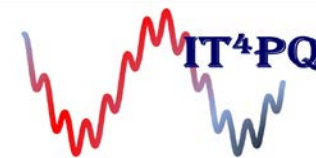




The EMPIR initiative is co-funded by the European Union's Horizon 2020 research and innovation programme and the EMPIR Participating States



Measurement Methods and Procedures for Assessing Accuracy of Instrument Transformers for Power Quality Measurements

EURAMET EMPIR project 19NRM05: Overview

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19 NRM05 1st Telco Stakeholder Workshop - February 25th 2021

Outline

- **The EMPIR framework and Call Normative**
- **Overview of the IT4PQ project**
 - Motivation and background**
 - Goal, implementation and expected output**
 - Consortium**
- **Role of Chief Stakeholder and Stakeholder Committee**

The EMPIR Research programme



Article 185 of the Treaty on the Functioning of the European Union (TFEU) allows the EU to participate in research programmes jointly undertaken by several EU countries.

Ongoing Article 185 initiatives under Horizon 2020



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The European Metrology Programme for Innovation and Research is a joint European Research Programme **in the field of Metrology**, undertaken by **22 countries - Member States and Associated Countries to Horizon 2020**.

- Enable European metrology institutes, industry, medical organisations, and academia to collaborate on a wide variety of joint research projects within specified Calls
- **Call Normative**: research to develop metrological methods and techniques required for standardization, regulation and conformity assessment.

The project is also supported by the European Metrology Network for Smart Electricity Grids

Project background and motivation



Decarbonisation of Energy Supply

Large scale electrification of the energy system



Use of renewable energy sources, storage integration

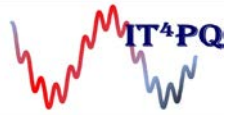


impact on the quality of the energy transmitted and distributed by electrical grids

Monitoring and control of the grid

Accurate and traceable measurement methods and procedure under realistic grid conditions

Open issues



PQ measuring instruments:
IEC 61000-4-30/.. & IEC 62586-1/2:
**traceable PQ measurement method,
parameters, uncertainty
requirements
and test methods defined!**



Measurement instrument
transformers (IT) must be used in
transmission and distribution grids
to accurately scale the line
voltage/current to PQ measuring
instrument input

IT&PQ? IEC TR 61869-103

**Needs for research, covering traceable characterisation of ITs for
PQ has been expressed by IEC TC 38.**

Knowledge Gaps :

- understanding and quantification of ITs behavior in PQ measurements;
- traceability of PQ measurements;
- tests procedures to qualify ITs for PQ measurements under actual conditions.

Instrument Transformer

IEC 61869-XX Series:

accuracy limits provided only for ITs
verification at rated power frequency.
Limits given for harmonic frequencies

**Effect of transducers recognized,
but not deeply addressed**

5 Project objectives

AIM

To develop the metrological framework for the **traceable calibration and test of ITs for PQ** measurements in electricity distribution grids.
Focus on MV voltage distribution grids and frequency range up to 9 kHz.

OBJECTIVES

1 Definition of ITs accuracy and uncertainty limits for PQ measurements

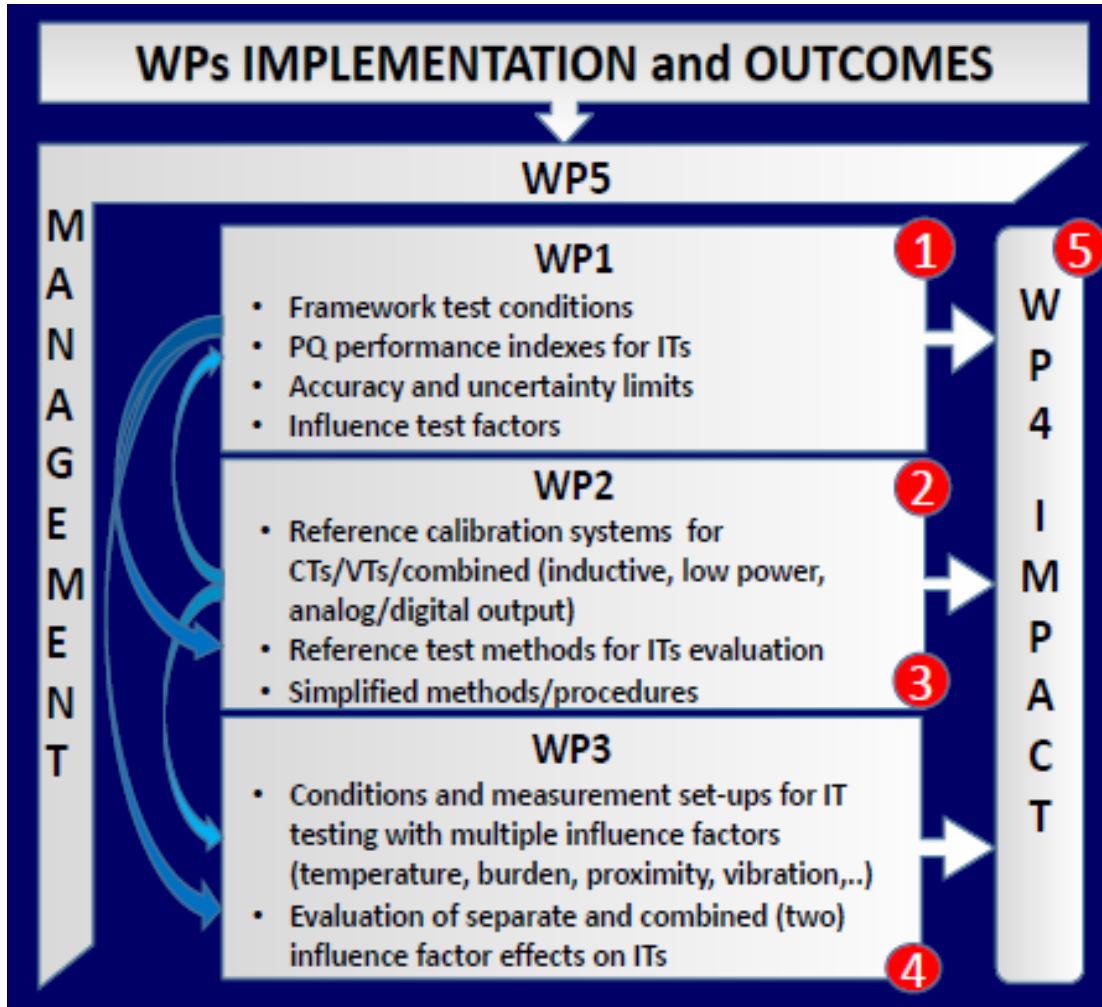
2 Reference measuring systems for IT and evaluation methods of uncertainty contribution to PQ indexes

