MyRailS: Metrology for smart energy management in railway system

EMRAILS 2019

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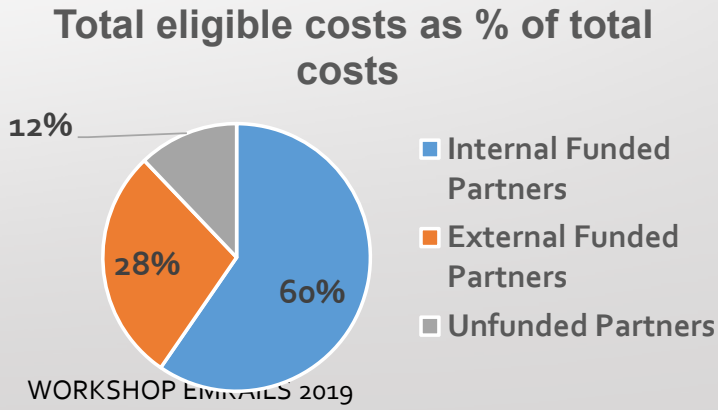
The aim

To develop the **metrological** framework and **measurement infrastructure** that underpin the adoption of energy efficient technologies in European railway systems

Total eligible cost: **2.5 M€**

EU Contribution: **2.2 M€**



The consortium – 16 Partners

National Metrology institutes	Universities – Research centers	Industries
INRIM, Italy	Comillas, Spain	HRI, Italy
CMI, Czech Republic	Railenium, France	MM, Spain
FFII, Spain	STRATH, United Kingdom	R.F.I., Italy
LNE, France	SUN, Italy	Trenitalia, Italy
NPL, United Kingdom		ASTM, Switzerland
VSL, Netherlands		
MEATS, Switzerland		
7	4	5

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The EMPIR initiative is co-funded by the European Union's Horizon 2020 research and innovation programme and the EMPIR Participating States

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WP 1

To provide calibration facilities generating traceable highly dynamic electrical signals for EMF (Energy Measurement Function) and Power quality (PQ) measurement systems

WP 2

To develop a wide-area power quality monitoring architecture

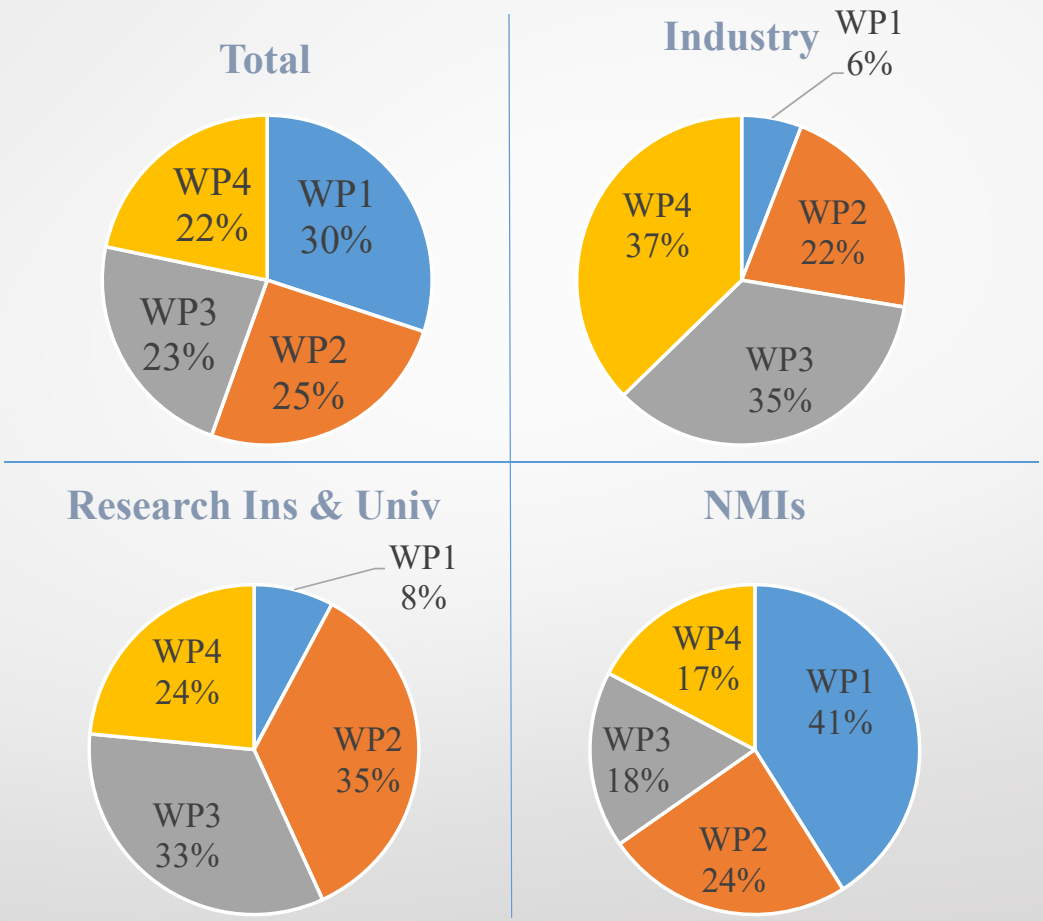
WP 3

To setup combined measurement-simulation tools to quantify the impact of new Reversible Substations (RSSs)

WP 4

To develop measurement systems and procedures for evaluating energy saving provided by eco-driving strategies

Labour man month distribution



Expected results

WP 1

Phanotm distorted power generator – realization of new generation system for AC (25 kV 50 Hz, 15 kV 16.7Hz) and 600 V – 3 kV DC systems

AC: 6 MW, 5 kHz
DC: 4 MW, 2 kHz

On-board EMF calibration/re-verification – Design, application and uncertainty budget estimation

accuracy
DC: 0.4%

Calibration of EMF and PQ meters – Realizatioon of new laboratory calibrators and procedures for calibration under real harsh electrical conditions

accuracy
DC: 0.1%
AC 0.5%

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WP 2

A PQ test waveform database composed of typical signals that occur on a variety of railway systems will be built and made available

Real-time algorithms for the analysis of the waveforms provided by the database

An algorithm for the pantograph to overhead line contact quality

A demo PQ monitoring system involving synchronised on-board and in-substation measurement units associated with the communication architecture

Metrics for new PQ phenomena specific for railway systems

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WP 3

Measurement system and protocols for the on-site measurement of the energy dissipated by the braking rheostat

Data from measurement campaigns carried out in subway and railway systems for the estimation of rheostat losses

A circuital model of the DC railway system coupled with the AC supply system

WP 4

Report on sensitivity analysis on the variables which can affect the eco-driving algorithm performances in terms of saved energy

A good practice guide to provide a reliable tool for the estimation of the impact, in terms of energy efficiency, of a specific eco-driving procedure

Accurac
y 1%

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Summer 2020

Final workshop in Turin

Napoli - Pietrarsa, 21 February 2019