

# Sustainable and intelligent Management of Energy for smarter Railway systems in Europe: an Integrated optimisation approach

## D7.1 Exploitation Plan

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Leader of this Deliverable: Aida Herranz (FFE), Eduardo Prieto (FFE),

Contributions: Franco Cataldo (UNIFE), Isabelle De Keyzer (UIC)

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<b>PP</b>	Restricted to other programme participants (including the Commission Services)	
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## EXECUTIVE SUMMARY

MERLIN is encompassing stakeholders from across the railway sector, subsequently making the results from this project beneficial for a wide spectrum of organisations. Therefore, it is paramount that a clear and effective plan is developed in order for the results of the projects to be exploited and implemented in an optimum manner. Without such a strategy outlined the full potential benefits of the project may not be realised.

Dissemination of the project's outputs will facilitate the wide-spread of information and knowledge from the results created by MERLIN stakeholders beyond the members of the consortium and will also help to draw interest.

Exploitation of MERLIN aims to have partners of the project as well as external organisations implementing results derived from the project. The strategy of how this will be done is fundamental in order for the full value of the project to be attained.

MERLIN seeks to investigate and demonstrate the viability of an integrated management system to achieve a more sustainable and optimised energy usage in European Mainline Railway systems. The results of the project are to be demonstrated which will validate the results and aid implementation.

This document consists of a general SWOT analysis of the project which will need to be considered in order for the projects outcome to be successfully implemented and exploited. This document also highlights the political and legislative aspects which ought to be considered by the MERLIN project. At this stage in the project this document provides a general overview of the context in which the MERLIN project is set in.

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## PROJECT OVERVIEW

### 1.1 PROJECT AIM

MERLIN's main aim and purpose is to investigate and demonstrate the viability of an integrated management system to achieve a more sustainable and optimised energy usage in European electric mainline railway systems.

MERLIN will also contribute to the EU's aim of a more sustainable rail system and a reduction in CO<sub>2</sub> via a more efficient use of energy resources. Where MERLIN's results will be implemented, an overall reduction of the energy consumption of 10% is expected

Some of the benefits that MERLIN will bring are listed below:

- Providing a support for the fulfilment of the requirements in Directive 2009/72/EC as MERLIN will aim to define a framework for the implementation for railway stakeholders and actors
- Providing recommendations for the design of distribution networks and electrical systems
- Allowing for a better understanding of energy usage and demand through a better understanding of train operation patterns
- Permitting an optimisation of traction energy supply, reliability and capacity – leading to a more efficient use of resources and improvement in rail environmental performance
- Highlighting incentives to invest in smart and sustainable energy supply and distribution methods

### 1.2 EXPECTED RESULTS

MERLIN will provide an integrated optimisation approach that includes multiple elements, dynamic forecasting supply-demand scenarios and cost considerations to support operational decisions leading to a cost-effective intelligent management of energy and resources through:

- Improved design of existing and new railway distribution networks and electrical systems as well as their interfaces with the public grid and considering network interconnections
- Better understanding of the influence on energy demand of operations and operational procedures of the different elements of the railway system
- Identification of technologies and solutions able to further contribute to the optimisation of energy usage
- More efficient traction energy supply based on optimised use of resources
- Understanding of the cross-dependency between these different technological solutions to define optimum combinations for optimised energy usage
- Improving cost effectiveness of the overall railway system
- Contribution to European standardisation (TecRec)

MERLIN will also deliver the interface protocol and the architecture for energy management systems in the railway domain, combining the technical development with new business model that would enable and foster their application.

## 2. MARKET ANALYSIS

The first step is to understand the market status of the railway energy industry in order to understand who the main actors and stakeholders are, the trends of the market and identify the needs of the industry.

### 2.1 MARKET STATUS

In many European countries, railway systems developed as separate privately owned companies operating regional networks, with permission to construct and operate a line being granted or instructed by government legislation or by royal decree or license. These entities in general had total or virtual monopolies.

These national companies were vertically integrated organisations and it was difficult or impossible for private or regional enterprises to run their own trains on the national networks, or to compete in another EU country's railway systems. Thus in 1991 EU Directive 91/440/EEC was created to make it a legal requirement for independent companies to be able to apply for non-discriminatory track access on a European Union country's track.

The EU has also promoted electricity market liberalisation and security of supply through the 2003 Internal Market in Electricity Directive, which replaced earlier directives in this area. The Directive 2003/54/EC has been replaced by the EU Directive 2009/72/EC.

Nowadays, with respect to EU legislation, any train operating company has got the principal access right to any European network as well as to any electricity supply for electric traction. The energy supplier can be chosen independently of the rail infrastructure manager. Business models for non-discriminatory track access are fully implemented whereas business models for energy supply, distribution and exchange are still insufficient. MERLIN aims at defining a framework for the sector-wide implementation of EU Directive 2009/72/EC for all railway business partners in the European Union.

The traction power supply should be managed according to the EU Directive 2009/72/EC which is implemented into the national laws. Giving an example from Spain, the Infrastructure Managers put traction power supply out to tender in batches for 1 to 2 years period to distributors.

They pay to the distributors the regulated costs to access to the grid and receive from the railway operators the previous costs plus the cost of managing them according to the rates published in the Statement of the Railway Network.

### 2.2 WHY MERLIN?

Better energy management means lower cost which will attract more interest from investors and therefore bring more competitiveness which will lead to cheaper fares which in turn will bring more demand for the railway industry. Another important aspect of the project is the potential for the liberalisation of the electricity market. Furthermore, as mentioned above this project will also have a positive impact in terms of the reduction of CO<sub>2</sub> emissions in the rail sector.

### 2.3 SWOT ANALYSIS

The SWOT analysis gives a general overview of the Strengths, Weaknesses, Opportunities and Threats of the MERLIN project.

### I. Strengths

- All aspects of rail transportation relating to energy are addressed. The project is multidisciplinary and looks at the interfaces within the railway system as well as the interfaces external of the rail system.
- Involvement of partners who have knowledge of the energy sector ensuring the project does not focus solely on the railway environment.
- Solutions are intended to be flexible and will consider:
  - Availability of smart technology
  - Interoperability
  - Scalability.
- Through UIC and UNIFE, excellent output for dissemination is available. In addition through these channels external stakeholders also have some access to the project via involvement in the Rail Reference Group.
- Collaborative actions already exist between some partners. Some partners are already involved in integrating technologies which will be beneficial during the integration phase of the project.
- Through the simulations, MERLIN gives the opportunity for the results generated to be validated against real-life applicable scenarios.
- The industry partners are leaders in railway technologies and energy systems and therefore bring an excellent knowledge base into the project.
- Good level of participation from Railway Operators and Infrastructure managers ensures that customer needs are carefully considered by the industrial partners.
- MERLIN will bring together the knowledge of equipment, devices and technology, both for those that are now in use, and for those that will be necessary to use in the future with the aim of managing the energy in a more efficient way.

### II. Weaknesses

- The potential lack of involvement of partners coming from the electric sector (generation and distribution) that may have contributed with a different point of view to the smart grid analysis and approach.
- MERLIN will have to look after the developments of national projects that might work on the same area and may affect its results.

### III. Opportunities

- In relation to the emergence of technologies, the project could be instrumental in the development of rail energy standards. The project includes the task of developing Technical Recommendations which can be the basis of future standards. These technical recommendations will also be available publically.
- The increasing growth in demand of energy efficient products and systems from both public and private investors – this is also identified in the European Commission's Transport White Paper.
- Opportunity to develop a true implementation plan for railways of legislation relating to the liberalisation of the energy sector.
- Co-operation with other rail energy research projects. Application of new technologies and operational criteria that may derive to global energy saving in the rail sector. This

knowledge will suppose new opportunities for the stakeholders inside and outside of the MERLIN project (within the confidentiality limits of the project).

