunities for such solutions, and identifying the future trends and requirements for research and development.

The ultimate aim is to provide a pivotal contribution to the evolution of e-Mobility in Europe by identifying the benefits and costs in absolute terms so that the investments required in the coming years for widespread implementation and exploitation can be fully defined and quantified.

FABRIC is in the third year of the planned 4-years duration. In this year the charging solutions will be delivered and installed at the test sites where the evaluation of functionality and efficiency of these prototypes will take place. The results will be an input to the feasibility analysis regarding the potential of their large-scale implementation that will be concluded within 2017.

Project Facts:

Budget: 9 M€	Funding: 6.5 M€
Duration: 48 months	Start: 01 January 2014
DG / Unit: Research and Innovation	Contract n°: 605405

Coordinator: Angelos Amditis, ICCS Contact: a.amditis@iccs.gr;

Partners: ICCS, ERTICO, CRF, VEDECOM, VOLVO, SCANIA, AMET, KTH, TRL, HITACHI, POLITO, CIRCE, CEA, ENIDE, FKA, IRE, MECT, TECNOSITAF, TNO, UNIGE-DITEN, ATA, SANEF, QiE, SAET, TUB,

Website: www.fabric-project.eu

1.2 FABRIC midterm event: Introduction - Overview

The FABRIC One-Day Conference, which was focused on the challenges and concepts of the Wireless dynamic charging for FEVs, was successfully held in Brussels, on the 2nd of February 2016. The Conference was organized by ICCS and hosted by ERTICO-ITS Europe and gathered approximately 70 participants from 15 different countries, including policy makers, standardization experts, OEMs, solution providers as well as representatives of the academic and research community.

The conference was inaugurated by Mr. **Hermann Meyer**, CEO of ERTICO-ITS Europe, who welcomed the participants and introduced ERTICO activities, emphasizing in the Electromobility area and specifically on the FABRIC activities towards its large-scale deployment. Following that, Mr. **Angelos Amditis**, Research Director of ICCS and FABRIC project Coordinator, presented the motives for wireless dynamic charging for EVs, their important advantages compares to other EV charging technologies and introduced the objectives and goals of the Conference. In addition, Mr. **Maurizio Maggiore,** the Project Officer of FABRIC, presented the strategic questions that arise regarding the large-scale deployment of Electromobility and he emphasized on the need to figure out the directions regarding Electromobility and pay close attention to the user needs. He also stated that interoperability is of great importance and highlighted the need to assess the strengths and weaknesses of all charging technologies before taking important deployment decisions. The opening session ended with the speech of Mr. **Alessandro Coda**, Research Director of EUCAR, who introduced EUCAR, its mission and the three Strategic Pillars for collaborative research and innovation (R&I) in the automotive sector to the attendees. In addition, he also presented the projects where EUCAR is involved and officially supports in the framework of the Strategic Pillar of Sustainable Propulsion.

During the 1st technical session, the FABRIC project activities as well as some initial results were presented to the attendees. Specifically, Mr. Angelos Amditis (ICCS) gave an overview of the project's status and developments during the first two years of its duration while Mr. **Peter Vermaat** (TRL) presented the charging solutions and prototypes which are under development in the project. After that the activities in the Italian and French tests sites were presented by Mr. **Paolo Guglielmi** (POLITO) and Mr. **Stephane Laporte** (VEDECOM) respectively. The framework, methodology and preliminary results for the feasibility analysis of wireless dynamic charging within FABRIC was also discussed by Mr. **Sebastian Meijer** (KTH). Finally, the ICT requirements, functionalities and existing gaps for dynamic charging as identified within FABRIC

were presented by Mr. **Andrew Winder** (ERTICO).
The next session, gathered key experts from several standardization bodies, associations and related platforms with basic aim to discuss the potential of wireless dynamic charging in the scope of standardization and policy drawing and implementation. Particularly, the eMI^3 platform activities for Electromobility were presented by **Andrew Winder** (ERTICO) and the current status of static and dynamic wireless EV charging was presented by Mr. **Nicholas Keeling** (Qualcomm). After that, Mr. **Gian Maurizio Rodella** (CUNA) introduced the future plans of international standardization bodies for Wireless Power Transfer (WPT) and gave a short presentation of CUNA, the national representative of Italy to ISO and CEN and Mr. **Peter Van den Bossche** (Vrije Universiteit Brussels) talked about the IEC standardization for WPT.
The conference continued with a Round Table Discussion that focused on the following issues/questions:

- Trends and roadblocks towards the wide deployment of Electromobility;
- How far are we from the deployment of dynamic charging? What are the obstacles?
- Which charging technology is the more likely candidate for deployment?

The discussion panel, that consisted by well-known experts from ALSTOM, Viktoria Swedish, Hubject, CRF and KAIST, identified interoperability of the developed systems and standardization as issues of high importance for the wide deployment of Electromobility. Regarding the obstacles for the wireless charging deployment it was commonly agreed that the cost, mainly for building the required infrastructure, is the biggest one. Other roadblocks that were pointed out are related to V2G connection, safety and EM interference, the current regulatory framework (or the lack of it) and standardization as well as the lack of business models. Regarding which technology is the more likely candidate for deployment it was mentioned that this issue highly depends on politics and needs for standardization.

The 3rd and final technical session was dedicated to the progress being made in various European projects and other research initiatives in Europe towards the wide deployment of Electromobility. Specifically, Mr. **Denis Naberezhnykh** (TRL) presented the conclusions about the feasibility of implementing Dynamic Wireless Power Transfer on the road network and Mr. **Håkan Sundelin** (Viktoria) presented the status of the ongoing public road trails in Sweden of two different conductive electrified road technologies (overhead and on-road). Additionally, Mr. **Mauricio Esguerra** (MAGMENT) presented a new cement like material with magnetic properties that could be very useful for wireless charging. Furthermore, the R&D projects Victoria, UNPLUGGED, FastInCharge, EV-Connect were shortly presented by Mr. **Hans Bludszuweit** (CIRCE), Mr. **Axel Barkow** (FKA), Mr. **Evangelos Karfopoulos** (ICCS) and Mr. **Giampiero Brusaglino** (ATA) respectively.
In the following section the minutes of the conference are included. The exact programme of the

FABRIC One-Day Conference, the speakers' biographies as well as detailed information on participation are also presented as annexes. The overall presentations that took place in this event are also available for download as PDFs at the FABRIC website and can be accessed through the following link:

http://www.fabric-project.eu/index.php?option=com_k2&view=item&id=100:fabric-one-day-conference-on-wireless-dynamic-charging-for-fevs-challenges-and-concepts&Itemid=228

2. ONE-DAY CONFERENCE MINUTES

2.1 Opening

Mr. **Hermann Meyer**, CEO of ERTICO-ITS, opened the event, welcomed the participants and introduced ERTICO activities, emphasizing in the importance of Electromobility in road Transport and specifically of the FABRIC activities and evolutions towards its large scale deployment.

