Innovative controls for renewable source integration into smart energy systems

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D5.1

WP5 Annual Scientific Report

WP5 – Simulation and Experimental validation

Grant Agreement no 675318

Lead beneficiary: IREC
Date: 20/11/2017
Nature: R
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TABLE OF CONTENTS

675318	**D5.1:** WP5 Annual Scientific Report	
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Description of the deliverable	The report will include a summary of the research activities during the first 24 months						
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[1] Report
[2] Administrative (website completion, recruitment completion…)
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[4] Other including coordination
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[7] Classified: classified information as intended in Commission Decision 2001/844/EC

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NAME	DATE	VERSION	DESCRIPTION
José Luis Domínguez-García (IREC)	31/10/2017	1.0	First Draft
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Nicolas Retière (UGA)	17/11/2017	1.2	Review and changes
Marta Fonrodona (IREC)	20/11/2017	2.0	Final version

DEFINITIONS

- Beneficiary partners of the INCITE Consortium are referred to herein according to the following codes:
  - **IREC**. Fundacio Institut de Recerca de l'Energia de Catalunya (Spain)
  - **UPC**. Universitat Politècnica de Catalunya (Spain)
  - **TU Delft**. Technische Universiteit Delft (Netherlands)
  - **VITO**. Vlaamse Instelling Voor Technologisch Onderzoek (Belgium)
  - **UniBo**. Universita di Bologna (Italy)
  - **UGA**. Université Grenoble Alpes (France)
  - **GE Global Research**. General Electric Deutschland Holding GmbH (Germany)
  - **Efacec Energia**. Efacec Energia - Maquinas e Equipamientos Electricos SA (Portugal)
- **Beneficiary**. The legal entity, which are signatories of the EC Grant Agreement No. 675318, in particular: IREC, UPC, TU Delft, VITO, UniBo, UGA, GE and Efacec Energia.
- **Consortium**. The INCITE Consortium, comprising the above-mentioned legal entities.
- **Consortium Agreement**. Agreement concluded amongst INCITE Parties for the implementation of the Grant Agreement.
- **Grant Agreement**. The agreement signed between the beneficiaries and the EC for the undertaking of the INCITE project (Grant Agreement n° 675318).
- **Partner Organisation**. Legal Entity that is not signatory to the Grant Agreement and does not employ any Researcher within the Project and namely, 3E NV (Belgium).

ABBREVIATIONS

- **CA**. Consortium Agreement
- **CMO**. Central Management Office
- **EC**. European Commission
- **ESR**. Early Stage Researcher
- **GA**. Grant Agreement
- **INCITE**. Innovative controls for renewable source integration into smart energy systems
- **IRP**. Individual Research Project
- **WPs**. Work Packages

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EXECUTIVE SUMMARY

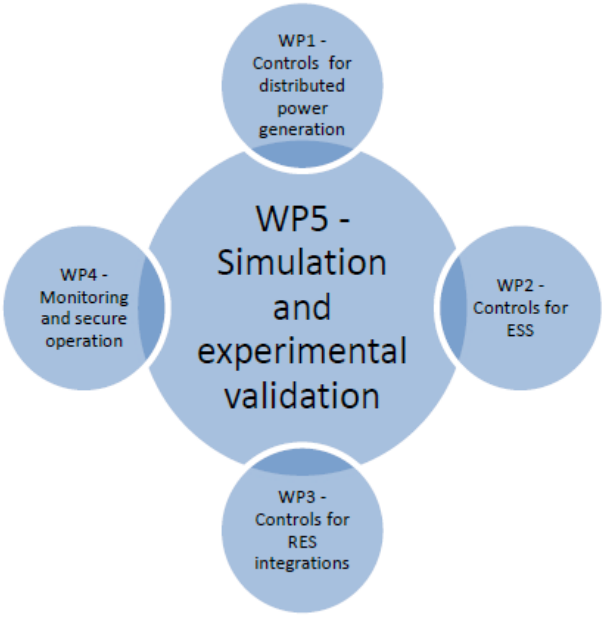
The general objective of INCITE is to propose innovative solutions for the challenging work of controlling and designing the future electrical networks while providing the Early Stage Researchers (ESRs) with deep knowledge in control, optimisation, power electronics, and power systems, and a complete view of the real needs of the main actors in the smart-grids sector.