- Further relation with Horizon 2020 initiatives should be explored in order to continue with the development of the major findings from MERLIN. Liaisons should be made with any PPP initiatives inside H2020 or Smart Cities initiative.
- Developments coming from MERLIN should be evaluated in order to explore the possible application to new markets other than Europe.

#### IV. Threats

- There may be difficulties in integrating developed solutions with legacy systems.
- Lack of well-defined operator needs and requirements may make the results uninteresting for them.
- Lack of consensus amongst partners, particularly during the drafting of the technical recommendations.
- Cooperation between project partners can be weak; this can lead to fewer contributions from some partners. Poor information sharing within the consortium could lead to confusion and misinformation which ultimately lead to poor outputs.
- There is a need to look closely after the cost efficiency and the technological viability of the project results, as the ambitious scope of MERLIN might lead to difficulty in implementing them in the near future.

## 2.4 POLITICAL AND LEGISLATIVE FACTORS

The political and legislative framework in which MERLIN is related to, is quite complex. This is because it needs to take into account factors that affect the two key sectors that underpin the European Economy; Transport and Energy. MERLIN therefore must ensure that it reflects carefully the policies of these two sectors, to ensure that the overall outcome of the project is in line with the key objectives of European Transport and Energy policy.

### European Legislative Factors

Several European policies have led to increase liberalisation in both the transport and energy sectors. In the rail sector, railway undertakings (operators) under the established legislative framework have the ability to access and operate on part of the European Railway Network; further secondary legislation has been and is continuing to be developed in order to further facilitate this practice particularly aiming to create an interoperable European Rail System. These efforts aim to lead to the creation of a true European Rail market. Additionally, through liberalisation of the energy sector, the legislative framework (EU Directive 2009/72/EC) permits for Railway Undertakings to choose the energy supplier for traction from anywhere across Europe. Thus, in theory this also should mean that the energy supplier can be chosen independently of the rail infrastructure manager. Business models for non-discriminatory track access are fully implemented whereas business models for energy supply, distribution and exchange are still insufficient. MERLIN aims at defining a framework for the sector wide implementation of EU Directive 2009/72/EC for all railway business partners in the European Union, in particular through MERLIN deliverable 7.2.

Other key important European legislation that MERLIN will take into account:

- Directive 2012/34/EU of the European Parliament and of the Council of 21 November 2012 establishing a single European Railway Area. This directive recasts the Directives 91/440/CEE, 95/18/CE y 2001/14/CE and slightly affects some points lightly related to the use of electrical railway smart grids.
- Directive 2008/57/EC of the European Parliament and of the Council of 17 June 2008 on the interoperability of the rail system within the Community (Recast)
- Commission Decision of 6th March 2008 (2008/284/CE) concerning a technical specification for interoperability relating to the “energy” sub-system of the trans-European high-speed rail system (Energy HS TSI).
- Commission Decision of 26 April 2011 concerning a technical specification for interoperability relating to the ‘energy’ subsystem of the trans-European conventional rail system [notified under document C (2011) 2740].

In addition, MERLIN will also monitor and take into account relevant outputs coming from activities at a standardisation level, in particular the activities led by CEN-CENELEC in regard to energy management. Several initiatives are on-going relating energy management for examples as standards for energy metering and information exchange, and these will be carefully followed to ensure that MERLIN developments are aligned with relevant standards to facilitate the implementation of the project results.

### **Key European Initiatives**

In addition to the legislative framework, the sector is involved in working and developing several important initiatives of particular relevance to research.

#### *Energy efficiency and CO<sub>2</sub> reduction*

Energy efficiency and CO<sub>2</sub> reduction is high priority in Europe’s agenda and Transportation has a significant role in meeting the EUs targets. The transport sector is responsible for 23.8% of all greenhouse gas (GHG) emissions and for 27.6% of CO<sub>2</sub> emissions (data from 2006). Rail is acknowledged to be one of the most environmentally-friendly modes of transport – and can therefore play a pivotal role in “de-carbonising transport”. Nevertheless, to maintain this competitive advantage of rail, rail has to progress to continue improve the efficiency of the railway system.

The Transport White Paper, adopted on 28 March 2011, the European Commission’s transport policy agenda for the next decade, has announced a CO<sub>2</sub> reduction target of transport by 60% by 2050.

#### *Railroute 2050- The European Rail Research Advisory Council (ERRAC)*

The aims and vision outlined in Railroute 2050 which concern what should be achieved for energy matters through innovation and technology are very much aligned with MERLIN. The MERLIN project proposal went through ERRAC during its initial approval phase which further supports the relevance of the MERLIN project and its potential uptake after the project. The rail sector has a clear vision and will support the measures and initiatives that allow the rail system to reach its objectives.

*“In 2050 railway energy networks are managed as smart grids. The consumption of energy is optimised on global and local level. In 2050, smart energy on-board distribution, use and storage is*

*fully implemented. ....[]]; cooling systems consume considerably less energy and are clearly more environmentally friendly. Furthermore, smart and low impact rolling stock is developed, reducing infrastructure maintenance needs”.<sup>1</sup>*

*Challenge 2050, a comprehensive vision from the whole sector.*

The vision of Challenge 2050 Rail includes a definition of the policies (what needs to be done), the technologies (developing the tools to enable it to be done) and the services that need to be provided (what the user sees and receives when a customer of rail) in different areas.

Throughout the document, enabling technologies that lead to a cost efficient rail system are key for facing the social and economic challenges which the sector will face in the future.

*“Europe’s rail sector leads the world and is at the cutting edge globally, continually growing its share of international markets as a result of investment in research and innovation and appropriate regulatory support. A strong European railway area is the key to sustainable mobility in a low-carbon society; it is also essential for economic growth, social cohesion and people’s expectations of mobility.”<sup>2</sup>*

This is a basic support for MERLIN, which aims at reducing the overall consumption of 10% in the whole sector.

*The future challenges of the European Energy system - The internal energy market.*

Concerning the electrical sector challenges that need to be taken into account by MERLIN, the key issue is contributing to the functioning of the internal energy market. In this sense, the exploitation and adaptation of the knowledge from MERLIN will help deploy the innovations for the interconnection of smart grids, subsequently contributing to the aims planned by the European Commission:

*“The Commission will further support R&D and innovation to facilitate the deployment of smart grids. The Commission will renew the standardisation mandate granted to the European standardisation organisations in order to develop a second set of standards and develop guidance and identify potential Projects of Common Interest by the end of 2012.”<sup>3</sup>*

Also, MERLIN will help reach the aims planned by the European Commission on the Energy Efficiency Strategy, as it will serve obtain higher energy savings in the transport sector and pave the way for future savings in the relation between the rail energy grids and the electric grids.

*“...the Union energy efficiency target is not on track and that determined action is required to tap the considerable potential for higher energy savings in buildings, transport, products and*

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<sup>1</sup> Railroute 2050: The sustainable backbone of the Single European Transport Area. An initial update of the ERRAC Vision for Railway Research and Innovation for the future of rail

<sup>2</sup> Challenge 2050. The Rail Sector Vision.

<sup>3</sup> COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS. Making the internal energy market work. Brussels, 15.11.2012 COM(2012) 663 final.

processes. Those conclusions also provide that the implementation of the Union energy efficiency target will be reviewed by 2013 and further measures considered if necessary<sup>4</sup> “

**Summary**

In summary, the number of key initiatives, in addition to the established legislative framework, support the validity of the need for the MERLIN project and should subsequently lead to a successful market uptake and exploitation of the MERLIN outcomes. The project has been carefully aligned with the high-level objectives outlined in key relevant initiatives and legislation.

