



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

How can the Portuguese tourism sector contribute to reduce energy consumption and pressure on CO₂ emissions?

Ângela Lobo

**Department of Prospective and Planning and
International Relations – DPP**

CLITOP, September 7, 2007



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

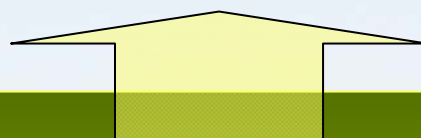
- 1. Tourism & Climate Change: a dichotomy**
- 2. The importance of tourism for the Portuguese economy**
- 3. National policy orientations**
- 4. Touristic products & regions**
- 5. Measures for a sustainable generation and consumption of energy & reduction of CO₂**
- 6. Conclusions**
- 7. Bibliography**



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

1. Tourism & Climate Change: a dichotomy

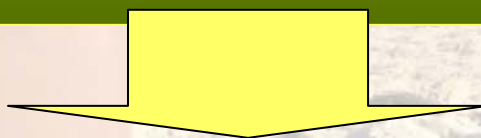
Taking action through adaptation measures



Tourism can be affected by climate change conditions

...but...

The activities connected with tourism share the responsibility in the increase of energy consumption and CO₂ emissions.



Taking action through prevention measures

=

Taking action through energy production and consumption patterns



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Challenges facing Tourism

“Global priorities are shifting. Climate change is now seen as a fundamental issue with major implications for tourism, requiring the industry to reduce its contribution to greenhouse gas emissions and destinations to adapt to changes in the pattern of demand and in the type of tourism they can offer.”

(in TSG Report (2007) “Action for more Sustainable European Tourism”)

“Tourism can become the victim of its own success if it does not develop in a sustainable way”

(in COM(2006) “A renewed EU Tourism Policy: Towards a stronger partnership for European Tourism”)



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

2. The importance of tourism for the Portuguese economy

Portugal is a wealthy nation concerning diversity of landscapes, biodiversity, and historic and cultural heritage



Images Source: PENT, National Strategic Plan for Tourism, 2007

Climate, natural conditions, and the kindness of Portuguese people strengthen tourism development



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Delimitation of sectors:



“By definition Tourism is impossible without transport”

(in EC, DG Enterprise (2004) “Feasibility and preparatory study regarding a Multi-stakeholder European Targeted Action for Sustainable Tourism & transport”)



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Some socioeconomic indicators - 2005:

- ✓ **Economic Dimension*** – 5,5% GDP
- ✓ **Social Dimension*** – 7,1% National Employment
- ✓ **Contribution to Exports**** – 14,9% National Exports of
Goods and Services

**Includes Hotels & caterings, Supporting and auxiliary transport activities of travel agencies, and Recreation, cultural and sports activities*

