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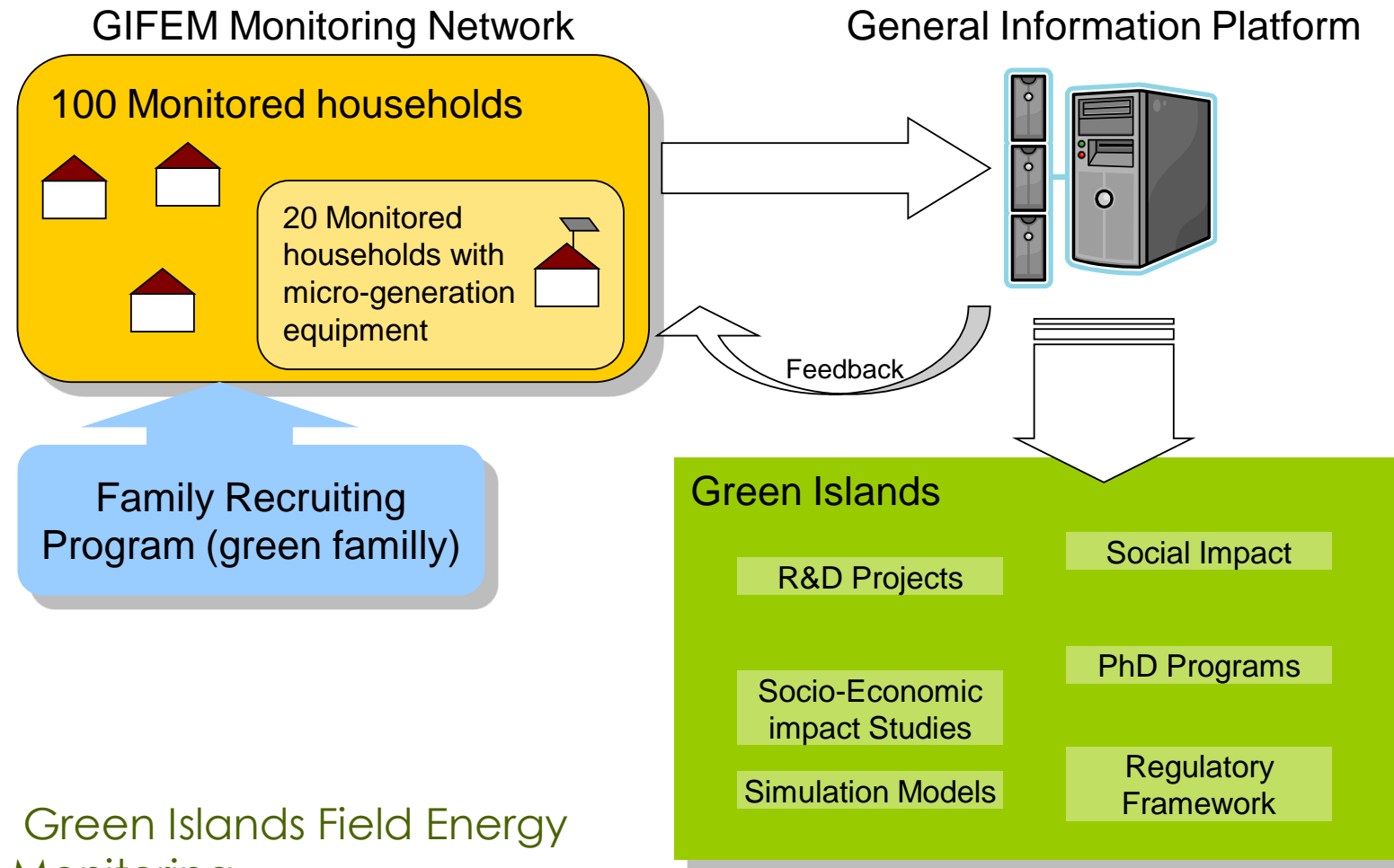
Eco Bairros team

Eco Bairros demonstration project:

Towards a net zero
island: Distribution
and demand side



The Origins: GIFEM Project Scope



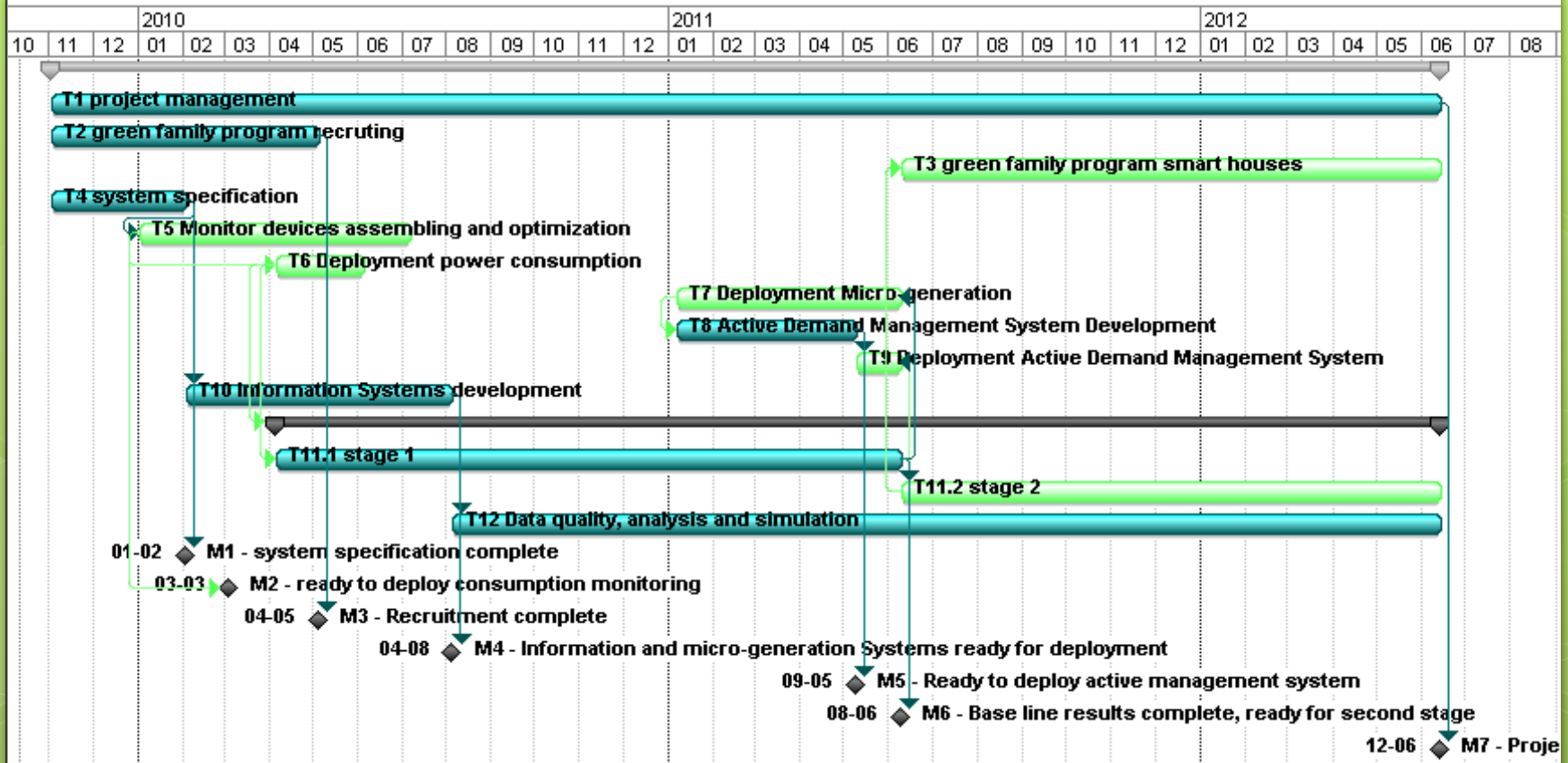
Green Islands Field Energy Monitoring

The Origins: GIFEM Project Goals

- To monitor energy consumption:
 - characterize the energy consumption, through its continuous monitoring.
- To provide the households under study with information regarding their energy consumption profile in order to promote efficient behaviors moving towards the smart houses reality.
- To share our monitoring network with other projects studying compatible topics.
- To evaluate the performance of micro-generation equipments in Azorean households:
 - the equipments: photovoltaic, wind energy generators and solar water heating;
 - the outcome: to provide information to energy market to evaluate the economical strengths of micro-generation energy in the Azores.



