This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 314125

Public Summary of D4.2

Preliminary design of the wayside energy dispatcher

What is MERLIN?

MERLIN is a collaborative project funded under the European Commission's 7th Framework Programme on Research and Development. MERLIN started on 1st October 2012 and will last 39 months.

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.

What are the issues at stake?

Energy management is a key issue for railway systems and this situation will continue to be prominent for the foreseeable future. Multiple operational scenarios add complexity to the development of suitable and appropriate energy management solutions. Moreover, existing assessment tools lack an integrated approach, and tend to omit the variation in emission levels, energy usage and associated costs resulting from differing traffic peaks.

Given that the railway system is a complex and interconnected system, a single supplier, operator or infrastructure manager (as large as they may be) cannot tackle the energy management issue for the entire network alone. Hence, only through a collaborative approach such as **MERLIN** can effective solutions for this issue be developed. Appropriately, the **MERLIN** consortium brings together the key rail stakeholders from across Europe.

What are MERLIN's main achievements?

- Proposals for technical recommendations (UIC/UNIFE TecRec) on Specification and verification of energy and power consumptions of railway systems and on Energy and power related information protocols at operational level;
- Future business models & recommendations (smart energy management, cost saving);
- Optimised solutions for current and future business models;
- Reference architecture and interfaces related to a strategic support tool and operational energy management tool which supports real time suggestions to network actors.

Public summary:

***WARNING**: This document is a synthesis of a confidential document. Access to the full content of the deliverable is restricted to the members of the MERLIN consortium and to the European Commission's services.*

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The main aim of MERLIN project is to investigate and demonstrate the viability of an integrated energy management system and to achieve a more sustainable and optimized energy usage in European electric mainline railway systems. This implies that energy consumers, producers, and storages are not isolated elements, but players of the global energy game. A smart and coordinated contribution of each of them brings more savings and provides more flexibility for the system to manage the energy flow more efficiently. In order to achieve this objective, D4.1 develops the detailed reference architecture of Railway Energy Management System (REM-S) based on D2.3 while D4.2 describes REM-S tool implementation according to the reference architecture.

REM-S is developed in MERLIN to integrate on-board, wayside and coordination services by developing a system that monitors the energy consumption of different railway subsystems and their components, and then suggests a "smart" solution for coordinating optimal energy usage in the different parts of the system.

REM-S implements two automation architecture standpoints: centralized and decentralized. According to railway system specifications there is possibility to partition the system to local areas and also there is possibility to define local or global targets for system optimisation. In the hybrid centralized-decentralized REM-S architecture, while the global Energy Management System (EMS) is executed in Control Centre considering the whole railway network for the following day by running Day Ahead Optimisation (DAO) tool, the local EMS will be done in local subnetworks during each timeslot by running Minutes Ahead Optimisation (MAO) tool.

The contribution of D4.2 is describing preliminary design of DAO and MAO tools. While the first chapter reviews the REM-S implementation concept which is defined in D2.3 and D4.1, the second chapter describes the implementation methodology. In the next two chapters modelling different actors in railway system (e.g. demand side model or modelling energy production units) and problem formulation are presented. The last two chapters describe the optimisation procedure and the method for validating optimization results. To finalise the document, a conclusion section summarises the achievements. In D4.2 the REM-S interface specifications is presented at annex 1.

More information
To know more on the MERLIN project, please visit http://www.merlin-rail.eu.