
Interoperable solutions for implementing holistic **FLEXI**bility services in the distribution **GRID**

Demo-Sites description and boundary conditions report

Deliverable 2.1

WP2

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Approvals

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ABBREVIATONS

PC: Project Coordinator
CA: Consortium Agreement
CC: Communication Committee
DoA: Description of Action
DSO: Distribution System Operator
EC: European Commission
GA: General Assembly
IPR: Intellectual Property Right
KPI: Key Performance Indicator
M: Month
PH: Project Handbook
R&D: Research and Development
SC: Steering Committee
TP: Technical Partner
WP: Work Package
SME: Small and Medium Enterprise
DMP: Data Management Plan
H2020: Horizon 2020

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EXECUTIVE SUMMARY

This deliverable is the report on the Demo-Sites related to Task T2.1. The document describes of all the needed information stated by the solutions developers to create the bases on which the development of the Demo Sites will rest.

The main objective of this document is the definition and characterization of Demo-Site boundary conditions and main scenarios to later design and develop FLEXIGRID solutions.

The document includes the provided information on different areas for each of the 4 Demo-Sites according to a guide agreed by the project partners.

This document is of public nature and so it does not include the data but a description of it. The data has been gathered, classified and put at the disposal of the members of the consortium for activities. These activities include tasks such as the creation of the simulation models for the demo sites. However, most of the data is confidential and it cannot be made open for the public.

1. TABLE OF CONTENTS

1. INTRODUCTION

The main objective of the WP2 is to define the baseline and key aspects for the correct development and later deployment of the FLEXIGRID solutions.

Specific objectives:

This WP2 has the following specific objectives:

- To identify a comprehensive set of parameters able to specifically define the particular conditions of the FLEXIGRID Demo-Sites and its associated systems including the most adequate data sources and collection & treatment methods, while modelling the Demo-Sites grids.
- To analyse the Demographic conditions and stakeholders' requirements to increase the participation of all stakeholders in the energy system.
- To develop a FLEXIGRID monitoring and evaluation plan based on a set of performance KPIs.
- To work together during the whole research and innovation process with the main societal actors.
- To ensure the General Data Protection Regulation (GDPR) when treating with data external to the project.

The Task 2.1 included in WP2 is devoted to **Demo-Sites grid details and characterisation** (M1-M9). The main aim of this task is to perform an exhaustive analysis of the four Demo-Sites in the project. All the needed information stated by the solutions developers will be collected (network architecture, security issues, level of renewable production, regulatory constrains, …)

The Task Leader is UNICAN and the Partners Involved are: CIRCE, VIESGO, VERD, HEP-ODS, EDYNA, ATOS, OPA, ZIV, SELTA IOSA, HYPER, UNIZG-FER, LINKS.

2. REQUESTED INFORMATION

The Demo Site coordinators received this list of requested information can be used as a check-list for the Demo-Site coordinators.

- ✓ ***General description***. Brief description of the Demo-Site.
- ✓ ***Location.*** Qualitative information (google map tag) about the geographical location of the Demo-Site. If available, latitude and longitude coordinates of the Demo-Site.
- ✓ ***Single-line diagram.*** A basic single-line diagram of the distribution network in the area of interest. The diagram should include basic information about transformers, lines and loads. When available, the diagram should also include information about protections (settings) and any other auxiliary element.
- ✓ ***Border points***. Characterization of the network limits by defining the equivalent circuit and the short-circuit current (SSC) at the border points of the area of interest.
- ✓ ***Simulation files***. Availability of network simulation files (PSS, PSCAD/EMTDC, ATP/EMTP are welcome)
- ✓ ***Generation resources***. Any generator connected to the distribution network in the area of interest including technology and any other information of interest.
- ✓ ***Loads***. A basic description of the loads (rated power, demand response, …). The loads can be aggregated according their typology just to reduce the list. Important loads in terms of their criticality, social value or any other criteria should be included.
- ✓ ***Storage.*** A basic description of the available storage capabilities. The description should include information about the technology, rated power, energy capacity, …
- ✓ ***Metering Capabilities.*** Available measurement devices including PMU.
- ✓ ***Communication and IT devices.*** Architecture description of IT systems and protocols.
- ✓ ***Cyber security issues***. General description of the policy. Map of the ICS according the network architecture.
- ✓ ***Data Sharing.*** List of data to be provided to the consortium (parameter, location, sampling frequency, …)
- ✓ ***Format of Data shared.*** Brief description of the exporting process that it is available and can be followed for sharing the data to the consortium (i.e. by means of scheduled FTPS, Web Services, …).
- ✓ ***Normative and Regulatory Issues.*** Any standard or specific regulatory framework (European, National, Local) that is of key interest for the DSO.
- ✓ ***Pictures***. A set of pictures of the Demo-Site.
- ✓ ***Building information.*** Information related to the buildings. It applies to the Greek Demo Site bungalows. It has been included in the single diagram section.

3. SPAIN DEMO-SITE

2.1. General description

The Spanish Demo Site focuses on two important aspects related to the architecture of the smart grids of the future.

There will be a Demo Site for fault location and a Demo Site for the smart secondary substation.

The fault location Demo Site consists of two cases in two different areas:

- Case 1: Artificially generated faults to ground at a predefined location in order to verify general performance and accuracy for different fault resistances to ground.
- Case 2: After successful testing during case 1, the test will shift to the second location where the detection system will be validated in a high fault occurrence overhead line

The secondary substation Demo Site will focus on automation of the substation and management of high penetration DER areas. A grid can operate thousands of secondary substations and some of them require special attention. The automation and remote control capabilities on these facilities can vastly improve the efficiency of the resources of a utility. The savings in time and petrol for the vehicles alone make it worthy to improve these nodes of the grid. The Spanish Demo Site will include a location for a full modern secondary substation and a location for a retrofitted secondary substation. The costs of fully substituting every facility is out of reach, but retrofitting may become a good trade solution for lots of locations.

2.2. Location

The Case 1 fault location Demo Site is located in Toranzo (Cantabria), Norh of Spain and it can also be referred as Luena. The coordinates of the substation of Toranzo are 43°12'46.2"N 3°56'42.3"W.

