



StoRES

Promotion of higher penetration of Distributed PV through storage for all

Priority Axis 2: Fostering low-carbon strategies and energy efficiency in specific MED territories: cities, islands and remote areas

2.2: To increase the share of renewable local energy sources in energy mix strategies and plans in specific MED territories

Deliverable n°: **4.5.2**

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3 Contents

1 Document Info	2
2 Document History	2
3 Contents	3
4 Project Summary	4
5 Introduction.....	5
6 Delivery of trainings.....	6
6.1 Identification of the attendees	6
6.2 Outline of the trainings	6
6.3 Selection of the speakers	8
6.4 Definition of the training materials.....	8
6.5 Evaluation of the trainings.....	9
7 Conclusions.....	9
Appendix.....	10
A. Provisional info about the training courses	10
B. Proposal of the structure of the report on the training course.....	11
C. Proposal of questions of the final questionnaire	11
D. Certificate of Attendance	13

4 Project Summary

The project addresses the development of an optimal policy for the effective integration of Renewable Energy Sources (RES) and Energy Storage Systems (ESS). The primary challenge is to achieve increased penetration of RES and predominantly photovoltaics (PV), in the energy mix of islands and rural areas in the Mediterranean (MED) region without compromising grid stability. The main objective of StoRES is to boost self-consumption in the MED region with the integration of optimal storage solutions. Testing coupled PV-ESS solutions in different pilot sites and taking into account local particularities for optimization, current barriers concerning grid reliability with higher RES deployment will be eliminated. In addition to this, the development and integration of the proposed solution at both residential and community levels and applying different policy scenarios will lift the barriers related to the grid integration of ESS and extend the practical knowledge about this technology. It is expected that all the shortcomings regarding the intermittent nature of PV energy for increased penetration into the energy mix will be addressed whilst maintaining smooth operation of the grid.

The project started on 1st of November 2016 and is expected to be completed within 36 months.

5 Introduction

One of the main outcomes of a research project is the possibility to spread the lessons learned and the knowledge acquired during the path. The dissemination strategy proposed in the StoRES project consist in the organisation and performance of conferences, workshops and trainings. In particular, the trainings allow engaging the stakeholders with the solutions arisen during the project, with the aim of convincing them to adopt the main guidelines and suggestions.

Given the strategic importance of the trainings, a proper organisation which ensures a high level of content, suitable for the characteristics of the organising country and the typology of Stakeholders identified during the activity 4.5 (and reported in Del. 4.5.1) is crucial. Yet, even if the trainings are customized for the organizing country, contents, procedures and quality assurance will be common in all countries and agreed beforehand. In particular, regarding the contents, the actual trainings will consist of a part dealing with the necessary background relative to the proposed solution and a second part for a hands-on experience on using the developed StoRES Online PV and Storage Optimisation Tool in practical case studies.

The deliverable is organised as follows: in the first section a description of the attendees is provided and in section 2 an outline of the trainings, taking into account the possible participants' interests, is proposed. In section 3, the main characteristics of the speakers of the trainings are reported. Then the training materials useful for the courses are described. In conclusion, the importance of a final valuation of the course is described.

In Annex 1 the provisional data, the target audience and the message intended to share during the trainings in each organising country are reported. Since one training course per country is foreseen, each project partner has to compile a report regarding the training course organised (Del 4.5.3). The proposed sections of the Del 4.5.3 are anticipated in Annex 2. In Annex 3, the questions that should be proposed in the final questionnaire are reported. In Annex 4, the template of the Certificate of Attendance of the training is proposed.

6 Delivery of trainings

The activity of delivery of trainings is the presentation of discussions, demonstrations and any other material that will help the attendees gain the required knowledge about a specific topic. The aim of the StoRES trainings is to share knowledge acquired during the project, in order to give the tools to foster the development of an optimal policy for the integration of RES supported by ESS. Since the objective is very ambitious and new, the organisation of training courses capable to encourage the Stakeholders to develop such policies is necessary.

A fruitful training is a successful combination of several aspects related not only to the contents of the course but also to a proper organisation. Once the message to share is defined, the following key steps have to be followed:

- Identification of the attendees
- Definition outline of the trainings
- Choice of the relators
- Identification the training materials
- Evaluation of the training

Some information regarding the trainings (e.g. provisional data, message to share) in each participating country are reported in Annex 1.

6.1 Identification of the attendees

This aspect has been deeply analysed in Del. 4.5.1, where the importance of a proper selection of the Stakeholders in order to foster the outcomes of project is described. A deep knowledge of the Stakeholders (e.g. their activity, their interest and possible involvement and influence in the project) allows defining the best strategy to increase their interest in the project and involve them in the application of the main outcomes.

