Energy forecasting service

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Name of the HW/SW technology: Energy forecasting service **Purpose of the HW/SW technology: The service is used to provide forecast up to 2 days ahead and with a hourly resolution for: aggregated grid load, PV plant generation, wind turbines generation, single house load**	
Detailed description	Forecasting of energy flows to maximize self-consumption, reduce the environmental footprint, maximize profits in the energy market. The forecasting models are based on machine learning algorithms that use: Past measures of energy consumption or generation Historical data on weather conditions Weather forecasts from the Global Forecasting Service
Applications	The energy forecasting service is essential for the optimal management of any system with renewable energy generation. Any energy system where there is production from renewable sources may need a system for predicting energy flows, for example to manage and maintain a stable energy distribution system, to better manage energy flows to and from an energy storage system, to operate profitably on the energy market. Even the individual user who wants to maximize the portion of their own consumption may be interested in taking advantage of the service.
Technical specification	The technology is based on multi-model, multi-technology, resilient approach, taking advantage of deep knowledge of weather forecasting models and machine learning techniques. The models are based on machine learning algorithms that use: • Past measures of energy consumption or generation • Historical data on weather conditions • Weather forecasts from the Global Forecasting Service • The forecast is renewed every six hours on the basis of the new weather forecasts and on new measured data from the points of supply The models are renewed daily with a continuous learning process that improves the models as new data is available. The configuration of the system is fully automated, the only information required is the measured power (i.e. PV capacity and orientation is automatically deduced from the power output) The service is resilient to missing measurements (i.e. a forecast is issued in any case based on the most recent measurements available). The service is accessible through a RESTful API and through a web interface

Images, drawings	

MV Photovoltaic plant
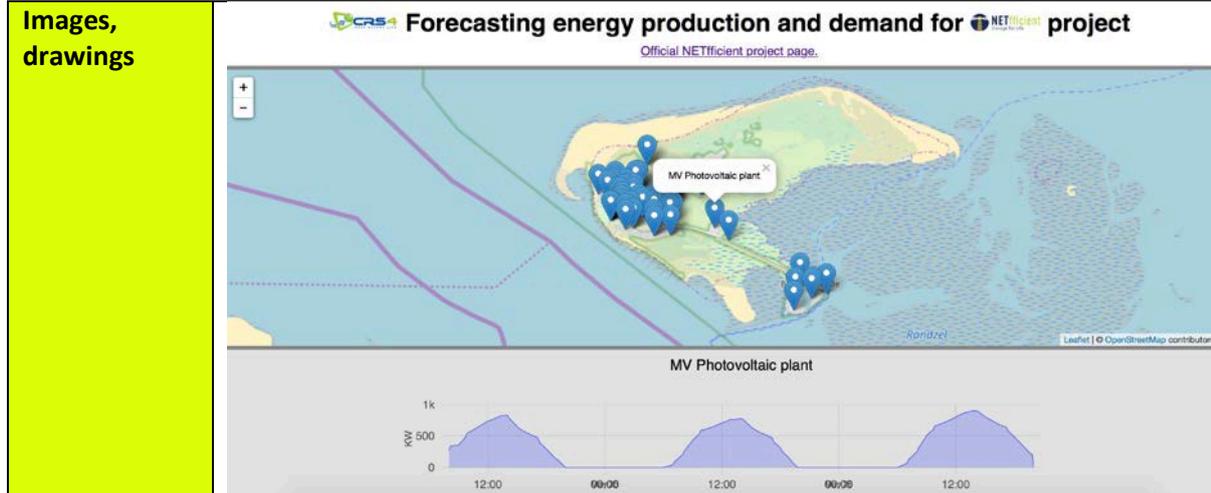
| Company name and details | The Centre for Advanced Studies, Research and Development in Sardinia-**CRS4** (http://www.crs4.it) is a multi-disciplinary research centre founded by the Sardinia Autonomous Region in 1990. CRS4 is a wholly-owned subsidiary of the public body Sardegna Ricerche (http://www.sardegnaricerche.it). Initially headed by the Nobel Prize in Physics Carlo Rubbia, CRS4 has a current staff of about 150 people among researchers, technologists and other professionals focused on 6 main strategic sectors: Biosciences, Data intensive Computing, High Performance Computing & Networks, Energy & Environment, and Information Society.

Since 2003, the centre is located in the Technology Park of Sardinia, Pula (Italy). CRS4 is equipped with high-end technological platforms: one of the major Italian HPC centres (47 Tflops of computing power and 5 Pbytes of storage capacity) directly linked to the first massive DNA Sequencing platform in Italy and a state-of-the-art Visual Computing Lab.

CRS4 is active in a large number of research domains such as Bioinformatics, Distributed and Visual Computing, Numerical Simulation and Scientific Computing, Data-intensive Applications, Human Computer Interaction, Virtual and Augmented Reality, Multimedia, Database and Information Systems.

CRS4 has participated in more than 35research projects funded by the European Commission among which 16 in FP7 and 5 in H2020, mainly in the topics ICT, ENVIRONMENT, SECURITY, PEOPLE, SMART CITIES and ENERGY, more than 70 research projects funded by National/Regional Research Programmes and various research contracts with the Private Sector (Oil&Gas and IT Industry).

CRS4 attracts an average income of 3.5 M€ per year from National and European competitive R&D calls. For the last 10 years, the publication record of CRS4 includes more than 320 scientific publications in international journals, more than 450 publications in conferences proceedings and 32 books and book chapters. |
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