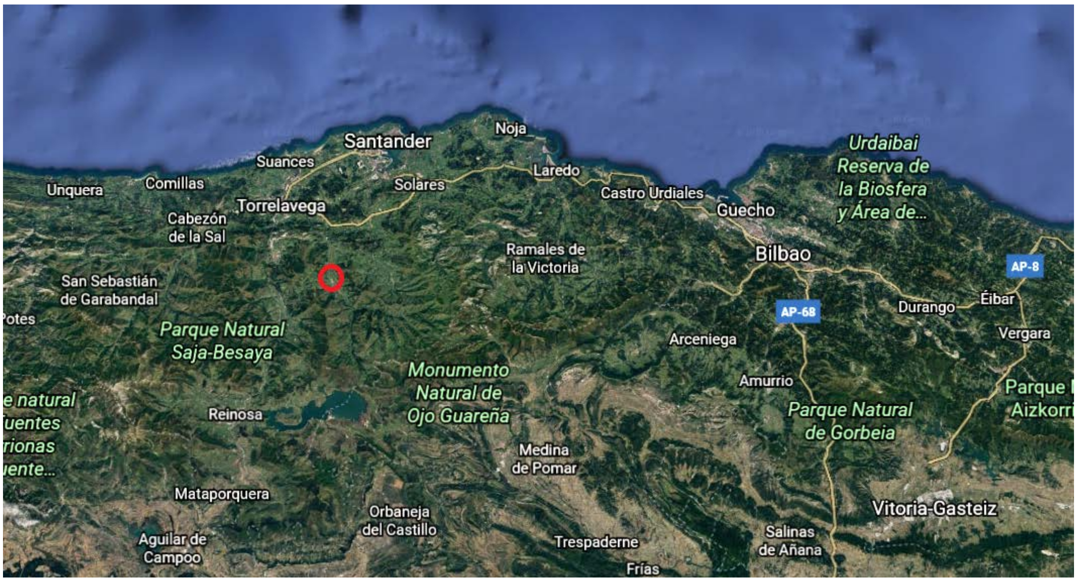

Figure 3.2.1 Area of Toranzo Demo Site

Figure 3.2.1 shows the general area of the case 1 fault Demo Site while Figure 3.2.2 shows an image of the substation at Toranzo.

Figure 3.2.2 Toranzo Substation

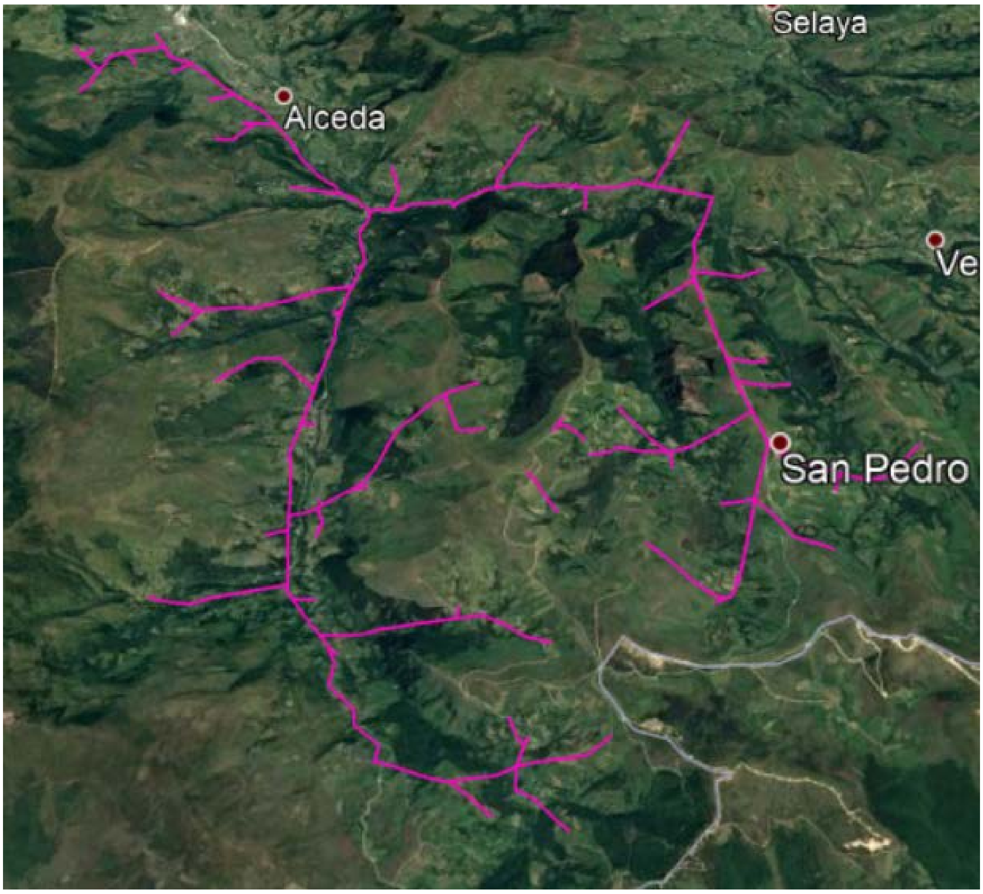

Figure 3.2.3 GIS for Fault Demo Site Case 1

The area involves almost 90 km of medium voltage grid (12 kV) with close to one hundred transforms to LV loads. The most important characteristic is that VIESGO has the ability to generate faults artificially at will so it is a perfect test field for the fault detection equipment.

Figure 3.2.3 shows a snapshot of the grid obtained after a LIDAR scan.

The Case 2 fault location Demo Site is located in Meira (Galicia), North-West of Spain. The coordinates of the substation are [43°13'17.1"N 7°19'08.2"W.]

Figures 3.2.4 and 3.2.5 show the area of Meira and the substation.

The choosing of Meira as a Demo Site is related with the frequency in which faults occur. It is one of the highest in the VIESGO grid and most of them are temporary faults. These temporary faults disappear and so they are very difficult to locate. Once the fault detection devices have been tested and calibrated in Luena, they can be use to locate this real world faults.

The secondary substation demo site includes two locations close to each other (25 km in a straight line). The area is located South of the fault Demo Site case 1 and not far from it.

