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A G E N E A L

LETIT

Valuing Local Assets for Sustainable Energy

Pedro Machado & Marcos Teixeira

AGENEAL – Agência Municipal de Energia de Almada
Research Group on Energy and Sustainable Development - RGESD

27 April 2006

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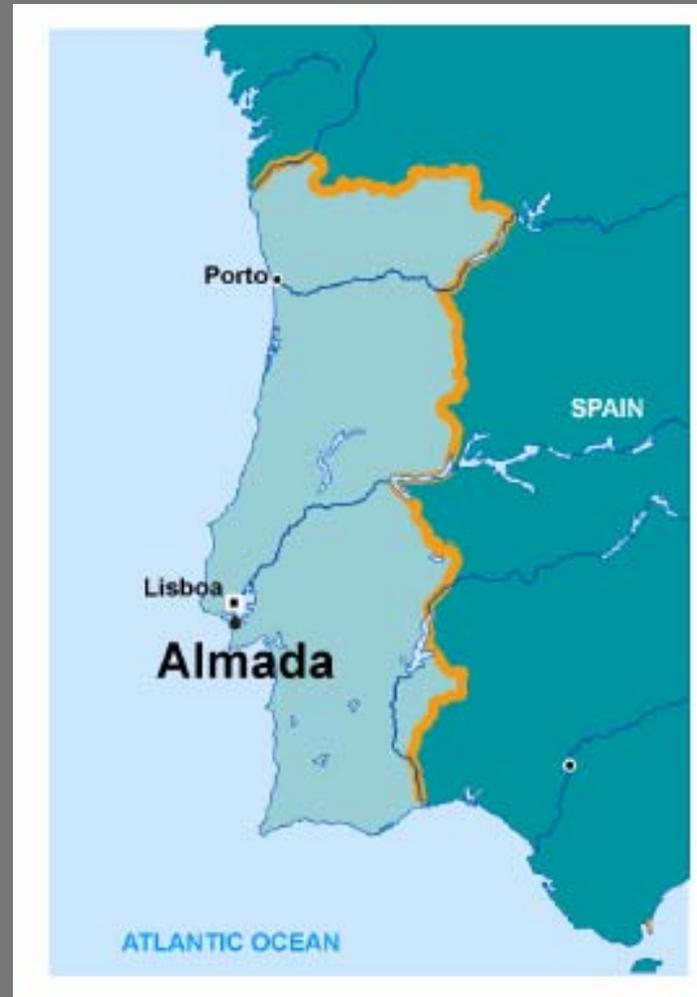
Summary of presentation



- Presentation of Almada
- Start of the LETIT process
- Initial Meeting with the stakeholders
- Main results of the LETIT process
- Second Meeting
- Results on the Case Study



