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Promotion of Building Integrated Photovoltaics

Intelligent Energy Europe

BIPV in Portugal

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- Historical of electricity produced by photovoltaic (GWh)
- Historical of the total power installed in photovoltaic (MW)
- Historical of the photovoltaics production in the total electric production (%)
- The current situation of electricity generation from photovoltaic (GWh)
- Historical of average hours production of photovoltaic (h)
- Registration of energy micro-production units by district
- Examples of integration

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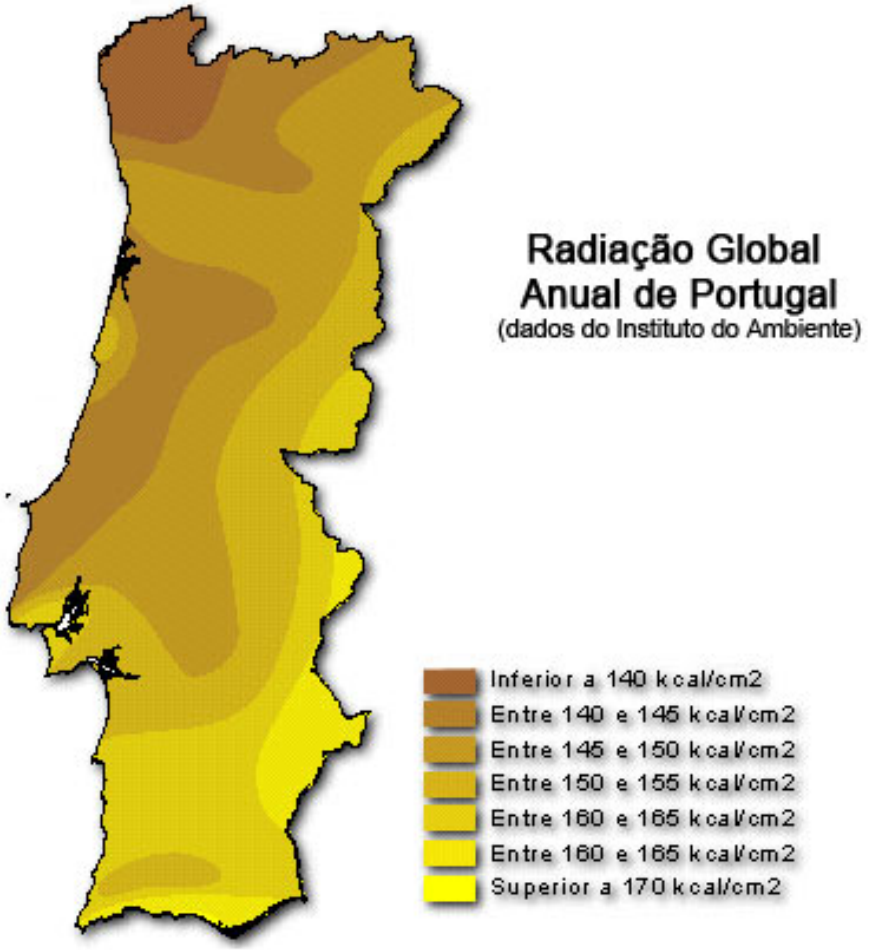
Portuguese solar potential