3 Traceable test procedures to calibrate ITs for PQ

4 ITs performance in presence of multiple influence factors

5 **Data, methods, guidelines and recommendations to contribute to technical reports and standards (of the IEC 61869 family)**

Implementation and outputs



The consortium

Short Name	Organisation legal full name		Country
INRIM	Istituto Nazionale di Ricerca Metrologica		Italy
CMI	Cesky Metrologický Institut		Czech Republic
LNE	Laboratoire national de métrologie et d'essais		France
PTB	Physikalisch-Technische Bundesanstalt		Germany
TUBITAK	Türkiye Bilimsel ve Teknolojik Arastırma Kurumu		Turkey
VSL	VSL B.V.		Netherlands
RSE	Ricerca sul Sistema Energetico – RSE S.p.A.		Italy
SUN	Università degli studi della Campania Luigi Vanvitelli		Italy
TUD	Technische Universität Dresden		Germany
UNIBO	Alma mater studiorum Università di Bologna		Italy

Impact

Creating impact

Stakeholder Committees
Chief Stakeholder

Links with Standardisation Organisations

Calibration set-ups, Test procedures, Guidelines,..

Papers/ Presentations (Scientific/Trade Journals, Conf. ,..

Training events/ actions

Short-term /wider impact

Standards/ Report for PQ&ITs

CMCs

ITs qualified for PQM and relevant test facilities

Reduction of PQ issues

Increased reliability grids

Certainty in legal issues

Chief stakeholder

Chief stakeholder is not a member of the consortium, but a representative of the user community that will benefit from the proposed activities and outputs

Chief Stakeholder role

- Provide input** to the project
- Monitor** the project progress to ensure that the work that is being carried out **is aligned with** the **stakeholder needs** and the **market demand**.
- Be ready to **take up the output(s) of the project**, which are expected to benefit their organisation.



IEC TC 38

Stakeholder Committee

Direct link with the different stakeholders (TSO, DSO, Regulators, IT and PQ measuring instrument manufacturers, test and calibration laboratories, NMIs, TC members, ...)

- Be regularly **informed** about the **project progress**
- Support the project with their practical **experience** and **needs**
- Benefit** from the project results
- Facilitate early **exploitation of results**
-



Important roles for project impact

The project will provide knowledge, data and systems that will fill gaps in the understanding and quantification of ITs behavior in PQ measurements and cover missing traceability

Expected outcomes to be provided as a contribution to standardisation

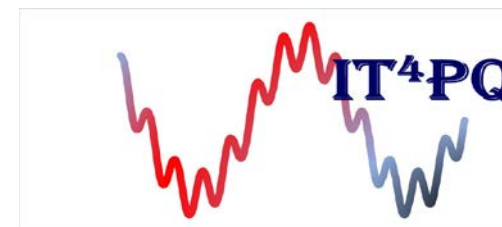
- Specific accuracy class for IT** (inductive ITs and LPIT) relevant to the measurement of PQ disturbances
- Reference set-ups and methods** for the evaluation of ITs performance and uncertainty contribution under realistic PQ waveforms.
- Architecture** for simplified methods for IT tests in industrial sites
- Understanding** of the effects of combined influence parameters on ITs

Impact on standardisation

- Continuous interaction with relevant WGs**
- new or improved guidelines, recommendations and standards on the use of ITs in PQ measurements provided to IEC TC 38 in usable form**



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Thanks you!

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