The different Individual Research Projects (IRPs) are organized in four different Work Packages (WPs), each focusing on different aspects the control of smart-grids. WP5 aims to bring together all results produced within the network, so that the complex interactions among the different parts of a smart grid are taken into account.

This report aims to introduce and present the ongoing efforts within the action among both ESRs and WPs in order to ensure promising collaborations, interactions and comparison of results to maximize the impact of the INCITE results.

1. STATUS OF WP5

One of the key objectives of INCITE is to provide innovative solutions for controlling, monitoring, and designing the future electrical network. This goal is treated within the project by taking into consideration the whole value chain in the future electric system; in other words, including analysis from generation, transport, distribution, and consumption.



Bearing in mind this integrated approach, WP5 "*Simulation and Experimental validation*" can be understood as the glue for all the different research projects taking place at each work package and in the project. For that reason, according to the description of work, the main aim of WP5 is to ensure all results produced in the other 4 work packages take into account the complex interactions of the different parts of the smart grid. To achieve the objective of comparison and integration of results, the proper selection of benchmarks, test cases, software, and experimental environments must be done.

1.1 WP objectives

As stated above, WP5 can be seen as the common place for all the individual research projects (IRPs). The main objective of WP5 is to ensure that all results produced in WPs 1-4 (those including IRPs) consider the complex interactions among the different sectors, topics, and technologies to be integrated in the smart grid.

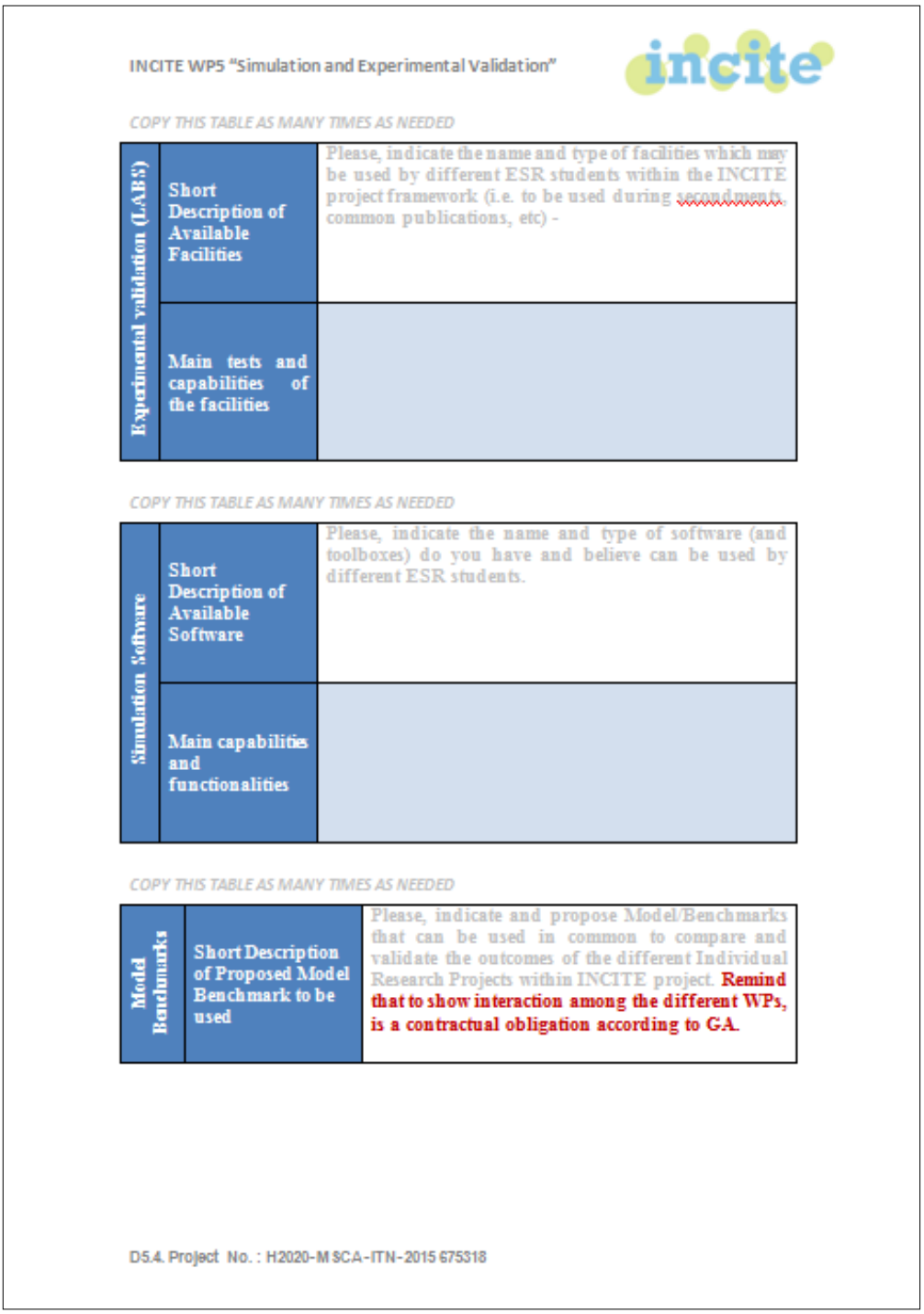
The key idea is to help the ESRs in their collaboration through the definition of common simulation tools, common (or similar) case studies (benchmarks) when possible, data bases, and experimental validation scenarios.