6.2 Outline of the trainings

Once the Stakeholders are identified, the second step is devoted to the identification of the trainings' program. As underlined in Del. 4.5.1, since the Stakeholders identified belong to different areas (e.g. installers, politicians, researchers, DSOs), with different backgrounds and interests, customized sessions (or courses) should be organised. However, the courses do not have to be devoted to only one topic, but several aspects should be proposed focusing the attention on the most interesting items.

Therefore, the trainings should start with general contents, related to the operating context and the last European Directives. Then the StoRES project should be presented focusing the attention on its main objectives, the participating partners and the implemented pilots.

Then the results obtained (in terms of Self-Consumption Ratio and Self-Sufficiency Ratio, Cost and Benefit Analysis, etc.) and the most interesting study cases should be proposed. Moreover, the description of the StoRES Online PV and Storage Optimisation Tool and its application should be presented.

A very important topic that should be analysed is related to the challenges faced and solutions adopted in order to highlight the lacks in the existing legislation and propose possible solutions. Finally, an open discussion should be proposed.

The possible outline of the training should be:

Table 1. Outline proposal of the trainings

Main topic	Description
General context	<ul style="list-style-type: none"> • Description of the European operating context; • State-of-the-Art about (more emphasis should be placed on the topic of main interest for the audience): <ul style="list-style-type: none"> ◦ Regulatory aspects at European and National levels ◦ Grid-connected energy storage: <ul style="list-style-type: none"> ▪ Roles of storage in the electricity grid, ▪ Essential elements - life cycle phases and planning, ▪ Business models, ▪ Risks in energy storage.
Description of StoRES project	<ul style="list-style-type: none"> • Main objectives (Description of the aim of the project, expected outcome); • Partners and Activities (Brief presentation of the partners involved and their activities during the project); • Pilots (Description of the pilot characteristics).
Study cases	Description of the results obtained from the analysis of the pilot sites (supported by the StoRES Living Lab)
Project outcomes	Description of the lesson learnt from the project (from the technical and regulatory point of view)
General barriers and solutions adopted (adoptable)	<p>Description of the issues raised during the project and solutions adopted (more emphasis should be placed on the topic of main interest for the audience), for instance:</p> <ul style="list-style-type: none"> • Investment barriers and financial hurdles, • Lack of public perception and awareness, • Lack of Demand Side policy, • Policy incoherence, lack of legislation, standardization and public procurement schemes,

	<ul style="list-style-type: none"> • Lack of cooperation.
Open discussion of stakeholders about the lesson learnt	An open discussion among the stakeholders about the lesson learnt should be proposed.
How to get involved	Description of possible collaboration, resources and forthcoming opportunities
Evaluation of training	A final questionnaire, in order to evaluate the effectiveness of the training course, can be proposed.

6.3 Selection of the speakers

For the success of the trainings, a very important role is played by the speakers invited to deliver the courses. They should have strong communication skills in order to interact and engage the stakeholders with the proposed solution and convince them to adopt the main guidelines and the suggestions identified during the project.

Moreover, strong power systems skills, particularly on distribution network, are essential. Since the participants come from different background (engineering, law, economics, manufacturing, among others), a common basis for everyone attending the training by covering the most important aspects of electric power distribution in a concise way should be granted. The support that should be provided by energy storage systems in order to solve contingencies in the network (eg. Power System flexibility), increase the shift to renewables and reduce the costs for the owners should be underlined.

6.4 Definition of the training materials

The dissemination of the results of the Stakeholder should be supported by presentations, infographics, online tools, videos and similar material. In the following the training material identified is briefly described.

Trainings should be based on the use of *presentations* that should be delivered to the participants, in which the topic discussed, the main results obtained and photos from the pilots are showed. However, when possible, a visit to the pilot location should be proposed.

During the projects two *tools* have been developed:

1. the *StoRES Online PV and Storage Optimisation Tool*, which through a financial analysis of 20 years, taking into consideration technical and financial parameters and various options of energy policies, calculates the optimal size of a PV+Energy Storage System in terms of net present value of the investment (starting from the electrical consumption, solar irradiation, PV and battery size, and electricity costs);
2. the *StoRES Living Lab*, on the basis of the pilot locations where real data from pilot sites are presented and tested, offering the possibility of experimenting with the different parameters which influence storage.

Both tools should be used for the presentation but also be presented to the audience in order to involve them in their use.

Moreover, the *infographics* developed during the projects (and shared with the newsletter) should also be used during the presentations and showed in the room used for the training.

Finally, the *videos* regarding the project can be showed, during the registration/coffee break and at the end of the trainings.

6.5 Evaluation of the trainings

Finally, at the end of the course, a final questionnaire should be proposed to the attendees. The questionnaire will allow detecting the degree of user satisfaction in terms of the clarity, novelty of the topics proposed, familiarity with the topics, their commitment to sustainability, and to evaluate the areas of greatest interest for future initiatives.