- Excellent solar potential in Europe



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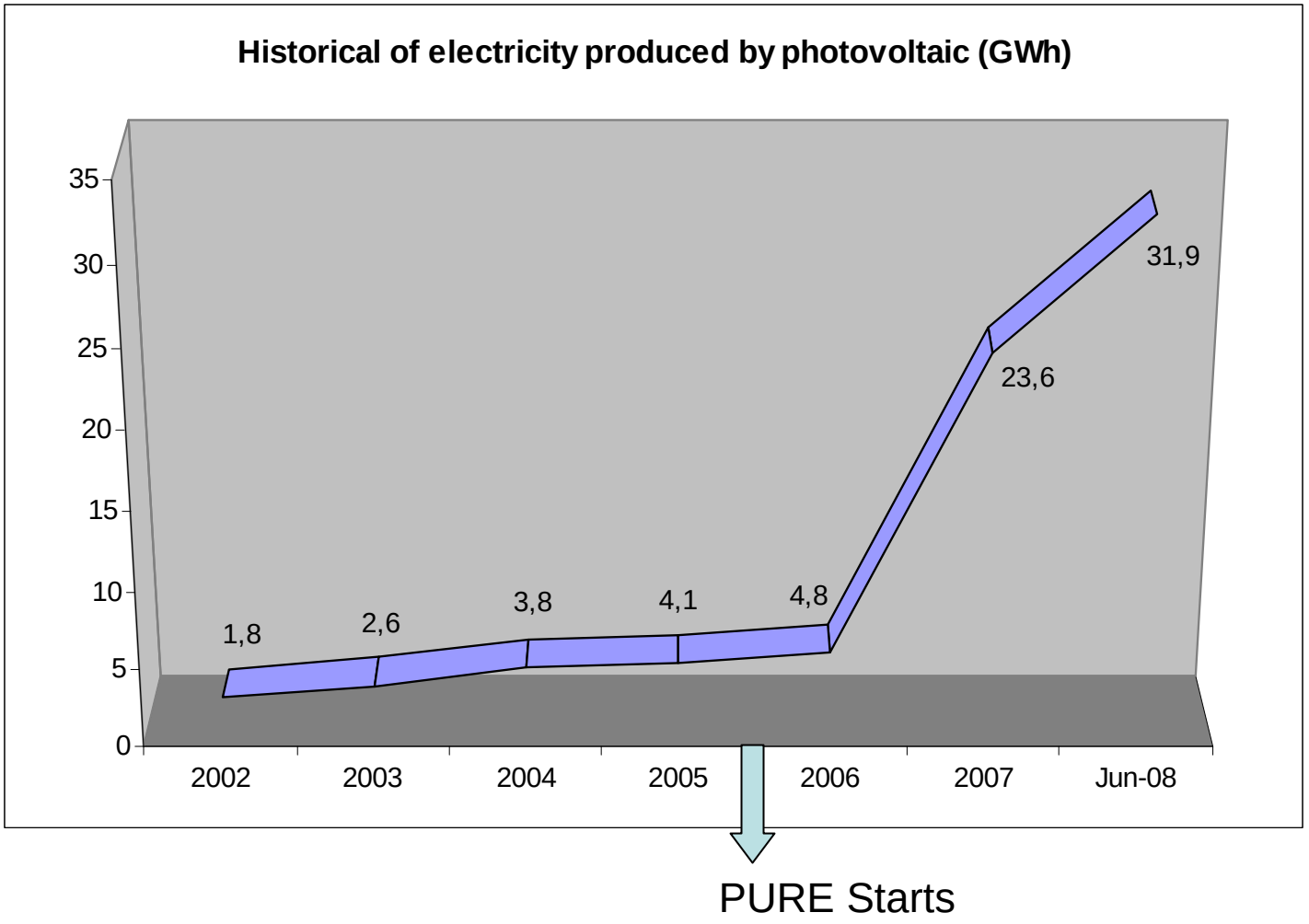

