



TALLER DE ARTICULACIÓN EN VINCULACIÓN CIENCIA – EMPRESA “BIOGÁS COMO FUENTE DE ENERGÍA RENOVABLE NO CONVENCIONAL: OPORTUNIDADES Y DESAFÍOS”
VALPARAÍSO, CHILE. 9-10 JUNIO, 2008



INTEGRATED ASSESSMENT OF STRATEGIES AND TECHNOSYSTEMS FOR THE VALORIZATION OF WASTES: EVALUATION AND PERSPECTIVES

PEGRA – STRATEGIC PLAN FOR WASTE MANAGEMENT IN THE AZORES REGION

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SECRETARIA REGIONAL
DO AMBIENTE E DO MAR
GOVERNO REGIONAL DOS AÇORES



UNIVERSIDADE
DO MINHO



PRESENTATION STRUCTURE

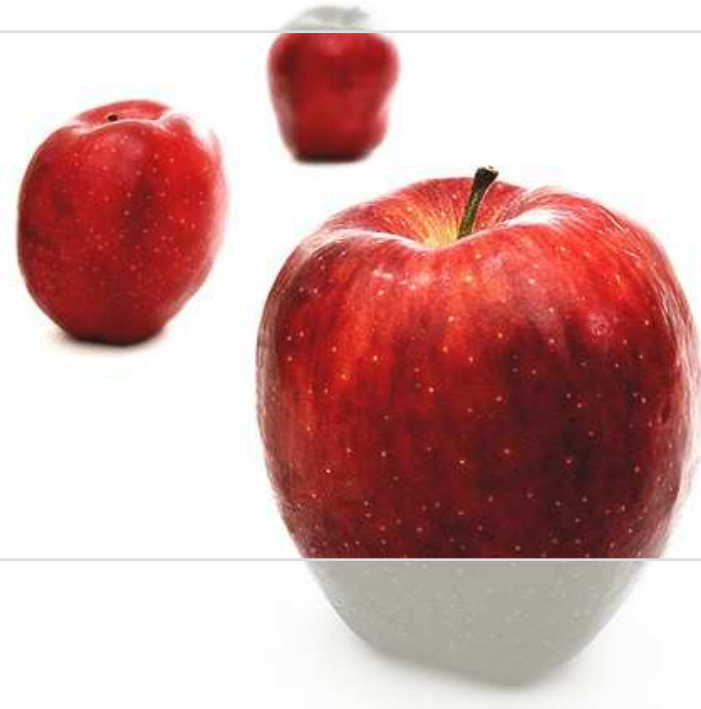
Slides and sections

INTRODUCTION

SCOPE OF THE PROJECT

PEGRA PROJECT

FINAL REMARKS



OBEJECTIVES OF THIS PRESENTATION

FOREGROUND

- Describe the PEGRA project/implementation in the Azores islands;
- Show the interaction established between government/university/private sector towards sustainable initiatives that resulted in the sucessfull implementation of PEGRA;
- Describe the integration of sustainability criteria in the development/implementation/monitoring of the PEGRA;
- Present some remarks about the ongoing results of the PEGRA until today.



AZORES islands

- Portugal
- 1500 km away from continent
- Autonomous region since 1976
- 2346 km²
- 250 000 inhabitants
- 104 inhab/km²



SECRETARIA REGIONAL
DO AMBIENTE E DO MAR
GOVERNO REGIONAL DOS AÇORES

INTRODUCTION

PARTNERS IN THE DEVELOPMENT OF PEGRA

05
24

University of Minho

- Student population of 16.000
- Postgraduate students 1.900
- Teaching staff of 1.200
- PhD share of 850
- Administrative staff of 600



SIMBIENTE – Environmental Engineering and Management

- Spinoff of the University of Minho
- Established in 2004
- 10 co-workers
- Specific services for strategy development, sustainability assessment and bioenergy projects
- R&D group funded by national program QREN



2005

~ 130×10^3 t/year solid urban waste

~ $30-50 \times 10^3$ t/year wood residues

~ 94×10^3 t/year of other residues

European legislation/objectives

Absence of “speeding-up” in the business chain of value

Absence of real awareness of socio-economic impacts

- To optimize waste management, valorizing residues as endogenous resources and at the same time, protecting the ecosystems, the natural resources and the public health;
- To find the most efficient model for service provision at the lowest cost within defined levels of economic, environmental and social sustainability.

2007-2013



KNOWN TECH

Innovative integration

biogas production, gasification of biomass

NEW TECH

Research&Development

fuel cells, biogas in cars

DEVELOPMENT

Models, framework



HIERARCHICAL ORGANIZATION OF THE ALTERNATIVES

FOCUS ON SUSTAINABILITY

Prevention

Reutilization

Recycling

Organic valorization (composting)

Energetic valorization (biomethanation)

Energetic valorization (gasif./pyrol./incin.)

Landfill



A1.

Efficient use of resources

A2.

Integrated management of waste

A3.

Information/environmental education

A4.

Training and innovation

A5.

Economic and financial aspects

A6.

Legislative framework

A1.

Efficient use of resources

A2.

Integrated management of waste

A3.

Information/environmental education

A4.

Training and innovation

A5.

Economic and financial aspects

A6.

Legislative framework

- Reduction in the introduction of dangerous substances
- Reduction in the production of waste

A1.

Efficient use of resources

A2.

Integrated management of waste

A3.

Information/environmental education

A4.

Training and innovation

A5.

Economic and financial aspects

A6.

Legislative framework

- Implementation of an integrated waste management system
- Elimination of environmental passive assets

A1.

Efficient use of resources

A2.

Integrated management of waste

A3.

Information/environmental education

A4.