With such surveys, suggestions are also gathered from users aimed at improving the areas mapped in the questionnaire.

It can be distributed before the end of the event or sent by email (through google forms <https://www.google.it/intl/it/forms/about/>). A proposal of the questions is reported in Annex 3.

Moreover, at the end of the course a Certificate of Attendance should be given (or sent by email). A proposal of the certificate is reported in Annex 4.

7 Conclusions

The deliverable provides a description of the activities regarding the delivery of the training for the Stakeholders. Starting from the classification of the Stakeholders, the content of the trainings and the outline of the training courses are proposed. Moreover, a proposal of the final questionnaire and the template of the certificate of attendance is provided.

Appendix

A. Provisional info about the training courses

In the following the provisional dates of the training courses for each participating country is reported.

Table 2. Provisional information regarding the training for stakeholders in each Country.

COUNTRY	PROVISIONAL DATES	TARGET AUDIENCE	MESSAGE
CYPRUS	5 June 2019	DSO, TSO, governmental authorities, municipalities, services providers, scientific community, general public	<ul style="list-style-type: none"> Disseminate the results of StoRES Describe the effectiveness of the use of ESS and PV, underlying the gained know-how and the barriers Stimulate discussion
GREECE	10 June 2019	Stakeholders and policymakers	<ul style="list-style-type: none"> Discuss the advantages and the challenges of ESS integration along with PVs, based on the outputs of the project activities and the experience gained so far through StoRES
FRANCE	10 October 2019	Installers, design offices and municipalities	<ul style="list-style-type: none"> Present the results of StoRES Bring knowledge on storage technologies Present the national context and describe the most interesting use cases Illustrate by some demonstration on pilot plants
ITALY	21 October 2019 (together with workshop)	DSO, Researchers, Governmental authorities, Municipalities/Politicians	<ul style="list-style-type: none"> Disseminate the results of StoRES Describe the effectiveness of the use of ESSs +PV, underlying the gained know-how and the barriers Stimulate discussion
SLOVENIA	12 Sep 2019	energy agencies, service providers, DSOs, energy experts, etc.	<ul style="list-style-type: none"> Disseminate the results of StoRES Describe the effectiveness of the use of ESSs +PV, underlying the gained know-how and the barriers Present the technical storage solution Visit the pilot location with the living lab

SPAIN	16 September 2019	Homeowners, small photovoltaic installers, government authorities, university community, etc.	<ul style="list-style-type: none"> Disseminate the results of StoRES Technical and administrative barriers in Spain Online demonstration Economic profitability
PORTUGAL	18 October 2019 (together with workshop)	Municipalities, services providers, scientific community, general public.	<ul style="list-style-type: none"> Disseminate the results of StoRES Describe the effectiveness of the use of ESSs +PV, underlying the gained know-how and the barriers

B. Proposal of the structure of the report on the training course

Each participating Country has to organise training courses for the stakeholders. Using a common format, one report per country should be defined (Del. 4.5.3). In particular, the contents of the training (with the national perspective), the summary and an evaluation of the results in terms of MoUs achieved will be described.

The proposal of the structure of the report of the training is listed in the following:

- TITLE: Report on the training course in _____ (name of the Country)
- Date
- General purpose
- Target audience
- Consultants
- Main contents of the course
- Agenda
- Final questionnaire /answers
- Photos
- Flyer
- Training material

More details are be provided in Del 4.5.3.

C. Proposal of questions of the final questionnaire

Instructions: Please indicate your level of agreement with the statements listed below.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The objectives of the trainings were clearly defined	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The topics covered were relevant to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content was organized and easy to follow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Speech (1)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I am familiar with the topic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The trainer was well prepared	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Speech (n)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am familiar with the topic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The trainer was well prepared	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Background

- ☐ DSO
- ☐ TSO
- ☐ Politicians
- ☐ Installer
- ☐ Research Institute
- ☐ Final user
- ☐ other

What did you like most about this training?












What aspects of the training could be improved?

What else would you like to see included in this event? Are there any other topics that you would like to be offered training courses in?

Any other comments?

D. Certificate of Attendance

Proposal of the Certificate of Attendance of the training (to be signed by the local coordinator).

  	Project co-financed by the European Regional Development Fund
<h1>Certificate of Attendance</h1>	
<p>This is to certify that</p>	
<p>has attended the <i>2-hour StoRES Training on Battery Energy Storage</i></p>	
<p>City, Country Day Month 2019</p>	
<p>Organisation: StoRES Project Consortium</p>	
<div></div>	
<p> Co-organised with: Logo and Name of co-organisier(s)</p>	<p>Project Coordinator Prof. George E. Georghiou</p>