

# BENCHMARKING

**Development of test procedures for  
benchmarking components in RES applications,  
in particular energy storage systems**

# Project participants

## **PROJECT COORDINATOR:**

**Fraunhofer-Institute für Solar Energy Systems (FhG-ISE)**

**Germany**

## **CONTRACTORS:**

Beratung für Batterien und Energietechnik (BBE)

Germany

National Renewable Energy Laboratory (NREL)

USA

Australian Centre for Renewable Energy Research (ACRE)

Australia

Commissariat a l'Energie Atomique - Groupement ENergetique de Cadarache (CEA)

France

Centre for Renewable Energy Systems (CRES)

Greece

The Netherlands Energy Research Foundation (ECN)

Netherlands

National Institute for Engineering and Industrial Technology (INITI)

Portugal

JRC-Environment Institute- Renewable Energies Unit (ISPRA)

Italy

Energy Research Unit (ERU) at Rutherford Appleton Laboratory (RAL)

UK

Risoe National Laboratory (RISOE)

Denmark

Centre for Solar Energy and Hydrogen Research (ZSW)

Germany

# Main objectives & tasks

- **Overall objectives are**
  - to provide a better decision basis for the use of energy storage components in Renewable Energy Systems than we have today.
  - To ensure a maximum of consensus and accept between stakeholders about the decision basis and its methodology
  - To make the decision base and its tools publicly available on the internet
- **Main tasks in this effort are**
  - Create a database on the operation of components in RES
  - Establish a classification process and definition of categories
  - Define performance requirements and test procedures
  - Benchmarking and recommendations
  - Dissemination and consensus building

# Work Packages

- **WP1: Data on the operating conditions of components in Renewable Energy Systems (FhG-ISE)**
  - Task 1.1: Specification of minimum requirement of measurement procedures. Report on minimum DAS requirements completed. (NREL).
  - Task 1.2: Analysis of datasets to create standard evaluation reports (FhG-ISE)
  - Task 1.3: Survey to collect information about operational experiences, in particular the lifetime of components (CRES)
- **WP1 will create a publicly accessible database with data on the operation and the performance of operational renewable energy systems and their components. Only validated data will be used.**
- **The database will consist of standard evaluation reports of the operating conditions, summaries of the system performance data and links to the actual data sets generated by the power system monitors. No new measurements will be carried out.**

# Work Packages

- **WP2: Classification process and definition of categories (ZSW)**
  - Task 2.1 Identification of mathematical tools to find similar data sets (CEA)
  - Task 2.2 Definition of categories of RES and building consensus about the categories (ZSW)
- **The standard evaluation reports will be used to define RES categories of similar operating conditions of all major components. Different categories have distinctly different requirements and operating conditions for at least one major component.**
- **The categories will be universally applicable to gain the support of all relevant institutions world-wide for their use**

# Work Packages

- **WP3: Definition of performance requirements and test procedures (ZSW)**
  - Task 3.1 Definition of performance requirements (ZSW)
  - Task 3.2 Definition of test procedures (RAL)
  - Task 3.3 Practicability of tests, i.e. check that proposed test procedures can be realised in practical terms (CEA)
- **After evaluation of existing standards for which manufacturer's data are available, additional test procedures will be defined:**
  - Specification of additional standard test procedures to represent performance requirements not covered by standard tests until now and
  - Specification of an accelerated test procedure for each category which reflects the complex combination of performance requirements.
- **This work package focuses primarily on energy storage systems**

# Work Packages

- **WP4: Benchmarking and recommendations as guidelines for planning**
  - Task 4.1 Lifetime prediction tools & models (Risø)
  - Task 4.2 Battery testing to verify lifetime predictions (CEA)
  - Task 4.3 Recommendation on benchmarking process and energy storage technology/product for each category (ECN)
  - Task 4.4 Smart design assistant software to assign a category for each installation with a standard evaluation report (ECN)

# Work Packages

- **WP5:Dissemination and consensus building (Risø)**
  - Task 5.1 Interaction with the standardisation community (e.g. the JCG TC82/TC88/TC21 on IEC/PAS 62111 -> IEC/TS 62257)
  - Task 5.2 Survey and questionnaires inviting all stakeholders to comment.
  - Task 5.3 Publication of results and work in progress in scientific & technical magazines and at workshops & conferences
- **Project web site [www.benchmarking.eu.org](http://www.benchmarking.eu.org) is being established. Will have a dialog page, comments are welcome.**