



## R&D on renewable energies: between science, society and economic application

Luís Junqueira, Ana Delicado, Mónica Truninger, Ana Horta, Luís Silva

# The project

- Title: **Socio-technical consensus and controversies regarding renewable energies**
- Institutions: ICS-UL, Univ. Aveiro, CRIA
- Funding: FCT Foundation for Science and Technology (PTDC/CS-ECS/118877/2010)
- Duration: March 2012-August 2014
- Main tasks: analysis of the political, social and scientific framework of renewable energy production in Portugal; media and public opinion analysis; case studies of wind farms and solar power plants

# Renewable energies research

- Relations between research, industry and society
- National level:
  - Science Policy
  - Researchers' Perceptions
- Local Level:
  - Photovoltaic plant in Amareleja
  - Development of research in a rural area

# Methodology

- 5 interviews with researchers
- Documentary analysis
- Case study: Photovoltaic Plant in Amareleja
  - Site visits
  - 7 interviews with local authorities, business owners and local associations

# Renewables: a scientific priority?

- New science funding category opened in 2004 by the Foundation for Science and Technology (79 funded projects till 2011, 15 on wind/solar power)
- MIT-Portugal Programme on “Sustainable Energy Systems” (83 students, 2 associated projects)
- 543 projects funded by the Framework Programmes since 1990

# Renewables: a scientific priority?

- ◉ National Laboratory of Energy and Geology (research units on solar energy and grid management).
- ◉ Renewable energy research units in all major Portuguese Universities.
- ◉ International scientific publishing from Portuguese researchers in the Energy and Fuel area has grown 630% since 2000
- ◉ Over 300 Portuguese researchers have published at least 3 articles in this area between 2000 and 2012

# Researchers' perceptions on renewable energies research

## Positive

- Attractive area for new students
- Research topic valued by society

## Negative

- Multidisciplinary nature of research is problematic
- Growth of the European research area poses new challenges

# Renewables research and industry

- QREN funding allows companies to obtain funding for research projects or scientific consulting services
- MIT Portugal projects associated with the Sustainable Energy Systems program involve major companies from the energy sector
- Private I&D expenditure in “Electricity, Heat and Cold” reached 50M€ in 2010, employing 301 researchers and 44 technicians.
- The National Laboratory of Energy and Geology has a certification laboratory for thermo solar systems, with IPAC accreditation.



# Researchers' perceptions on research-industry relations

## Positive

- Technologically capable industry
- Partnerships mandatory for European funding

## Negative

- Academia must take the initiative
- Venture capital unavailable for scientific entrepreneurship
- Scientific career progression undervalues partnerships
- Intellectual property issues

# Renewables research and public outreach

- Padre Himalaya Solar Competition (2004 and 2006)
- Solar Rally (2009/2010)
- MIT Professors go to school (2006-2011)
- The National Laboratory of Energy and Geology organizes guided tours of its Zero Emissions Building



Photos: Ciência Viva

# Researcher's perceptions on public outreach

## Positive

- Necessary for public participation in decisions
- Public outreach is included in career progression
- Public is interested

## Negative

- Media campaign against renewables
- Decisions are made without consulting or informing the population
- Some researchers are not interested in these activities

# Amareleja Photovoltaic Plant



Amareleja/Moura

45,8 MW

250 ha

2.520 solar trackers

Fonte: EN2P, INEGI

# Amareleja Photovoltaic Plant

- The power plant was initially promoted by a small private company (Renatura Networks) in partnership with the Municipality of Moura.
- The project was later sold to Acciona, a renewable energies multinational company of Spanish origin.
- The deal allowed for the creation of a social fund for local development.

# Renewable energies and industry in Moura

- R&D in renewable energies
  - International Partnerships through European Funding (Square Kilometer Array)
- Laboratory for the certification of Photovoltaic cells and systems
- Management of a Technologic Park for renewable energies' companies

# Renewable energies and public outreach in Moura

- Visits to the power plant and Lógica's Zero Emission Building
- Solar Festival
- Mini Solar Plants in schools in Moura and Amareleja
- Renewable Energies Forum during the local annual May Fair.





# Local actors' perceptions on renewable energies research

## Positive

- Bringing R&D and high-tech industry to a rural area
- Creation of qualified job positions
- Future economic impact

## Negative

- Economic crisis and new political context is delaying the project development
- Long-term impact of research activities is not obvious to the local population



# Final Remarks

- ◉ Development of renewable energies research due to a favourable political and social context.
- ◉ Research teams maintain a strong connection with industry, despite some intellectual property issues and a lack of initiative from companies, and a willingness to engage in public outreach.
- ◉ In Moura, the funds from the power plant allow for the development of local R&D
- ◉ The economic crisis and the new political context had a strong negative impact on the project