1.2 WP general progress

The general progress of this WP is quite dependent on the status of the different IRPs, since the definition of case studies to be applied or potential data bases, etc. have to be selected when better knowledge of the potential impacts is acquired.

In order to start defining such common work environments, a questionnaire was shared among the ESR supervisors. This form asked for descriptive details about their research infrastructures (experimental labs), simulation software, and benchmark test cases available and proposed to be used within the INCITE project.

The template of the questionnaire shared with the participants can be seen in the following figure:



INCITE WP5 "Simulation and Experimental Validation"

COPY THIS TABLE AS MANY TIMES AS NEEDED

Experimental validation (LABS)	Short Description of Available Facilities	Please, indicate the name and type of facilities which may be used by different ESR students within the INCITE project framework (i.e. to be used during secondments, common publications, etc) -
	Main tests and capabilities of the facilities	

COPY THIS TABLE AS MANY TIMES AS NEEDED

Simulation Software	Short Description of Available Software	Please, indicate the name and type of software (and toolboxes) do you have and believe can be used by different ESR students.
	Main capabilities and functionalities	

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Model Benchmarks	Short Description of Proposed Model Benchmark to be used	Please, indicate and propose Model/Benchmarks that can be used in common to compare and validate the outcomes of the different Individual Research Projects within INCITE project. **Remind that to show interaction among the different WPs, is a contractual obligation according to GA.**

D5.4. Project No.: H2020-MSCA-ITN-2015 675318

The information provided by the supervisors can be found in D5.4 – Shared experimental facilities report.

Another action taken was highlighting the potential interactions among the ESRs at each presentation within the project workshops and proposing work package leaders and ESRs to have periodic work package Skype meetings.

2. UPCOMING STEPS

The idea is to create a new updated questionnaire for the ESRs, taking advantage of their increased knowledge, specific research and the progress of their IRPs, in order to update the benchmark, test cases and software to be used.

Another key step forward is to take advantage of the secondments of the ESRs to enhance such collaborations and interactions among partners, work packages and tasks.

Additionally, INCITE's intranet tool (based on Office365) is also used to share the available documentation, data, models, etc. generated within the project in order to ensure that any other ESR may utilize it for their own developments and allow reliable comparisons.