Figure 1 Hermann Meyer welcomes the participants and gives a brief presentation of ERTICO

Following that, Mr. **Angelos Amditis**, Research Director of ICCS and FABRIC project Coordinator, thanked ERTICO for hosting the event, Mr. Maurizio Maggiore, the FABRIC Project Officer, and Mr. Alessandro Coda, Research Coordinator of EUCAR, for their participation as well as the European Commission's and EUCAR's continues support to the FABRIC project activities. In addition, he presented the motives for wireless dynamic charging for EVs, their important advantages comparing to other EV charging technologies and introduced the objectives and goals of the FABRIC Conference emphasizing on the interoperability and standardization topics to be discussed later on.

Figure 2 Approximately 70 experts in the field of electromobility & Infrastructures registered and attended the FABRIC Conference

Figure 3 Maurizio Maggiore the EC Project Officer for FABRIC presents strategic issues concerning Electromobility

Mr. **Maurizio Maggiore**, the Project Officer of FABRIC, welcomed the audience and presented the strategic questions that arise regarding the large scale deployment of Electromobility and user need. He mentioned that Interoperability is of great importance. A system that covers only one type of vehicle is difficult to justify costly infrastructure changes. Static and semi-static charging may be of interest for initial deployment as well as applications on buses. High power systems need to be thoroughly investigated. The strengths and weaknesses of all the charging technologies need to be assessed before taking important deployment decisions. Inductive charging needs visibility, in depth-analysis and communication of the technology to the public.

The opening session ended with the speech by Mr. **Alessandro Coda**, who is the Research Director of EUCAR. Mr. Coda Introduced EUCAR, its mission, the three Strategic Pillars for collaborative research and innovation (R&I) in the automotive sector namely the Strategic Pillars of Sustainable Propulsion, Safe & Integrated Mobility and Affordability & Competitiveness, to the attendees. In addition, he also presented the projects where EUCAR is involved and officially supports, in the framework of the Strategic Pillar of Sustainable Propulsion. These projects, amongst them and the FABRIC project, are related to ICE, hybrids, methods and tools.

2.2 Technical session: *"FABRIC Initial Results"*

During this session, that was moderated by **Dennis Naberezhnykh**, Head of ITS and Ultra Low Emission Vehicle Technology of the Sustainable Mobility Group of TRL, the FABRIC project activities as well as some initial results were presented to the attendees. Specifically, the following presentations were made:

- Mr. **Angelos Amditis** (ICCS) gave an overview of the project's status and developments during the first two years of its duration.
- Mr. **Peter Vermaat** (TRL) presented the charging solutions and prototypes under development in the project: as well as the Italian and French test sites there are two existing systems in Sweden, not done by FABRIC, but which will be included in FABRIC's theoretical evaluation (see presentation by Håkan Sundelin in Session 5).
- Mr. **Paolo Guglielmi** (POLITO) presented the status of the Italian test site near Susa. Technical measures to mitigate issues towards the power grid and smooth the demand were presented as well as the current adaptations and the timeline towards making the site operational in 2016.
- Mr. **Stephane Laporte** (VEDECOM) presented the status of the French test site near Versailles. During the tests, besides functional operability, emphasis will be given to

exposure to magnetic fields and EMC. Probes will be put inside the cars to measure the intensity of magnetic flux at any time.

- Mr. **Sebastiaan Meijer** (KTH) presented the framework, methodology and preliminary results for the feasibility analysis of wireless dynamic charging within FABRIC. Positive proof on EMF exposure safety is required before advising large scale deployment. Finally the scenarios that are more feasible were presented.
- Mr. **Andrew Winder** (ERTICO) presented the status of the FABRIC second sub-project dealing with the ICT development for dynamic charging. Specifically he presented the ICT requirements, functionalities and existing gaps for dynamic charging.

All presentations can be found at this link.

Figure 4 Peter Vermaat presents the current status of FABRIC charging prototypes

Figure 5 Guglielmi presents an overview of the Italian test site

Figure 6 Stephane Laporte presents the status of the French test site

Figure 7 Andrew Winder, presents FABRIC ICT for supporting EV dynamic charging

2.3 Technical session: *"Policies & Standardisation in Wireless Power Transfer: Drivers & Barriers Towards Wide Implementation"*

This session was moderated by **Sebastiaan Meijer**, Professor and Head of GaPSlabs of the KTH Royal Institute of Technology. The session gathered key experts from several standardization bodies, associations and related platforms to discuss the potential of wireless dynamic charging in the scope of standardization and policy drawing and implementation. Specifically the following presentations were given:

- Mr. **Andrew Winder** (ERTICO) gave a presentation about eMI^3 platform for electromobility. The importance of interoperable ICT standards for electromobility was analyzed emphasizing on e-roaming.
- Mr. **Nicholas Keeling** (Qualcomm) gave a presentation on the current status of static and dynamic wireless EV charging. Specifically he mentioned the following: China now overtakes US in EV sales. Qualcomm wanted to enable the Electromobility market due to its potential. It wants to enable static and dynamic charging. They design static systems with dynamic charging interoperability in mind and this is their main interest in FABRIC. 85kHz is the current operating frequency but this poses limitations on the transfer of power at long distances. So the design is focused on grid and how to get power to where it needs to go. Qualcomm is involved a lot in standardization. OEMs want to minimize the cost but this is going against what is required for a dynamic charging system. Qualcomm also sees challenges in safety. Foreign Object Detection (FOD) and removal increases the cost significantly. If protecting the systems and people was solved the rollout of the systems would be fast. There are solutions for FOD by detecting the change in inductance but there is a lot of work towards making the system cheap.
- Mr. **Gian Maurizio Rodella** (CUNA) presented the future plans of international standardization bodies for Wireless Power Transfer (WPT). He also gave a short presentation of CUNA, its members and its technical commissions. CUNA is the national representative of Italy to ISO and CEN. The existing standards' status on wireless charging were also presented.
- Mr. **Peter Van den Bossche** (Vrije Universiteit Brussels) gave a presentation on IEC standardization for WPT. The IEC standards are accepted as European standards by CENELEC.

All presentations can be found at this link.

2.4 Round Table Discussion: *"Wireless Charging: Is it the Solution for the Range Anxiety Problems?"*

During this Round Table discussion that was moderated by the FABRIC project coordinator, Mr. **Angelos Amditis**, the following topics/questions were mainly addressed and thoroughly discussed:

1. Trends and roadblocks towards the wide deployment of Electromobility;
2. How far are we from the deployment of dynamic charging? What are the obstacles?
3. Which charging technology is the more likely candidate for deployment?

Regarding the wide deployment of Electromobility, interoperability of the developed systems and standardization are of high importance. It was stated that interoperability of charging points is the key success factor for Electromobility, however, it still needs full coverage nationally and

internationally. The EU-Directive from 2014 defines, that each charging point has to provide at least two types of charging: contractual and pay as you go. Since the directive will be transferred into national law at the end of this year, it is a good step forward, but doesn't solve the problem at once. Authentication and billing are big issues towards achieving interoperability, therefore more actions need to be taken. A great advantage of wireless charging is that you don't have to deal with plugs and their various types anymore, which are a big obstacle for the end user. A question is how authentication for wireless charging will be conducted. Interoperability is also very important for heavy vehicles and a crucial question is who pays for the losses because when you transfer 200 kW for truck applications a 10% loss is very significant. All key players in the heavy duty area must provide their input to the standardization bodies regarding the operating frequency, which affects greatly the design of the system.