The Origins: GIFEM Project Scheduling

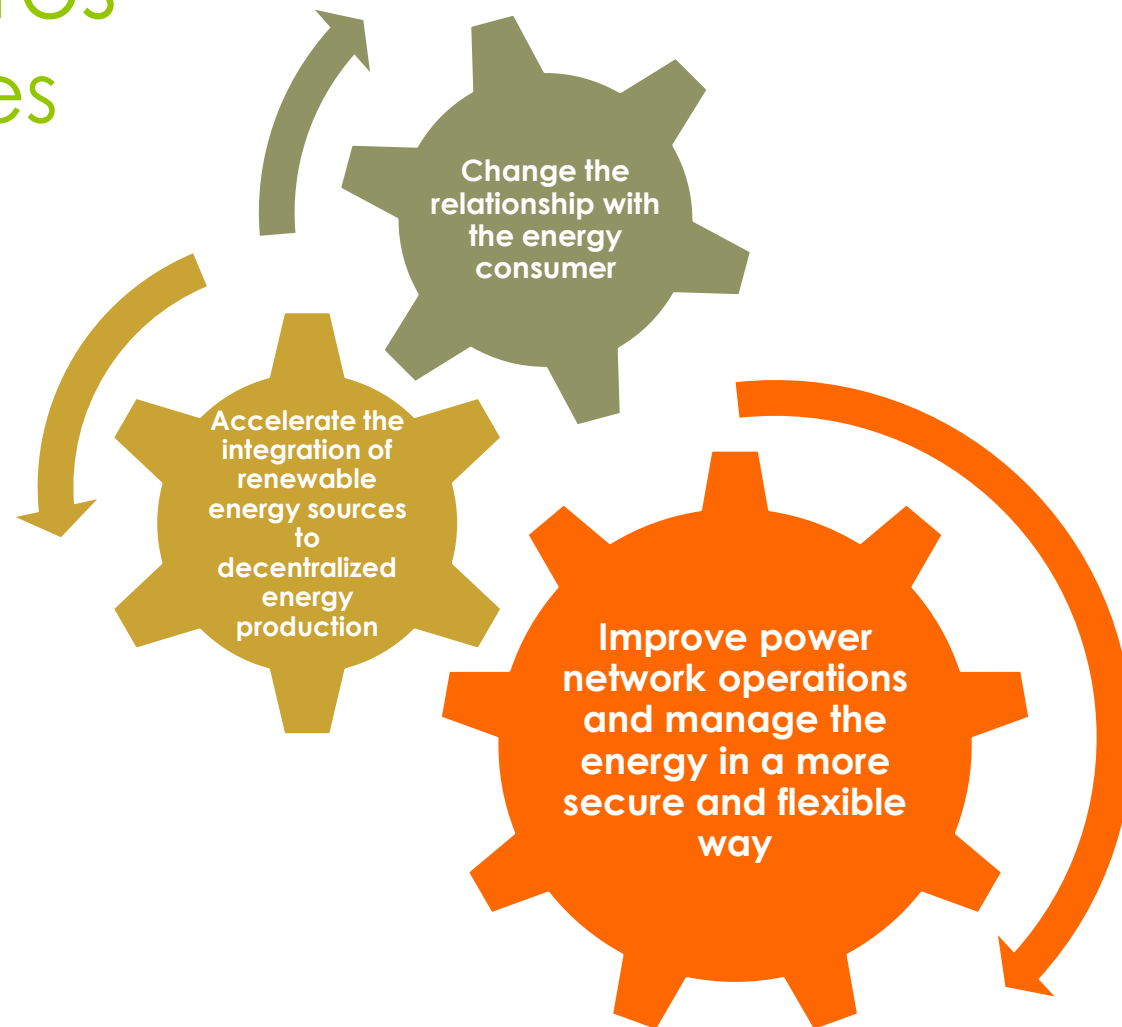


Why Eco Bairros centers on Intelligent Power Networks?

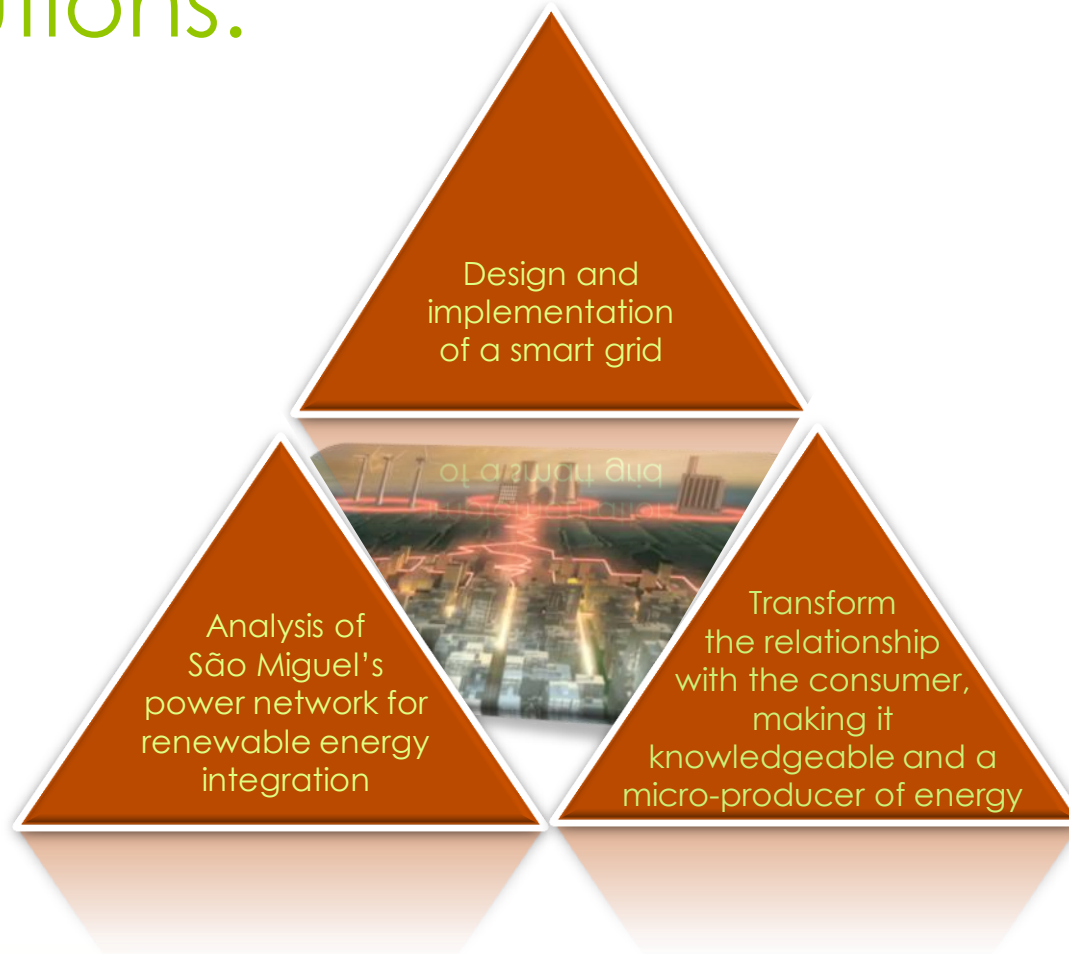
- Our electric generation, transmission, and distribution infrastructure is rapidly aging and out of synch with new digital technology;
- Core utility workers needed to operate and maintain the grid are also aging and getting more difficult to replace
- Central generation energy production is becoming more capital intensive, leading to an increase in distributed generation resources
- While T&D spending is increasing, the allowed rate of return will require greater focus on longer-term horizons and greater project benefits
- Carbon legislation is on the horizon and new technologies and practices are needed to meet our sustainable needs
- Sensors and controls become truly autonomous, driven by self-correcting, intelligent algorithms, operationally embedded
- Utilities and energy providers are making the investment decision a priority, with intelligent controls a design standard for asset management
- New stakeholders and market participants offer a larger array of new products and services
- Regulators and policy makers enable effective cost recovery schemes, not tied to the current regimes
- Consumers demand the flexibility and fully engage as active participants