**2.5 EVALUATION WORKING GROUP OF THE EUROPEAN RAIL RESEARCH ADVISORY COUNCIL**

One of the main objectives of the work developed by the Evaluation Working Group (EWG) of the European Rail Research Advisory Council (ERRAC) since 2006 is to provide essential information and tools on the lessons learnt from the evaluation of past projects to promote a more systemic and focused approach to the use of funding resources and to enhance real market uptake of project results.

MERLIN will build on the lessons learnt and recommendations elaborated by the EWG with the objective of achieving a strong market uptake of the project results. It is important to highlight that the “market uptake concept” defined by the EWG is related to how results have been implemented once the work has ended, not judging any project per se, as every project that was financed and delivered results is already monitored during the course of the research by the European Commission, with the support of independent evaluators.

A project is evaluated with a strong market uptake if there is clear evidence of use of products or services, processes, dissemination of knowledge, tools, etc. in several countries/products and the major outputs of the project have been implemented. These projects will sometimes lead to additional research to realize their full market uptake.

The table below includes a list of the ERRAC EWG recommendations for a project that aims at achieving a strong market uptake and the analysis of how these issues are dealt with in MERLIN project<sup>5</sup>.

ERRAC EWG Recommendations	MERLIN project approach
Make it clear that projects should search for viable solutions in terms of applicability and cost implications, and develop real business cases.	This statement is part of the philosophy of the whole project. Business models are developed in WP2.
Think of future market uptake and what happens after project ends: the project as an enabler and not an end to itself.	The TecRec’s and recommendations made through WP7 will help facilitate post project market uptake, in particular through standardisation. <i>Special attention should be paid to this aspect during the last phase of the project.</i>
Clearly define scope, inputs and deliverables of project	Scope, inputs and deliverables are clearly defined

<sup>4</sup> DIRECTIVE 2012/27/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC

<sup>5</sup> Source: Evaluation Working Group, ERRAC Roadmaps WP06. Preliminary Report, March 2012. PowerPoint presentation of Strong Recommendations. www.errac.org.

at inception. Specify meta-goals of projects and develop implementation strategy/ plan (a mandatory critical factor), identifying targeted users for dissemination of results.	in the DoW. Targeted users for dissemination results are identified in WP8 and WP7 (Task 7.1.).
Clarify ownership of project results and deliverables at inception.	Defined in the Consortium Agreement.
Select committed partners really interested in finding and applying viable solutions (eg. for new products, involve companies that actually make them to avoid barriers to implementation).	<i>The interest of MERLIN project partners on the results of MERLIN is described in section 3 of this document and shows commitment to find good solutions to the identified needs.</i>
Anticipate and identify possible problems/ barriers to implementation to avoid split of interest and weak market uptake, taking account of implications for strategic interests of key players to avoid strategic, commercial, technological and operational constraints (eg. not to devise technical solutions that incur extra costs to another party, without involving them).	A risk registry is regularly updated and included in the agenda of the Steering Committee meetings when necessary.
Set-up a Steering Group of experts/stakeholders familiar with context at play, to be in charge of advisory aspect and exploitation of results once the project has ended.	Rail Reference Group created. Exploitation Plan elaborated.
Plan for knowledge retention and dissemination at inception.	Developed in WP8 and WP7 (Task 7.1.).
Establish clear communication channels and frequency of exchange.	Developed in D10.2 Quality Plan and in WP8.
Conduct a regular review on post-project progress (possibly electing a project responsible/promoter).	<i>To be defined during the last phase of the project.</i>

### **3. STRATEGY FOR EXPLOITATION**

The beneficiaries of the MERLIN project will be the entire railway sector. This is reflected by the fact that infrastructure managers, train operating companies, the manufacturers and system integrators as well as three associations (UIC, UNIFE and FFE) work together in this project. All parties have an interest to deliver sufficient results which will help develop an overall smarter and more energy efficient railway system that is oriented to the market and end users. Some restricted projects results are also going to be shared with the MERLIN Rail Reference Group (RRG). This end-user group (containing members who are not project partners) together with the MERLIN project partners can be regarded as the as major players in the European railway business. Technical Recommendations (TecRecs) developed jointly by UIC and UNIFE members will also provide a proposal for sector wider standards on some of the results that stem from MERLIN. These TecRec's will be an important tool in ensuring the results of MERLIN will be applicable after the project conclusion.

#### **3.1 CONSORTIUM STRATEGY**

At this stage of the project it is difficult to define a detailed exploitation strategy for the results of the project. However, a general overall plan can be described.

The results from the project will be tested in scenarios and this will help ensure the validity and viability of the solutions developed in MERLIN. This will aid the exploitation into the market as the solutions will have actually been tested and applied, thus providing confidence to the market that the solutions developed are practical and realistic, in addition to beneficial.

As the project encompasses the majority of the main key stakeholders, it is expected partners will implement the relevant results into their organisations. In addition, through the rail reference group set up in the project and also as a result of partners who are association of other organisations, awareness of the project will be achieved through these channels. The rail reference group will also further enhance the validity of the outcomes, as it gives the MERLIN project an enlarged knowledge base to provide advice and suggestions on the developments of the project. This increases the relevance and potential market uptake of the innovations developed in MERLIN.

Partner organisations will be expected to disseminate and exploit the results from the project into their respective companies. This will lead the uptake of the solutions developed and as the project represents a large number of the key stakeholders, the results of MERLIN should be able to reach a wide spread implementation.

In addition, inside the Annex 1 MERLIN DOW, an initial idea of the type of exploitation expected by some of the partners can be found.

#### **3.2 STAKEHOLDER STRATEGY**

In order to define the MERLIN individual partner strategies, a questionnaire was been sent out to the MERLIN partners requiring them to answer the following questions:

- a. WHAT ARE YOUR NEEDS IN TERMS OF ENERGY MANAGEMENT?
- b. WHAT SPECIFIC AREA OF MERLIN PROJECT'S EXPECTED ARE RESULTS USEFUL / RELEVANT FOR YOUR ORGANISATION?

- c. (relating to the TecRecs to be developed) HOW ARE THESE RECOMMENDATIONS USEFUL TO YOUR BUSINESS?
- d. HOW DO YOU PLAN TO IMPLEMENT THE MERLIN RESULTS?
  - a. In the short term (less than 5 years after completion)
  - b. In the long term (more than 5 years after completion)

As the project is still at an early stage, these results will give an idea of the intentions of the partners to implement and exploit the results of the MERLIN project but of course can only go to a limited level of detail as the final outcomes of the MERLIN project will be realised at a later stage.

The answers and analysis of the answers have been split into the type of organisation that the partner is; railway undertakings and infrastructure managers, rail supply industry, academia and sector association. The model of the questionnaire can be found in annex 1.

### 3.2.1 Operators and Infrastructure Managers

#### NEEDS:

The operators and infrastructure managers identified following needs in terms of energy management:

- Need of a truly integrated energy management system for the network – this can only be achieved by firstly understanding the loads and losses in the network.
- Efficient traction energy usage and lower costs.
  - Optimise energy usage in regard train traffic so that extreme power peaks and lows are minimised, this would require energy efficiency to be taken into account when defining train timetables.
  - Better understanding of energy demands will allow for greater economic flexibility and better decisions to be made in regard to energy storage and control
- Maximising the use of regenerative energy systems

#### MERLIN RESULTS RELATED TO NEEDS

- Better understanding of cross-dependencies between different technological solutions to define combinations for optimised energy usage.
- Where results can demonstrate an economic benefit, these can lead to investments being made to uptake these results
- Better understanding of the influence on energy demand and operating procedures by the different elements of the railway system – allow for better decision making in regard to energy management.
- TecRec's will help facilitate standardisation across the rail system in regard to energy management.