Figure 8 Experts during the round table discussion Q&A

On the current status of the wireless charging deployment and the obstacles that these technologies might be currently facing, it was commonly agreed that the biggest obstacle is the cost, mainly for building the required infrastructure and not for the technical implementation of such systems, as many solutions are already developed. There are also some obstacles regarding the V2G connection, the current regulatory framework (or the lack of it) and standardization. Other issues are the lack of business models, safety and EM interference as well as who will be willing to assume the cost for building the required infrastructure. For heavy duty vehicles there is a limitation for using battery. There is no standardization and the solutions are custom, so cost increases. As a summary, the benefits for dynamic charging are no more plugs, less or no battery and ideally it may offer limitless range. Within FABRIC, tests are now ongoing regarding frequency, speed, power level etc. in order to collect respective data that will help the consortium to assess the viability of the solution.

Regarding which technology is the more likely candidate for deployment it was mentioned that this is an issue that depends on politics and standardization. A completely interoperable eRoaming network across the Electromobility sector, will minimize transactions costs for all market participants. In addition, battery technology is improving but there is still need to charge

fast. A problem with fast charging could be with the grid. It is also a matter of who will pay the investment for fast charging for all vehicles.

Range anxiety is not such a problem when you have over 200 km range. What potential buyers fear is the range limitation problem in long trips. You may stop and recharge, but if the battery is very large it will take either more time or more power; an alternative is to have a spare battery on a trailer for the long trips, as proposed in one of our projects.

Some people believe that if we used the money spent on developing various solutions solely for Electromobility, the costs might be covered but in Europe we don't have too many backbones and we cannot cut them off. On the other hand, it is a good idea to focus the effort but where do you start? Perhaps change will come from China where Electromobility growth surpasses all expectations. It is a business model issue and the end users should have the ability to choose. Furthermore, any solution has to be able to stand on its own feet (without continued public support).

It was also stated that people do not wish to make the transition to a new technology unless the new technology is cheaper or at least not more expensive. However it was emphasized that one cannot compare a technology with 100 years of development (ICE) with a new technology of 10 years. If EV were produced at the scale of ICE perhaps they could be even cheaper than ICEs. China market is exploding and they have the materials for batteries, magnets etc. so the context is different. In America they say it can go either way so you have to take a lot of aspects into account to assess the trade-offs. There are many stakeholders and each one wants different things. This requires a joint approach which is a responsibility of government. Once there is a market there will be technology solutions. There should be a study of how many people make long trips in a given moment on a given motorway. If they are not many then the range and charging time numbers may not be very important when comparing to ICE. A question is how to find the available databases and how to mine them. USA requires access to the data of all EVs that were bought using the government incentives. So this could be a good data source.

2.5 Technical session: *"R&D Initiatives Towards Electromobility Deployment"*

The final session of the FABRIC One- Day Conference was moderated by Mr. **Andrew Winder**, Manager, Efficiency & ElectroMobility, ERTICO-ITS Europe, Belgium

- Mr. **Denis Naberezhnykh** presented the conclusions about the feasibility of implementing Dynamic Wireless Power Transfer on the road network.
- Mr. **Håkan Sundelin** presented the status of the ongoing public road trails in Sweden (24M euros) of two different conductive electrified road technologies (overhead and on-road). Testing of the overhead solution will start in June 2016 and public road testing of the on-road solution is planned to start in 2017.

- Mr. **Hans Bludszuweit** presented Victoria project for the wireless dynamic charging of buses. The power transfer level is 50kW, the THD <1%, the total efficiency >85%, and the Inductive Power Transfer efficiency >91%. An Energy Storage System is integrated and the system is also ready to integrate photovoltaics.
- Mr. **Axel Barkow** presented UNPLUGGED project (3.7 and 50kW static, IEC 15118 communications).
- Mr. **Evangelos Karfopoulos** presented FastInCharge project (30kW, 92% efficiency, 9 cm airgap, and maximum allowed misalignment 20 cm).
- Mr. **Giampiero Brusaglino** presented the EV-Connect project activities and results.
- Mr. **Mauricio Esguerra** presented a new cement like material with magnetic properties that could be very useful for wireless charging.

All presentations are available at this link.

Figure 9 Denis Naberezhnykh presents the conclusions from UK feasibility study regarding DWPT


Figure 10 Hans Bludszuweit presents the results of Victoria project


Figure 11 Axel Barkow presents the results of UNPLUGGED project

Figure 12 Evangelos Karfopoulos presents the results of FastinCharge project

Figure 13 Giampiero Brusaglino presents the results of EV-CONNECT project

Figure 14 Mauricio Esguerra presents the benefits of the new magnetized cement material

The event ended at 17:30 with the concluding remarks of FABRIC Project Officer Mr. **Maurizio Maggiore**.

3. CONCLUSIONS

The FABRIC One-Day Conference primary goal was to promote the discussions towards the wide deployment of Electromobility and to set the basis for knowledge exchange and further collaboration between the different stakeholders, i.e. national and European Authorities, Researchers and Academics, OEMs, solution providers, infrastructure operators, etc.. The Conference gathered approximately 70 European and international participants, who had the chance to discuss on issues related to the status of wireless EV charging, on the interoperability in Electromobility, on related Standardization activities and work specifically on wireless power transfer for EVs, on the main obstacles for the wide deployment of Electromobility and on the different EV charging modes.

It is worth to be mentioned here, that the creation of links between different stakeholders and other European and National R&D initiatives is a continuous effort within FABRIC. Especially, the sessions *"Policies & Standardisation in Wireless Power Transfer: Drivers & Barriers Towards Wide Implementation"* and "*R&D initiatives towards Electromobility deployment"* of the One-Day Conference, were held as a follow up of the FABRIC IEEE IEVC 2014 Workshops organised with similar themes by FABRIC, on December 2014, in Florence, Italy. More information about these Workshops can be found at:

http://www.fabric-project.eu/index.php?option=com_k2&view=item&id=62:fabric-workshop-on-standardization&Itemid=220

and:

http://www.fabric-project.eu/index.php?option=com_k2&view=item&id=63:europe-meets-ievc-workshop&Itemid=220

