

## **Public Summary of D5.1**

# **Smart strategic energy management system software specification**

### **What is MERLIN?**

**MERLIN** is a collaborative project funded under the European Commission's 7<sup>th</sup> Framework Programme on Research and Development. MERLIN started on 1<sup>st</sup> 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.*

The overarching aim of the MERLIN project is to investigate and demonstrate the viability of an integrated management system to optimise energy use. One of the key elements of this management system is a Strategic Decision Making Tool (SDMT), intended to be a decision support system for design or modification of railway systems.

An initial architecture was developed from Work Package 2 (WP2) and described in Deliverable D2.2. This architecture has been implemented by a modular software tool developed in WP5, in order to investigate (in WP6) the Scenarios defined in WP3, with the primary goal being to test the architecture. The results will be fed back to WP2 to refine the architecture, so it can be taken forward as an output of MERLIN.

The description, methodology and objectives of the Scenarios were developed further in order to establish the requirements for a common data format (SDMF) that will allow the exchange of data between the different software modules that are to be written. There are three new software modules for which this document forms the specification, namely:

- The SDMT Core Module;
- The Contractual Arrangements Module;
- The Optimisation Algorithm

A total of 22 functionalities describing the simulation process are defined in this document. Deliverable D5.2 implements this specification effectively developing the three new software modules while D5.3 reports on the validation procedure. The tool has subsequently been applied to several different real-world scenarios (D6.1), in order to test the architecture.

#### **More information**

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