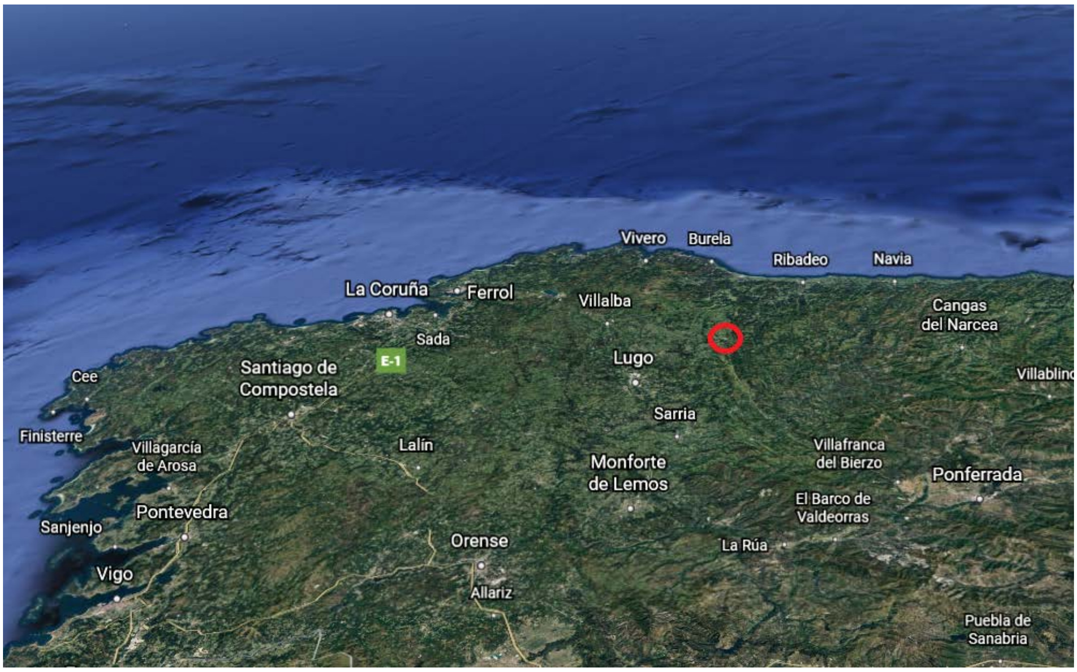

Figure 3.2.4 Area of Meira Demo Site

Figure 3.2.5 Meira Substation

Figure 3.2.6 Area of Secondary Substation Demo Site

One of the involved secondary substation is located in Villabermudo (Palencia) (42°36'58.0"N 4°21'32.6"W) while the other is placed in Melgar de Fernamental (Burgos) (42°24'11.2"N 4°14'35.4"W)

Those secondary substations have been chosen due to their high renewable energy penetration, close to 50% of the generation connected to them. This could be important for the tests of the secondary substations.

2.3. Single line diagram

The single line diagram is useful to get a basic and fast idea of the grid and it is a previous step in the creation of the simulation files.

In the case of the Spanish Demo Site, a simulation file of Demo Site case 1 (Luena) is going to be necessary so a single line diagram was created. The diagram does not include all the information required for the model but the topology and other qualitative information. The additional information is provided through an independent file.

In this case, the Demo Site was decomposed in 179 sections depending on conductor characteristics and connections and includes the transformers from MV to LV as well as the main substation that connects this Demo Site to the 55kV grid.

A sample of the diagram is provided in Figure 3.3.1

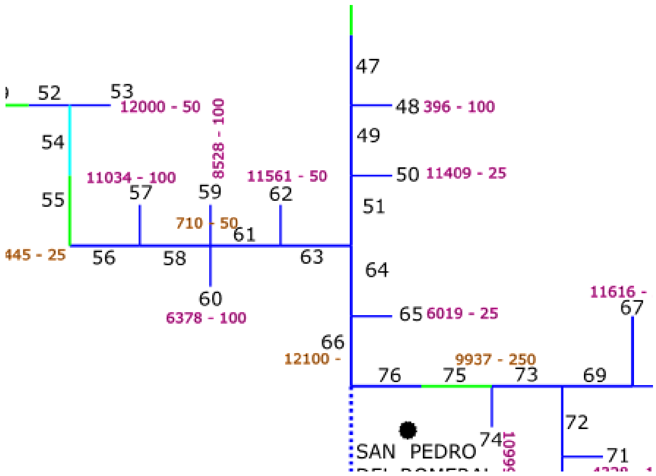

Figure 3.3.1 Single line diagram for the Spanish Demo Site (sample)

2.4. Border points and simulation files

The simulation files are available in deliverable D2.2.

The simulation platform of choice for this case has been PSS SINCAL as it has been considered by VIESGO the most appropriate due to the size of the model and the analysis required.

The required information for the creation of the model includes the length of the sections, the characteristics of the conductors (both overhead conductors and ground cables), data of the different transformers to the LV clients and the characteristics of the border point with the 55kV grid which include the information about the transformer of the substations

The remaining Demo Sites for Spain do not require simulation model.

2.5. Generation resources

The generation resources for the secondary substation Demo Sites include 115 kW of renewable generation (PV) out of a total generation of 250 kVA in Villabermudo.

The secondary substation at Melgar (referred sometimes as *Reparto Madepei*) involves 102 kW renewable generation (PV) out of a total of 250 kVA of generation.

This renewable generation is obviously dependant of the weather in the area. VIESGO has its own weather station grid and there are two of them very close to the area of the secondary substation Demo Site. The data for this weather stations along the last two years has been made available to the members of the consortium. This data is key to the generation of prediction models for renewable energy generation and so they are very important for the generation/demand forecasting tasks of FLEXIGRID.

2.6. Loads

In the case of the Spanish Demo Site, the loads are the MV to LV transformers of the Luena grid. Those transformers provide final user supply for homes in the area.

There is also the loads at the secondary substation Demo Site, which are useful for the demand forecasting part of the project.

2.7. Energy storage

Not applicable for the Spanish Demo Site.

2.8. Metering capabilities

The VIESGO network include several different equipment allowing the collection of all main electrical parameters along the Demo Sites. Those parameters include voltage, current, active and reactive power and power quality data.

2.9. Communications, cybersecurity and data

The VIESGO network is isolated. There will be no possible access to the network by third parties. This has obvious advantages in terms of security but causes some difficulties for data sharing.

Data files will be shared without direct access to the VIESGO network.

A detailed description of data layers and variables is necessary for the generation of the data architecture of the project. This data include the name of the variables, the origin of the data, the dependences with other variables, the sharing of the data, the use cases where each data is going to be used, the communication protocols… All of this has been included in the corresponding file and shared with the partners.