ANNEX 1 PROGRAMME

Tuesday, 2 February 2016	
Start–end time	**Main topic**
9:00-9:30	***Registrations/Welcome***
09:30- ***10.00***	• *Welcome Address* • **Hermann Meyer,** Chief Executive Officer, ERTICO-ITS Europe, Belgium • **Angelos Amditis**, FABRIC Project Coordinator, Research Director, ICCS, Greece • *Opening speeches* • **Maurizio Maggiore**, Project Officer, European Commission, DG Research & Innovation, H2, Belgium • **Alessandro Coda**, Research Coordinator, European Council for Automotive R&D (EUCAR), Belgium
10:00-11:15	*Technical session:* ***"FABRIC INITIAL RESULTS"*** • Moderator: **Dennis Naberezhnykh**, Head of ITS and Ultra Low Emission Vehicle Technology, Sustainable Mobility Group, TRL, UK
10:00-10:10	"*FABRIC overview*" **Angelos Amditis**, FABRIC Project Coordinator, Research Director, ICCS, Greece
10:10-10:20	"FABRIC *charging solutions and prototypes*" **Peter Vermaat**, ICT consultant, TRL, UK
10:20-10:35	"*Infrastructure of the FABRIC test sites*" **Paolo Guglielmi**, Associate Professor, Politecnico di Torino, Italy **Stéphane Laporte,** Project Manager, VeDeCom, France
10:35-10:45	*"Identifying first deployment feasibility: separating unrealistic from real options*" **Sebastiaan Meijer**, Professor, Head of GaPSlabs, KTH Royal Institute of Technology, Sweden
10:45-10:55	*"ICT Needs and Solutions"* **Andrew Winder**, Manager, Efficiency & ElectroMobility, ERTICO –ITS Europe, Belgium
10:55-11:15	Q&A Session (20' min)
11:15-11:45	***Coffee break***
11:45-12:45	*Technical session:* ***"POLICIES & STANDARDISATION IN WIRELESS POWER TRANSFER: DRIVERS & BARRIERS TOWARDS WIDE IMPLEMENTATION"*** • Moderator: **Sebastiaan Meijer**, Professor, Head of GaPSlabs, KTH Royal Institute of Technology, Sweden
11:45-11:55	*"eMI³ platform for interoperability in ElectroMobility"* **Jean-Charles Pandazis**, Head of Department, Efficiency & ElectroMobility, ERTICO-ITS Europe, Belgium
11:55-12:05	*"Current status and outlook of stationary and dynamic wireless electric vehicle charging"* **Nicholas Keeling,** Senior Staff Engineering, Qualcomm, Germany
12:05-12:15	*"Standardisation in electromobility: future plans of international standardisation bodies for WPT"* **Gian Maurizio Rodella***,* Director, Commissione Tecnica di Unificazione nell' Autoveicolo-CUNA, Italy

12:15-12:25	"*IEC International Standardization Work on WPT for Electric Vehicles*" **Peter Van den Bossche**, Lecturer, Vrije Universiteit Brussel, Belgium/ Secretary of IEC TC69
12:25-12:45	Q&A Session (20' min)
12:45-13:45	***Lunch break***
13:45-14:45	*Round Table discussion:* ***"WIRELESS CHARGING: IS IT THE SOLUTION FOR THE RANGE ANXIETY PROBLEMS?"*** • Moderator: **Angelos Amditis**, Research Director, Institute of Communication & Computer Systems (ICCS), Greece
• **Patrick Duprat,** APS Solution Manager, ALSTOM, France • **Håkan Sundelin,** Senior Researcher, Viktoria Swedish ICT, Sweden • **Nicolai Woyczechowski,** Senior Manager Business Development, Hubject GmbH, Germany • **Daniel Roiu,** Electrical Energy & Electrification Unit Manager, Centro Ricerche Fiat, Italy • **Uooyeol Yoon,** Research Professor, KAIST Wireless Power Transfer Research Center, Korea	
14:45-*15:15*	***Coffee break***
***15:15*-16:45**	*Technical session:* ***"R&D INITIATIVES TOWARDS ELECTROMOBILITY DEPLOYMENT"*** • Moderator: **Andrew Winder**, Manager, Efficiency & ElectroMobility, ERTICO-ITS Europe, Belgium
15:15*-*15:25	*"Conclusions from UK feasibility study into implementing DWPT on the strategic road network"* **Dennis Naberezhnykh**, Head of ITS and Ultra Low Emission Vehicle Technology, Sustainable Mobility Group, TRL, UK
15:25-15:35	*"Two electrified roads tested in real environment in Sweden"* **Håkan Sundelin**, Senior Researcher, Viktoria Swedish ICT, Sweden
15:35-15:45	*"Project Victoria - The first Spanish showcase for DWPT"* **Hans Bludszuweit**, Modeling Unit Director, CIRCE, Spain
15:45-15:55	*"UNPLUGGED – Interoperable inductive charging for electric vehicles"* **Axel Barkow,** Senior Manager, Forschungsgesellschaft Kraftfahrwesen mbH Aachen, Germany
15:55-16:05	*"Static and Dynamic Fast Inductive Charging: The FastInCharge project concept"* **Evangelos Karfopoulos,** PhD student (NTUA)/ Researcher, SmartRue Research team, ICCS, Greece
16:05-16:15	*"EV-CONNECT: Roadmap for the deployment of the Electric Vehicle Charging Infrastructure"* **Giampiero Brusaglino**, Engineer, Associazione Tecnica dell'Automobile- ATA, Italy
16:15-16:20	*"Magnetizable concretes as a competitive and road integrable solution to increase the efficiency and/or coil distance for DWPT"* **Mauricio Esguerra**, CEO and co-founder, MAGMENT UG, Unterhaching, Germany
16:25-16:45	Q&A Session (20' min)
16:45	***Closing***

Table 1 One Day conference programme

ANNEX 2 SPEAKERS' SHORT BIOGRAPHIES

Hermann Meyer, *Chief Executive Officer, ERTICO-ITS Europe, Belgium*

Since 2008, Hermann works at ERTICO – ITS Europe. He leads a team of 40 highly qualified professionals in Brussels who are managing cooperation activities of ERTICO Partners in Europe and beyond. He is the Chair of the Board of Directors of the ITS World Congress in Bordeaux 2015, Co-Chair of the iMobility Forum, member of the Steering Group of ERTRAC and a member of the Coordination Committee of the Network of National ITS Associations. In 2009/2010, he was the Chair of the eCall Implementation Platform of the European Commission. Prior to joining ERTICO, he represented the interests of the Volkswagen Group in the EU institutions in Brussels as Head of the Government Relations Office. He was seconded in 1996/1997 to the Principal Policy Department in the German Federal Ministry of Transport and from 2003 to 2006 to the European Car Manufacturing Association (ACEA) as Director of Environmental Policies. Between 2001 and 2003, he headed the "Vehicle Technologies" Working Group of the "Sustainable Mobility 2030" Initiative of the World Business Council for Sustainable Development presenting the results at the World Economic Forum in Davos 2003.Hermann holds a PhD in Land Economy from the University of Cambridge (UK) and a Master of Arts in Economics from State University of New York.

Angelos Amditis, *FABRIC Project Coordinator, Research Director, ICCS, Greece*

Dr. Angelos Amditis is Research Director in the Institute of Communication and Computer Systems (ICCS), and member of its Board of Directors. He is the founder and the Head of the I-SENSE Group. He is the President and one of the founding members of ITS Hellas and the Chairman of the EUROVR Association. He is representing ICCS at ERTICO where he is also a member of its Supervisory Board, of its Strategy Committee and of the Electromobility and Automation Task Forces.
He is the writer of several peer reviewed journal articles, book chapters and more than 177 conference papers. His current research interests in the field of ITS include electromobility, cooperative systems, automated transport systems, and smart mobility both for people and cargo (ITS for Logistics). He is also quite active on Internet related research (IoT, Cloud services etc.). He has participated in more than 80 R&D projects in the last 15 years and he is currently the coordinator of the following projects: FABRIC (www.fabric-project.eu/), AutoNet2030 (http://www.autonet2030.eu/) , INACHUS (http://www.inachus.eu/), RECONASS (http://www.reconass.eu/), ROBO-SPECT (http://www.robo-spect.eu/) and SENSKIN (http://www.senskin.eu/).

