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608540

Project acronym:
GARPUR

Project full title:
Generally Accepted Reliability Principle with Uncertainty modelling and through probabilistic Risk assessment

Collaborative project

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D10.5.1
Training content

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PU	Public	x
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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Submitted		
Author(s) Name	**Organisation**	**E-mail**
Clémentine COUJARD	TECHNOFI	ccoujard@technofi.eu

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Table of Contents

Page

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1 INTRODUCTION

This report results from task 10.5 “Training session development and validation” led by TECHNOFI, aiming to develop training sessions targeting TSOs on the key results produced by the project.

The initial task objective was to develop a programme for a one-day training session, mainly focused on the use of the quantification platform, and implemented in two sessions in view of reaching 30 organisations.

Under proposal by Technofi, the Executive Board agreed to modify this objective in order to benefit from the opportunity brought by the contacts with ISGAN[1] and more specifically with ISGAN Annex 6: Power T&D Systems and ISGAN Academy Annex 8: ISGAN Academy on Smart Grids. This was motivated by two main interrelated needs:

- To reach a much wider audience within a more realistic format, and also take into account the late delivery of the GQP. The next sections detail these reviewed objectives, and the audience, format and content of the training programme developed
- To take the opportunity of networking offered by a joint initiative of some EC funded projects and ISGAN Annex 6 to enhance exchanges of views and practice in technical and non-technical issues.

As a complement to this report, D10.6.1 describes the implementation of the training developed.

2 TARGETED AUDIENCE

The key targeted audience for the training **are reliability concerned experts within TSO organisations**, in particular team leaders, heads of operational planning and operations, as well as R&D managers, as future adopters and promoters of the concepts and tools developed in GARPUR.
The research community active in the field of power systems reliability management is also a relevant audience, as they should be involved in the further development of the related principles and tools. However, **the training activities will be tailored for the TSOs organisations in priority**, as the scientific community can already access GARPUR results via other dedicated channels such as conferences and publications.

[1] *ISGAN was launched as the International Smart Grid Action Network at the first Clean Energy Ministerial (CEM), a meeting of energy and environment ministers and stakeholders from 23 countries and the European Union held in Washington, D.C on July 19 and 20, 2010. See* http://www.iea-isgan.org

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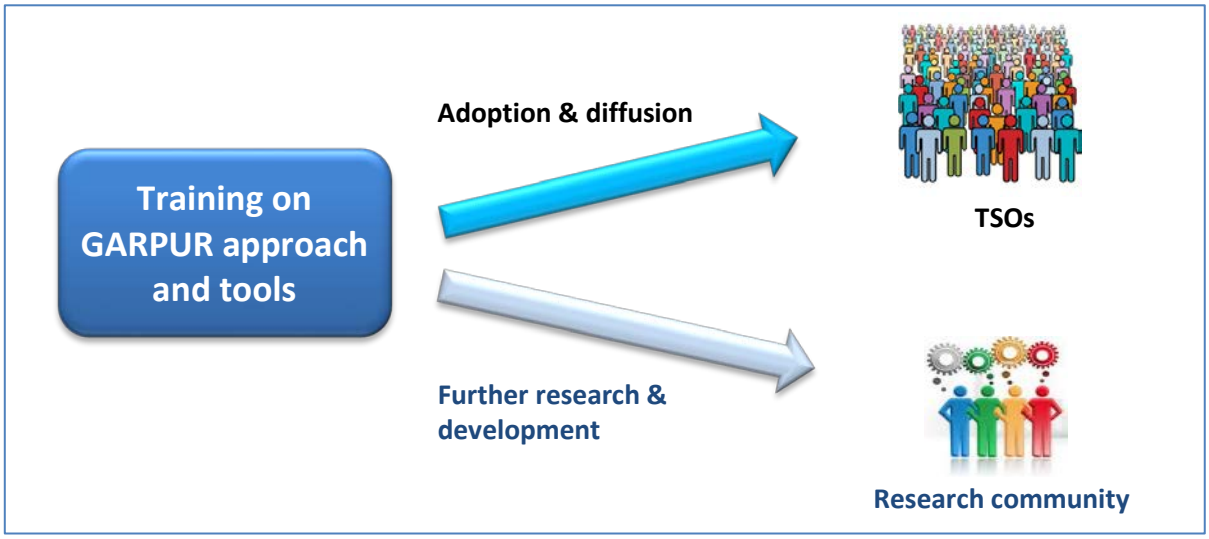

3 TRAINING OBJECTIVE

The training has the ambition to initiate a change of mind-sets in TSOs about reliability management. Its practical objectives are the following:

- **Transmit the main concepts** developed in GARPUR and show practically how it will impact reliability management activities in the future;
- **Demonstrate the benefits of RMAC** supported by the description of the methodology and its applied results
- **Motivate towards the adoption and further development** of the principles and tools developed in GARPUR.

