METSUPERCAP

Metrology for static and dynamic characterization of supercapacitors

1st June 2024 - 31 May 2027

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INRIM - Istituto Nazionale di Ricerca Metrologica – Torino - Italy

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Overall objective

The overall objective of the project is to establish a traceable, consistent and sound measurement and characterization framework for both SCs and SCs banks.

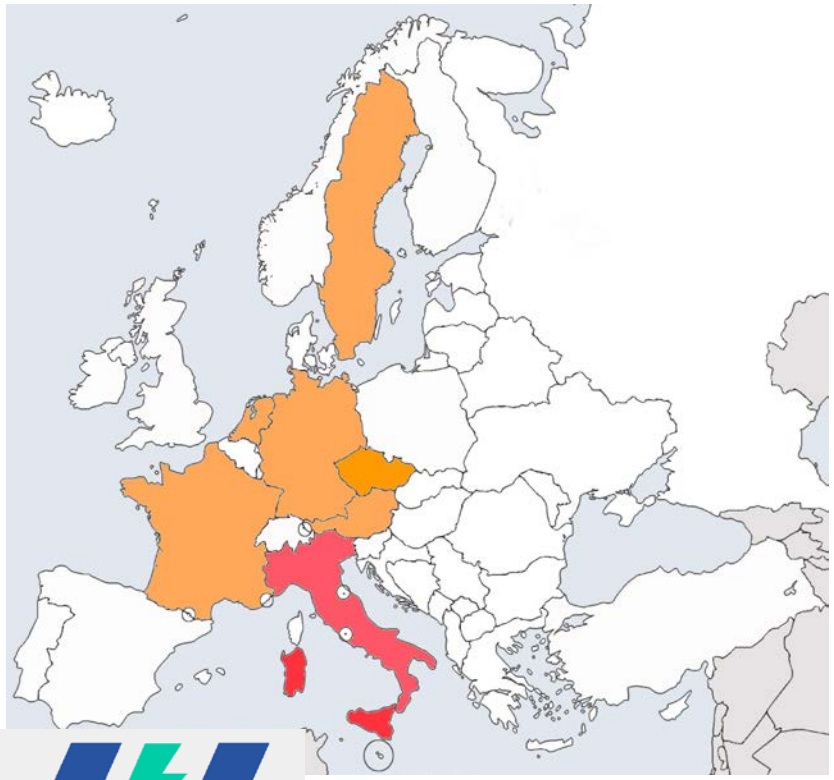


https://maxwell.com/products/ultracapacitors/

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Participants



INRIM	Istituto Nazionale di Ricerca Metrologica	Italy
CMI	Cesky Metrologicky Institut	Czechia
LNE	Laboratoire National de Métrologie d'Essais	France
RISE	RISE Research Institutes of Sweden AB	Sweden
VSL	VSL B.V.	Netherlands
CRF	Centro Ricerche Fiat S.C.p.A./Stellantis	Italy
KEYS	Keysight Technologies GmbH	Austria
Novac	Novac Srl	Italy
Pleione	PLEIONE ENERGY GmbH	Germany
POLITO	Politecnico di Torino	Italy
UNIGE	Università degli Studi di Genova	Italy
UTwente	Universiteit Twente	Netherlands

12 partners from 7 European countries

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Joint MetSuperCap - EMPHASIS Workshop

https://www.emphasis-supercaps.eu/

Half a day

Open to public

12 June 2024
save the date

The aim of this workshop, organized on the occasion of the 2nd Progress Meeting of the EMPHASIS project and the Kick-off meeting of the MetSuperCap project, is to provide a broad overview of the supercapacitor technology and testing, along with related applications.

Fourteen pitch talks which show the supercapacitor technology perspective, testing and applications, ranging from e-mobility to textiles.

Needs

SCs are an eco-friendly complement to batteries (hybrid storage systems) for dynamic high-power applications.

SC metrics only partially defined. Completely undefined for new SCs types.

Quick SoC/SoH assessment is an Open Problem.

ECM determination not standard.

Accurate parameters assessment in pilot lines is a crucial issue for producers.

SC behavior with power converters not yet analyzed. Hybrid storage management.

International Standards mainly address EDLC

Behavior in operation is of great interest for manufacturers

From 10 to 100 times the life of a battery.



No metals like Li, Mn, Co, Ni … but biomaterials. No runaway effect.

SoC and SoH requires quick methods. Currently no traceability for this quantities. DC methods and EIS to be investigated

Pilot lines are crucial for product development and declaration of SC specifications. Accuracy is important

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Objectives

1 Traceable characterization of SCs

- Methods for charactering SCs and SCs banks .
- Sizes from 1 F up to 1000s of F.
- Discharge currents up to 500 A.
- SCs banks with max. instantaneous discharge power up to 25 kW.

2 To develop software/models

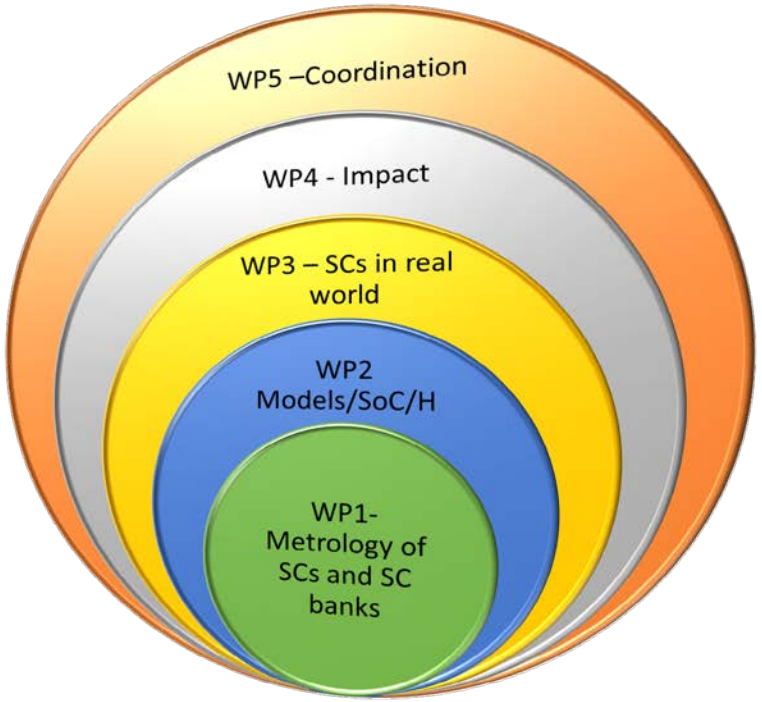
- Identification of relevant parameters.
- Static and dynamic. Target error will be lower than 5 %.
- Optimized voltage/current waveforms for testing.

3 Accurate determination of SoC and SoH of SCs

- Developing rapid techniques (on 2 SC types).
- Uncertainty assessment.

4 Actual behavior of SCs under operating conditions, including battery-SCs hybrid systems

- To design and produce test benches (TBs).
- TBs fitted with a measurement system.
- Validation of the outputs of Objectives 1-3 in two applications.



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Planned achievements

MetSuperCap, for a wide range of applications, intends to:

- Provide two databases useful to academia, industry and designers, for the development of SCs applications.
- Develop new CMCs at NMIs for large capacity characterization.
- Deliver a Good Practice Guide to for SCs testing (industry, academia, design).
- Improve the characterization accuracy at pilot lines.
- Make available a widely validated ECM to be used by designers for RT applications.
- Provide evidence about the behavior of SCs in operation.
- Promote the use of SCs instead of batteries or in together with batteries.

Thank you for your attention!!