#### USE OF THE TECRECS AND RECOMMENDATIONS

- Guidelines for the implementation should provide a support for a true integrated energy management of energy, as it will provide a railway specific guideline for the implementation of the recent energy liberalisation legislation.

- The TecRec for Energy and Power Consumption is expected to allow a more accurate assessment of manufacturer's equipment and will allow for better comparison and decision making.
- The TecRec for Energy and Power Information protocols will be useful as it will provide some support for the interaction of actors, particularly where new actors are defined. However, it is important that this TecRec takes considers current practice so that it can be practically used.

### **SHORT-TERM IMPLEMENTATION PLAN (less than 5 years post-project)**

Where the results provide improvements and are economically feasible, the developments from MERLIN will be implemented for new power management systems and also as part of renewal plans.

For some IM's the results a tool will be developed that will determine energy consumption and evaluate the impact that the technical and operational innovations coming from MERLIN will potentially have on their respective systems so to make an appropriate decision on how to implement the outcomes.

### **LONG-TERM IMPLEMENTATION PLAN (more than 5 years post-project)**

In terms of long-term implementation it is foreseen that where the results can bring about an increased level of optimisation they will be form part of future investments for new parts of the network. For example where train traffic optimisation is achieved through MERLIN and can lead to a reduction in power peaks, such developments will be considered when deciding on network design such as sub-station needs.

In addition, one IM foresees eventually developing a full scale real time energy management and monitoring system for all the consumers of energy in the railway system.

## **3.2.2 Rail Supply Industry**

### **NEEDS**

The main needs of the supply industry are to ascertain an increased knowledge in requirements in terms of energy management for the railway system. This in turn will allow the supply industry to provide better products to railway operators and infrastructure managers which are in line with their needs. Understanding the role of energy management in operation allows the supply industry to design products, therefore knowledge of all the components of the rail system which have an impact on energy management is necessary in order to understand how they interact with each other and interact external of the rail system. This knowledge will allow for the development of an intelligent Railway Energy Management system to optimise energy consumption.

In parallel better products which lead to improvements in energy efficiency will as a whole increase the competitiveness of rail and increase the market potential for the products of the rail supply industry. Standardisation is an important need for the supply industry to meet this objective.

### **MERLIN RESULTS RELATED TO NEEDS**

The rail supply industry identified that a significant part of the expected results will be useful. These include:

- Getting a better understanding of energy consumption of the whole rail system, which was previously not considered, this should lead to increased energy efficiency and allow the supply industry to design better products for their clients.
- The development of a Railway Energy Management System should be realised by the project which is something the rail system will find useful, in addition to the integration of smart grids into the system.
- MERLIN will look at different scenarios which will allow the rail supply industry to understand the diversity of the Railway System in Europe and therefore tailor products to meet these requirements.
- Algorithms which will be developed for the energy management systems, which will be used to enhance existing products for energy management.
- With the enhanced understanding of the interfaces, the supply industry will be able to achieve an advanced design method for electrical systems which will help improve the energy efficiency.

### **USE OF THE TECRECS AND RECOMMENDATIONS**

Regarding the TecRec's, the supply industry in general agrees that where the works of MERLIN can be developed into standards this will help provide an agreed set of guidelines to work with different operators and infrastructure managers across Europe.

The TecRec's are also important to ensure that the new practices that will come out of MERLIN will be implemented by both manufactures inside and outside of the project consortium; otherwise manufactures may work to older standards which do not bring out an increase in energy efficiency.

The use of common standards will also allow for modularisation and allow for an interoperable and competitive market for manufactures to provide products to their clients.

The guidelines for the implementation of network integration will also allow manufactures to better understand the actors and interfaces, and therefore provide better products meeting the needs of an integrated railway system.

### **SHORT-TERM IMPLEMENTATION PLAN (less than 5 years post-project)**

The supply industry will implement as soon as is possible any developments from MERLIN which materialise into an improvement of what they can provide to their clients in terms of products

In addition some manufactures responded that the algorithms developed in the scope of MERLIN will be integrated into simulation tools to allow for an increased optimisation and better design of products.

The guidance and recommendations elaborated in the products will also be integrated into designs and studies for new products where there is an expected improvement to be gained.

### **LONG-TERM IMPLEMENTATION PLAN (more than 5 years post-project)**

The manufactures intentions in the long-term are to use the MERLIN results as basis for developing new more advanced products for energy management and energy infrastructure components. These developments will look to build on the investigations made in MERLIN into a more integrated approach in terms of energy management in order to provide intelligent tools which are link the different actors to energy management inside and outside the rail system. For

example tools such as the energy dispatcher and dynamic on board manager will look to be developed.

### 3.2.3 Academia<sup>6</sup>

#### NEEDS

The main needs in terms of energy management identified by academia involved in MERLIN were:

- Need to understand better the application of energy management in the rail system
- Need to understand the challenges faced by the railway system in terms of energy management
- The need of close cooperation between the main actors; infrastructure managers, operators and suppliers.

#### MERLIN RESULTS RELATED TO NEEDS

As the academic institution which responded has an energy supplier background rather than a predominantly rail background, the main interesting results are the implementation of energy management practices such as integrating smart grids and developing an integrated energy management into a different sector; the railway system. In particular the investigations into the interaction between the rail system and public grid is relevant as it could bring about significant benefits to both sides in terms of energy consumption optimisation and in the long term CO<sub>2</sub> reduction.

In addition, the participation into the development of an energy management system for the different industry will give an opportunity to become familiar with the different constraints and capabilities of the rail industry.

#### USE OF THE TECRECs AND RECOMMENDATIONS

The guidelines for implementation of network integration will be useful in implementing smart grid in the EU railway system and defining the interaction of railway system with the external power system specially focusing on the rules and guidelines for integration local energy sources in both systems (railway system + external power system).

Specification and verification of energy and power consumptions in railway system will allow for bigger picture of the holistic system (external power system + railway system), regarding both the analysis of energy flows and calculating the system costs more precisely which could help for developing interactions between two systems in order to achieve more efficient energy and power consumption.

With the knowledge of these recommendations we will be able to get involved in more projects in this field.

#### SHORT-TERM IMPLEMENTATION PLAN (less than 5 years post-project)

With the results of MERLIN providing a big step in the development of an intelligent Railway Energy Management System, academia will be able to support implementing such systems in the different member states they are involved in.

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<sup>6</sup> Only one response from one partner was received for Academia

## **LONG-TERM IMPLEMENTATION PLAN (more than 5 years post-project)**

In addition to implementing the results in the short-term for railways, the investigations made in MERLIN can be used as basis for further investigations for energy management in other sectors and allow for potential technology transfers.

### **3.2.4 Sector Associations**

#### **NEEDS**

As association are representing interests of other companies and are there to provide a knowledge base, the responses identified that the main needs relate to gaining a better understanding of the challenges of energy management of the railway system.

This means there is a need to understand the context of the railways in regard to energy management and interactions it may have with other sectors, in particular the electricity sector. The associations are involved in the coordination of rail research projects, therefore an understanding of the research needs in terms of energy management are important, particularly in the light of the European Commission's objectives to reduce CO<sub>2</sub> emissions.

In addition, the associations are involved in promoting the rail sector as a whole, therefore understanding the innovations and technological solutions that can bring about an improvement in energy efficiency will help in its efforts to promote the rail sector.

#### **MERLIN RESULTS RELATED TO NEEDS**

The associations are interested in all the results as they look to bring about significant improvements in energy management for railway system. In particular the associations are involved in knowledge transfer stemming from research projects such as MERLIN and therefore will have a key role in disseminating and building consensus across the sector in regard to the developments and recommendations of MERLIN.

The standardisation outputs are also particularly relevant as the associations will be involved in coordinating these outputs to achieve maximum consensus and potential market uptake.