2.10. Pictures

The last part of the Demo Site description are some pictures of the Demo Sites. Two of them have been added to this report as well as some additional images have been shared with the consortium.

Figure 3.10.1 shows an image of the substation at Toranzo (fault location Demo Site), while figure 3.10.2 is the secondary substation at Villabermudo (secondary substation Demo Site).

Figure 3.10.1 Toranzo substation

Figure 3.10.2 Secondary substation at Villabermudo

4. GREECE DEMO-SITE

3.1. General description

The Greek Demo Site focuses on a Demand Side load with distributed generation facilities.

The Demo Site consists of a vacation resort in Thasos. with a 400kVA substation and a number of bungalows, three of which will be equipped with PV and batteries. The substation load will be monitored. A double EV charging point will also be monitored.

The hotel is in transition to becoming a green hotel and some challenges are to be addressed:

- Management of the renewable resources including generation and storage with the aim of maximizing the benefit while ensuring the optimal operation of the local grid.
- Management of the local storage capabilities to support the gird in case of blackout risk.
- Reduce the impact on the upstream distribution network and in turn minimize the cost for the owner.

Figure 4.1.1 shows a diagram of this description.

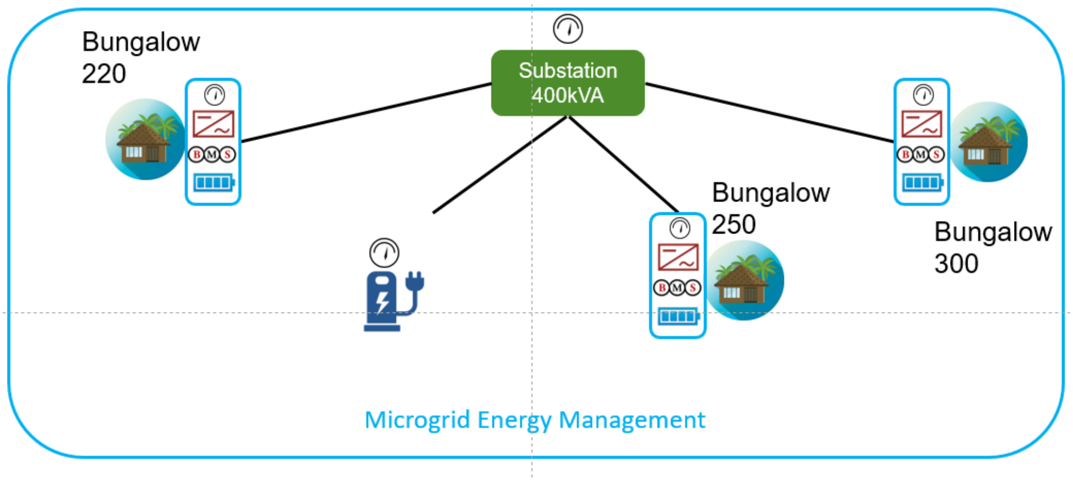

Figure 4.1.1 Greek Demo Site diagram

3.2. Location

The Demo Site is located in the Island of Thasos (Θάσος), North of the Aegean Sea and its coordinates are [40°46'14.4"N 24°43'33.1"E (40.770663, 24.725846)].

Figure 4.2.1 shows the location of the resort within Thasos while figure 4.2.2 is a hawk eye view of the resort.

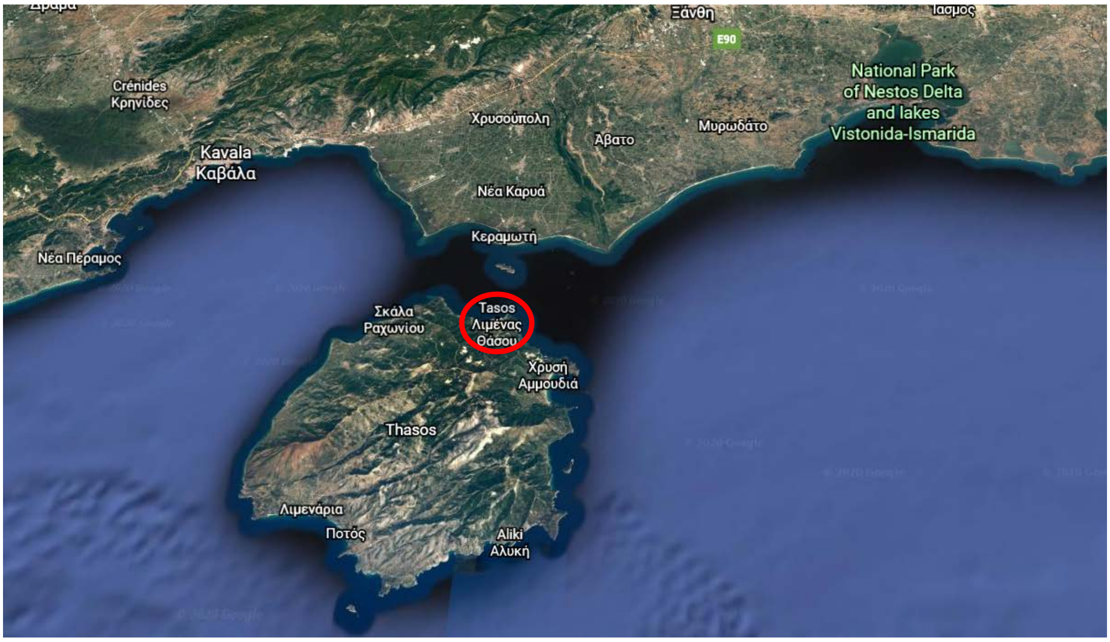

Figure 4.2.1 Thasos Island

Figure 4.2.2 Makryammos Hotel and Bungalows

3.3. Single line diagram

The single line diagram is useful to get a basic and fast idea of the grid and it is a previous step in the creation of the simulation files.

In the Greek case, the single line diagram if far more simple than the diagrams from the other three Demo sites as it only includes the hotel instead of a full grid.

Figure 4.3.1 shows the single line diagram of most of the Greek Demo Site. That includes the connection to the MV substation, the technical information regarding the generation and the storage capabilities and the bungalows loads.

Figure 4.3.2 shows some details of one of the bungalows, including communications between the different components.