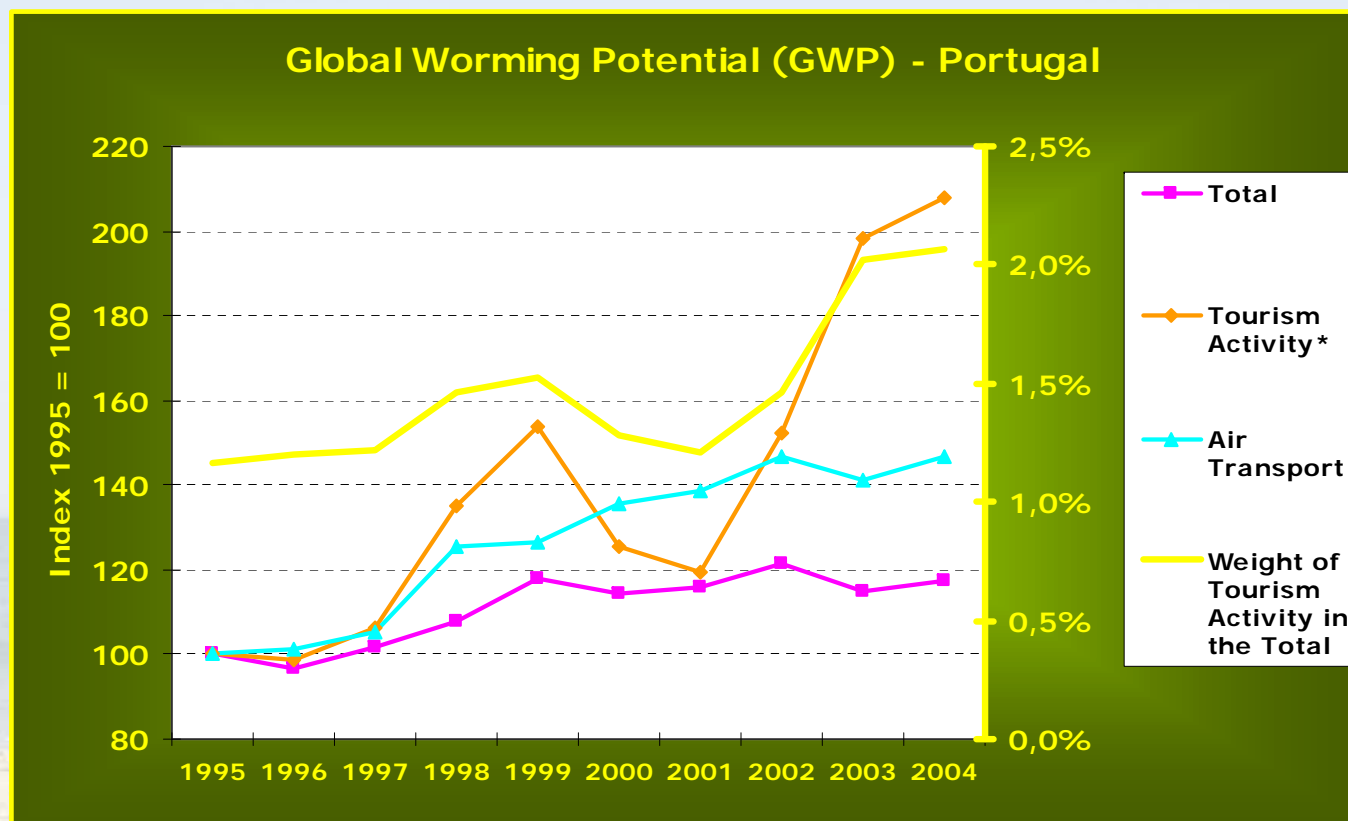
***Includes Travel & tourism, and Other personal cultural and recreational services*

Sources: National Statistics Institute (INE), National Accounts; Bank of Portugal (BP), Current Accounts



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Contribution to GWP:



*Includes Hotels and caterings, Air transport, Supporting and auxiliary transport activities and activities of travel agencies, and Recreation, Cultural and Sports Activities

Source: National Statistics Institute (INE), NAMEA Air 1995-2004



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Energy sources for end-uses in Hotels and Restaurants The situation in 2003/2004