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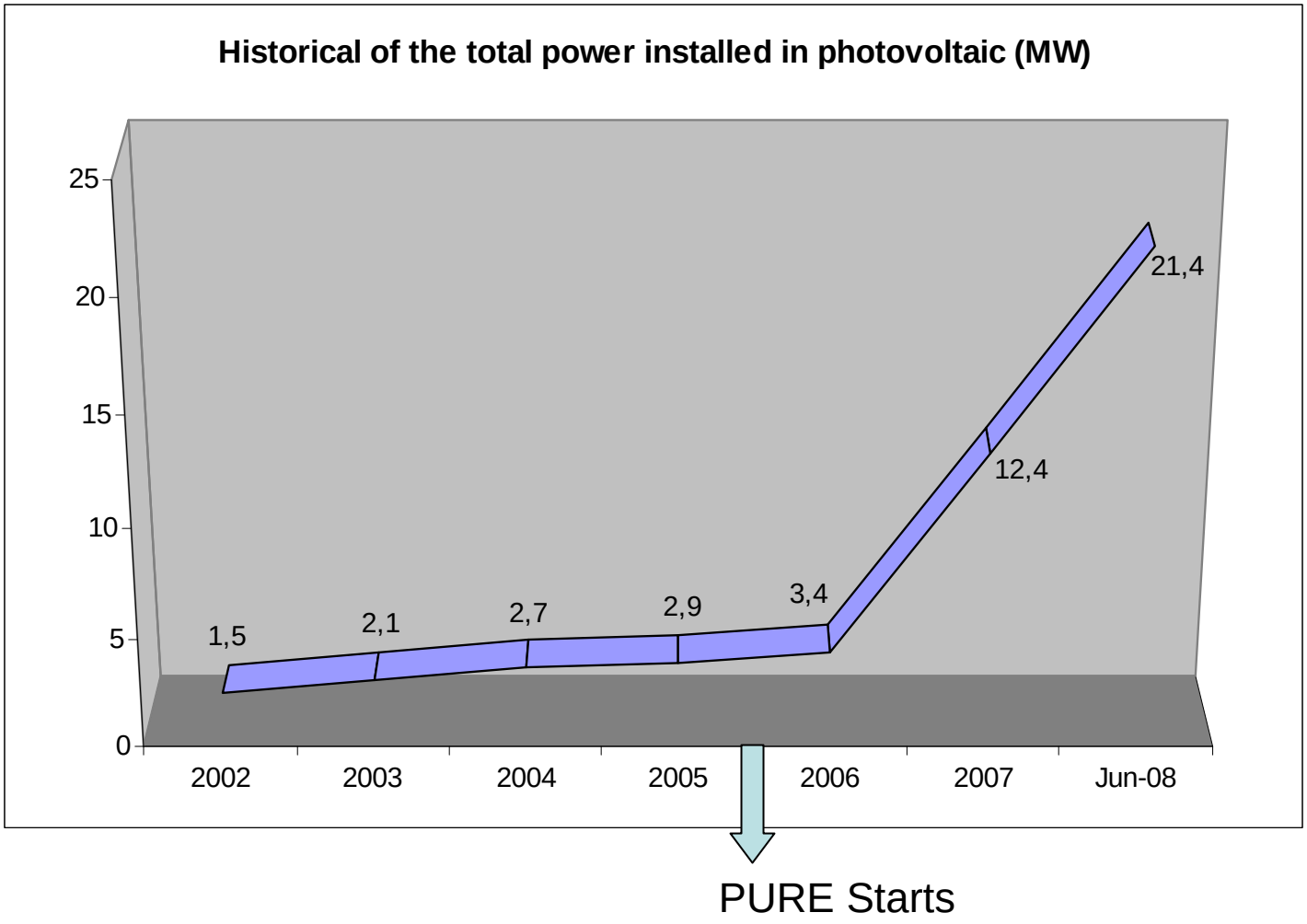

