La Graciosa Project: Maximization of distributed energy resources penetration through local management and storage support

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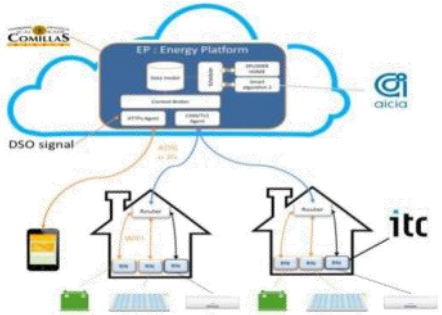
Proyecto GRACIOSA
CDTI Centro para el Desarrollo Tecnológico Industrial
UNIÓN EUROPEA Fondo Europeo de Desarrollo Regional (FEDER) Una manera de hacer Europa
IREC Institut de Recerca en Energia de Catalunya Catalonia Institute for Energy Research
endesa

INTRODUCTION

The Canary Islands are especially appropriate for experimenting and installing new technologies, necessary to guarantee the quality and safety of the power supply when the power of renewable generation is very high.

Smart Citizens:

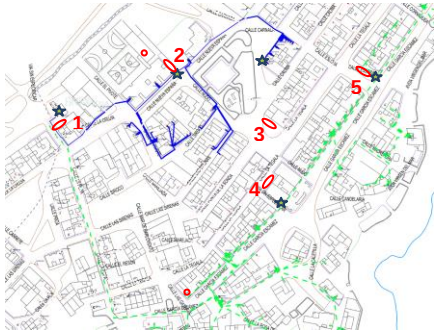


Arquitectura propuesta por Comillas de plataforma energética y clientes

HESS:

uGrid Manager:

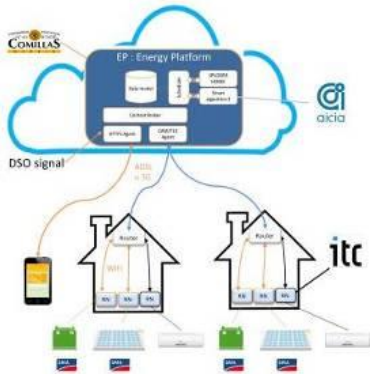
Demostrador:



SMART CITEZENS

Consumers be able to offer flexibility in their consumption in favor to the stability and security of service of the distribution network.

Market Place:



Self consumption system:

Measurements and control:

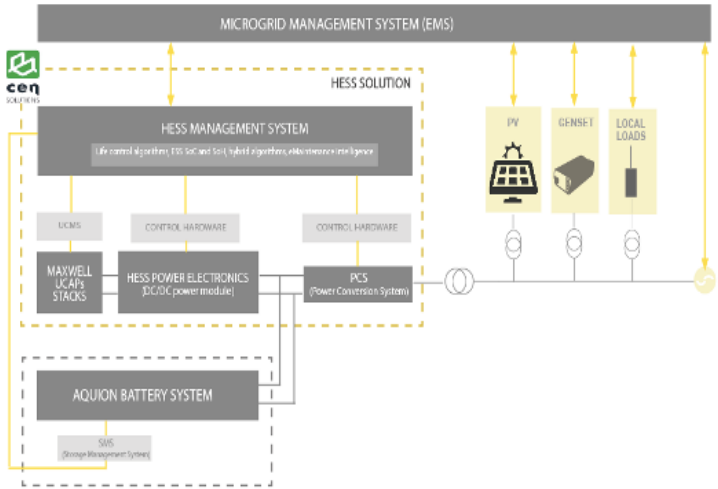
AMPERE: dispositivo IoT analizador de señal de elevada precisión que se instala en el cuadro de protecciones del edificio.

VOLTA: dispositivo de control de la energía generada por los paneles solares y de la energía almacenada en las baterías.

CARRIER: dispositivo para el control de equipos de clima, a través de los puentes de comunicaciones Intesis Box.