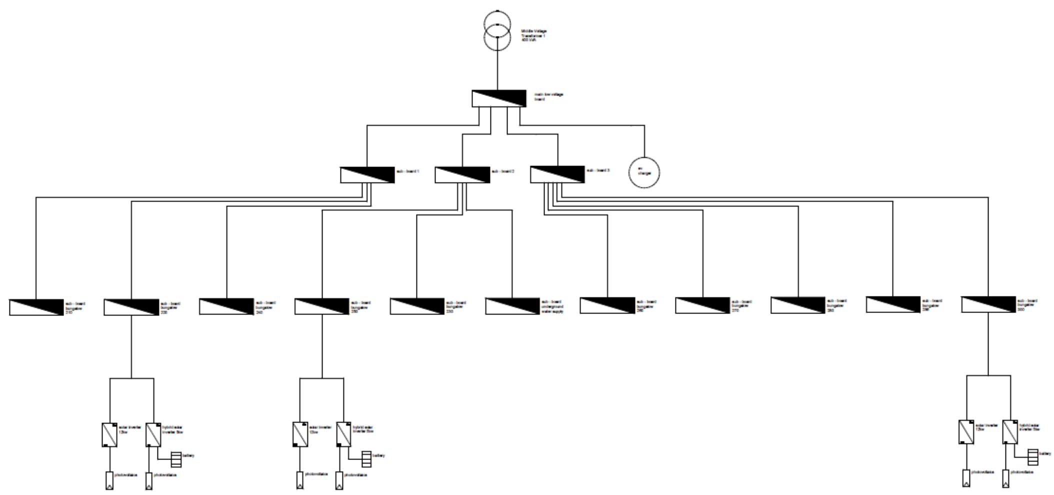

Figure 4.3.1 Single Line Diagram Greek Demo Site

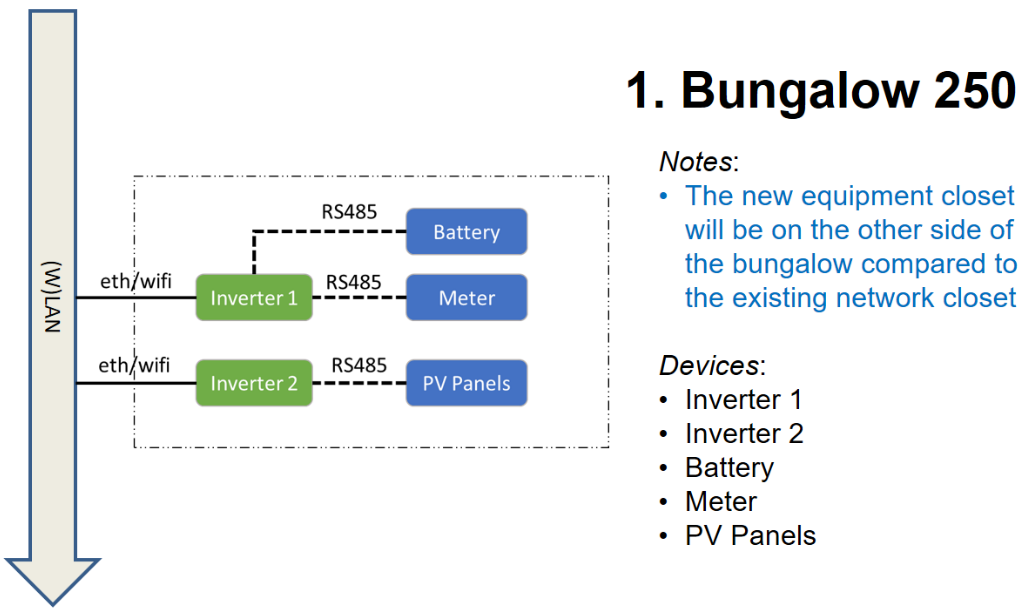

Figure 4.3.2 Bungalow Diagram

3.4. Border points and simulation files

The simulation files are available in deliverable D2.2.

The data required for the simulation files is mainly in the single line diagram although some additional data was required to create the model. This extra data were the distances between the elements, which is important for the cables modelling, and some data related to the substation such as the voltages of the MV grid to which the resort is dependant.

3.5. Generation resources

The generation resources include a 200 kVA generator for back up only with a total generation capacity of 51.1 kWp.

There is also some generation data available for different areas useful for the generation forecasting task under WP4. This include daily energy generation for several months and can be used to predict energy generation in the future.

3.6. Loads

The hotel comprises a number of loads that are mainly individual lodge loads, offices and other auxiliary services (e.g. reception building, restaurant, etc.), however, this dedicated 400kVA substation supplies only residential bungalows and the double EV charging point.

3.7. Energy storage

The available energy storage is composed by 3x5 Lithium-ion batteries with a combined total peak capacity of 24.9 kWh and an 80% depth of discharge.

3.8. Metering capabilities

Schneider PM2200 energy analysers are available and connected at the substation and they measure the total substation load and the dedicated double charging point. The measured capabilities include 4-quadrant energy, power quality, demand (including prediction), and true rms. The user manual is available here.

3.9. Comunications, cybersecurity and data

The hotel is fully equipped with an optical fibre local network (that reaches every bungalow) which is supplied by appropriately hierarchically distributed access points. Each monitored and controllable device (i.e. the inverters, the energy analysers, the energy meters and the control relay) are networked locally. Their communication with the private cloud storage will be enabled via a dedicated gateway and appropriate software components.

The local network is secured and where required 2FA authentication and encryption is employed.

All data monitored for the assets of the hotel are aggregated and stored in the hotel's private cloud. An appropriate data exchange mechanism will be developed in collaboration with FLEXIGRID partners to ensure that data:

- Will be transferred from the hotel's private cloud to FLEXIGRID's FUSE platform through FUSE's (ATOS) REST API. The exact data to be transferred through this mechanism will be used to feed the forecasting and congestion management modules to be developed in T4.2 and T4.4.
- Will be transferred from FLEXIGRID's FUSE back to the hotel through VERD's REST API. These data will be the output of the congestion management module that will be used to control batteries and the EV charging point relay, as well as the outputs of the forecasting module to enable KPI calculations on forecasting accuracy.

A detailed description of data layers and variables has been created same way than in the other cases so that the IT architecture can be defined in WP5.

3.10. Normative and regulatory issues

The Greek pilot area is a commercial customer that has a dedicated commercial electricity tariff.

3.11. Pictures

The end of the description of the Thasos Demo Site includes some pictures of the facilities. Figure 4.14.1 shows a picture of the PV generation panels while figure 4.14.2 shows the EV charger.