Maurizio Maggiore, *Project Officer, European Commission, DG Research & Innovation, H2, Belgium*

Currently working at the European Commission, Directorate General for Research and Innovation, Surface Transport Unit, he is mainly responsible for automotive projects dealing with electric drives in the framework of the European Green Vehicles Initiative (EGCI) PPP. He is also responsible for the technical content of the EGVI and participates in several policy working groups on fuels and emissions regulations. He has also been responsible for ICE powertrains, Hydrogen and Fuel Cells, Aftertreatment and Light structures projects in the Road sector. Born in Como, Italy, he earned a Degree in aerospace engineering at Milan Polytechnic in 1985, after which he joined Agusta, the Italian helicopter manufacturer. He worked there for 14 years, initially in the Advanced Design Dept, and later in the Research Coordination office. There he mostly managed EU-funded cooperative research projects in different areas such as aerodynamics, interior and exterior noise, concurrent engineering, training, gearbox design. A fervent supporter of the need to increase the awareness of science and technology in the general public, he has been involved in the publishing business since 1979, mostly as a free lance, finally taking the post of Chief editor for mechanical technologies of a technology magazine for two years before joining the Commission in 2002.

Alessandro Coda, *Research Coordinator, European Council for Automotive R&D (EUCAR), Belgium*

Alessandro Coda graduated with full marks in Electronic Engineering at the Turin Polytechnic in May 1987. He has been Research Coordinator at EUCAR (European Council for Automotive R&D) in Brussels, Belgium, since beginning of 2006. Sone April this year he added the role of acting director. Previously at Fiat Auto - Engineering & Design in Turin, Italy he held the position of General Manager for Methodologies, Intellectual Properties and Regulations Responsible (2004-2005) and for Innovation Projects (2001-2003). Before that, he held various managerial positions at the Fiat Research Centre in Vehicle and Innovative Product Technology, Safety and Reliability Engineering, Planning and Innovation becoming responsible for the coordination of public funded projects. He is the author of several technical papers and has chaired sessions in various Congresses and in October 2015 he got by the European Commission, during the ITS World Congress in Bordeaux the 2015 iMobility "Excellence in ITS Achievement" Award.

Peter Vermaat, *ICT consultant, TRL, UK*

Peter Vermaat is a Principal ITS Consultant at TRL. He has over 25 years' experience in the electronics, communications and intelligent transport businesses, including research and development, product development, systems engineering, integration, test and operations. His principal areas of expertise are in the fields of Cooperative Systems, Road User Charging, and more recently in Low Carbon Vehicles. He has been the technical lead in a number of Cooperative Systems projects for both the EC and Highways England in the UK, most recently in a project investigating the benefits that European road authorities could derive from the use of Cooperative applications. He is currently TRL's technical lead in a project investigating the feasibility of providing connectivity on road corridors on the UK's strategic road network.

Paolo Guglielmi, *Associate Professor, Politecnico di Torino, Italy*

Paolo Guglielmi received the M.Sc. degree in electronic engineering and the Ph.D. degree in electrical engineering from the Politecnico di Torino, Turin, Italy, in 1996 and 2001, respectively. In 1997, he joined the Department of Electrical Engineering, Politecnico di Torino, where he became a Research Assistant in 2002. Since 2012, he is Associate Professor with the Politecnico di Torino. He has authored several papers published in technical journals and conference proceedings. His fields of interest include power electronics for wireless power transfer, high-performance drives, and computer-aided design of electrical machines. Mr. Guglielmi is a member of the IEEE Industry Applications Society and the IEEE Industrial Electronics Society.

Stéphane Laporte, *Project Manager, VeDeCom, France*

Graduate engineer from INSA Lyon (Institut National des Sciences Appliquées) (National Institute of applied sciences), Stéphane Laporte worked at the University of California UC Davis as a post-graduate researcher from 1991 to 1992. He has then been a member of the L.N.E. (Laboratoire National d'Essais) (national test laboratory) as a Laboratory Manager for 8 years, before holding the same position in FAURECIA Research & Development department from 2000 to 2009, and then the position of Product Manager for two years in the same company. He integrated the ERT (Europe Research Transport), an in-house subsidiary of IFFSTAR, to be an Operations Manager until 2014. Since October of the same year, Stéphane Laporte has been Project Manager for the Vehicle Program at the VeDeCoM Institute.

Sebastiaan Meijer, *Professor, Head of GaPSlabs, KTH Royal Institute of Technology, Sweden*

Prof. dr.ir. Sebastiaan Meijer is full professor in Health Care Logistics at KTH Royal Institute of Technology, Stockholm, Sweden. Meanwhile he is part-time associate professor at Delft University of Technology, The Netherlands. He leads GaPSlabs: a multi-disciplinary center for gaming and participatory simulation in complex systems like transport, logistics, health care, urban development and energy. His main interests are in design methods for such systems, and how different methodologies shape decisions by authorities that manage complex multi-layered organizations and loosely coupled services. Gaming simulation in this sense is used for hypothesis testing, studying behaviour, knowledge and cognition, and designing new practices and procedures. Validity aspects of this type of research are his special interest, as well as multi-method simulation. Dr. Meijer received his PhD from Wageningen University in 2009, for which thesis he won the Special Category of the Deutscher Planspielpreis 2010 for best European PhD dissertation on gaming methodology. His publications are both in domain and in methodology oriented conferences and journals and won several best paper awards. He is a honorary visiting professor at IIIT Bangalore, and was visiting fellow at CSTEP, Bengalore, India at the Next Generation Infrastructure Lab. He is coordinator for EU projects within FP7 (PETRA, FABRIC (SP-coordinator)), and EIT ICT Labs (Activity Line 'Mobile Data for Control Rooms'). He leads the RGS projects between ProRail and TU Delft too.

Andrew Winder, *Manager, Eco & Energy Efficient Mobility, ERTICO –ITS Europe, Belgium*

Andrew Winder has been a project manager at ERTICO for 3 years and was previously involved in planning and evaluation of Intelligent Transport Systems, traffic management and public transport studies in consultancies in France and the UK. He is currently involved in projects dealing with the contribution of ITS to reducing the environmental impacts of road transport. He is leader of the FABRIC sub-project covering Information and Communications Technology aspects required for on-road charging.

Jean-Charles Pandazis, *Head of Department, Eco & Energy Efficient Mobility, ERTICO-ITS Europe, Belgium*

Jean-Charles Pandazis, joined ERTICO, as Head of Department Efficiency & ElectroMobility, in 2009. He holds a MSEE degree from the Swiss Federal Institute of Technology in Lausanne (EPFL) and from the Georgia Institute of Technology in Atlanta. He built his career at Bosch Corporate Research successively as R&D engineer, Project Manager and finally Group Manager in the field of Driver Assistance. Seconded by Bosch to ERTICO from 1996 to 2003, he developed a "shared vision for ITS in Europe 20 years ahead", then developed many activities related to map databases and driver assistance. He was the coordinator of the EU Integrated Project eCoMove and was also responsible of the ERTICO Task Force on "ITS for ElectroMobility". He is currently the coordinator of the industry-driven forum ADASIS, he is responsible for the ERTICO Programme on eMobility, and is coordinator of the eMI3 Association.