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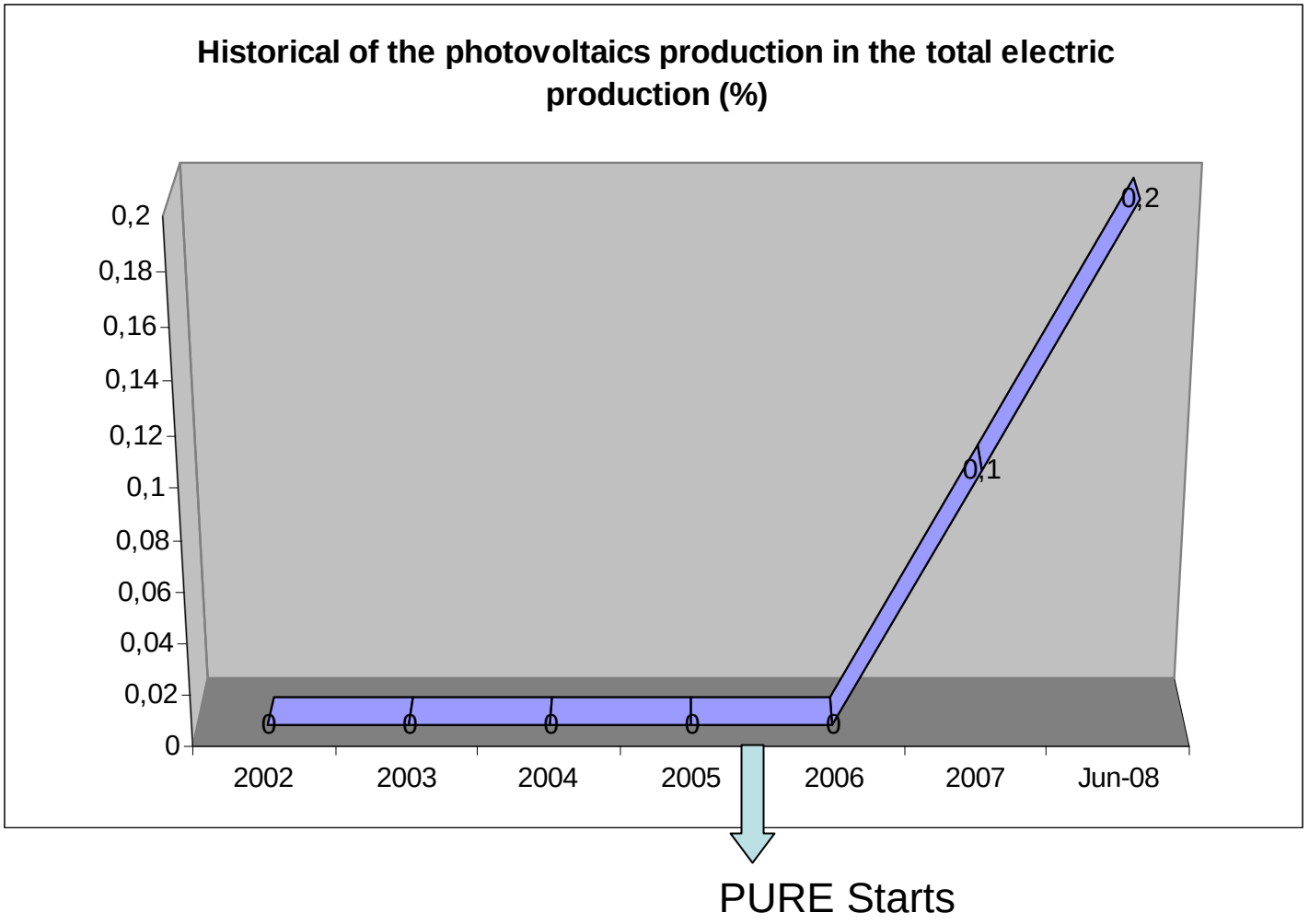

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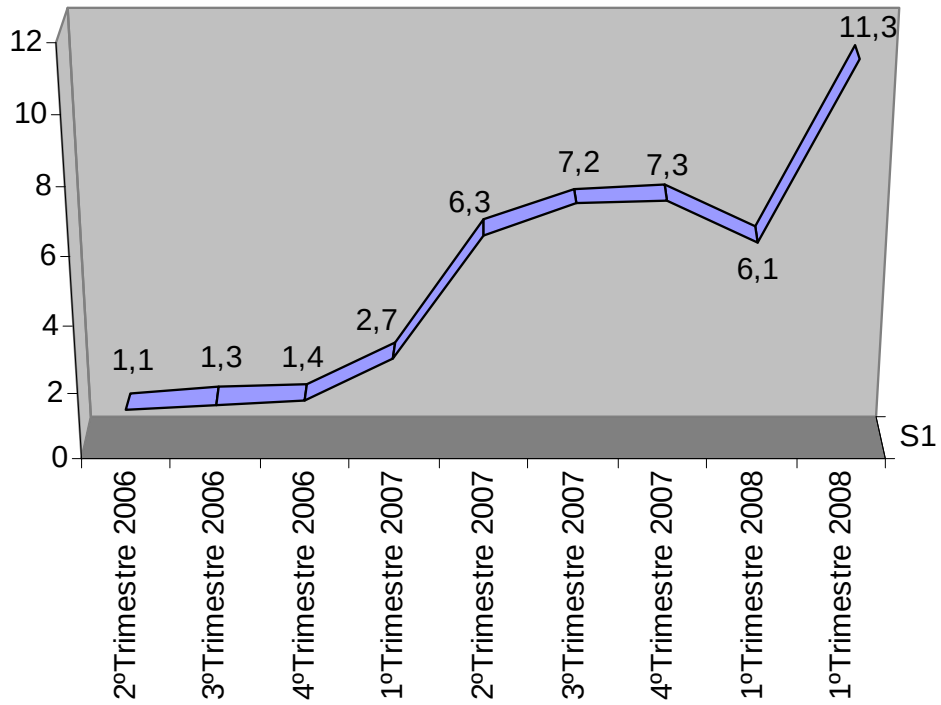
The current situation of electricity generation from photovoltaic (GWh)



