

II. Test Case Description

TITLE: PLANREC		AUTHOR: fabbricadigitale S.r.l.
		DATE: 31.03.2023
<p>Object under Investigation (Oul) "The component(s) (1..n) that are to be qualified by the test"</p> <p>The proposed research targets the implementation of a software platform for REC - Renewable Energy Communities, aimed at estimate and forecast techno-economic metrics and having the form of a web platform that can be used by research centres and companies in the sector to support the formulation of REC business plans, estimating the financial incentives of the REC in a rapidly evolving regulatory framework.</p>	<p>Test Objectives Why is the test needed? What do we expect to find out?</p> <p>Tests are needed in order to perform validation of porting and improvements applied to the algorithms and models. Tests will be performed using experimental data.</p>	<p>System under Test (SuT) Systems, subsystems, components included in the test case or test setup</p> <p>The Magliano CER will be used as a test bed given its ability to share energy production data. Experimental data from other EU sources will be used too. The subsystem of the test will be</p> <ul style="list-style-type: none"> - Web application Security - Forecast Model - Input/output system
<p>Function(s) under Investigation (Ful) "The referenced specification of a function realized (operationalized) by the object under investigation"</p> <p>Aim of the proposed project is to create a web application that guarantees</p> <ul style="list-style-type: none"> - Engineering and porting of the prototype model to improve its industrial solidity increasing its TRL from level 6 to 9, possibly improving it - Implementing a multiuser experience through a web user experience - Implementing scenario configuration capability - Implementing input data treatment pipeline (dataflow), ensuring data 	<p>Purpose of Investigation (Pol) The test purposes classified in with terms <i>Characterization, Verification, or Validation</i></p> <p>To Evaluate the forecast algorithm of REC behavior in terms of characterization, considering energy production and consumption, real data from Magliano Alpi's REC will be compared with predictive models output in order to evaluate, through metrics like accuracy and precision, model's algorithms fitness.</p>	<p>Functions under Test (FuT) Functions relevant to the operation of the system under test, including Ful and relevant interactions btw. Oul and SuT</p> <p>The main item under test is the predictive model that will be evaluated using scientific methods. Metrics and methods will be established after a review of the model itself in order to test the uncertainty, sensitivity and, output variability.</p>

<p>segregation (security) between different entities</p> <ul style="list-style-type: none"> - Implementation of data quality assurance automated procedures - Implementation of simulation capabilities over real cases and studies - refine forecasting tools by introducing space-time correlation tools on demand/generation as an alternative to using historical data. 	<p>At the code level we will implement unit, integration, system and UAT tests.</p>	
<p>Domain under Investigation (Dul): “The relevant domains of test parameters and connectivity”</p>		
<p>Target metrics (TM) Measures retrievable from SuT required to quantify each of the identified test criteria</p> <p>Given the model the main object of investigation, metrics like accuracy, precision, F2, P-value will be chosen after an initial assessment for the model to measure uncertainty, sensitivity and, output variability.</p> <p>Results will be tested against different RECs data from Open Power System Database in order to verify that no under or over fitting happens. Validation will take place with real data from Magliano Alpi REC.</p> <p>At the code level metrics like Maintainability index, cyclomatic complex-</p>	<p>Test criteria (TCR) Formulation of criteria <i>for each Pol</i> based on properties of SuT; encompasses properties of test signals and output measures</p> <p>The input set of the tool under test will encompass data such</p> <ul style="list-style-type: none"> - Produced energy by single user/prosumer characterized by time information - Consumed Energy by single user/prosumer characterized by time information <p>The measured out dataset will include</p> <ul style="list-style-type: none"> - Aggregate load and PV generation - REC import and export - Self-consumed energy - Financial incentive entity 	<p>Variability attributes (VA) Identify relevant controllable or uncontrollable factors of the SuT and their required variability; refer to Pol</p> <p>The relevant variability factors that will be considered for the system under test are</p> <ul style="list-style-type: none"> - REC's extension (km²) - Number of users by class (consumer, prosumers and producers) - seasonality - REC geo-localization

ity, depth of inheritance, class coupling will be measured to assure code quality and maintainability .	Quality attributes (QA) Threshold levels for test result quality as well as pass/fail criteria Simulation accuracy Metrics on models and tools	
---	--	--