Almada - Geography



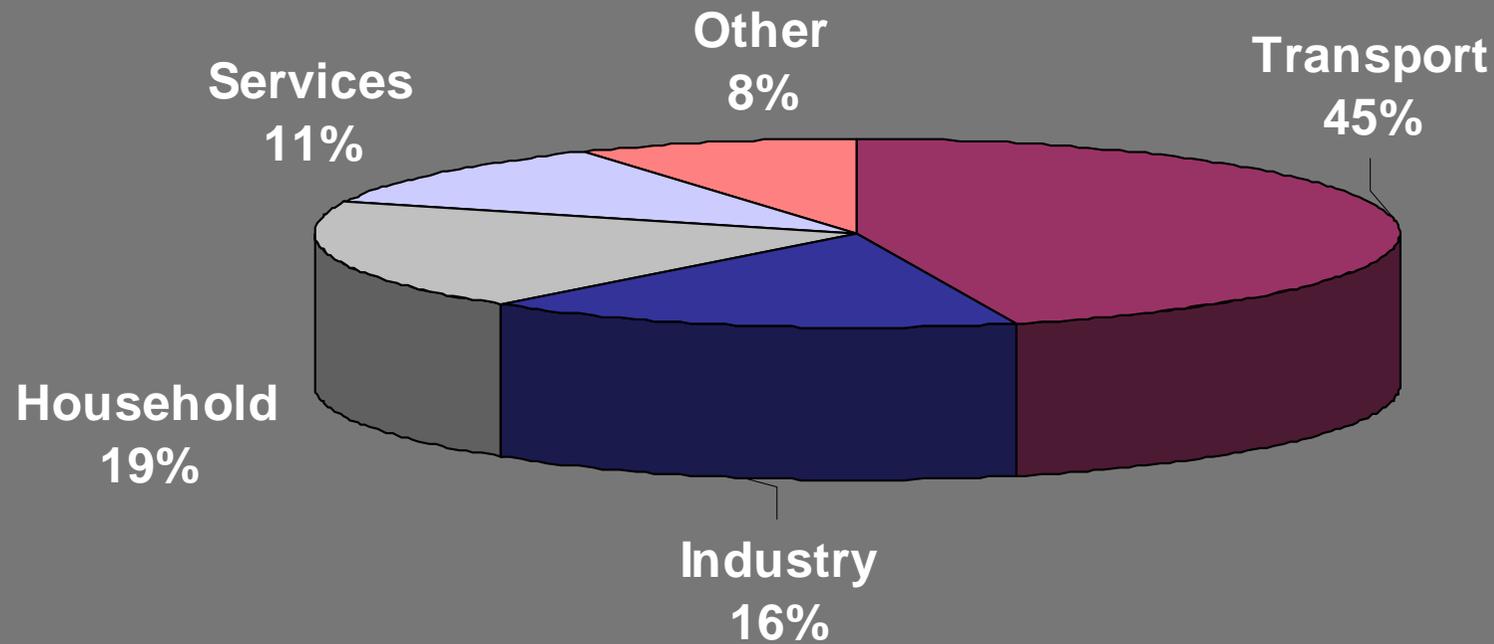


Almada Region:

- 160 000 inhabitants (2001)
- Sup: 72 km²
- 2 000 hab/km²
- Floating population: 70 000
- 8 000 000 visitors/year
- 160 000 vehicles/day in the Bridge



Energy Consumption in Almada



Source: Energetic Matrix for Almada, 1997



GHG Inventory

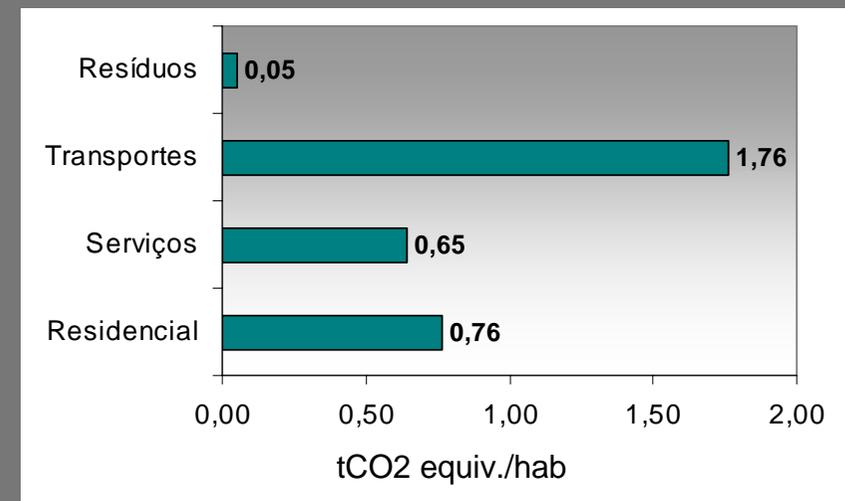


Energy and GHG in Almada

GHG emissions in the Almada Council (year base 1997)
Indicator used – emission per inhabitant (t CO₂ equiv./hab)

- Transports
 - Almada: 1.76 (tCO₂ equiv./inhab.)
 - National: 1.47 (tCO₂ equiv./inhab.)

Transports > 2 X Residential !!!



Some projects – Energy Efficiency



Energy Efficiency in Buildings

- Energy optimization of 2 WTP: Mutela e Portinho da Costa
Biogas production – Electricity Generation
- Support to the implementation of the EMAS system [LIFE Project]
- Energy Audit to the Municipal Sports Centre – Thermal solar panels application



Some projects – Municipal Campaign



Sustainable Mobility

Almada
MELHOR SEM CARROS



“Almada, Better Without Cars”

- Good practice driving awareness and drivers education towards sustainable mobility
- International Award – Ambassador Project of the “Stockholm Partnerships for Sustainable Cities” – ONU

Mobility Plan: Acessibilidades 21 (2005 e 2007)

- The objective is to improve the mobility of cars, public transports, pedestrians and bicycles in the municipality.



First Meeting with the Stakeholders

Venue Almada City Hall - 5 April 2005



Objective:

- Engage the Almada's Local stakeholders in the LETIT process
- Work on the data collection on the Municipality assets.