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Historical of average hours production of photovoltaic (h)

2002	1187 h
2003	1235 h
2004	1322 h
2005	1322 h
2006	1304 h
2007	1491 h

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Registration of energy micro-production units by district

Aveiro	49
Beja	29
Braga	70
Bragança	31
Castelo Branco	23
Coimbra	25
Évora	43
Faro	96
Guarda	32
Leiria	42

Lisboa	153
Portalegre	11
Porto	77
Santarém	45
Setúbal	43
Viana do Castelo	15
Vila Real	9
Viseu	57
Açores	0
Madeira	1

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Examples of integration

Secondary School of Moura, Alentejo, Portugal

This school was built in 1963, so it is not a solution of integration but an installation solution. It was installed a PV system connected to the national electricity network with 25 kWp.

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Examples of integration

Basic School of Amareleja, Alentejo, Portugal

This building was terminated in 1999 but the installation of the 210 panels with 35 kW was in May 2005 and it is also connected to the national electricity network.

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Examples of integration

German School, Lisbon, Portugal

The german School in Lisbon understood the potencial of the solar market in Portugal and built an instalation on the roof of the building with 233,4 m2 of solar panels with the capacity of producing 34,517 kWh per year.

PV Potential: 24,75 kWp

Annual performance: 1,389 kW/kWp

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Examples of integration

SOLAR XXI building, INETI, Lisbon, Portugal

Headquarters of the Department of Renewable Energy of INETI, the National Institute of Engineering, Technology and Innovation. The building has 1500 m2.

The photovoltaic system integrated in the south facade of the building is grouped in 100 m2 modules of polycrystalline silicon in the vertical position. These panels have a total installed capacity of 12 kWp, and will generate about 12000 kWh of electricity per year.

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Examples of integration

House of Clarity (Casa da Claridade), Portugal

The House of Clarity is the biggest example of PV application in Portugal showing the possibility of total energetic independence in a house. The PV central is built above 5 structures with a total of 1389 panels that generate up to 302A.

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Examples of integration

Quinta do Rio Dão, Santa Comba Dão, Portugal

It's a rural hotel between the city of Coimbra and the city of Viseu, with 4080 Wp in a 48 solar panels system. The same owner is building another rural hotel with 300 m2 of panel area and will generate 45 kWp.

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Other Examples

Edifer Headquarters

Atrium Saldanha

BCP Tagus Park

Caixa Geral de Depósitos

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Other Examples

Edifício Revilla

Freeport Leisure

Numismatic Museum

Hotel Sheraton Porto

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Other Examples

Hotel Villa Rica

Torre Zen

Sotto Mayor Palace

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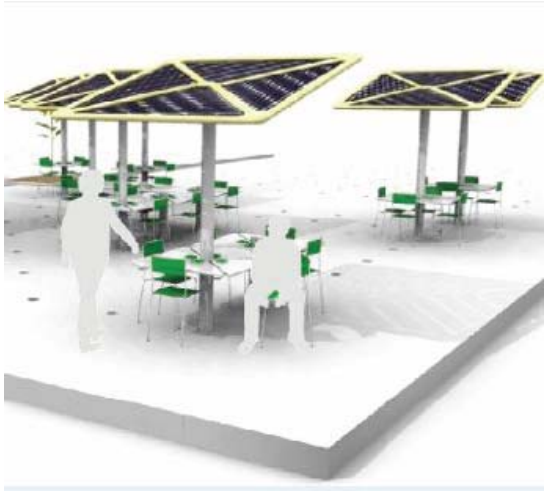
Urban Design with PV