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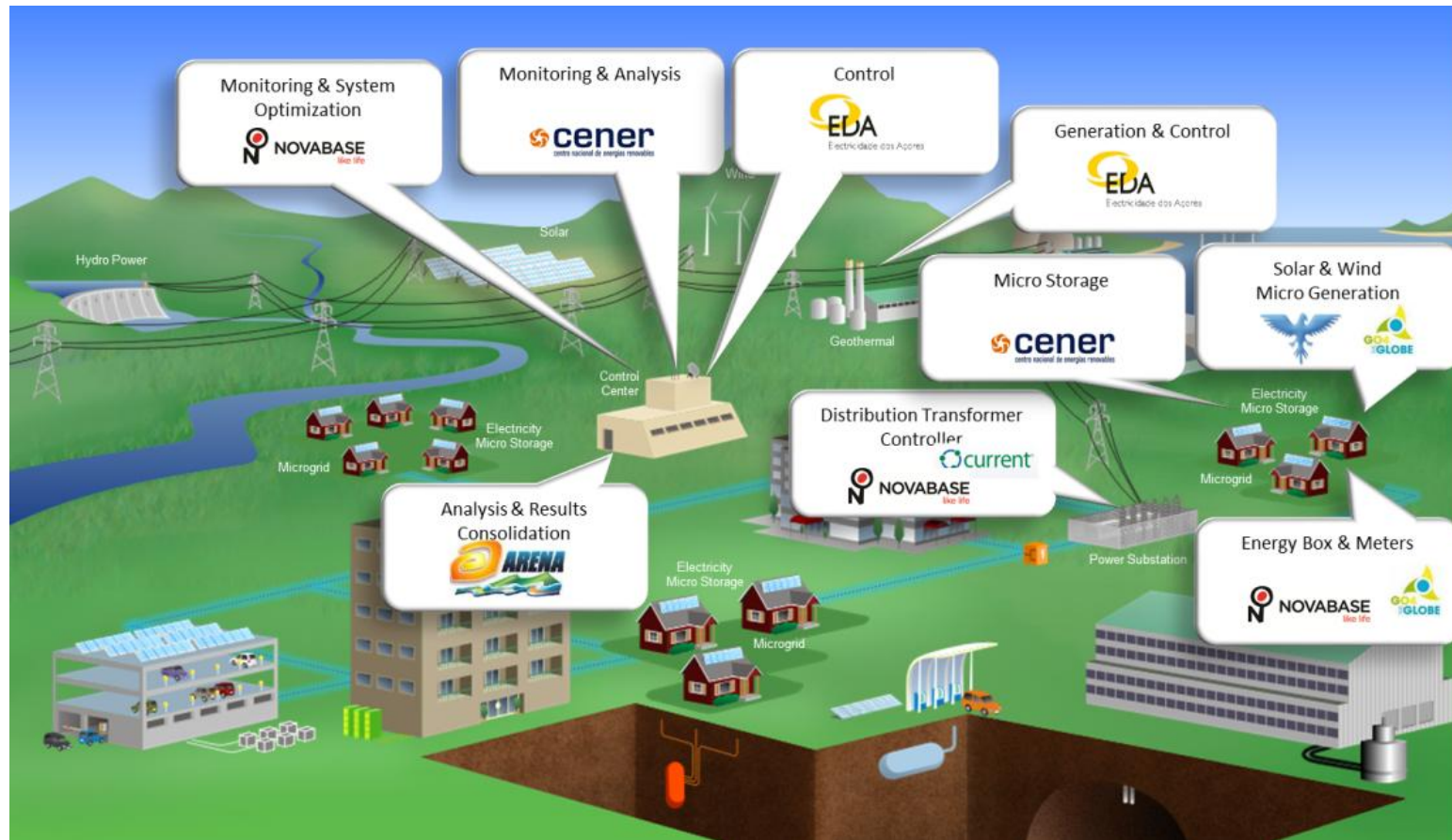
Eco Bairros Objectives