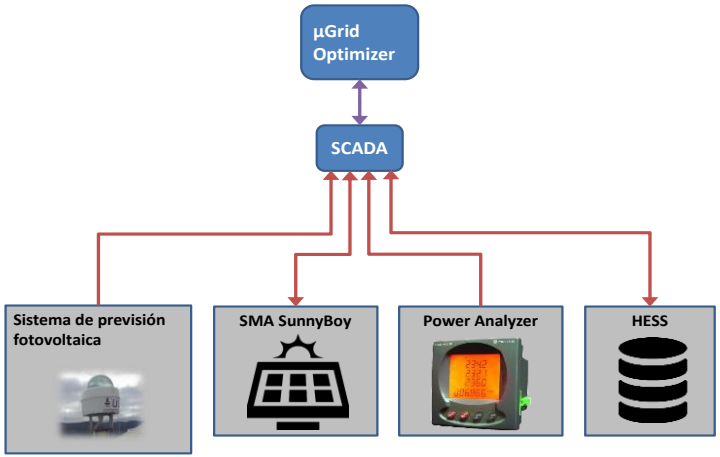
SMART STORAGE

A storage to absorb the demand peaks and store the renewable production to maintain the stability to the grid.



SMART GRID (I)

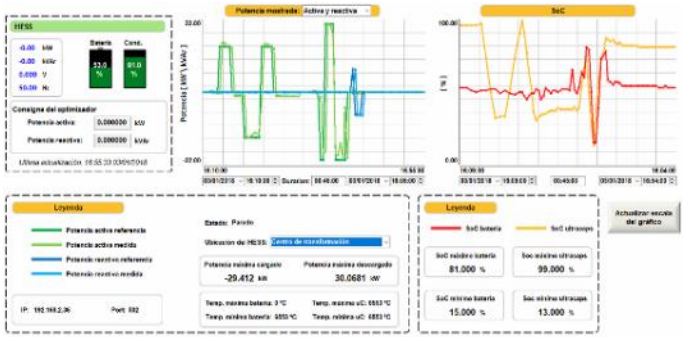
A monitoring and management system is required to optimize the network operation in order to maximize the efficiency of the distribution network, including all the controllable and observable systems of the microgrid.



SMART GRID (II)

This system must be able to communicate with all existing equipment (to read and control) and helps to predict the consumption and generation.

SCADA + FV:



SCADA + HESS:

RESULTS (I)

The results obtained in the field have been validated with respect to some indicators (KPIs) which have been separated between users and the distribution network.

Smart Citizen

Reducción del consumo Global	36,8 % (15,1 kWh/día)	Reducción del consumo Local	7,78 % (8 kWh/día)
Ahorro económico en la factura	31 % (2,12 €/día)	Reducción global de emisiones de CO_2	36 % (2,89 $KgCO_2$/día)

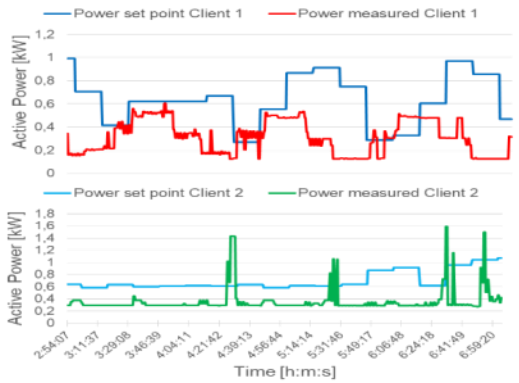
Smart Grid

Equipos gestionables en la isla	5	Gestión remota	SÍ
Número de puntos visibles en la red	9	Número de cámaras para predicción	2

RESULTS (II)

The accuracy of the predictions and the correct response have also been validated.

Forecast vs real measures



	Max.% Error*	Avg. % Error*
Branch 1 (Line 4)	22 %	7%
Branch 2 (Line 6)	16 %	4%
Branch 3 (Line 4)	9 %	2%
Branch 4 (Line 6)	10 %	4%

	% Error*
Client 1	1,8 %
Client 2	69 %
Client 3	54 %

Response of the clients


PROYECTO
G.R.A.C.I.O.S.A.

Topics to discuss

- Key results:
  - SCADA Application with Optimal Power flow in a real demonstrator.
  - Regulation recommendations.
- Lessons learned:
  - Technology communications matters.
- Future activities:
  - Improve forecast in solar and in consumptions.
- Testing:
  - The pilot has been working during 2 months and end on March.

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