Figure 4.11.1 PV Generation Panels

Figure 4.11.2 EV Charger

There are a series of additional images of the Greek Demo Site available for the partners of the project.

5. CROATIA DEMO-SITE

4.1. General description

The Croatian Demo-site focuses on the problems of the distribution network of the future in a populated and urban area.

HEP-ODS plans, operates and maintains the distribution grid of medium voltage (MV) grid (30 kV, 20 kV and 10 kV) and low voltage (LV) grid (0.4 kV). The grid includes 14 substations of 30/10(20) kV and 2463 substations of 10(20)/0.4 kV and 9000 km of grid (LV and MV).

Figure 5.1.1 Daily Votage Profile

Figure 5.1.1 represents a typical daily consumption diagram with the highest demand being from 6:00 to 10:00 and from 16:00 to 21:00. There are often voltage drops during those periods.

The main challenges for this demo site are:

- Reducing the distribution network losses.
- Reducing the numerous planned and unplanned interruptions of electricity supply for end users.
- Higher integration of renewable energy sources, mainly for end users.
- Higher involvement of end users in managing their energy resources and consumption by increasing their access to smart grid tools.

4.2. Location

The Croatian Demo Site is located in Zagreb. The geodesic coordinates are [45º 48' 3.88" N 15º 58' 36.8" E].

Zagreb is the capital city of Croatia and it is located in the North-East of the country. Its population is around 1 million people, which means one quarter of the population of the country. This means that improving the energy efficiency of this city may have a huge impact on the efficiency of the whole country.

Figure 5.2.1 shows the area of Zagreb

Figure 5.2.1 Area of Zagreb

4.3. Single line diagram

The single line diagram is useful to get a basic and fast idea of the grid and it is the first step to create the simulation files.

In the case of the Croatian Demo Site, single line diagrams for the three areas of the three secondary substations involved have been provided. Besides that, a dwg AutoCad file has been included with technical data required for the creation of the simulation model.

Figure 5.3.1 shows a sample of one of the single line diagrams for the Croatian Demo Sites.

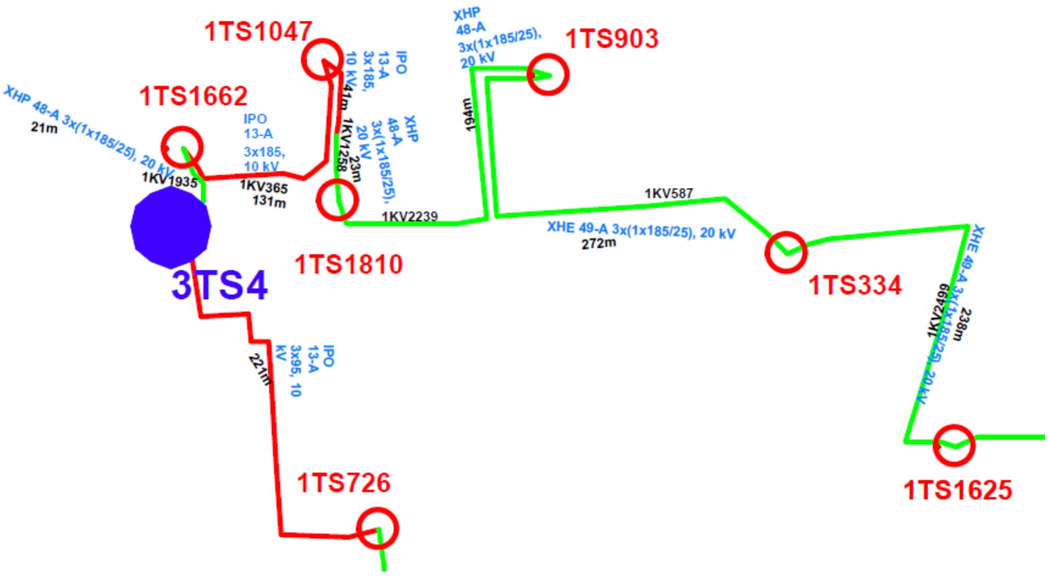

Figure 5.3.1 Single Line Diagram for one of the Croatian Demo Sites

4.4. Border points and simulation files

The simulation files are available in deliverable D2.2.

Besides the data from the single line diagrams, additional data related to the lines and the transformers from MV to LV has also been provided in an extra file. This data includes cable types and transformation ratios and power of the transformers, which is necessary for modelling the loads of the grid.

4.5. Generation resources

There is a cogeneration plant in the area of interest. Cogeneration power plants create electricity out of exciding useful heat. These plants generate heat to perform their activities and then that heat is reused in the generation of electricity. This means that they get to recycle the heat that otherwise would have been lost without any extra benefit. However, this plant will be not part of any of the Demo Sites in Zagreb.

4.6. Loads

Zagreb is a big city and so there is a wide variety of loads to be taken into account. All this information is included in the data provided for the creation of the models.

4.7. Energy storage

Not applicable for the Croatian Demo Site.

4.8. Metering capabilities

There is a variety of devices composed by three Schneider Electric Ion models (7600, 7650, and 9000) and one PQI-D model by A-Everle. The characteristics of these devices have been provided to the consortium and main Electrical parameters are available from all models.

4.9. Communications, cybersecurity and data

The communication diagram with the substations follows the structure of Figure 5.9.1.