Nicholas Keeling, *Senior Staff Engineering, Qualcomm, Germany*

Dr. Nicholas Keeling is a Senior Staff Engineer at Qualcomm, with responsibility for system architecture of both static and dynamic electric wireless charging (WEVC) for Qualcomm Halo. Dr. Keeling joined Qualcomm in November 2011 when Qualcomm purchased HaloIPT Ltd. He continued research and development on static charging systems in New Zealand resulting in one of the first publicly deployed wireless charging systems. Prior to Qualcomm, Dr. Keeling was a founding employee of HaloIPT Ltd, which was a startup formed by Auckland UniServices Ltd to developed and enable wireless charging technology for the burgeoning electric vehicle market using IP development within the University of Auckland. Dr. Keeling received his Bachelors in Electrical Engineering in 2006 and a Ph.D from University of Auckland in 2010, specializing in Wireless Power Transfer under the supervision of Prof. John Boys and Prof. Grant Covic. He currently has more than 35 patents granted and pending.

Gian Maurizio Rodella, *Director, Commissione Tecnica di Unificazione nell'Autoveicolo-CUNA, Italy*

Dr. Engineer RODELLA Gian Maurizio is Director of CUNA (Commissione Italiana dell'Automobile). He is a member of the Steering Committee of ISO TC/22.
His specific experience in Automotive field come from '80 years, like responsible of Engine and vehicle Development in international team (Europe, USA and China and India). His experience is focused on Diesel Engines and Commercial Vehicles.
He is consultant to the Italian Ministry of Infrastructure and Transport for innovative vehicles and new fuels.

Peter Van den Bossche, *Lecturer, Vrije Universiteit Brussel, Belgium/ Secretary of IEC TC69*

Peter Van den Bossche promoted in Engineering Sciences from the Vrije Universiteit Brussel on a thesis "The Electric vehicle, raising the standards". He is currently lecturer at the Erasmushogeschool Brussel and the Vrije Universiteit Brussel. Since more than 15 years he is active in several international standardization committees, currently acting as Secretary of IEC TC69. He has been closely involved in electric vehicle research and demonstration programmes in collaboration with the Vrije Universiteit Brussel and the international associations AVERE and CITELEC, and is now coordinating research projects on battery modelling, always observing the link to standardization development in the field.

Patrick Duprat, *APS Solution Manager, ALSTOM, France*

After ten years as aeronautical engineer, Patrick Duprat joined Alstom Transport in 2001; within the group, he first worked nearly six years in the signalling solutions as responsible for developing applications for metro projects. Thereafter, he joined the Transport Global Solutions entity as R&D Project Manager for the development of a new driverless metro before becoming technical manager on turnkey system tenders. In 2008, he discovered the ground-level feeding system (APS) for trams as head of the engineering for projects. Since then, he is a Senior Expert and Head of the APS R&D programs including the "APS for Road" one (with a first demonstrator made in Sweden in partnership with Volvo).

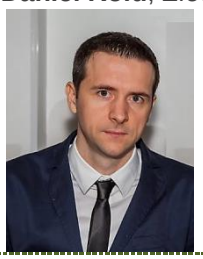
Håkan Sundelin, *Senior Researcher, Viktoria Swedish ICT, Sweden*

Håkan Sundelin is working as a senior researcher in electromobility projects. He has a long background from Scania ranging from system architect to his latest responsibility of coordinating and managing their research within electromobility. He has been evaluating and testing the concept of electric roads using both inductive and conductive power transfer in many different research projects. Håkan Sundelin received his B.Sc. in Electrical Engineering at the Royal Institute of Technology 2002 after completing his studies with a final year at Fachhochschule Zentral Schweiz. His initial research area was systems engineering of vehicle electronics. His licentiate thesis was accepted in 2008, where a method was presented on how to improve the decisions made during the early phases of E/E-system development. His PhD thesis investigated how Lean thinking can be applied to system architecting and was defended in March 2011.

Nicolai Woyczechowski, *Senior Manager Business Development, Hubject GmbH, Germany*

Nicolai Woyczechowski is a graduate from the European-University of Frankfurt (Oder), he holds a German business administration degree, similar to an MBA. His published diploma thesis was focused on the success factors for emobility in Germany. Before joining Hubject in January 2014 he worked four years as a management consultant for different consulting companies in the Utilities sector. At Hubject he is responsible for the Business Development department and focuses on shaping innovative solutions for the emobility sector. Furthermore, he is responsible for deriving customized partner specific solutions and for overseeing international implementation projects.

Daniel Roiu, *Electrical Energy & Electrification Unit Manager, Centro Ricerche Fiat, Italy*

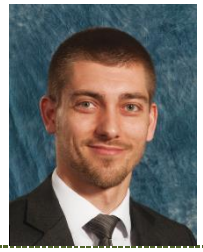


Daniel Roiu received the Ph.D. degree in Electrical Engineering from Politecnico di Torino, Italy, in 2009. He is Senior Researcher at Fiat Research Centre and he is head of Electric Energy and Electrification Unit. He has authored or coauthored more than 10 papers in international conferences and technical journals. His current research interests include electric machines, digital control of power electronics, batteries, energy management, vehicle integration of E/E components, international standards. He has participated in more than 15 R&D projects in the last 5 years.

Uooyeol Yoon, *Research Professor, KAIST Wireless Power Transfer Research Center, Korea*

Dr. Uooyeol Yoon is Research Professor and team leader in Wireless Power Transfer Research Center at KAIST (Korea Advanced Institute of Science and Technology), Korea. He got Ph.D degree of Electrical Engineering at Washington University in St. Louis, USA. Before joining in KAIST, he had worked at Alcatel-Lucent USA and Texas Instruments as SoC (System-On-Chip) design staff. Since joining in Wireless Power Transfer Research Center at KAIST, he has worked on wireless power transfer projects for electric bus, high-speed train and electric bicycle. Also, he has worked on the Standardization of Wireless Power Transfer for Electric Vehicles. He is a regular working group member of IEC 61980 and SAE J2954.

Dennis Naberezhnykh, *Head of ITS and Ultra Low Emission Vehicle Technology, Sustainable Mobility Group, TRL, UK*



Denis is the Head of ITS and Low Carbon Vehicle Technology at TRL. Denis has worked on various projects related to WPT (both static and dynamic) over the last 6 years. Most notably, Denis is the technical coordinator for charging solutions development subproject within project FABRIC and the technical lead on the feasibility study of use of dynamic power transfer on the UK motorways, commissioned by the UK Highways Agency. FABRIC is a European Research programme on the development and feasibility assessment of dynamic on-road power transfer systems for electric vehicles.

Hans Bludszuweit, *Modeling Unit Director, CIRCE, Spain*

Hans Bludszuweit is PhD in electrical engineering. Born in Jena (Germany) in 1974, received the Dipl.-Ing. degree in Electrical Engineering from the Technical University of Ilmenau (Germany) in 2001 and the PhD (European Doctorate) from the University of Zaragoza (Spain) in 2009. Since 2009 he is a researcher in the Electrical Division at CIRCE, where he is part of the research group on renewable energy integration which also comprises CIRCE's activities on wireless power transfer. He collaborated as one of the main authors in 4 journal papers and 10 contributions to international conferences and gained experience in project management participating among others in 3 European projects.