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First Meeting with the Stakeholders

Venue Almada City Hall - 5 April 2005



Agenda:

- Presentation of the LETIT
- Analysis of the municipality projects and priorities
 - Make sure Process is in line with local policy
- Discussion of the role of the local authority within the project
 - Commitment of local stakeholders
- Future actions
 - Planning and Scheduling to secure participation



First Meeting with the Stakeholders

Venue Almada City Hall - 5 April 2005



Keep it simple to allow time for discussion
Need to secure the correct level of understanding and
commitment



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First Meeting with the Stakeholders

Participants



- **LETIT Partners** - AGENEAL
- **Municipality** Almada Municipality / Municipal Chamber
- **National Energy Agency** ADENE
- **University and research centres** - FCT-UNL / MADAN-Park
- **Transport Companies** - TRANSTEJO / FERTAGUS / TST
- **Energy related companies** - TREMC / SETGAS / EDP



First Meeting with the Stakeholders

Participants



AGENEAL - Eng. Pedro Machado

Almada Municipality - Eng. Catarina Freitas,

Municipal Chamber - Vereador Henrique Carreiras, Municipal Water and Sewer Services

National Energy Agency ADENE - Eng. Luís Silva

University and research centres

- FCT-UNL - Prof. António Urgueira
- MADAN-Park - Prof. Luís Sousa Lobo

Transport Companies

- TRANSTEJO – Ships across the river - Eng. Alberto Grossinho
- FERTAGUS - Dr. Ana Cristina Dourado
- TST - Dr. Corrêa de Sampaio

Energy related companies

- TREMC - Carlos Fonseca
- SETGAS – Natural Gas - Eng. Nuno Cabral,
- EDP – Electricity - Eng. Cunha Pinheiro,



Preparation for the Second Meeting



- Consolidate the Assets Identification
- Prioritisation of Assets
- Identification of the technologies
- Prepare material for the Risk Analysis

Real x Perceived

Local Authorities x Private Investors



Assets – Resource: Water – Soil - Residues



Level 1	Level 2	Name	Location	Owner. & Control
Water	Rivers	Tejo River	North – Direction Este – West	National Government ?
	Sea	Atlantic	West	National Government ?
Land	Forests	Wooded cultivations 76.025,06 ha 43,7% of the total available surface	Municipal areas out of town	
	Agric.			
	Undevelop. Land	3.247 agricultural companies 6.958 Utilized Rural Surface	Municipal areas out of town	
	Brownfield land	7.584 Km2 52,12%		
Waste	Domestic	Municipal Solid Waste	Seixal	Almada Municipality + Seixal Municipality
	Sewage	ETAR da Mutela	Mutela	SMAS

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Assets – Resource: Buildings



Level 2	Name	Location	Ownership and Control
Residential	30599 houses	Almada Municipal Area	Private
Comercial		Almada Municipal Area	Private
Industrial			
3 Public Fair Space	2 Cinemas	Almada Municipal Area	Private
	1 Museum	Almada Municipal Area	Ministry of Culture
	6 Art Gallery	Almada Municipal Area	Ministry of Culture and Private
	Almada Municipal Area	Almada Municipality and Ministry of Culture	
6 Universities	73 Kindergarten	Almada Municipal Area	Education ministry and private
	61 Elementary School	Almada Municipal Area	Education ministry and private
	Almada Municipal Area	Education ministry and private	
	13 High School	Almada Municipal Area	Education ministry and private
	3 Technical School	Almada Municipal Area	Education ministry and private
	Almada Municipal Area	High education ministry and private	
	25 Libraries	Almada Municipal Area	



Assets – Resource: Buildings



Level 2	Name	Location	Ownership and Control
Administrative	Administrative buildings	Almada Municipal Area	
12 doctor's offices	1 Hospital	Almada Municipal Area	Health Ministry
	15 Health Centres	Almada Municipal Area	Health Ministry
	18 Pharmacies	Almada Municipal Area	Health Ministry and Private
	Almada Municipal Area	Private	
Other	3 Hotels	Almada Municipal Area	Private
	6 Pensions	Almada Municipal Area	Private