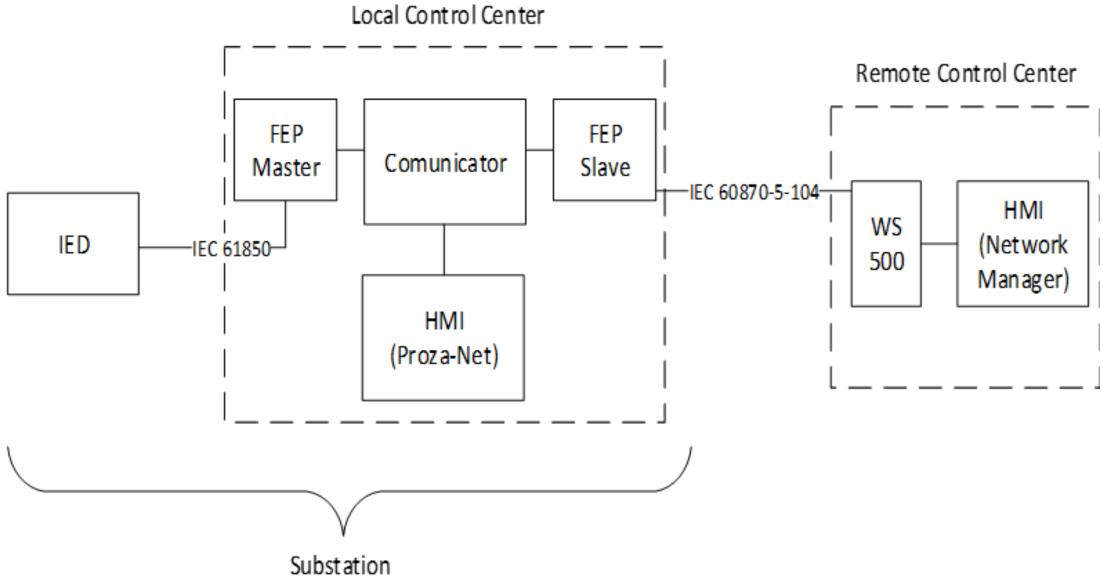

Figure 5.9.1 Communication Diagram Croatian Demo Site

The network is isolated. There will be no possible access to the network by third parties. This means that there is a high level of security but it has the disadvantage of the difficulties it causes for the sharing of data.

A detailed description of data layers and variables has been created in the same way as in the other cases so that the IT architecture can be defined in WP5.

4.10. Normative and regulatory issues

There is some normative and regulatory documentation that may be of interest in relation to the Croatian Demo Site:

- The Constitution of the Republic of Croatia, Article 37 (Official Gazette, No. 85/10)
- The Act on Implementation of General Data Protection Regulation (Official Gazette, No. 44/2018)
- Convention 108 for the protection of individuals with regard to automatic processing of personal data
- European Convention on the Protection of Human Rights
- Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector
- Directive 2009/136/EC amending Directive 2002//58/EC
- Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the projection of individuals with regard to the processing of personal data and on the free movement of such data
- REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 April 2016 on the protection of natural persons with regard to the processing of

personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)

- Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union

4.11. Pictures

The Croatian Demo Site has provided some images of the facilities.

Figures 5.11.1 and 5.11.2 show two of the secondary substations involved in the study.

Figure 5.11.1 Secondary Substation TS 2500

Figure 5.11.1 Secondary Substation TS 723

6. ITALY DEMO-SITE

5.1. General description

The Italian Demo Site is located in the South-Tyrol, in the North of Italy. Its importance comes from the high number of hydroelectric energy power plants in the area and that this is also an isolated grid which makes it very interesting for the FLEXIGRID project.

The challenges to be issued include the operation of the grid in island mode, and monitoring and control of the users active and reactive power production.

Operating in island mode means that the grid has no way to upload overproduction to a higher-level grid and it also means that it has to be self-sufficient in terms of generation as it cannot get additional energy from the outside in terms of need. When operating in island mode balance is of the essence and properly monitoring and controlling the generation may be key to the successful operation of the assets.

The main transformation station of the valley (CP Sarentino) gets supplied by only 1 high voltage power line which starts at Bolzano and goes trough the whole valley. The high voltage power line is a overhead line and because of the natural influences it happens at least once per year that the line is out of use for maintenance.

There is a emergency medium voltage line which starts also form Bolzano and goes to the valley, but the capacity isn't enough to guarantee the power supply for the whole valley. That means that in the case of a failure of both lines (MV and HV) approx. 7000 people would come to feel a complete Black Out.

The biggest advantage of the valley is that we find a lot of hydro electrical production which can be used, in case of a Black Out, to create a emergency supply for the electricity network by creating small distribution islands. In simpler words, the generated energy would go direct from the producer to the user.

5.2. Location

The Demo Site is located in Sarentino, North of Italy and its coordinates are 46°38'34.6"N 11°21'21.7"E (46.6429405,11.3560343).

Val Sarentino/Sarntal Valley is located just 16 km from South Tyrol's regional capital, Bolzano, and as the largest municipality in the region in terms of area, is known as the "green lung of South Tyrol".

Figure 6.2.1 shows a wide visual of the location of the Demo Site while a view of Sarentino Valley is available through Figure 6.2.2.