#### **USE OF THE TECRECs AND RECOMMENDATIONS**

The associations are involved in coordinating activities relating to European standards and recommendations and therefore will take great interest in being able to define and shape these norms to reflect the developments of MERLIN. The publication of common European recommendations for energy management will help the associations share knowledge from the results of MERLIN and anticipate future activities in terms of regulation and standardisation, thus providing a further support to their respective member organisations.

## **SHORT-TERM IMPLEMENTATION PLAN (less than 5 years post-project)**

In the short-term the associations will be able to enhance their knowledge in terms of railway energy management and use these to further support their member organisations, particularly in terms of understanding the European framework and in some cases support decision making for potential new investments. Furthermore, future research and existing research where the

associations are involved in will be able to take into account where possible the developments coming from MERLIN, in order to ensure that the results are not lost post-project.

During and post project the associations will also be involved actively in disseminating the public results to a wider audience, and also the elaboration of Technical Recommendations and standards.

### **LONG-TERM IMPLEMENTATION PLAN (more than 5 years post-project)**

The results will be used for the development and tools for energy management. In particular the results may be used to contribute to future long-term research visions in which the associations are involved in formulating alongside other European actors. In particular in meeting the long-term objectives set out by the European Commission.

### **3.3 DISSEMINATION**

Dissemination of the project, led by the UIC and UNIFE, will also ensure that the project reaches out to an audience wider than just the partners taking part in the project. The purpose of disseminating is to ensure that knowledge of the results from MERLIN reaches as far an audience as possible. This is to increase the likelihood that there will be an uptake of the solutions that come out of the project. Dissemination will occur in various ways such as newsletters, conference presentations, website and other forms of media.

The following are the tools for dissemination:

- The MERLIN website
- Newsletters
- Participation and organisation of conferences, workshops and info days
- Press Releases
- Presentations and Publications.

The main activities concerning dissemination will be dealt with under Work Package 8 led by UIC. Annex 2 details the full MERLIN Dissemination plan.

**ANNEX 1: QUESTIONNAIRE MODEL**

**Exploitation Plan Questionnaire**

Author	Franco Cataldo
Partner	UNIFE
Date	15/03/2013
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Status	Draft

Document history		
Revision	Date	Description
1	15/03/2013	First draft of the questionnaire
2	27/03/2013	Questionnaire approved following Task 7.1 teleconference

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EC Contract No. FP7 – 314125



## INTRODUCTION

This questionnaire aims to ascertain how each MERLIN partner intends to exploit and implement the MERLIN results. The following questions will have to be answered by the partners involved with the MERLIN project.

- **ENERGY MANAGEMENT**

- **WHAT MERLIN WILL BRING TO THE TABLE**

MERLIN's main aim and purpose is to investigate and demonstrate the viability of an integrated management system to achieve a more sustainable and optimised energy usage in European electric mainline railway systems.

MERLIN will also contribute to the EU's aim of a more sustainable rail system and a reduction in CO2 via a more efficient use of energy resources.

Some of the benefits that MERLIN will bring are listed below:

- Providing a support for the fulfilment of the requirements in Directive 2009/72/EC as MERLIN will aim to define a framework for the implementation for railway stakeholders and actors
- Providing recommendations for the design of distribution networks and electrical systems
- Allowing for a better understanding of energy usage and demand through a better understanding of train operation patterns
- Permitting an optimisation of traction energy supply, reliability and capacity – leading to a more efficient use of resources and improvement in rail environmental performance
- Highlighting incentives to invest in smart and sustainable energy supply and distribution methods

- **WHAT ARE YOUR NEEDS IN TERMS OF ENERGY MANAGEMENT?**

- **EXPECTED RESULTS**

- **OUTLINE OF MERLIN'S RESULTS**

MERLIN will provide an integrated optimisation approach that includes multiple elements, dynamic forecasting supply-demand scenarios and cost considerations to support operational decisions leading to a cost-effective intelligent management of energy and resources through:

- Improved design of existing and new railway distribution networks and electrical systems as well as their interfaces with the public grid and considering network interconnections
- Better understanding of the influence on energy demand of operations and operational procedures of the different elements of the railway system
- Identification of technologies and solutions able to further contribute to the optimisation of energy usage
- More efficient traction energy supply based on optimised use of resources
- Understanding of the cross-dependency between these different technological solutions to define optimum combinations for optimised energy usage
- Improving cost effectiveness of the overall railway system
- Contribution to European standardisation (TecRec)

MERLIN will also deliver the interface protocol and the architecture for energy management systems in the railway domain, combining the technical development with new business model that would enable and foster their application.

- **WHAT SPECIFIC AREA OF MERLIN PROJECT'S EXPECTED RESULTS USEFUL / RELEVANT FOR YOUR ORGANISATION?**

- **STANDARDS**

- **MERLIN'S TECHNICAL RECOMMENDATIONS (TECREC) AND GUIDELINES FOR THE IMPLEMENTATION OF NETWORK INTEGRATION**

In 1991 EU Directive 91/440/EEC was created to make it a legal requirement for independent companies to be able to apply for non-discriminatory track access on a European Union country's track.

The EU has also promoted electricity market liberalisation and security of supply through the 2003 Internal Market in Electricity Directive, which replaced earlier directives in this area. The Directive 2003/54/EC has been replaced by the EU Directive 2009/72/EC.

Nowadays, with respect to EU legislation, any train operating company has got the principal access right to any European network as well as to any electricity supply for electric traction. The energy supplier can be chosen independently of the rail infrastructure manager. Business models for non-discriminatory track access are fully implemented whereas business models for energy supply, distribution and exchange are still insufficient. MERLIN aims at defining a framework for the sectorwide implementation of EU Directive 2009/72/EC for all railway business partners in the European Union.

To support the fulfilment of this market liberalisation, MERLIN will deliver recommendations for:

- TecRec for Specification and verification of energy and power consumptions of railway systems
- TecRec for Energy and power related information protocols at operational level
- Guidelines for the implementation of network integration (strategic and operational levels)

- **HOW ARE THESE RECOMMENDATIONS USEFUL TO YOUR BUSINESS?**

- **IMPLEMENTATION OF RESULTS**

- **IMPLEMENTING MERLIN'S RESULTS**

MERLIN addresses the integrated energy management of electric railway systems in the following range of scenarios: High-speed, freight, regional, commuter and mixed freight-passenger traffic.

Other electric loads, like buildings, workshops, parking lots or escalators will be considered as potential consumers of the surplus of energy but their own optimisation will not be tackled within MERLIN (due to the limited project size). Indeed, the higher the number of players that are taken into account in the integrated management of energy, the more potential reduction of consumption is possible. A large network of interconnected nodes leads to more saving opportunities as the number of potential flows of energy increases. MERLIN targets an overall reduction in energy consumption at system level by 10% by 2020.

- **HOW DO YOU PLAN TO IMPLEMENT THE RESULTS?**

- **In the short term (less than 5 years after completion)**

- **In the long term (more than 5 years after completion)**

**ANNEX 2: MERLIN DISSEMINATION PLAN****TABLE OF CONTENTS**

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## EXECUTIVE SUMMARY

As part of the Exploitation plan to be submitted as part as the deliverable of WP7 (D7.1 Exploitation Plan) this document provides a plan for disseminating the knowledge gained during the European Commission Framework Program 7 MERLIN project. It completes the exploitation plan provided under WP7 (Del 7.1).

## 1. INTRODUCTION

MERLIN is encompassing stakeholders from across the railway sector, subsequently potentially making the results from this project beneficial for a wide spectrum of organisations.

Whereas exploitation of MERLIN aims to have partners of the project as well as external organisations implementing results derived from the project, the dissemination of the project's outputs will facilitate the widespread distribution of information and knowledge derived from the results achieved by MERLIN among stakeholders beyond the members of the consortium and will also help to draw interest.