4 TRAINING FORMAT

In order to allow for maximal impact of the training, the **webinar format** has been collectively agreed, for two main reasons:

- The software tools will not be yet "packaged" enough to allow for direct tests by the trainees, therefore physical presence of the audience is not an absolute prerequisite;
- The **webinar session can be recorded, maintained and made permanently available** on the GARPUR website –and possibly in other online resource centres-, thus ensuring a continuous diffusion of its content.

A **progressive approach** is adopted, with **two successive webinars of complementary contents**, the 'level 1' session (held in Spring 2017) focusing on Reliability Management Approach and Criteria description and application to real time, the 'level 2' session (held in Fall 2017) dedicated to the pilot test results and the project recommendations.
In terms of development, this progressive format allowed to develop and implement the "level 1 session" while the pilot test results were not yet available.
The webinar duration is 1h00 including Questions & Answers slots, a standard duration for successful webinars of this type (reference: Leonardo Energy), and featuring several speakers (mentioned further below) to provide diversity in perspectives on the project.

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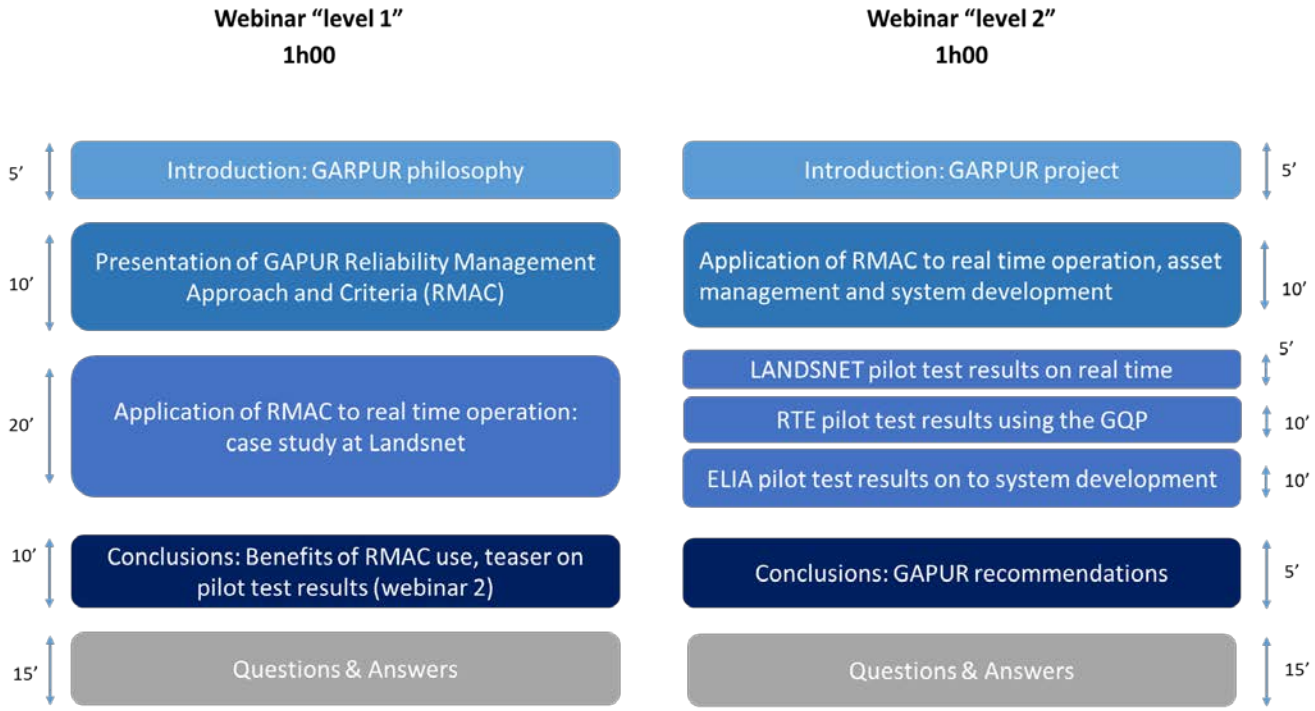
5 CONSIDERATION OF ISGAN FRAMEWORK IN THE TRAINING DEVELOPMENT