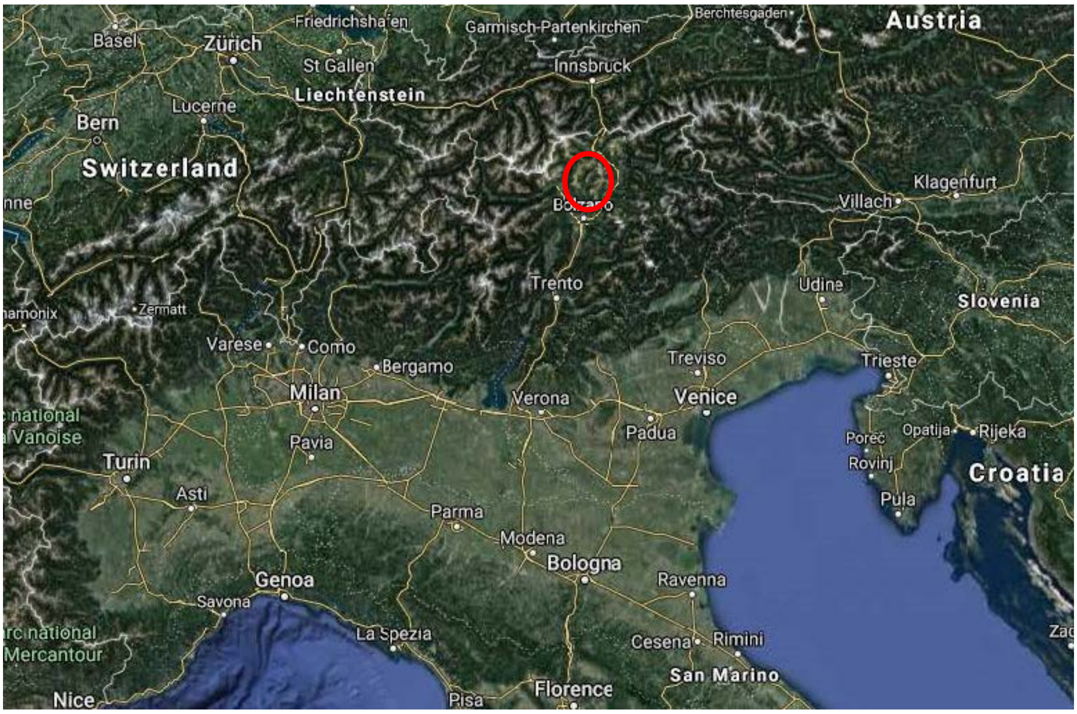

Figure 6.2.1 Sarentino Area

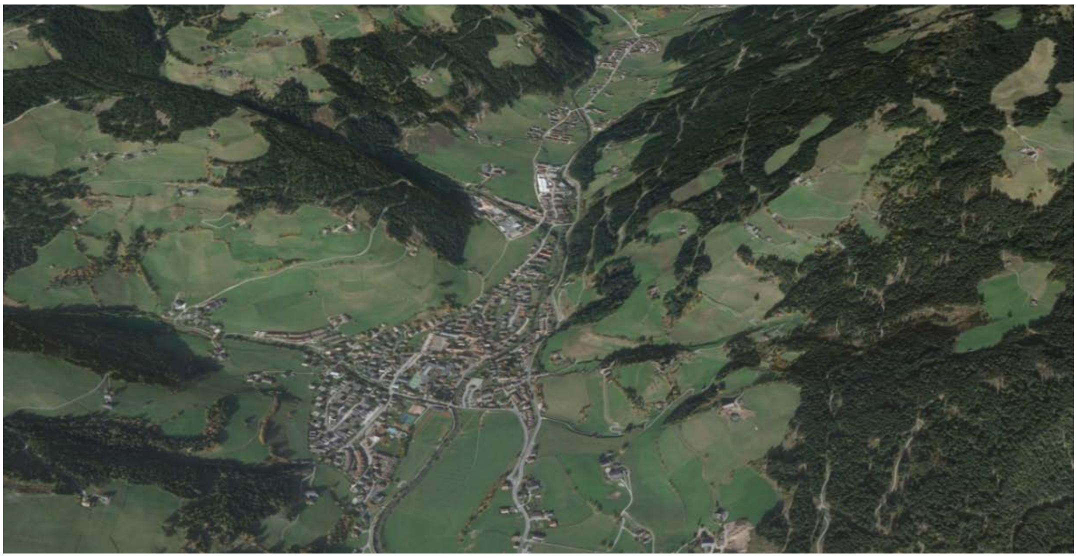

Figure 6.2.2 Sarentino Valley

5.3. Single line diagram

The single line diagram is useful to get a basic and fast idea of the grid and it is a previous step in the creation of the simulation files.

In the case of the Italian Demo Site, a full single line diagram has been provided. Figure 6.3.1 shows a sample of the diagram provided by the Demo Site coordinator. The diagram include the lines, the connections and other useful information.

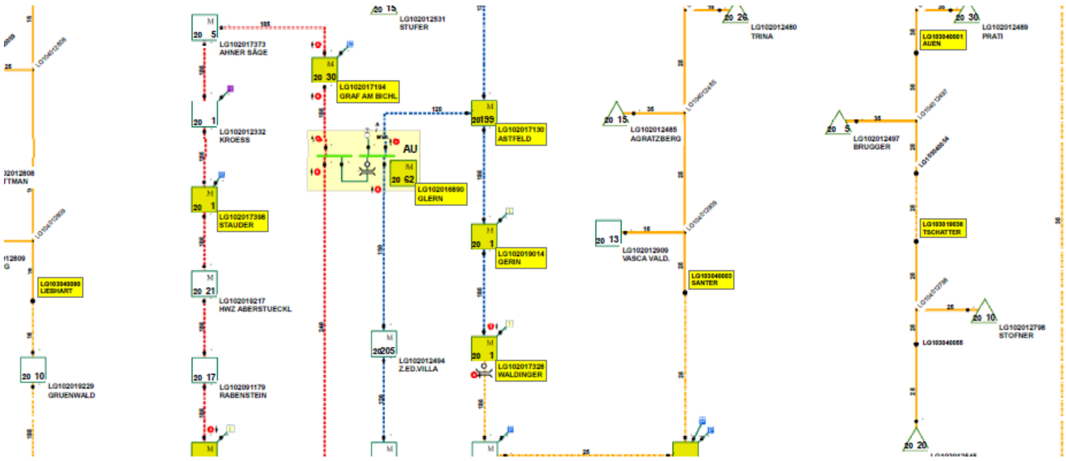

Figure 6.3.1 Single Line Diagram sample for the Italian Demo Site

5.4. Border points and simulation files

The simulation files are available in deliverable D2.2.

The Demo Site coordinators have also provided several files with technical data related to different areas of the Demo Site. These files includes data such as the length of the different sections or the conductor characteristics (material, cross section, etc) which are necessary for modeling the grid.

5.5. Generation resources

The known data about generation resources in the Italian Demo Site is limited to main characteristics such as power and Technology. This is enough for modelling but forecasting requires more information.

Fortunately, the Demo Site coordinator managed to acquire historical generation data relative to some of the plants (not all) connected to the lines. The data includes the current (and so the power) provided by the plants in 15 minutes intervals along one full year. This can be very useful in predicting the future behaviour of this power plants as well as some others in the area.

5.6. Loads

The loads data is included in the simulation data. Measurements on loads are only available for higher than 55 kW loads.

5.7. Energy storage

Not applicable for the Italian Demo Site.

5.8. Metering capabilities

All the main parameters of the grid are available or partially available. These parameters are the same as in other Demo Sites i.e. current, power…

5.9. Communications, cybersecurity and data

A full description of the variables to use and their relations have been made available to the project partners. This includes the different communication layers and the way the data is going to flow to whoever needs it within the project needs.

5.10. Pictures

The pictures available for this Demo Site show the substations at Sarentino and one of the hydroelectric power plants and also one of the problems of an overhead line through forests: faults caused by trees.

Figure 6.10.1 HV/MV Substation at Sarentino

Figure 6.10.2 Hydroelectric Power Plant

Figure 6.10.3 HV Grid Issue

7. CONCLUSIONS

The gathering of the required data took more time and effort than it was expected. Some of the data was difficult to compile and the Covid-19 pandemic situation made it worse. Because of the difficulties, this D2.1, however on time for delivery, took much longer than expected to be completed. Fortunately, the data collected has been sufficient to keep everything going without significant impact.