The MERLIN dissemination and communication activities are coordinated by UIC as WP8 leader, under the control of the project coordinator UNIFE.

UIC, UNIFE, ADIF and FFE are the four participating members to WP8.

All the consortium partners, however, contribute more or less to the dissemination and communication activities.

Within the MERLIN project, the internal and external interactive information share and communication has been identified as an important task. Indeed project facts, figures and results are generally only appreciated and accepted when communicated properly.

This communication comprises on the one hand a wide-spread gathering of best practise as input (e.g. FP6 RailEnergy) and a comprehensive dissemination of results to the reference groups based on a knowledge database. The work will also facilitate a consultation process to develop agreed technical recommendations.

During the first stage of the project, proactive promotion of the project will be carried out in the form of an information campaign, mainly aiming at raising awareness about MERLIN and inviting targeted stakeholder groups (policy makers, railway operators, infrastructure managers, etc.) by presenting the objectives, processes and expected results of the project, as well as building the necessary networks to increase the efficiency of the project and its connexions to its environment.

This information campaign will comprise brochures, posters, flyers and the periodic presentation of the MERLIN project on various international railway and environment related conferences.

All along the project duration, ongoing communication activities will be necessary to keep dissemination active to continuously present, discuss and get feedback on the progress of the project.

In a final stage, dissemination activities will be focusing on promoting the results achieved and making the appropriate target audience aware and sensitive to their potential benefits, in order to facilitate implementation of the project results.

With a global system view, MERLIN covers a wide range of technical areas, and a large variety of dissemination targets detailed hereafter.

The following objectives have been identified for the MERLIN dissemination:

- Raising awareness for the project approach and results;

- Generate active involvement of railway stakeholders in the evaluation and usage of MERLIN results;
- Stimulate active involvement of researchers into MERLIN related research activities;
- Dissemination of scientific and technical new knowledge;
- Facilitating and encouraging the implementation of outcomes by end-users.

## 2. REPRESENTATIVENESS OF THE CONSORTIUM

Thanks to its fairly broad representativeness, both in terms of railway stakeholders and in terms of geographical scope, thanks also to the European membership of UNIFE and to the worldwide membership of UIC, the international outreach of universities and the presence of major industrial partners, the consortium in itself is the primary base for dissemination. It covers countries of West to East and North to South of Europe and brings together a balanced combination of large industrial groups, as well as SMEs, Infrastructure Managers, and Operators, with a strong support of research centres.

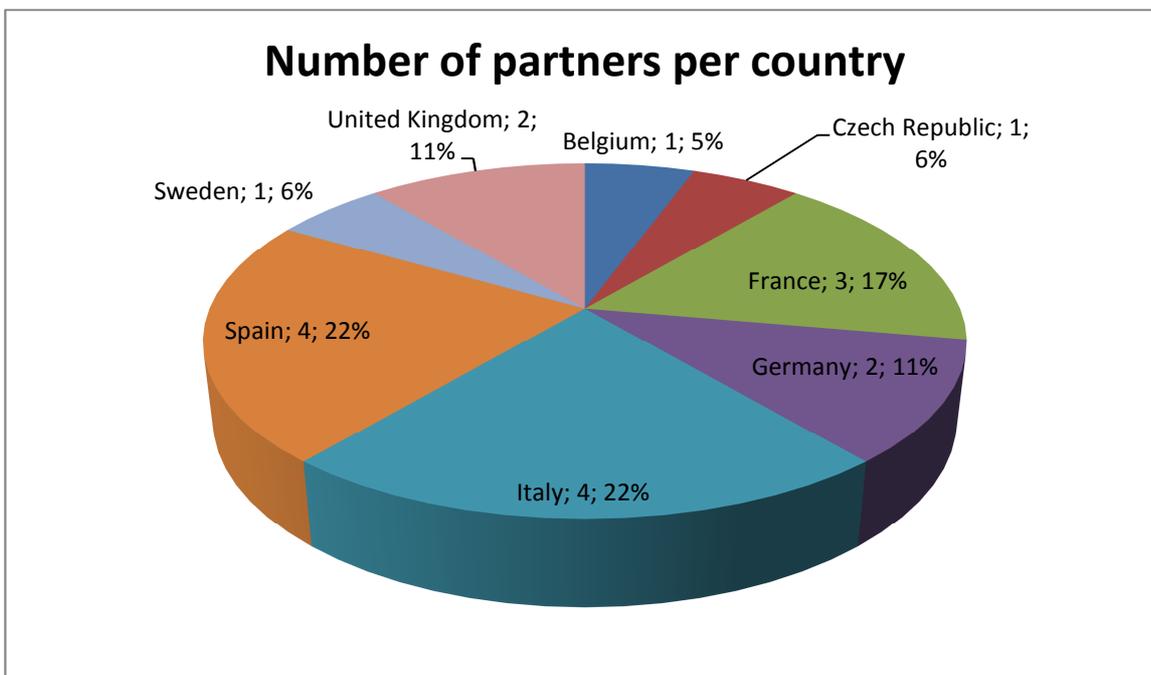


Figure 1 Number of partners per country

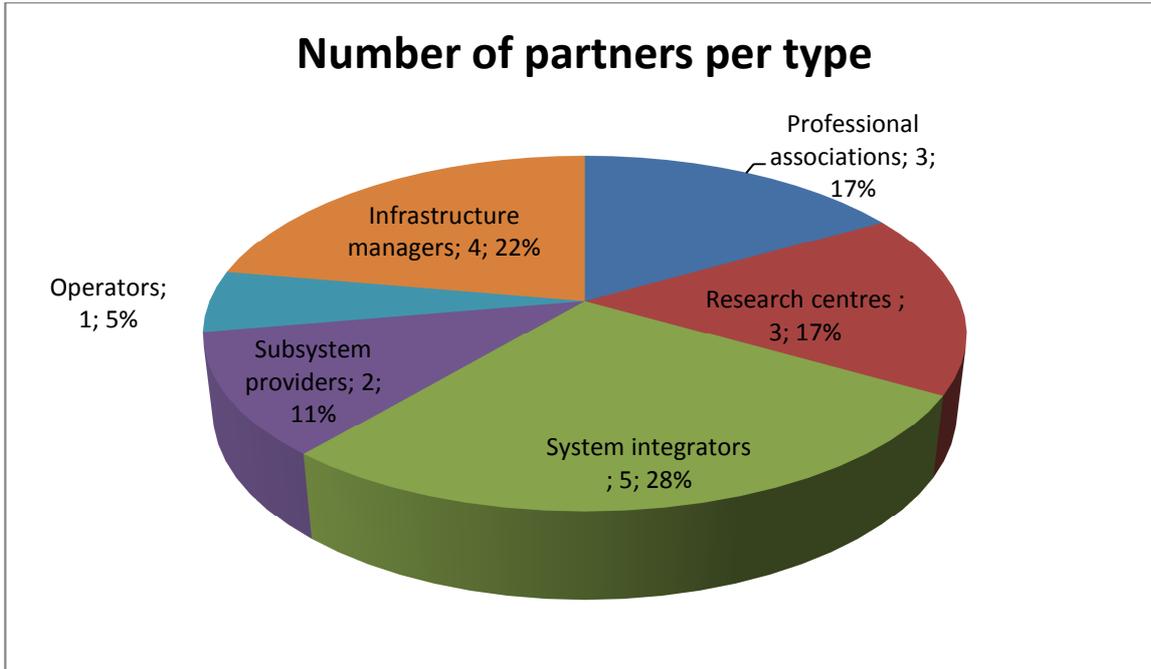


Figure 2 Number of partners per type

### 3. DISSEMINATION TARGETS

#### 3.1 EUROPEAN COMMISSION

As it is co-funding the Project, the European Commission is one of the main targets of the dissemination and the first recipient of the deliverables. Moreover it has to ensure that MERLIN is performing according to the contractual agreements. It is therefore necessary to have an open and informative dialogue with the Project Officer representing the Commission which is naturally the first and main addressee of the deliverables.