Assets – Resources: Transports



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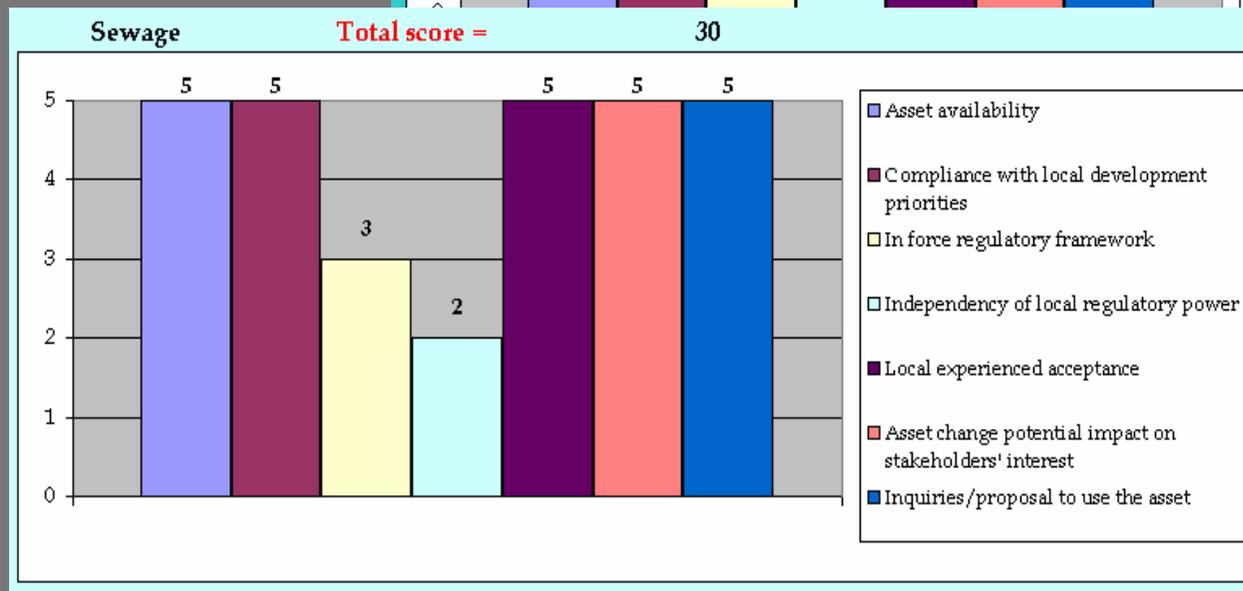
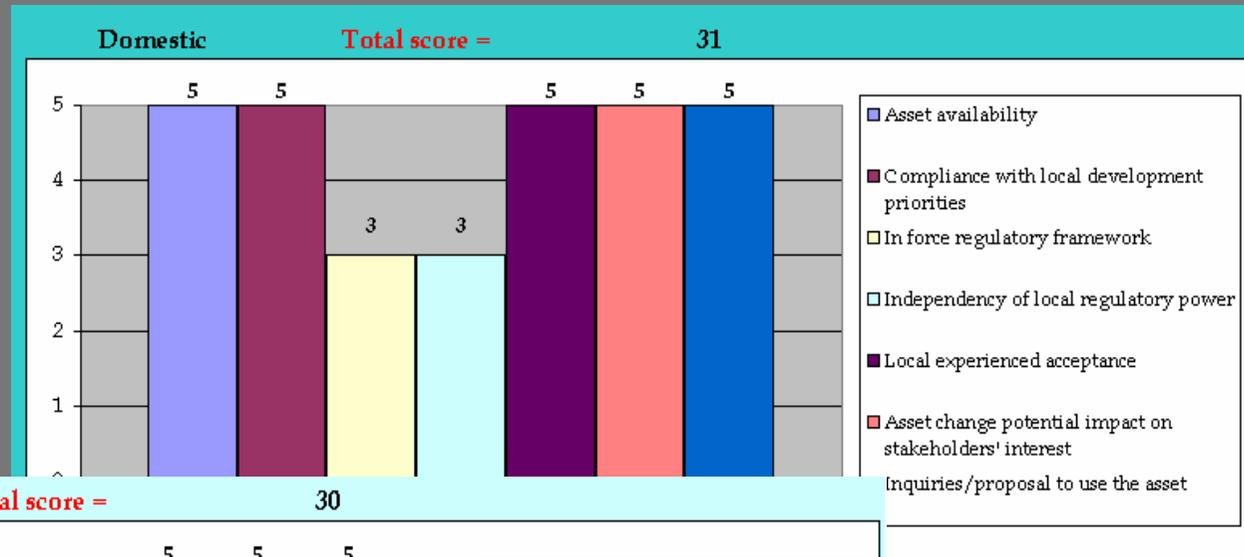
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Level 1	Level 2	Name	Location	Owner. & Control
Transport	Public Transport Use (buses)	Highway	IC20	Road Institute? Municipality?
			A2	
			National roads	
			Urban Streets	
	Urban areas	Beaches	ECALMA (Municipal Parking Company)	
			TREMC	
	Trafaria	Rail Station	Pragal Railway station	FERTAGUS
		Rail Road	South Line	FERTAGUS
		Cacilhas Porto Brandão	TRANSTEJO	
Water	Ferry Boat	Tejo River	TRANSTEJO	
Light Surface Rail	Stations	Almada Municipal Area		
	Rail Road	Almada Municipal Area		



Prioritisation

Solid Waste



Waste Water



Technologies - Possibilities



Water

- Hydroelectric
 - Mini Hydroelectric
 - Micro Hydroelectric
- Waves/Tides
 - Seashore
 - Open Sea
- Hidrotérmic → Seashore Facility

Residues

- Incineration → Combustion
- Biogas → Anaerobic Digestion

Transports

- Efficient vehicles
 - Bio fuels
 - Fuel Cells

Soil

- Biomass → Direct Combustion
- Bio Fuels
- Solar Thermal / Power
- Wind → Wind Turbines