Discussions were held since December 2016 with representatives of ISGAN Annex 6 - International Smart Grid Action Network – in order to perform the GARPUR webinars in the framework of ISGAN webinars program, therefore benefiting from their international audience to maximize GARPUR training's impact. These discussions led to the following agreement:

- Two GARPUR webinars to be held in the framework of the ISGAN ACADEMY program managed by Comillas University: these webinars can have a technical content, but their duration must be limited to 1 hour. This seemed appropriate to present the GARPUR principles and test results, following the progressive approach developed above.
- One additional webinar could be organized in the framework of ISGAN ANNEX 6 (Power T&D System). Webinars implementation managed by NREL, give priority to high level messages related to policy and regulation rather than technical content. This option was finally replaced by a set of interactions with the ISGAN ANNEX 6 in view of promoting the GARPUR final conference and in particular the sessions dedicated to the recommendations brought by the project on regulatory and policy issues.

6 TRAINING CONTENT

The diagram below synthesises the architecture of the technical webinar sessions 1 and 2.



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Outline of session 1

1. Introduction:
   - Present practice: N-1
   - N-1 limitations
   - Purpose of GARPUR
   - GARPUR in a nutshell
   - GARPUR ambitions

2. GARPUR Methodology for probabilistic Reliability Management
   - Weaknesses of the N-1 criterion
   - GARPUR proposal in a nutshell
   - Implementation in practice

3. Application of RMAC to real time operation: case study at Landsnet
   - Moving from N-1to Probabilistic Reliability Assessment on the Icelandic system (10 minutes)
   - Pilot test overview
   - Initial pilot test results

4. Conclusion: Benefits of the GARPUR Methodology for probabilistic Reliability Management
Main benefits
   - Dynamic contingency selection
   - Coherent decision-making from planning to operation
   - New tools and methods
   - Teaser 1 for session 2

Outline of session 2

1. Introduction to GARPUR
   - Reminder: Topics covered in Webinar 1
   - Purpose of GARPUR
   - GARPUR in a nutshell

2. Application of the methodology to real time operation, asset management and system development
   - GARPUR proposal in a nutshell
   - Implementation in practice
     - System development
     - Asset management
     - System operation

3. LANDSNET Pilot test
   - Pilot test objectives
     - Is the computation fast enough?
     - Does the output make sense?
     - How sensitive are the outputs?
   - Closing remarks

4. RTE Pilot test

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- Pilot test objectives
- Risk management problematic considered
- GARPUR Quantification Platform (GQP) main features for the test
- RMAC problems and test methodology
- Test results
- Closing remarks

5. ELIA pilot test
   - Pilot test objectives
   - Challenges of the system development process
   - Overview of GARPUR approach and current approach
   - Overview of the case study
   - Test results
   - Closing remarks

6. Recommendations
   - Recommendations to reach GARPUR's vision of reliability management
   - Four different clusters of recommendations
   - Regulation and socio-economic considerations
   - Data collection and models of uncertainties
   - Reliability management methodology, algorithms, and software
   - Testing and implementation

7 TRAINING DEVELOPERS

The development of the above-mentioned training programme was performed by the following organisations:

- TECHNOFI
- LANDSNET
- RTE
- ULG
- ELIA
- STATNETT
- SINTEF

The GARPUR dissemination team thanks all of them for their high-quality work.

8 CONCLUSIONS

D10.6.1 describing the successful implementation of the above-mentioned training concept and programme shows their relevance and value.
The training concepts developed here could therefore be relevant for other EU-funded projects of the H2020 programme, especially the ones tackling power system issues as they could also have interest in promoting their results through the ISGAN or LEONARDO ENERGY webinar framework. This deliverable could therefore be made public on the project website.

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