In accordance with the Grant Agreement, the project Officer will be kept informed through the periodic reports, on the progress of work, the project objectives, and on the achievements all along the duration of the project.

At the end of the project, the final summary report will give an overview of the project context, achievements and potential impact.

The Project Officer will be invited to attend all seminars and workshops for the dissemination of the MERLIN project.

The European Commission will be informed of any scientific publication related to the project.

For an improved and open dialogue, more informal direct meetings between the Project Officer and the Coordinator and involving a panel of experts of appropriate expertise and level will be organized upon request of the Commission Officer or proposed by the Coordinator, where particular items will be presented and questions answered.

#### 3.2 ENERGY STAKEHOLDERS

### 3.2.1 OECD and IEA

Both organisations are active in the field of sustainable development, the promotion of research and development and sound energy management. Therefore they will be informed and invited to all dissemination events related to the project and they will be informed on the release of public dissemination documents (public deliverables, website updates, flyer, etc.)

### 3.2.2 Eurelectric

## 3.3 RAILWAY STAKEHOLDERS

### 3.3.1 Railway operators

#### 1. Top management

This public is of primary importance, as it is the one who decides on the use of the project results and turn the proposed innovations and optimization into practice.

- During all the course of the project, presentations will be given several times a year within UIC Rail System Forum and Energy Sector Working Group meetings.
- Regular newsletters including a mid-term and final MERLIN brochure highlighting the main projects results at project mid-term and end and showing the interest of applying the results of MERLIN will be sent to the concerned representative of the top management and made available from the UIC and MERLIN website homepages.

#### 2. Procurement managers

### 3.3.2 Infrastructure managers:

Infrastructure managers are another key audience, easy to identify in the railways according to their respective technical skills. They are engineers and are generally well informed of the technical context of the ongoing research, as they are or have been involved themselves in current or previous projects, reviewing action, working groups or standardization committees.

Consequently, this audience can be reached in various ways:

- Directly with the deliverables or by guidelines derived from these documents;
- With the Final Technical Report;
- Through the UIC working groups they are active in: i.e. mainly Energy Sector and E&ETG
- Through their participation in workshops and dissemination seminars;
- Through general conferences, and exhibitions;
- Through their direct involvement into the reviewing process of the project via the Rail Reference Group (see 3.73.7 Rail Reference group).

### 3.3.3 Industry

This group that will be mainly targeted via the following stakeholders

- Top management
- Product system designers
- Product platform integrator
- Sub-suppliers,

They will be addressed via publications and information that will be delivered to the various UNIFE committees and groups (UNIFE Technical Plenary, UNIFE Sustainable Transport Committee, UNIFE Energy Efficiency Group...), will be available at UNIFE's office and at the events of the association throughout the year.

In particular, the top management, product system designers, product platform integrators, sub-suppliers, and infrastructure components suppliers will be addressed and kept informed on the project's work via UNIFE's working groups and committees. They will also be invited to the events and conferences where MERLIN will be presented.

### **3.3.4 Energy suppliers**

Energy suppliers will be addressed through the works conducted within the work packages. They will be invited to the events and training workshops organized within the project.

### **3.4 OTHER RELATED PROJECTS**

Linking with other energy management-related or similar projects allows cross-fertilization and mutual enrichment of projects. Therefore a connection shall be established with the former **RailEnergy** consortium and other projects linked to urban rail transport such as **OSIRIS**.

### **3.5 UIC**

Setting apart its role of work package leader in the Dissemination of the project, UIC is a target of major importance owing to the very wide membership of international railways. The different working groups and specialized forums and platforms (Infrastructure, Energy) will be regularly informed on the project results and will help in their future implementation. The working groups focussed on research activities will be also a target of dissemination: Research Coordination Group (RCG) and International Rail Research Board (IRRB).

### **3.6 UNIFE**

UNIFE is a European association that represents the interests of the railway supply industry in Europe at the level of both European and international institutions. Its membership comprises manufacturers and integrators of railway rolling stock, subsystems, components, signalling equipment and infrastructure. UNIFE will participate actively in dissemination, exploitation and training activities. Its particular focus will be dissemination and exploitation where, through its committees, technical forums, and events it will provide input from and result access to the rail industries, including maintenance contractors and suppliers. Further, it will distribute material at its annual and joint research events throughout the year. UNIFE is in close association with the national industry associations and constitutes as such also a point of dissemination to the industries outside of the project.

### **3.7 RAIL REFERENCE GROUP**

Even though through UIC and UNIFE excellent output for dissemination is available, the project foresees in addition that external stakeholders will also have some access to the project results provided they become involved in the Rail Reference Group.

The purpose of the Rail Reference Group is to provide input into the MERLIN project in terms of daily railway operation, good practice and user requirements. The Rail Reference Group will follow

the main work stream and progress throughout the project. This experts' network will indirectly contribute to the successful finalisation of the deliverables by cross-checking and revising them. The intention of the interaction between MERLIN and the Rail Reference Group is twofold: on the one hand it ensures the project's intermediate and final results fit with the needs and requirements of the stakeholders and end users; on the other hand, it guarantees a continuous dissemination of the project results. The Rail Reference Group can work as a virtual group in order to act in an efficient and cost effective way.

As part of the activities involved in the project promotion (DoW Task 8.1), an invitation has been sent to railway undertakings members of UIC not involved in the consortium to take part in the Rail Reference group. The access rights to the deliverables for the Rail Reference Group (RRG, as non-project partners), will be further defined on a case by case basis in line with the Intellectual Property Rights and the decision of the Steering Committee.

### 3.8 RESEARCH COMMUNITY

- European Rail Research Advisory Council – ERRAC and the stakeholders participating in it, such as CER, EIM, UIC, UNIFE, UITP, ERA, EURNEX, Member States representatives and National Technology platforms, among others.
- Other European Technology Platforms from transport modes/sectors related to the MERLIN project

## 4. DISSEMINATION MEDIA

### 4.1 PROJECT DELIVERABLES

MERLIN will generate a total of 33 deliverable reports. 20 of them will be distributed to the European Commission and to the Partners of the Consortium exclusively and 13 of them will be public. Public deliverables will be made accessible to the general public via the project website. Some of them will also be shared with the Rail Reference Group (see above) for feedback.

### 4.2 PROJECT PROMOTION

MERLIN produced a logo and a graphic charter as part of Del8.1 “Logo, Graphic charter” which has been delivered at the beginning of the Project as Part of the kick-off material.

This material also includes various templates for reports, meeting agenda, deliverables, presentations, etc.



Figure 3 Logo and example of presentation template

### 4.3 EVENTS AND CONFERENCES

Initiating or participating to major events is a prime opportunity to reach a large audience, and invite stakeholders related to the project and network to meet with experts and discuss research initiative in related areas.

The success of such a communication is only guaranteed if the information delivered is recent and up-to-date. Hence, the choice of external events to take part in, or the planning of special events has to stick not only to the targeted audience, but also to the time schedule of activities and of the production of results of the project.

Below are two tables displaying undertaken (Table 1) and planned dissemination actions (table 2) where the work progress of the MERLIN project has been or could be presented.

The events that are part of the project's milestones are highlighted in yellow.

These tables will be updated regularly in the course of the project in order to keep track of all the actions that have already taken place.