SUN SQUARE
RUI PALMA
PORTUGAL

Multimedia terrace with PV roof with dual function:
- Producing electricity
- Flaps of shading.

It is an ideal project for urban spaces, as squares, green spaces and universities.

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The difficulties of implementation of BIPV in Portugal, rejection or abstention?

- The barriers
- The initiatives

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The investment is small and mainly

- Small houses
- Houses without energy supply from national network
- Houses without designed BIPV integration

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The investment is small and mainly

- Urban Design with PV
- Urban Furniture
- Small installations connected to national network (5 kW)

Sunplant photovoltaic foliage

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The Portuguese Barrier

- Investment cost
- Policies and Laws
- Technical
- Formation and Information
- Market
- Cultural

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Policies and Laws

- Lack of political involvement on the objectives of renewable energy amounting to 30% for 2010;
- Lack of a strategic policy for sustainable development;
- Tax burden reduced price for electric energy (5%) compared with other European countries (45% to 60%) leading to the low investment in solar power;
- Green pricing, or sales prices to the network, divided into two types of systems installed by 5kW or above 5kW.

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Technical Barrier

- Most installers in Portugal are small and often not sufficiently mastered the technology generating possible flaws in design and technical information.
- The levels of investment in vocational training for installers of solar photovoltaic are small compared to solar heat

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Formation and Information

- Most of the projects is dependent on technical information from abroad and being the Portuguese market a marginal market, the information arrives late.
- Failure to update the scholars' curriculum associated with the central theme of renewable energy in architecture and engineering (are studied in the simplest form without focus on the BIPV).

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Market

- The development model of the Portuguese market for the past 17 years focused in construction and public works.
- Quantity and not quality, there was no application of new concepts like sustainable construction.
- Tourism, one of the most important sectors of the economy, showed the same momentum = mass tourism, residential and hotel offer little differently and without added value.

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Cultural Barrier

- The Portuguese cities are too inhibiting for integration of buildings with architectural components differentiated and bolder, especially the towns of the interior of the country, intrinsically connected with very strict urban environments.

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The Portuguese Initiative

- Opportunity for differentiation and added value in construction
- Implementation of EU directive for energy efficiency in buildings
- Opening up new markets (tourism and real estate)
- More policy discussion on sustainability
- Closer to centers of expertise for renewable energy

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Opportunity for differentiation and added value in construction

- With the exhaustion of the referred economic model, companies and promoters of real estate and market leader, begin to identify and invest in the market for value added;
- Quality construction differentiating themselves with new concepts of materials;
- Integration of solutions for renewable energy, energy efficiency and bioclimatic architecture.

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Implementation of EU directive for energy efficiency in buildings (2006)

- The new regulations require the study of economic and financial feasibility for implementation of renewable energy in buildings that will assess the opportunities for BIPV
- Incentives on things like natural lighting controlled, semi transparentes facades, which will allow the use of the new generation of thin film modules semi transparent and opaque that already assume levels-efficient production.

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Opening up new markets (tourism and real estate)

- Investment in ecotourism, environmental tourism, low impact tourism, sustainable tourism, environmental marketing.

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More policy discussion on sustainability

- Agenda 21 of local development and Agenda 21 for tourism
- Important in the development of cities
- Promotes local investments in the renewable component of buildings, opening opportunities for BIPV in sustainable cities

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Closer to centers of expertise for renewable energy

- The strong market growth of renewable energies in Spain, will make the Portuguese market grow and gain knowledge in the field of BIPV systems, which were previously concentrated in northern and central Europe.
- More stimulating and deepening of BIPV (example: PURE)

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Thank you for your attention!

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