Buildings

- Energy Efficiency
 - Thermal Isolation
 - Efficient Boilers
- Biomass → Combustion
- Solar
 - Solar Thermal
 - Photovoltaic
- Energy Efficiency → CHP



Risk Assessment - Resource x Technology



- To each assets/resource many technological options
- Risk must be evaluated within its associated technology

Resource x Technologies

- Shortlist:
 - Electricity Production
 - Combined Heat and Power
 - Heat Production
 - Liquid Bio fuels



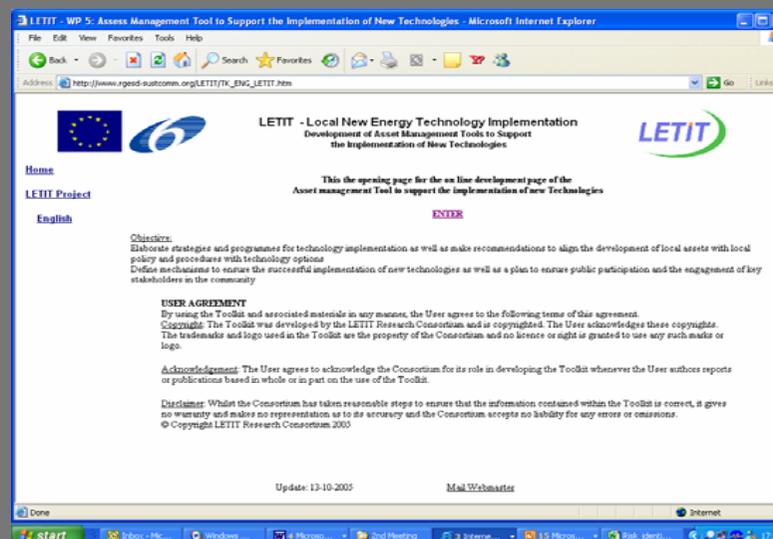
Second meeting Methodology

Workshop – Round Table



- Using Letit Supporting Material
- Tools available at internet connection
- Evaluate the Tools developed

http://www.rgesd-sustcomm.org/LETIT/TK_ENG_LETIT.htm



Second Meeting with the Stakeholders

Venue AGENEAL Building - 16 November 2005



What Almada wants from LETIT
What is important for Almada
What LETIT can give to Almada
What Almada can give to LETIT



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Second Meeting with the Stakeholders

Venue AGENEAL Building - 16 November 2005



Agenda:

- First Part – Internal meeting of AGENEAL Stakeholders 2006 annual Planning Meeting
Important to secure presence
- Resume of activities within the LETIT
- Risk evaluation for Local Authorities and for Technological Suppliers/investors
- Discuss of the LETIT Project Objectives for Almada



Photos of the LA/Stakeholders Meeting



Round Table Discussion with free use of the word

→ Active Participation of everyone



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Second Meeting with the Stakeholders

Participants



- **LETIT Partners** - AGENEAL / IST / LABELEC
- **National Energy Agency** - ADENE
- **University and research centres** - FCT-UNL / MADAN-Park
- **Transport Companies** - TRANSTEJO / FERTAGUS / TST
- **Energy related companies** - TREMC / SETGAS



Second Meeting with the Stakeholders

Participants



LETIT Partners

- AGENEAL – Eng. Pedro Machado, Eng. Carlos Sousa
- IST – Eng. Marcos Teixeira, Eng. Sandrina Pereira
- LABELEC – Eng. João Maciel, Eng. Rui Vieira

National Energy Agency - ADENE – Dr. Luis Silva

Transport Companies

- FERTAGUS – Train company - Eng. Clara Esquível
- Transtejo – Boat Transp. Company - Mr. João Abreu University and
- TST – Bus Company – Mr. José Guimas

University and Research centres

- Madan Park – Science and Technology Park – Dr. Nuno Lourenço, Dr. Luis Sousa Lobo
- FCT/UNL – Engeneering University - Prof. António Araújo Lopes

Energy Related Companies

- SETGÁS – Gas Production and Distribution – Eng. Nuno Cabral
- TREMC – Fuel Transportation Company – Mr. Carlos Fonseca



Second Meeting with the Stakeholders

Venue AGENEAL Building - 16 November 2005



- Core of the Meeting the Risk evaluation tool
- Use of paper version of the tool to allow transparency and individual work