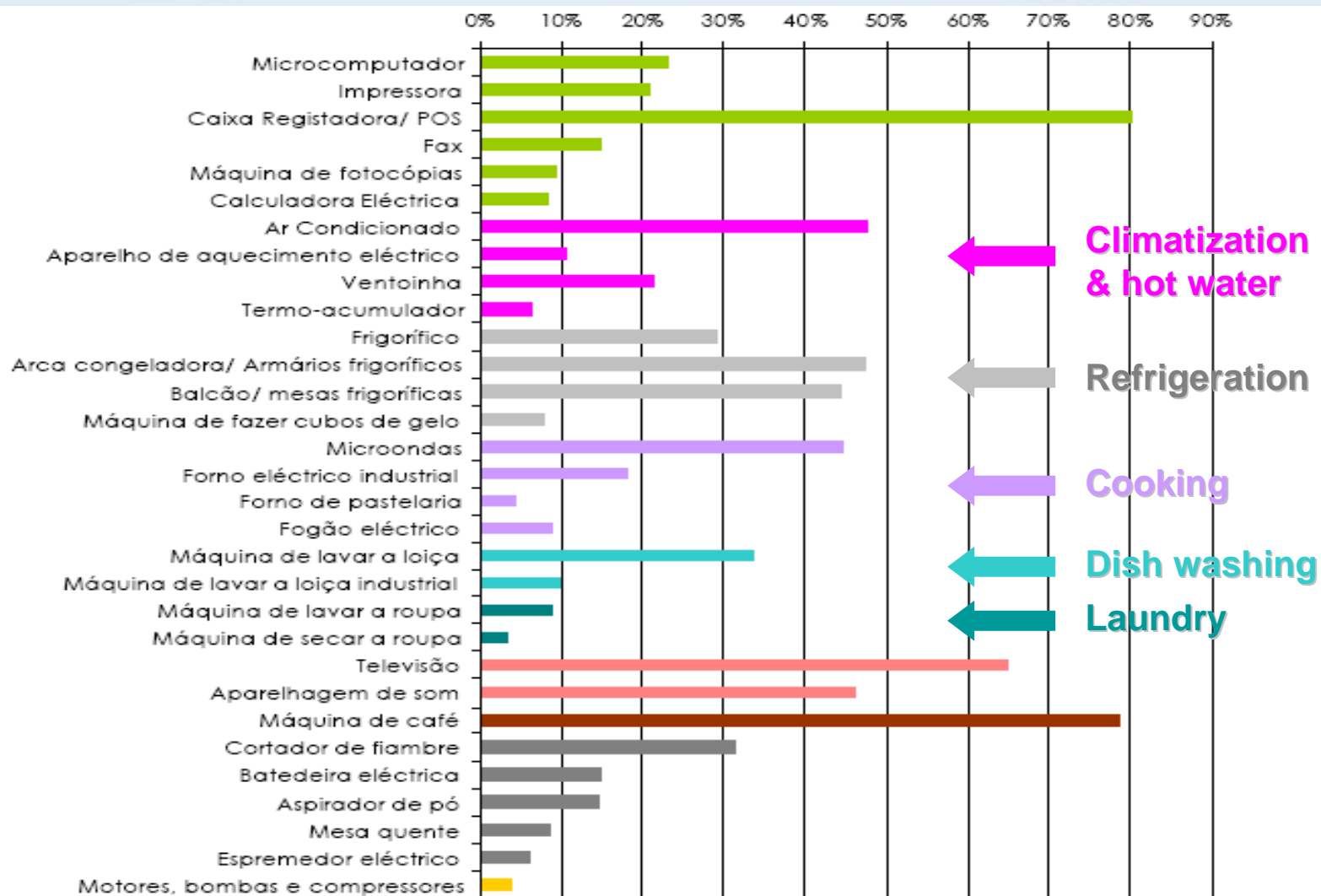
	Electricity	NG	LPG
Climatization			
(Central Heating) →	61%	14%	24%
(Local Heating) →	99%	0%	1%
Hot water →	39%	42%	19%
Cooking			
(Oven) →	43%	40%	17%
(Stove) →	48%	34%	18%

Source: EDP Distribuição (2006), "Estudo de Posse e Hábitos de Utilização de Aparelhos Eléctricos no Sector Serviços em Portugal Continental", Relatório Final



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Electric Appliances tax penetration in Hotels and Restaurants The situation in 2003/2004