Training and innovation

A5.

Economic and financial aspects

A6.

Legislative framework

- Development of a regional waste management information system
- Sensibilization and education towards sustainability aspects

A1.

Efficient use of resources

A2.

Integrated management of waste

A3.

Information/environmental education

A4.

Training and innovation

A5.

Economic and financial aspects

A6.

Legislative framework

- Training of human resources
- Specific research and development activities

A1.

Efficient use of resources

A2.

Integrated management of waste

A3.

Information/environmental education

A4.

Training and innovation

A5.

Economic and financial aspects

A6.

Legislative framework

- Development of a regional market for residues
- Guaranty of the social, economic and environmental sustainability of the waste management

THEMES

FOCUS ON SUSTAINABILITY

A1.

Efficient use of resources

A2.

Integrated management of waste

A3.

Information/environmental education

A4.

Training and innovation

A5.

Economic and financial aspects

A6.

Legislative framework

- Reinforcement of the legal and institutional framework

Themes	Field of action	Brief description of constrains	Reference framework
A1. Efficient use of resources	Prevention of waste production (and waste management)	Absence of control over dangerous waste importations, neither on additional barriers	Production of dangerous industrial waste: $13 \text{ t } 10^{-6} \cdot \text{€}^{-1} \text{ VAB/year}$
	Minimization of waste production	Difficulties in the implementation of best practices that lead to efficient utilization of resources	Production of solid urban waste: $1,7 \text{ kg} \cdot \text{inhab}^{-1} \cdot \text{day}^{-1}$ Production of industrial waste: $753 \text{ t } 10^{-6} \cdot \text{€}^{-1} \text{ VAB/year}$ Production of other residues: $< 108 \text{ t } 10^{-6} \cdot \text{€}^{-1} \text{ VAB/year}$

Themes	Objectives	Goals 2013
A1. Efficient use of resources	A1.O1. Replacement of dangerous substances	Reduction of 35% Production of dangerous industrial waste
	A1.O2. Control over production of solid urban waste	Production of solid urban waste: 1,4 kg·inhab ⁻¹ ·day ⁻¹
	A1.O3. Control over production of other residues	Production of industrial waste: < 700 t 10 ⁻⁶ ·€ ⁻¹ VAB/year Production of other residues: < 100 t 10 ⁻⁶ ·€ ⁻¹ VAB/year
	A1.O4. Reinforcement of the application of instruments and benefits intended for voluntary contributions of private and public companies and other organizations	Certified companies (ISO 14 000 ou EMAS): >15% of total number of companies

THEMES

INVESTMENT

x10³€

A1.	Efficient use of resources	4.0%	5.500
A2.	Integrated management of waste	83.3%	115.500
A3.	Information/environmental education	3.4%	4.650
A4.	Training and innovation	7.8%	10.850
A5.	Economic and financial aspects	0.8%	1.150
A6.	Legislative framework	0.7%	1.000

PEGRA

THEMES: 6

PROGRAMS: 11

MEASUREMENTS: 22

Total investment: 138.650.000 €

567 €/inhab-eq. \approx 81 €/(inhab-eq.year)

CONCLUSIONS

FINAL REMARKS

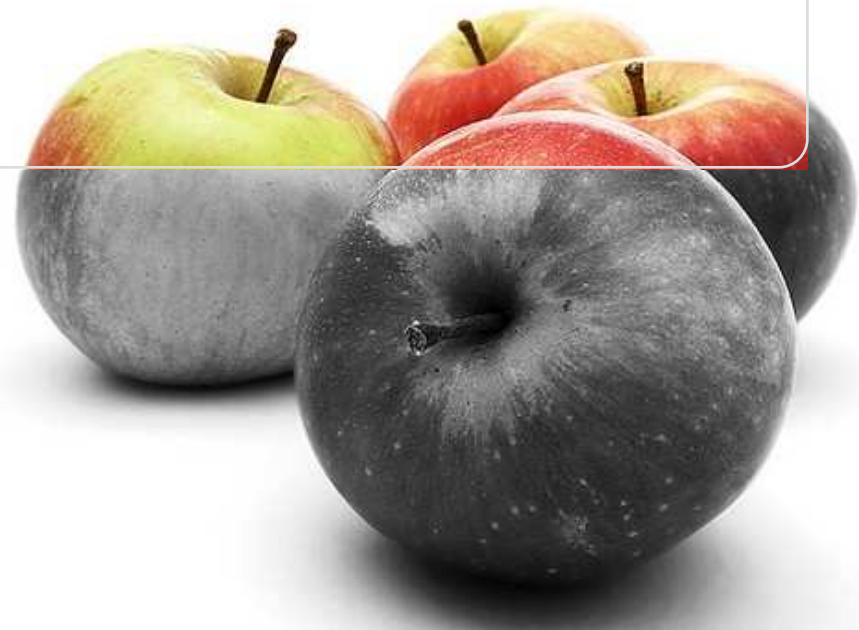
- Life cycle analysis (LCA) and other mechanisms for impacts assessments are essential for the desired targets of sustainability;
- Excessive LCA pressure is a risk for the implementation of innovative approaches;
- The cost of the renewable energy to society has to be compared with the economic value of the benefits, such as reduced CO₂, diversification of endogenous energy sources, enhanced security of supply and job creation in rural areas;



CONCLUSIONS

Structure and horizon

- The creation of cross-platforms between research institutions and private companies should be carried out together with strong auto-evaluation structures within the consortia;
- Information management platforms are of vital importance;
- Definition of realistic time windows for development/deployment/assessment is very important for the long term success of the project;
- Persistence of socio-economic awareness of long-term projects for main themes for sustainable development should be independent of changes in the administration.





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