Elect / Ciclo Combinado
Calor / Cogeração
Pedro Jull
AGENEAL
[District Heating]

ologia – Caldeira Industrial a Lenha

Disponibilidade dos Recursos Naturais		Mark
Disponibilidade de aparas de madeira		2
Disponibilidade de madeira comprimida – peletes e briquetes		2
Disponibilidade de serradura		3
Disponibilidade de combustível proveniente de culturas energéticas		3
Fornecimento de combustível a longo prazo (acordo com os fornecedores)		2
Fiabilidade do mercado de combustíveis		2
Barreiras administrativas na implementação do sistema de gestão de resíduos		3
Técnicos		Mark
Armazenamento de combustível		2
Fornecimento de combustível		2
Sistema de alimentação de combustível		2
Disponibilidade do espaço para a instalação do sistema de conversão de energia térmica em energia eléctrica		2
Combinação dos parâmetros do sistema de aquecimento à rede de distribuição de calor e de electricidade		3
Padrões de conectividade à rede		3
Investimento		Mark
Custos de investimento		4
Período de implementação do investimento		4
Licenças necessárias, como por exemplo licenças de construção ou licenças de conexão à rede		3
Disponibilidade de apoio financeiro		4
Período de retorno do investimento		4
Licença de venda de energia eléctrica		4
Funcionamento		Mark
Fiabilidade das caldeiras		2
Fiabilidade do sistema de alimentação de combustível		2
Disponibilidade de serviços de manutenção e reparação		3
Tempo de resposta dos serviços de manutenção e reparação		3
Competitividade deste sistema de aquecimento		2
Período de garantia técnica		3
Custos de funcionamento (trabalhadores)		2
Ambiental – Aceitação Pública		Mark
Aceitação da madeira como sendo um combustível para a produção de energia		2
Percepção dos novos padrões de manuseamento e utilização das novas tecnologias (prevenção de incêndios)		1
Confiança dos utilizadores finais na qualidade do calor e da electricidade		2
Percepção do grau de exposição ao risco da subida de preços dos combustíveis.		1

1 – Insignificante
2 – Baixo
3 – Requer Atenção
4 – Essencial – Compensação Possível
5 – Grande – Compensação não possível

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Discussion on the potential Case Studies



- Biodiesel production from used Oils
 - Waste Oils Collect
 - Domestic Sector
 - Hotels and restaurants
- Geothermal unit within shipyard re-urbanization project

