

Inovgrid - Évora Inovcity smart energy grid

Évora, Portugal



Inovgrid - Évora Inovcity

Inovgrid is an innovative pilot smart-grids project that was implemented in the city of Évora (Inovcity). The initiative provides smart meters to the electricity consumers' resident in Évora, free of cost. These smart meters collect data about individual consumption profiles and collective grid demands. After a few years of data collection this project enables and optimizes the smooth integration of decentralized energy generation, and electric vehicles (charging infrastructure) into the grid. The project also promotes automated grid management, the improvement of the quality of energy services, the reduction of grid operating costs, and the promotion of energy efficiency and sustainability while simultaneously reducing national energy dependence [1, 2].

The project was implemented in 2010 by EDP - Energias de Portugal, a power company, and included the installation of 30,000 energy boxes plus 40,000 distribution transformer controllers and the respective integration with the company's systems. In parallel, with the installation of this hardware, the project has proceeded with the definition of working groups dedicated to the analysis and quantification of the potential benefits of the installed technologies [1, 2].

The project comprises several features such as smart metering, public lighting, charging infrastructure for electric vehicles, energy efficiency and client interaction interfaces.

Country / City Profile



Country	City
Population (2014) 10,401,100 [3]	Population (2014) 54,662 [4]
Land area (km²) 92,225 [5]	Land area (km²) 1,307 [6]
GDP per capita (2014, current international \$, at purchasing power parity) 28,393 [7]	GDP per capita / GDP per capita at purchasing power parity n/a
Region Southwest Europe	Region Inland

City's physical geography

Location	✓ Évora is located in the Alentejo region of Portugal, in the southern central zone of the country, a large region of wide plains about 140 km away from the capital city Lisbon, and 80 km from Badajoz at the Spanish border
Climate	<ul style="list-style-type: none"> ✓ Évora has a hot Mediterranean/ dry-summer subtropical climate [8] ✓ On average there are 2,990 hours of sunshine per year [8] ✓ Average annual temperature: 15.79°C; Average annual precipitation: 627 mm [9]

Initiating context [10] [11]

Évora Municipality was chosen to implement the Inovgrid pilot project by EDP - Energias de Portugal, a power company, because of its size, the network diversity and the willingness of the customers to support a thorough evaluation of an innovative pilot smart-grids initiative. This World Heritage City is the first urban area in Portugal to join in the intelligent energy grid initiative.

Sociological studies allowed for the understanding of client's expectations about feedback information on energy efficiency and satisfaction with the hardware installation. In general, clients showed great interest in the new services introduced by Inovgrid infrastructure.

Project description

The project comprised the replacement of conventional electricity meters by Intelligent Network Terminals (smart meters combining metering functionalities with consumption management capability), called “energy boxes”. Each energy box transmits real data on consumption to the energy provider and eliminates the need for estimates thus helping make bills reflect real consumption accessible to all [12].

Implementation process [11, 13]

Launched by EDP, in association with other companies, the project was initiated in April 2010, with more than 30,000 consumption points, corresponding to 54,000 consumers.

Simultaneously, new public lighting was installed in Évora including LEDs and light regulators along with remote management systems. Traditional lights were replaced by LEDs in some central places taking special attention to the numerous historical locations (world heritage). Light regulators, movement sensors and more flexible public light controls operated by the customer (municipality) via web portal were also introduced within this project.

Projects implementation details [14]

Process/ Leadership	The project leader is EDP - Energias de Portugal.
Financing	The project was funded by EDP and Évora Municipality.
Involved stakeholders	Project developed by EDP in partnership with Évora Municipality and with support of national partners - EDP Inovação; Lógica; Inesc Porto; Efacec; Janz and Contar.

Results [15]

The project represents a real contribution to the achievement of the EU 20-20-20 goals and is fully aligned with the Europe 2020 agenda, enhancing a more competitive and innovative Europe by using cutting-edge technology regarding smart grids. The project was recognised internationally, as 1 of the 15 smart grids case-study projects among 200 European projects. The project also enabled new technologies such as: LED public lighting, electric vehicles and renewable technologies.

What has changed with Inovcity? [11]

- 30,000 residential customers in Évora city became part of the Inovcity project;
- Billing based on actual consumption became accessible to all, allowing consumer control via a computer or smartphone;
- More than 1,000 selected customers got access to new services among which is e.g. the possibility of cost estimation for the new rates;
- Greater grid capacity to integrate renewable energy and electric vehicles (charging stations);
- Improved ability to detect and resolve failures of the electricity distribution network.

Project benefits

With the installation of “energy boxes” in the homes of such a great number of consumers, it became possible to manage the distribution grid with a greater efficiency level as well as with significant positive impacts on the environmental sustainability, given the increased accommodation capacity for renewable energy generation and electric vehicle charging.

Lessons learned [2]

The importance of the involvement of end-users was one of the lessons learned. It was very important for project implementation to manage the expectations of end-users, to explain clearly to them the benefits of the solution and to understand their needs and difficulties. Local and direct contact is essential and it is something that was sought during the entire project. During the first year of implementation, public sector bodies in Évora, such as the university, schools, local administration and the city museum, were involved.

Initially there was a high expectation regarding the potential to reduce the maintenance costs of the distribution transformers. However, when the first results were analysed, this potential was found to be much lower than initially estimated.

Several international delegations have visited Évora since the beginning of the project due to the innovative characteristics of this smart grids initiative. Moreover, the successful implementation of Inovcity in Évora led to the replication of the idea in the city of Aparecida in Brazil, through EDP in Brazil in partnership with the Department of Energy of São Paulo and Aparecida Municipality. The replication the project in all Portuguese cities is also foreseen.

Awards [16, 17]

2012 - "Core Label" by the European Electricity Grid Initiative (EEGI).

2012 - "Utility of the Year Award 2012" under the "European Smart Metering Awards 2012" from the "Smart Metering UK & Europe Summit 2012", in London.

2011 - Selected by the European Commission and by Eurelectric as a single case study among 260 other European smart grids projects.

2010 - Optimus Innovation Awards, 2010 (Optimus and Accenture awarded the project by the 6th consecutive year on the Optimus Innovations Awards, in the category of Sectorial Innovation).

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