Eco Bairros Solutions:

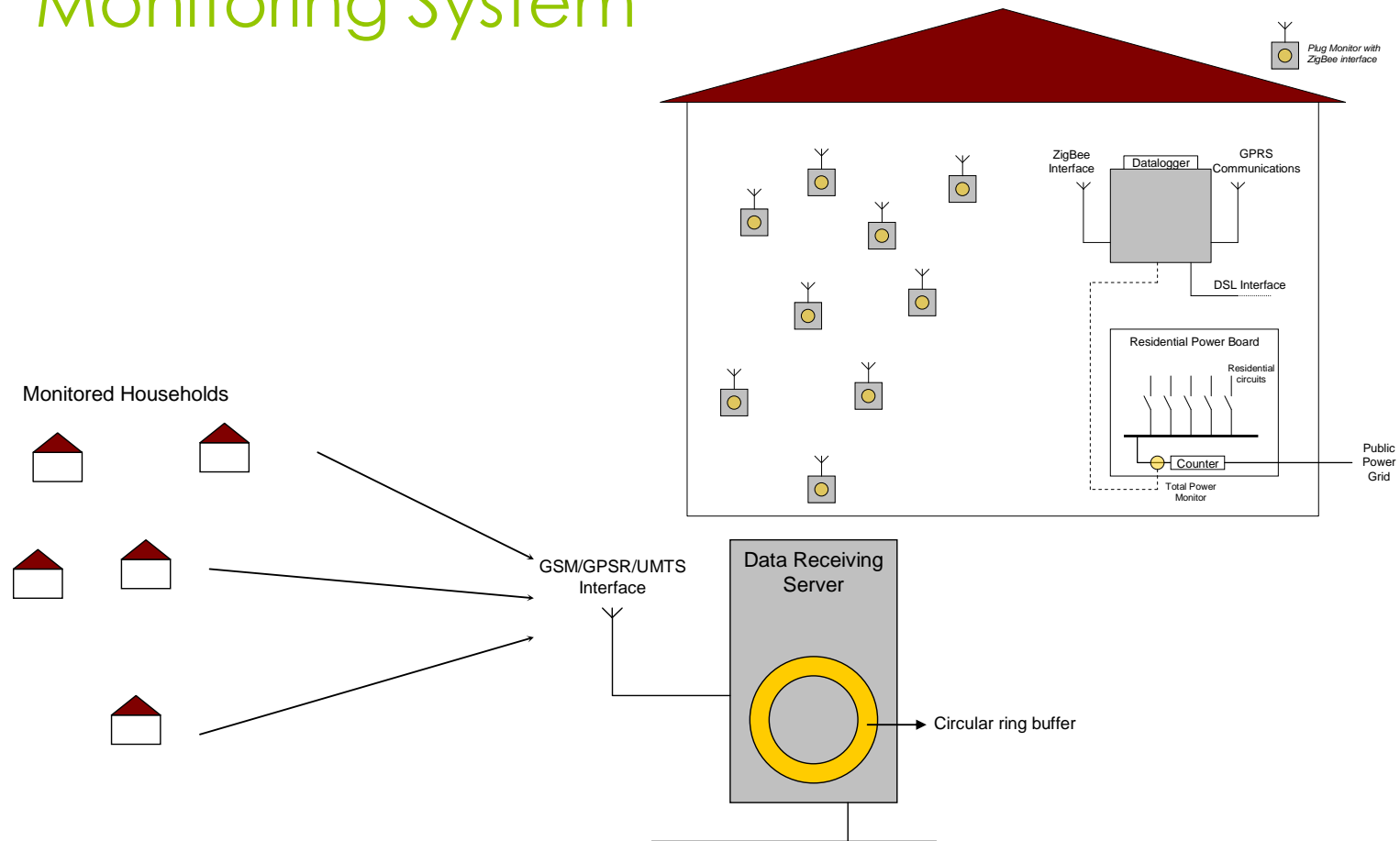


Eco Bairros Partners

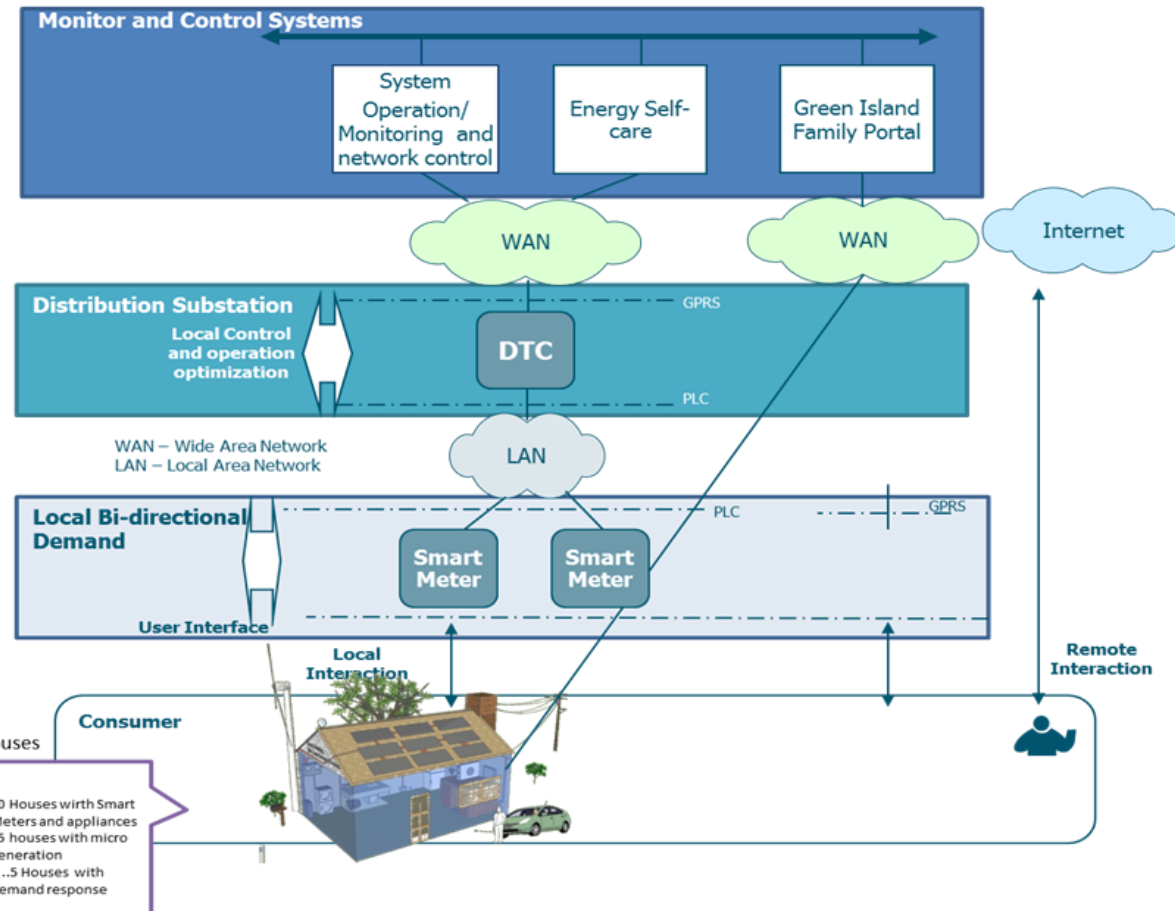


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Household