Axel Barkow, *Senior Manager, Forschungsgesellschaft Kraftfahrwesen mbH Aachen, Germany*

- Born March 6th 1978 in Cologne
- 2006 Diplomingenieur Electrical Engineering and Information Technology at RWTH Aachen University
- 2006 – 2010 Scientific Researcher at Institute für Kraftfahrzeuge Aachen (ika)
- 2009 – 2010 Manager Embedded Hardware and Software at ika
- Since 2010 Senior Manager Electrics/Electronics Department at Forschungsgesellschaft Kraftfahrwesen Aachen mbh (fka)

Evangelos Karfopoulos, *PhD student (NTUA)/ Researcher, SmartRue Research team, ICCS, Greece*

Evangelos Karfopoulos was born in Athens, Greece in 1982. He received his diploma in Electrical and Computer Engineering from NTUA, where he is now a PhD Candidate. His research interests include Electric Vehicle management, distributed optimization, multi-agent system controls. Mr Karfopoulos is a member of the Technical Chamber of Greece.

Giampiero Brusaglino, Engineer, Associazione Tecnica dell'Automobile- ATA, Italy

Giampiero Brusaglino is Electrical and Aeronautical Engineer, graduated at Politecnico di Torino. He has been Vice Director at Centro Ricerche Fiat as responsible for national and international programs on Electric and Hybrid Vehicles. He has been President of A.V.E.R.E. and is chairman of the Technical Committee CEI-CIVES, the Italian Section of A.V.E.R.E. In ATA He is involved in the activities related to Electric and Hybrid Vehicles, including the Formula SAE ATA Electric Italy, dedicated to University and High School students worldwide.

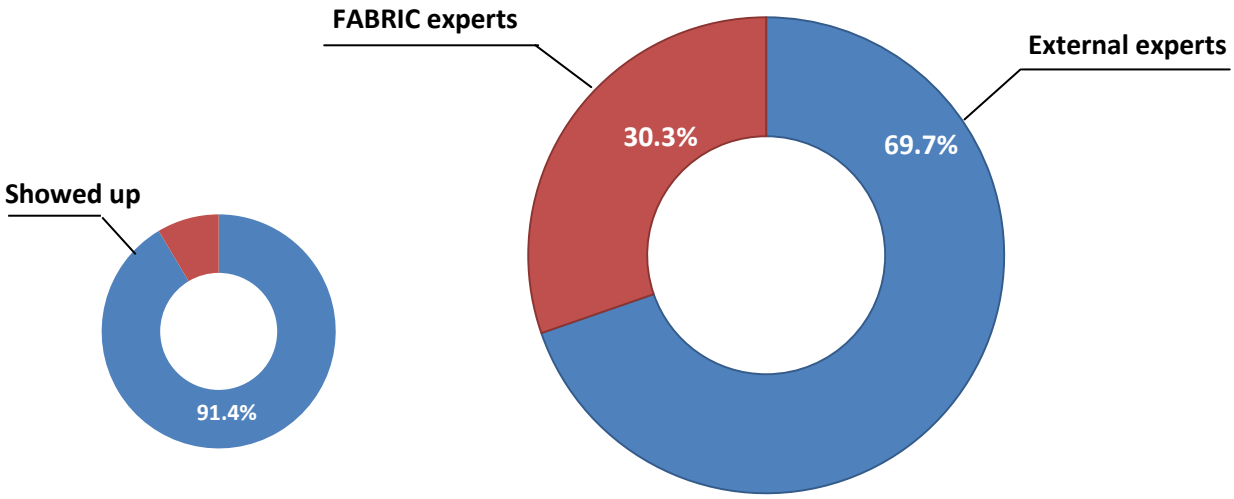
Mauricio Esguerra, *CEO and co-founder, MAGMENT UG, Unterhaching, Germany*

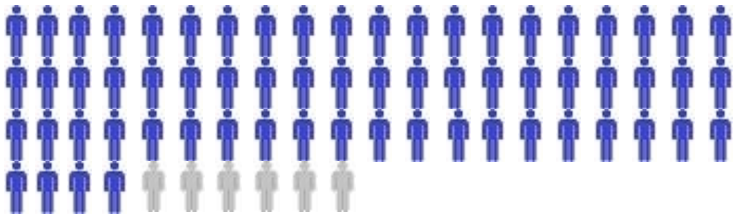
Mauricio was born in Bogotá, Colombia. He studied physics at TU München and Ohio State University and has more than 25 years of experience in the field of soft magnetic materials and its applications, modeling, testing, inductive components, power electronics and LED lighting. He held management positions at various companies including Siemens/EPCOS, Dialight, Pulse, Falco and Eglo and has been a member of IEC standard committees. Mr. Esguerra is a lecturer at Hochschule der Bayerischen Wirtschaft in Munich, holds fourteen patents and has published over 70 papers.