Event	Type of action	Audience	Expected output	Date	Leading partner
ICT on Trains (Milan)	Presentation at conference	Railway stakeholders, energy management experts, project partners	Presentation of the MERLIN outcomes which will be related to ICT, opportunity to disseminate and develop contacts	9-10 Oct 2013	UNIFE/DAPP
Transport Research Arena – TRA2014	Presentation, Paper, stand, flyers	All stakeholders of the transport system	Focus on MERLIN aim to optimise use of energy through sustainable innovations, Networking	Apr 2014	UIC UNIFE
Rail Reference Group Consolation Workshops (5)	Workshop	Energy management experts from Railway undertakings or suppliers not members of the MERLIN Consortium	Feedback from the RRG members will ensure results fit with needs and requirements of stakeholders and end users	Mar 2014 until Sept 2015	UIC/UNIFE
MERLIN Mid-Term conference	Conference	European Commission, Railway stakeholders, Project partners	Final results of WP1 & 2 Status of other WPs intermediate results + Next steps	May 2014	UIC
Innotrans Exhibition (Berlin)	Conference, Stand	Railway stakeholders, buyers and logistics, Industry and suppliers, Infrastructure experts. General.		Sept 2014	UNIFE
UIC Sustainability conference	Conference Stand	Environmental experts Energy experts	General presentation of main results Environmental benefits	Oct 2014	UIC
Open MERLIN Workshop	Workshop	Railway stakeholders, energy management experts, project partners	Presentation of the project demonstration results	May 2015	ADIF + FFE
MERLIN Final Conference (Brussels)	Conference	European Commission - Top management Railway stakeholders - Project partners	Final results of all WPs, exploitation and implementation of results after the end of project	September 2015	UNIFE
UIC Energy sector meeting	Presentation	Energy / Electric traction Experts	Presentation of progress Preparation of implementation, guidelines	4 times a year	UIC
Rail system forum	Presentation	IM top management / strategy		Once a year	UIC
UIC environment Platform meetings	Presentation	Environment Managers	Presentation of progress	Twice a year	UIC

**Table 1 Main events planned for MERLIN dissemination**

Event	Type of action	Audience	Expected output	Date	Leading partner
ERESS Forum (Vienna)	Presentation at conference	Railway stakeholders, energy management experts, project partners	General presentation of MERLIN in order to garner support for the Rail Reference Group	15th May 2013	DAPP
UNIFE General Assembly	Presentation	UNIFE Members	Presentation of the MERLIN project	12 <sup>th</sup> June 2013	UNIFE
UIC Eco Drive Workshop (Paris)	Presentation at workshop	Railway stakeholders, energy management experts, project partners, UIC members	Presentation of the MERLIN outcomes which will be related driver assist systems	26th June 2013	UNIFE/CAF

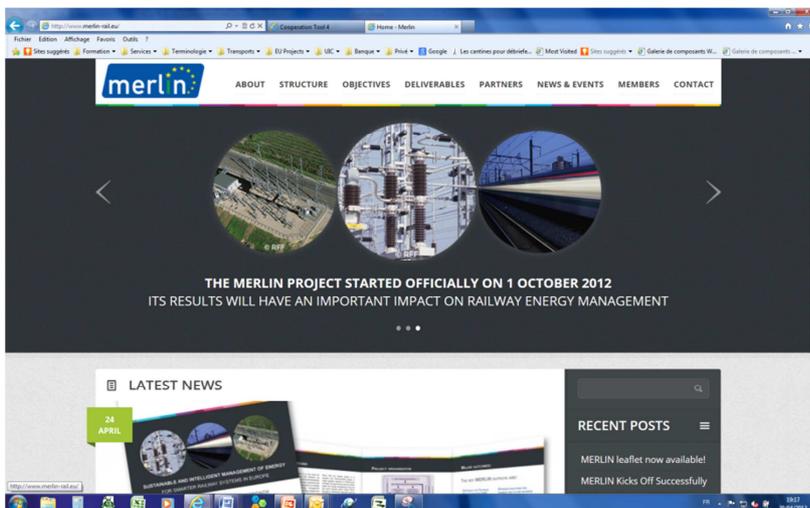
**Table 2 Events already undertaken for MERLIN dissemination**

#### 4.4 PROJECT WEBSITE

The project website, of which a complete description can be found in deliverable D8.2 Project website, is divided into a public webpage and a private platform.

**The public area** is the tool of choice for hosting communication materials and disseminating project activities to a vast audience. It provides information on project's objectives and duration, EU funding, participants list, etc.

The project website is available at: <http://www.merlin-rail.eu>



**Figure 4 Screenshot of the home page of the MERLIN website**

At this stage, the public website contains six public pages:

- About
- Structure
- Objectives
- Deliverables
- Partners
- News & Events
- Contact

The **private area** (see “Members” tab right on the top banner) is accessible from the public webpage or at <https://www.cooperationtool.eu/unife/login.aspx?p=merlin> .

This tool is the platform where documents and information of any type can be uploaded and made available by and for the project partners.

Access to the private area is restricted to the Consortium members only, with access rights depending on their role and implication level.

#### 4.5 PUBLICATIONS, PRINTED MATERIAL

#### 4.5.1 Flyer and posters

A project flyer has been produced at the beginning of the project, where the list of partners, the project objectives, the structure, the targeted innovation and expected benefits are presented.



**Figure 5 Picture of the MERLIN flyer**

In addition to the flyer, posters will be made available at events relevant to the scope of the project

#### 4.5.2 Newsletter

With the support of all members of the consortium, an annual newsletter will be published on the latest project achievements. Newsletters will be sent to all project members and made available on the MERLIN Public website.

A more detailed brochure will be published at mid-term and end of the project.

They will be completed by the electronic newsletters of UIC and UNIFE

#### 4.5.3 Articles

Articles containing progress reports and updates on the results will be published in the major rail European railway engineer magazines:

- European Railway Magazine (UK)
- European Railway Review (UK)
- Der Eisenbahningenieur (DE)
- Rail et Recherche (FR)
- La Revue Générale des Chemins de fer (FR)
- Vía libre Magazine (ES)
- Other trade journals

Dissemination will also be promoted through rail research portals such as:

- Transport Research and Innovation Portal - TRIP ([www.transport-research.info](http://www.transport-research.info))
- Railway Research Portal ([www.railway-research.org](http://www.railway-research.org))

The reporting of project relevant publications will be done through the publication approval process detailed below:

#### 4.5.4 Publication approval process

The publication of press articles, newsletters, brochures relevant to the MERLIN project has to undergo the following approval process:

1. Approval within the relevant work package
2. Send article to Project coordinator and WP Leader Dissemination
3. Distribution by Project coordinator and WP Leader Dissemination to TMT members
4. TMT Members distribute to WP members
5. TMT Members send feedback to Project coordinator and WP Leader Dissemination
6. Last approval round
7. If no comment is submitted within 15 days before publication deadline, document can be published.
8. Final version of the article is to be submitted to the WP Leader Dissemination for reporting.

**NB:** PUBLICATION RETROPLANNING HAS TO BE PLANNED CAREFULLY and may require being done several months in advance, depending on the medium!

#### 4.6 GUIDELINES

Although guidelines and proposals for Technical Recommendations (TecRecs) are part of the WP7 (Del7.3 Proposal for TecRec – Specification and verification of energy and power consumptions of railway system, Del7.4 Proposal for TecRec - Energy and power related information protocols at operational level ; Del7.5 Guideline for the implementation of network integration (strategic and operational levels)) ,they can be considered as very powerful dissemination media ensuring the implementation of the MERLIN research results.

They will be proposed to members of Standard Committees as input for future standards or update of standards in the area of MERLIN.

The target groups for the dissemination of guidelines are mainly:

- Industry
- Contractors in the area
- Infrastructure managers - high-level technical
- Assets managers high-level technical



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- Electric traction experts
- Regulatory bodies

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