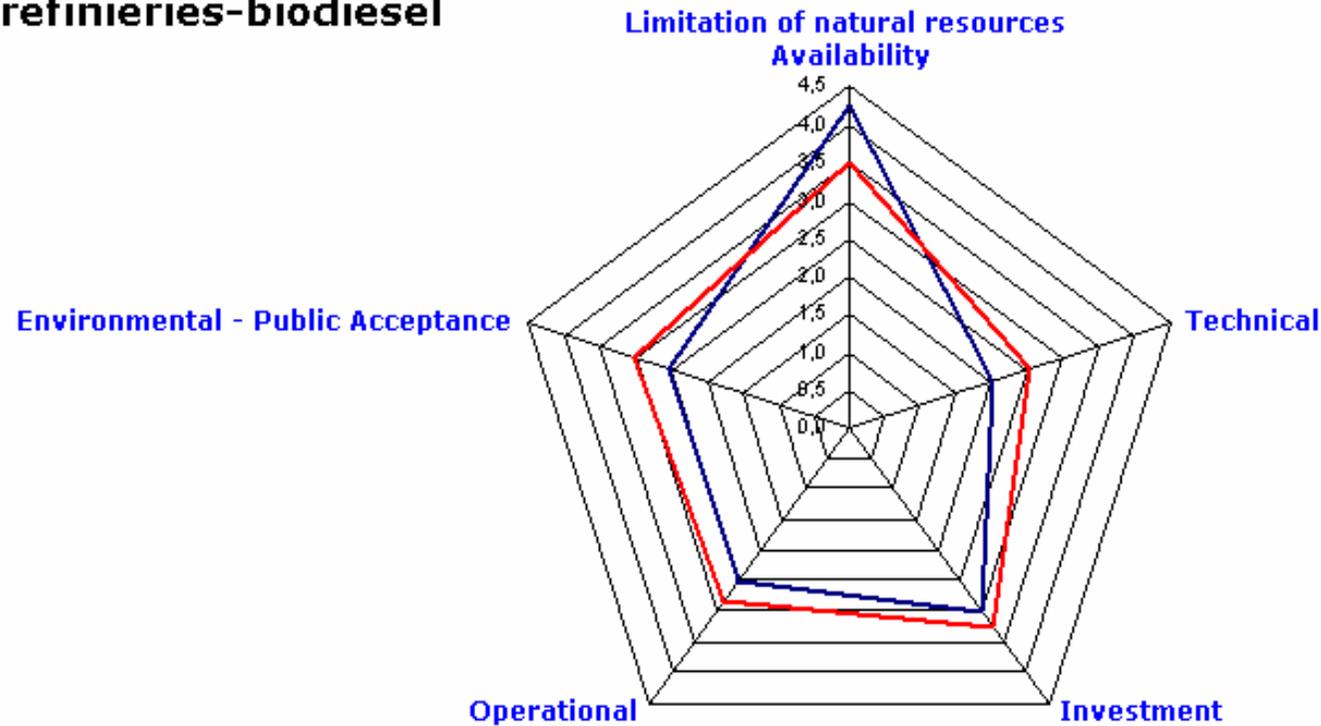


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Results – Risks - Biodiesel

Biorefineries-biodiesel

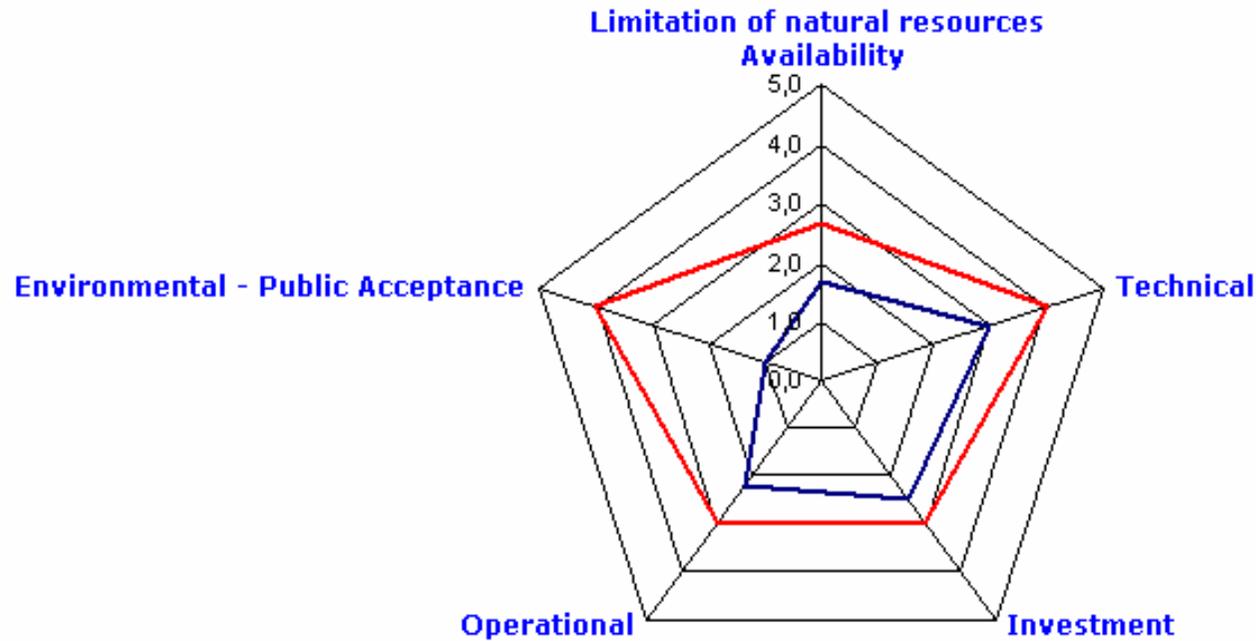


— Risk Perceived by Local Authority
— Risk Perceived by Technology Suppliers/Investors/Utilities