Power Consumption Monitoring System



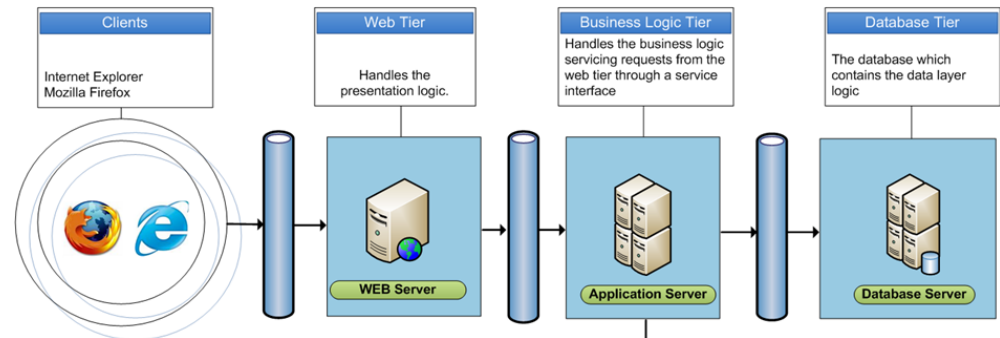
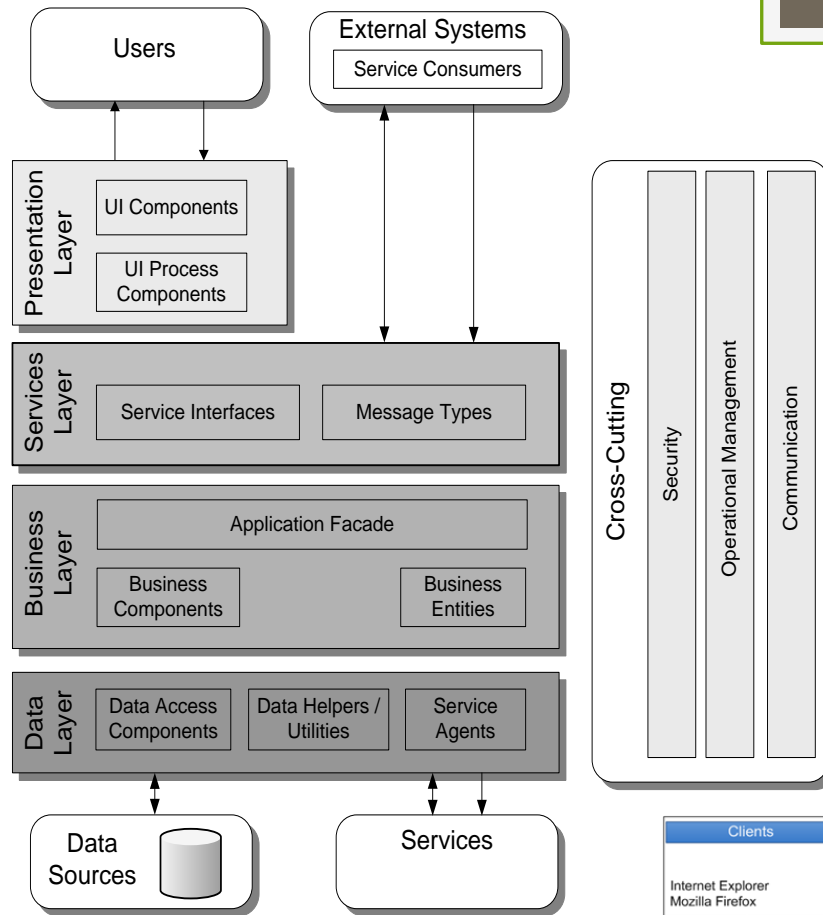
Communications Solution:



big difference
in scope

- 50 Houses with Smart Meters and appliances
- 25 houses with micro generation
- 2 ..5 Houses with demand response

Schematic diagrams of Central System:



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ID	Task Name	Duration	Start	Finish	2011				2012					
					Q1	Q2	Q3	Q4	Q1	Q2	Q3			
1	Eco Bairros	394 days	Tue 01-03-11	Fri 31-08-12										
2	Project Coordination and Management	394 days	Tue 01-03-11	Fri 31-08-12	3									
3	Family Program	64 days	Tue 01-03-11	Fri 27-05-11	3									
4	Cr�terios elegibilidade	24 days	Tue 01-03-11	Fri 01-04-11	01-04									
5	Selecc�o fam�lias	40 days	Mon 04-04-11	Fri 27-05-11	27-05									
6	Home Support	330 days	Mon 30-05-11	Fri 31-08-12	3									
7	Presenation project in detail to the families	2 mons	Mon 30-05-11	Fri 22-07-11	30-05 22-07									
8	SRM Regis tration	2 mons	Mon 30-05-11	Fri 22-07-11	30-05 22-07									
9	Technical Assistance	14,5 mons	Mon 25-07-11	Fri 31-08-12	25-07 3									
10	e quipment/communication specification	64 days	Tue 01-03-11	Fri 27-05-11	27-05 3									
11	Internal Meter deployment	40 days	Mon 25-07-11	Fri 16-09-11	25-07 16-09									
12	Installing meters consumption and establishment of communications	2 mons	Mon 25-07-11	Fri 16-09-11	25-07 16-09									
13	PV deployment	50 days	Mon 25-07-11	Fri 30-09-11	25-07 30-09									
14	Installation of photovoltaic kits	2,5 mons	Mon 25-07-11	Fri 30-09-11	25-07 30-09									
15	Information System specification	104 days	Tue 01-03-11	Fri 22-07-11	29-04 3									
16	Green family portal	44 days	Tue 01-03-11	Fri 29-04-11	29-04 3									
17	Data warehouse	44 days	Tue 01-03-11	Fri 29-04-11	29-04 3									
18	Active demand	2 mons	Mon 30-05-11	Fri 22-07-11	30-05 22-07									
19	Information System construction	120 days	Mon 02-05-11	Fri 14-10-11	02-05 16-09									
20	Green family portal	5 mons	Mon 02-05-11	Fri 16-09-11	02-05 16-09									
21	Data warehouse	4 mons	Mon 02-05-11	Fri 19-08-11	02-05 19-08									
22	Active demand	3 mons	Mon 25-07-11	Fri 14-10-11	25-07 14-10									
23	Monitoring and analyses	260 days	Mon 22-08-11	Fri 17-08-12	22-08 22-06									
24	Data quality and analysis	11 mons	Mon 22-08-11	Fri 22-06-12	22-08 22-06									
25	Agent Simulation	12 mons	Mon 19-09-11	Fri 17-08-12	19-09 17-08									
26	Analysis of San Miguel grid capabilities	360 days	Tue 01-03-11	Mon 16-07-11	28-03 18-07 05-12									
27	Migrate the data from EDA network system	100 days	Tue 01-03-11	Mon 18-07-11	19-07 06-12 30-01									
28	Collect the data about S. Miguel Grid	1 mon	Tue 01-03-11	Mon 28-03-11	28-03 18-07 05-12									
29	development of the electrical grid model of S. Miguel	4 mons	Tue 29-03-11	Mon 18-07-11	19-07 06-12 30-01									
30	San Miguel Grid study	5 mons	Tue 19-07-11	Mon 05-12-11	19-07 06-12 30-01									
31	Grid capacity and limits characterization	2 mons	Tue 06-12-11	Mon 30-01-12	06-12 30-01									
32	Sizing of distributed energy systems in the selected sites	2 mons	Tue 31-01-12	Mon 26-03-12	31-01 26-03									
33	Solutions proposal	3 mons	Tue 27-03-12	Mon 18-06-12	27-03 18-06									
34	Final report	1 mon	Tue 19-06-12	Mon 16-07-12	19-06 16-07									
35	Smart Grid	371 days	Tue 01-03-11	Tue 31-07-12	07-03 31									
36	Project Management	371 days	Tue 01-03-11	Tue 31-07-12	07-03 31									
37	Project Preparation	5 days	Tue 01-03-11	Mon 07-03-11	07-03 31									
38	Requirements Analysis and Specification	15 days	Tue 08-03-11	Mon 28-03-11	14-03 28-03									
39	State of the art	5 days	Tue 08-03-11	Mon 14-03-11	14-03 28-03									
40	Intelligent Network	10 days	Tue 15-03-11	Mon 28-03-11	15-03 28-03									
41	Energy SelfCare	10 days	Tue 15-03-11	Mon 28-03-11	15-03 28-03									
42	Design of solution architecture	20 days	Tue 29-03-11	Mon 25-04-11	18-04 25-04									
43	Intelligent Network	15 days	Tue 29-03-11	Mon 18-04-11	18-04 25-04									
44	Validation of selected counters	5 days	Tue 19-04-11	Mon 25-04-11	19-04 25-04									
45	Energy SelfCare	10 days	Tue 29-03-11	Mon 11-04-11	11-04 25-04									
46	Constru�o	70 days	Tue 26-04-11	Mon 01-08-11	26-04 20-06									
47	Energy SelfCare	2 mons	Tue 26-04-11	Mon 20-06-11	26-04 20-06									
48	Rede Inteligente	30 days	Tue 21-06-11	Mon 01-08-11	21-06 18-07									
49	Construction and custom intelligent network	1 mon	Tue 21-06-11	Mon 18-07-11	21-06 18-07									
50	Integration with other systems of collection of consumption outside the home and	10 days	Tue 19-07-11	Mon 01-08-11	19-07 01-08									
51	Pre-production	20 days	Tue 02-08-11	Mon 29-08-11	02-08 15-08									
52	Validation of the solution	10 days	Tue 02-08-11	Mon 15-08-11	02-08 15-08									
53	Installation Training for EDA	5 days	Tue 16-08-11	Mon 22-08-11	16-08 22-08									
54	Training in the central system	5 days	Tue 23-08-11	Mon 29-08-11	23-08 29-08									
55	Operationalization	40 days	Tue 30-08-11	Mon 24-10-11	30-08 19-09									
56	Configuration	15 days	Tue 30-08-11	Mon 19-09-11	30-08 19-09									
57	deployment	2 mons	Tue 30-08-11	Mon 24-10-11	30-08 24-10									
58	Network monitoring	9 mons	Tue 25-10-11	Mon 02-07-12	25-10 02-07									
59	Documentation and Analysis of Results	1 mon	Tue 03-07-12	Mon 30-07-12	03-07 30									