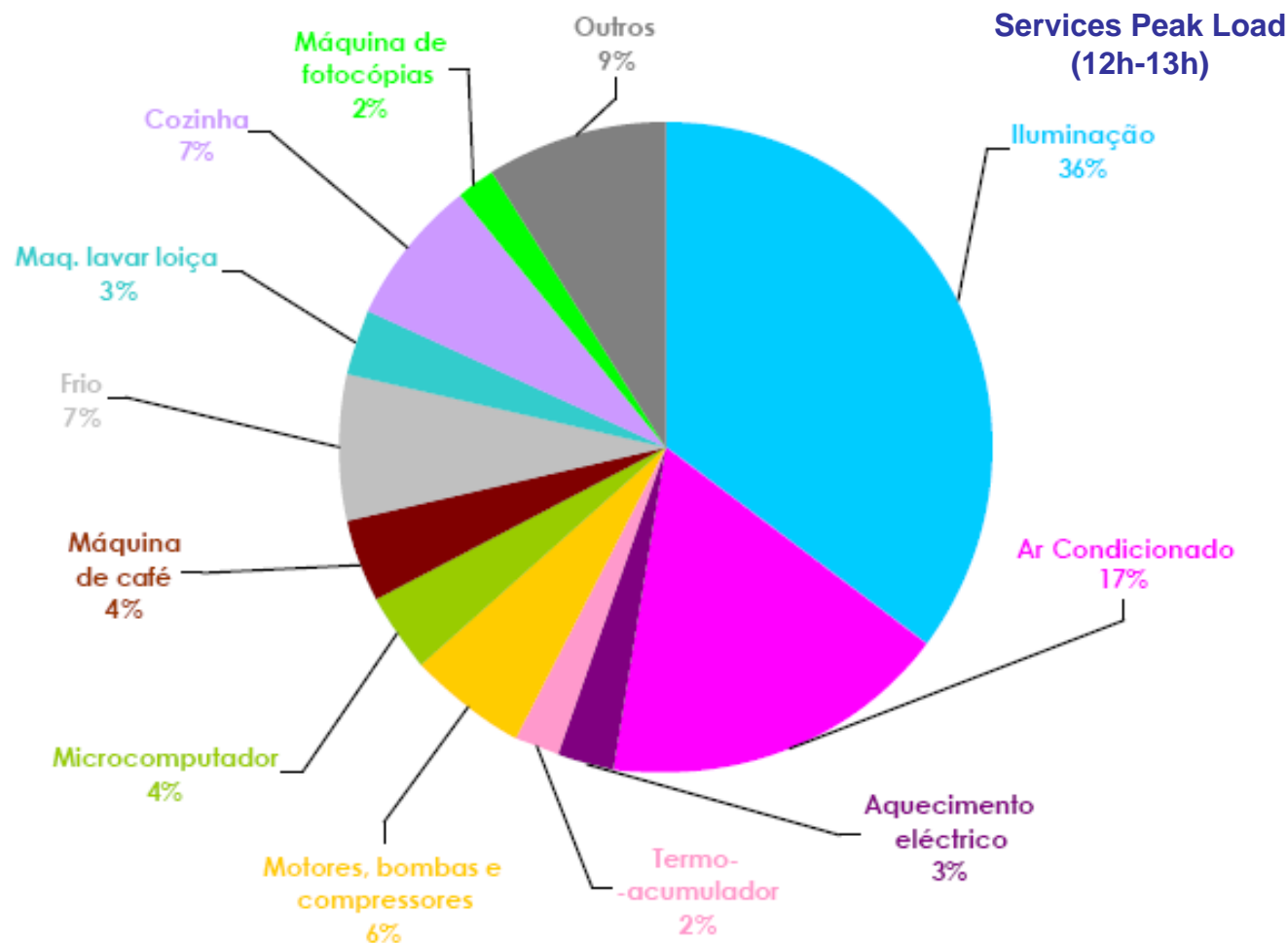


Source: EDP Distribuição (2006), "Estudo de Posse e Hábitos de Utilização de Aparelhos Eléctricos no Sector Serviços em Portugal Continental", Relatório Final



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Structure of consumption by electric appliance in Services The situation in 2003/2004