Results – Risks - Geothermal

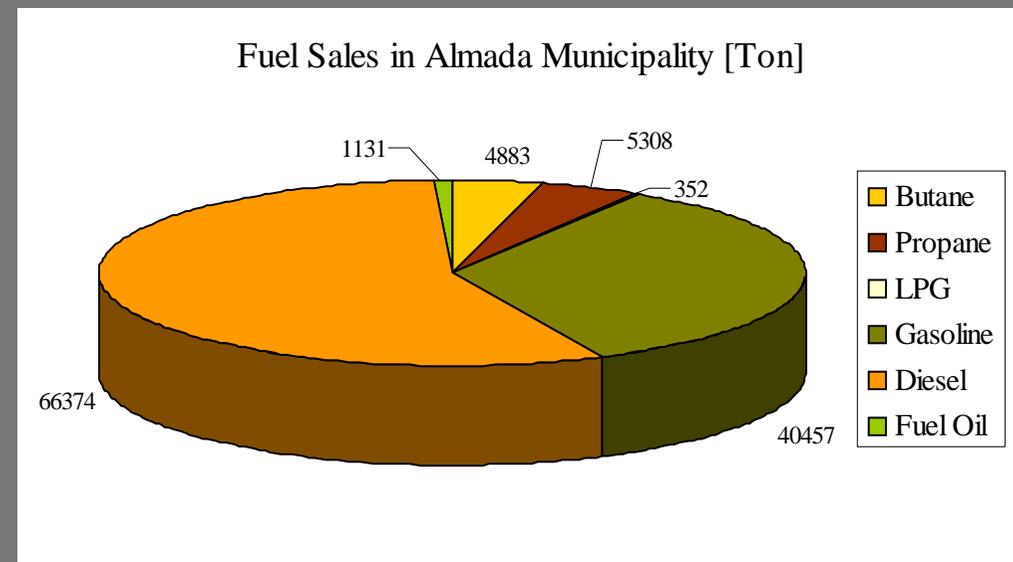
Geothermal Plants



Action Plan Developed – Liquid Bio fuels

Biodiesel production based on waste used oils

- Main risks associated:
 - Raw material supply
 - Investment risks
 - Operation risks
- Benefits:
 - Environmental gains
 - Impact on the energetic matrix
 - Jobs creation
 - Others



Results – Estimated Numbers / Impact



For Almada Municipality alone

	Waste oils potential [ton]	Biodiesel potential [ton]	Impact in the diesel consump. [%]	CO2 Red. potential [ton/year]	Financial gains [€year]	Environmental Gains [€year]
Domestic	811	747	1.4	1 712	248 554	42 795
Hotels, restaurants	664	611	1.2	1 400	203 362	35 014
Total	1 475	1 357	2.6	3 112	451 916	77 809

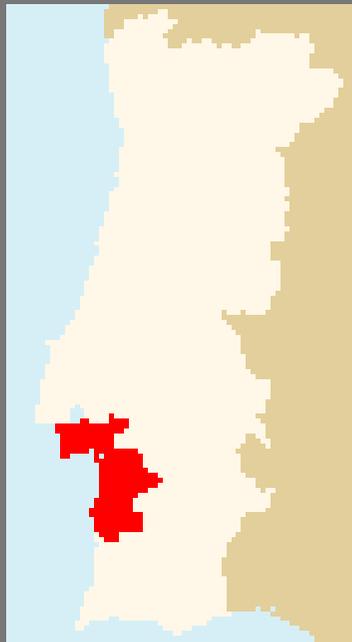
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Upgrade of Project Concept Setúbal District



- Secure the minimum raw material supply by extension of collecting zone
- Investment risk decreased by adoption of central processing unit (scale gain)



**Generate a regional
policy driven action
within the several
Municipalities to
overcome the
associated risks**



Results - Estimated Numbers / Impact for Setúbal Region



	Waste oils potential [ton]	Biodiesel potential [ton]	Impact in the diesel consump. [%]	CO2 Red. potential [ton/year]	Financial gains [€year]	Environmental Gains [€year]
Domestic	4 033	3 710	1.1	8 507	1 235 272	212 683
Hotels, restaurants	3 300	3 036	0.9	6 961	1 010 677	174 013
Total	7 333	6 746	2	15 468	2 245 949	386 696

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Conclusion – Case Study



Use of waste cooking oils to produce biodiesel has advantages at economical and environmental level

- Prevent discharge in public sewage system)
- Can be one important tool reach the goals of the Kyoto protocol, reducing the CO₂ emissions
- Can support the fulfilling of the Directive 2003/30/EC (2% of biofuels until 2005 and 5.75% until 2010)
- Can take advantage of the country taxation framework, lack of ISP, making the price of biodiesel is lower that diesel price
- Can support the country in reducing the energetic invoice and the importation of fossil fuels.



Final Words – LETIT Made possible



- LETIT Process help to identify a valuable asset that would be developed within the local priorities
 - waste cooking oils to produce biodiesel
 - economical and environmental benefits
- Can support a local action plan on the emissions reductions
- Offer a real possibility to attend the Renewable Directive 2003/30/EC
 - 2% until 2005 and 5.75% until 2010
- On going Process – next workshop to be held in Almada to present Action plan



Thanks / Contacts



Eng. Pedro Machado
Pedro.machado@ageneal.pt

Eng. Sandrina Pereira
sandrinapereira@ist.utl.pt
Eng. Marcos A. Teixeira
Mteixeira@ist.utl.pt

Ageneal – Agência Municipal de
Energia de Almada

Research Group on Energy and
Sustainable Development - RGESD

Rua Bernardo Francisco da Costa, 44
2800-029 – Almada -Portugal
<http://www.ageneal.pt/>
Tel: +351 - 21 272 23 80
Fax: +351 - 21 272 23 89

Mechanical Engineering Department
Pv. de Mecânica I, 2º Andar
Instituto Superior Técnico
Avenida Rovisco Pais
1049-001 - Lisboa – Portugal
<http://navier.ist.utl.pt/sustenergy/>
Tel: +351 - 21 841 7377
Fax: +351 - 21 847 5545

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