Schedule:

Workshop, 26 May 2011

Detailed Solution:

Objective	Description
design and implementation of a smart grid (optimization of a low voltage neighborhood network)	<ul style="list-style-type: none">• Design and construction of a smart grid for real-time powerlines monitor;• Detection and correction of faults, so as to facilitate the integration of renewable energy sources and enabling a more efficient management of energy;• Installation of micro-generation kits (25) for decentralized energy production;• Installation of plug smart meters and smart boxes (50 clients) that track the use of some appliances and also the global consumption of each house.
Analysis of São Miguel's power network for renewable energy integration	<ul style="list-style-type: none">• Analysis of the electric network of the island of São Miguel;• Static Study on electricity network;• Result analysis and selection of sites for new renewable energy installations.

Detailed Solution:

Objective Description

Transform the relationship with the consumer, making it knowledgeable and a micro-producer of energy

- Design and construction of a portal "Green islands family Portal" where customers can view their consumption both at appliance level and 10-15 minute resolution or in aggregated forms;
- Design and construction of a data warehouse for analysis and monitoring of consumption in order to realize if there have been changes in behavior regarding energy consumption over time;
- Design and construction of an "active demand management system" (2 to 5 houses) that helps to control which devices can be turn on in order to improve electric network management;
- Design and construction of a solution of "Energy Self-care" to take advantage of the information collected about usage by the smart meters. Will have two subsystems:
 - Management and control – for central use, interacting with EDA billing systems. The consumptions of clients will be collected automatically (in real-time), as well as, it will be possible to remotely send orders to individual energy boxes for power cut or tariff plan changes;
 - Self-care – for use by customers, who will have access to their consumptions and costs (in real-time), with aggregate or detailed views (from the central system); as is currently possible with telecommunications clients which can choose their tariff plan that best suits their needs based on this information.

Expected Results:



Improve network operations and manage energy more safely, efficient and resilient to the volatility of intermittent energy sources such as wind.

- Deal with constant oscillations between supply and demand of electricity;
- Prevent breakdowns;
- Manage all the real time information resulting from monitoring the networks, optimizing energy flows.



Speed up the integration of renewable energy sources, through detailed study of the behavior of high and medium voltage networks.



Transform the relationship with consumers through new services and involving him as an agent of change:

- access to several levels of information about appliances consumption and overall house consumption;
- access to knowledge as advices, simple rules or alarms, about changes in consumption patterns or better price plans.

«We do not inherit the Earth
from our Ancestors, we
borrow it from our Children.»