Table 2 speakers' short biographies

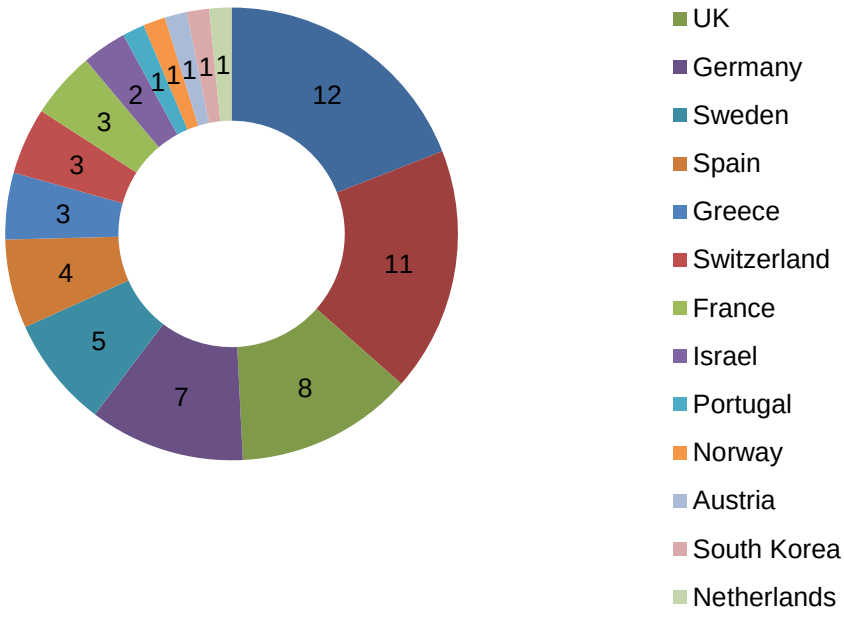
ANNEX 3 PARTICIPANTS

A. Participation Infographics

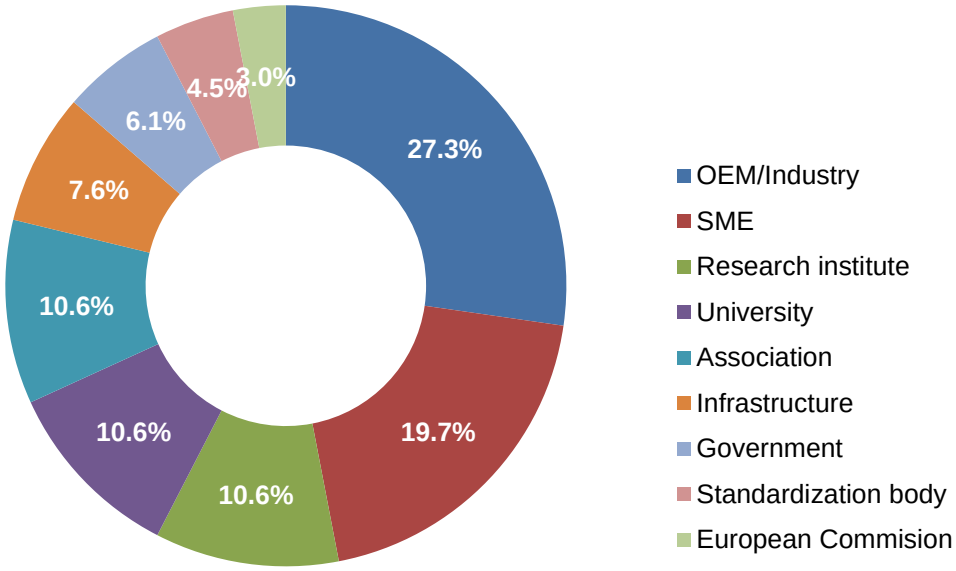




Participant Countries



Type of audience



B. List of Participants

External experts				
1.	Antonissen	Tom	Senior Advisor Europe & Central Asia	IRF - International Road Federation
2.	Barker	Myles	Business Development Manager	Swarco (APT Controls)
3.	Barrera	Gabriela	Deputy Director	Polis
4.	Beeldens	Anne	Senior Researcher	BRRC - Belgian Road Research Centre
5.	Bonte	Dominique	Managing Director and VP	ABI Research
6.	Bratz	Kerstin	Senior Consultant	German Association of the Automotive Industry, VDA
7.	Butcher	Neil	Director	Qualcomm
8.	Coosemans	Thierry	Proffessor	Vrije Universiteit Brussel
9.	de Jager	Will	Manager R&D	Imtech Traffic & Infra B.V.
10.	De Schutter	Niels	Global Head of Public & Health Solutions	Atos
11.	Di Pasquale	Guido	Project manager	Pluservice Srl
12.	Diaz Garcia	Jorge Camilo	Product Deployment Manager	CEMEX Research Group AG
13.	Ernström	Magnus	Strategist	Region Gävleborg
14.	Ezer	Oren	CEO	ElectRoad
15.	Garcia Duarte	Lourdes	R&D Expert	ENDESA

16.	Giannini	Monica	Project Manager	IRU Projects
17.	Guerini	Alexandre	Products Development & Industrialization Director	CEMEX Research Group AG
18.	Hegazy	Omar	Senior Reseracher and Team Leader	Vrije Universiteit Brussel (VUB)
19.	Hutchinson	Luke	PhD Student	University of Southampton
20.	Legrand	Thierry	Programme Manager	CCMC
21.	Libbrecht	Robert	Managing Director	ERTRALCO
22.	Matos	Joao	Professor	Instituto Telecomunicações / Universidade Aveiro
23.	Moran	Bob	Deputy Head	UK Office for Low Emission Vehicles
24.	Panzer	Matthias	Manager Engineering Primove Bus & Rail Components	Bombardier Primove GmbH
25.	Pizzaferri	Walter	Managing Partner	O.I.E.
26.				
27.	Rumbak	Hanan	CTO	ElectRoad
28.	Søråsen	Runar	Innovation Consultant	Miles Ahead AS
29.	Thompson	Ian	Senior Technology Adviser	Highways England
30.	Tollin	Johan	Head of e-mobility R&D	Vattenfall AB
31.	Tsukamoto	Hitoshi	Senior engineer	MITSUBA Germany GmbH
32.	Waterson	Ben	Lecturer in Transportation	University of Southampton
33.	Zampini	Davide	Head	CEMEX Research Group AG

Table 3 List of participants: External Experts

Presenters				
1.	Maggiore	Maurizio	Project Officer	European Commission
2.	Amditis	Angelos	Research Director	ICCS
3.	Meyer	Hermann	Chief Executive Officer	ERTICO-ITS Europe
4.	Coda	Alessandro	Research Coordinator	EUCAR
5.	Rodella	Gian Maurizio	Director	CUNA
6.	Barkow	Axel	Senior Manager	FKA
7.	Bludszuweit	Hans	Modeling Unit Director	CIRCE
8.	Duprat	Patrick	APS Solution Manager	ALSTOM
9.	Keeling	Nicholas	Senior Staff Engineering	Qualcomm
10.	Esguerra	Mauricio	Senior Technology Advisor | CEO	DMEGC Germany GmbH | MAGMENT UG
11.	Guglielmi	Paolo	Associate Professor	Politecnico di Torino
12.	Karfopoulos	Evangelos	Phd Student (NTUA)/ Researcher, Smartrue	ICCS

			Research Team,	
13.	Laporte	Stéphane	Project Manager	VEDECOM
14.	Meijer	Sebastiaan	Professor, Head Of Gapslabs	KTH Royal Institute of Technology
15.	Naberezhnykh	Dennis	Head Of Low Carbon Vehicle And ITS Technology	TRL
16.	Pandazis	Jean-Charles	Head Of Department, Eco & Energy Efficient Mobility	ERTICO
17.	Roiu	Daniel	Electrical Energy & Electrification Unit Manager	Centro Ricerche Fia
18.	Sundelin	Håkan	Senior Researcher	Viktoria Swedish ICT
19.	Van Den Bossche	Peter	Lecturer, Secretary Of IEC TC69	Vrije Universiteit Brussel (VUB)
20.	Vermaat	Peter	ITS Consultant	TRL
21.	Winder	Andrew	Project Manager	ERTICO
22.	Woyczechowski	Nicolai	Senior Manager Business Development	Hubject GmbH
23.	Yoon	Uooyeol	Research Professor	KAIST (Korea Advanced Institute of Science and Technology)
24.	Brusaglino	Giampiero	Consultant	ATA

Table 4 List of participants: Presenters

FABRIC partners				
1.	Damousis	Yannis	FABRIC Project Manager	ICCS
2.	Boni Castagnetti	Federico	Innovation Engineer	IREN S.p.A.
3.	Borra	Fabrizio	Technical Director	mect srl
4.	de Blas	Juan	General Manager	Qi Energy
5.	Forss	Anton	Development Engineer	Scania
6.	Freixanet	Josep	Project Manager	ENIDE
7.	Johansson	Roy	Research Engineer - Electrical HW	Volvo Group Trucks Technology
8.	Mercurio	Saverio	Project Manager	TECNOSITAF
9.	Parena	Daniela	R&D Manager	AMET s.r.l.
10.	Perrone	Walter	Project Manager	TECNOSITAF
11.	Rittà	Caterina	Responsible of Innovative Developments	TECNOSITAF
12.	Arsuaga	Carlos	Delegation in Brussels	CIRCE

Table 5 List of participants: FABRIC partners