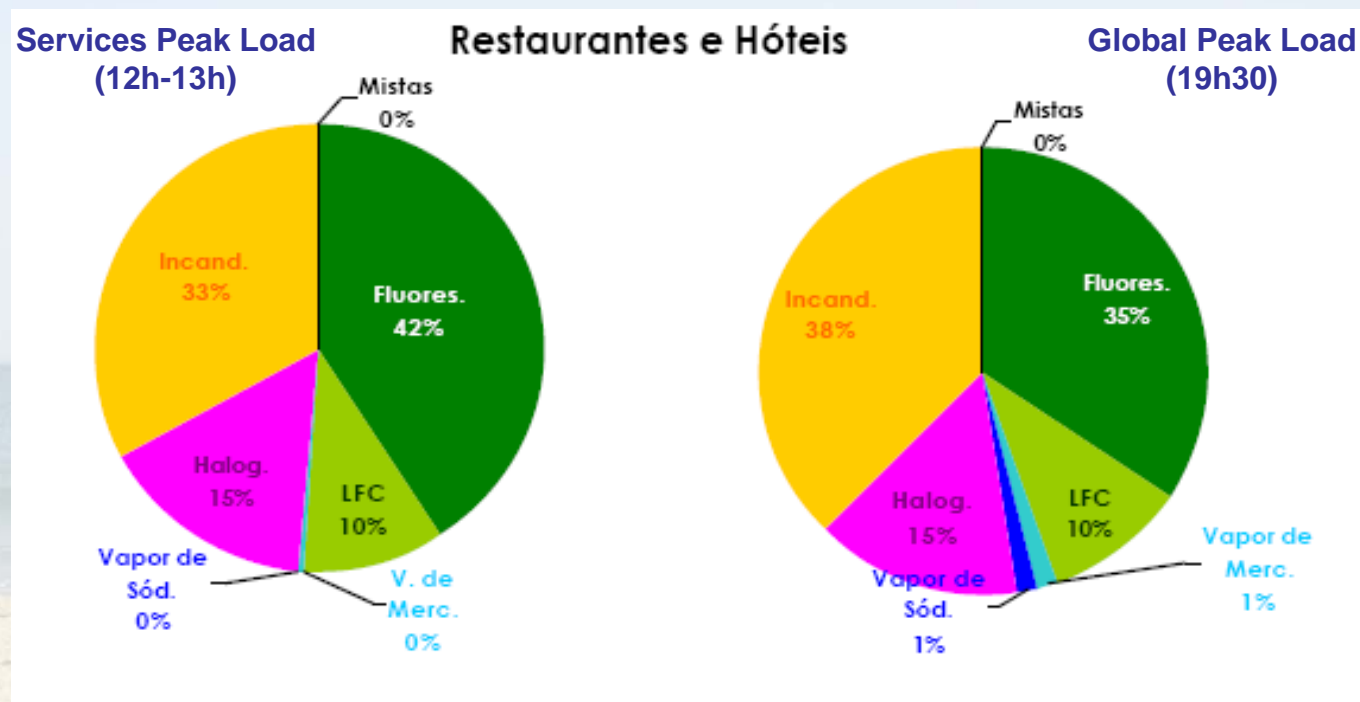


Source: EDP Distribuição (2006), "Estudo de Posse e Hábitos de Utilização de Aparelhos Eléctricos no Sector Serviços em Portugal Continental", Relatório Final



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Types of lighting used in Hotels and Restaurants The situation in 2003/2004



Source: EDP Distribuição (2006), "Estudo de Posse e Hábitos de Utilização de Aparelhos Eléctricos no Sector Serviços em Portugal Continental", Relatório Final



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

3. National policy orientations

Tourism Policy

Energy and Climate Change Policy



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

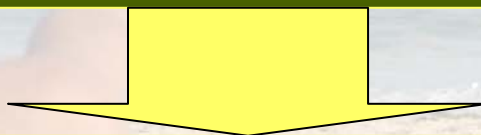
Tourism policy

What is in force:

National Strategic Plan for Tourism 2006-2015

April 2007 – Publication of the Plan, that identifies the path to 2015

The aim of the Plan is to secure an increase of the Tourism contribution to the Portuguese GDP, and a more qualified employment, in the time horizon of 2015



One of the challenges is the decoupling of an increasing value added of Tourism from energy consumption and CO₂ emissions



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Energy and Climate Change Policy

What is in force:

- ✓ **Kyoto Protocol – EU burden-sharing**
- ✓ **2005 – National Strategy for Energy sets energy targets**
- ✓ **January 2007 – Approval of a new set of ambitious energy and climate change targets for 2010**

Greenhouse gas emissions – 27% increase (2008-2012)

Energy efficiency – 10% reduction (2015)

Electricity generation from renewables – 45%

Biofuels in transportation – 10%

Solar photovoltaic panels – 150 MW and to secure the linkage with micro-generation

Solar thermal panels or other renewables in new buildings (150 000 m²/year)

Micro-generation – installation of 50 000 systems until 2010



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Touristic products and regions:

The PENT - National Strategic Plan for Tourism 2006-2015, 2007, identifies 10 strategic products:

Traditional products:

Sun & sea
City & short breaks
Golf
Cultural & landscape touring
Business Tourism

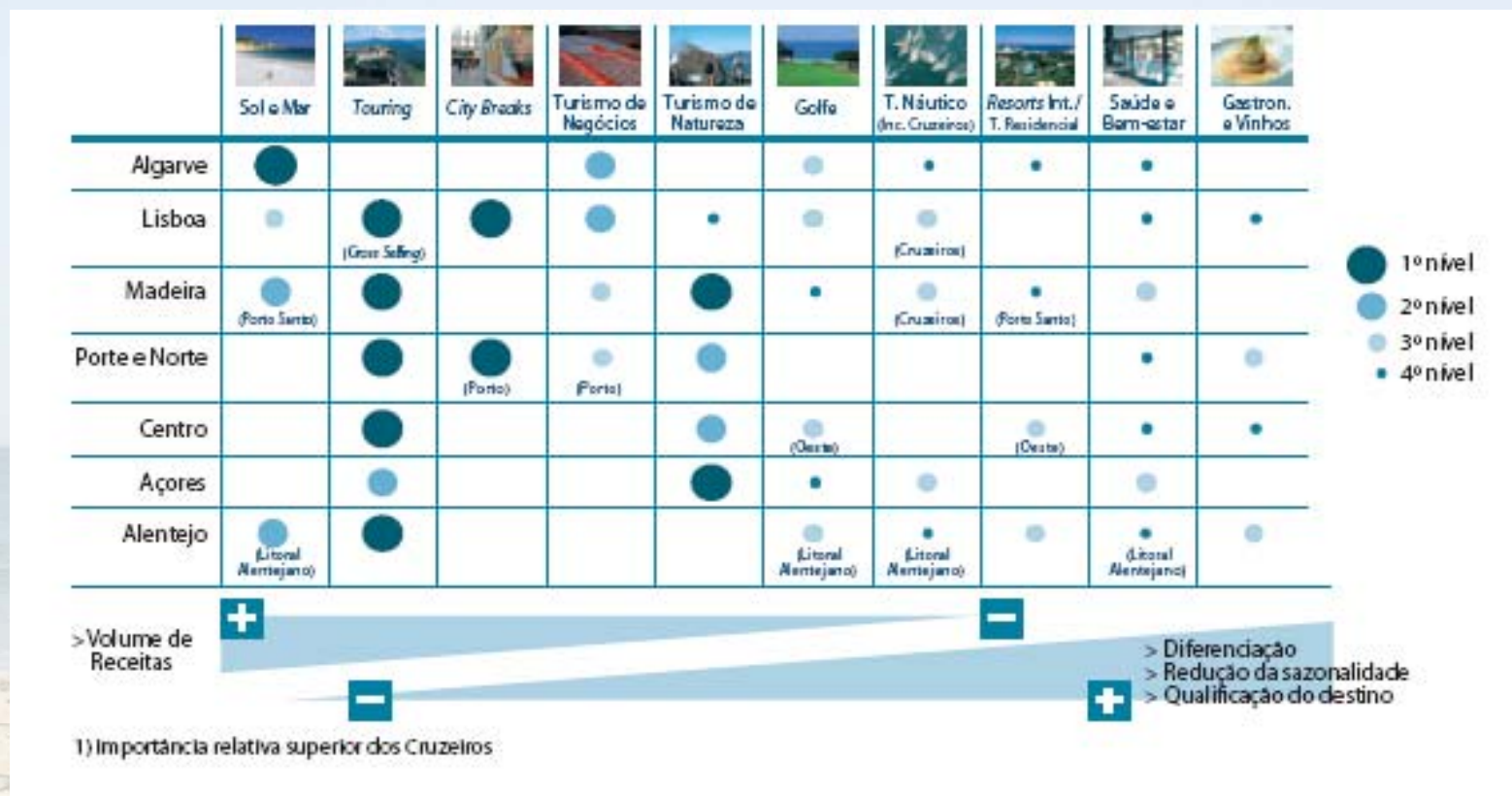
Innovative products:

Gastronomy & wine
Health & well-being
Nature Tourism
Resorts Tourism
Nautical Tourism



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

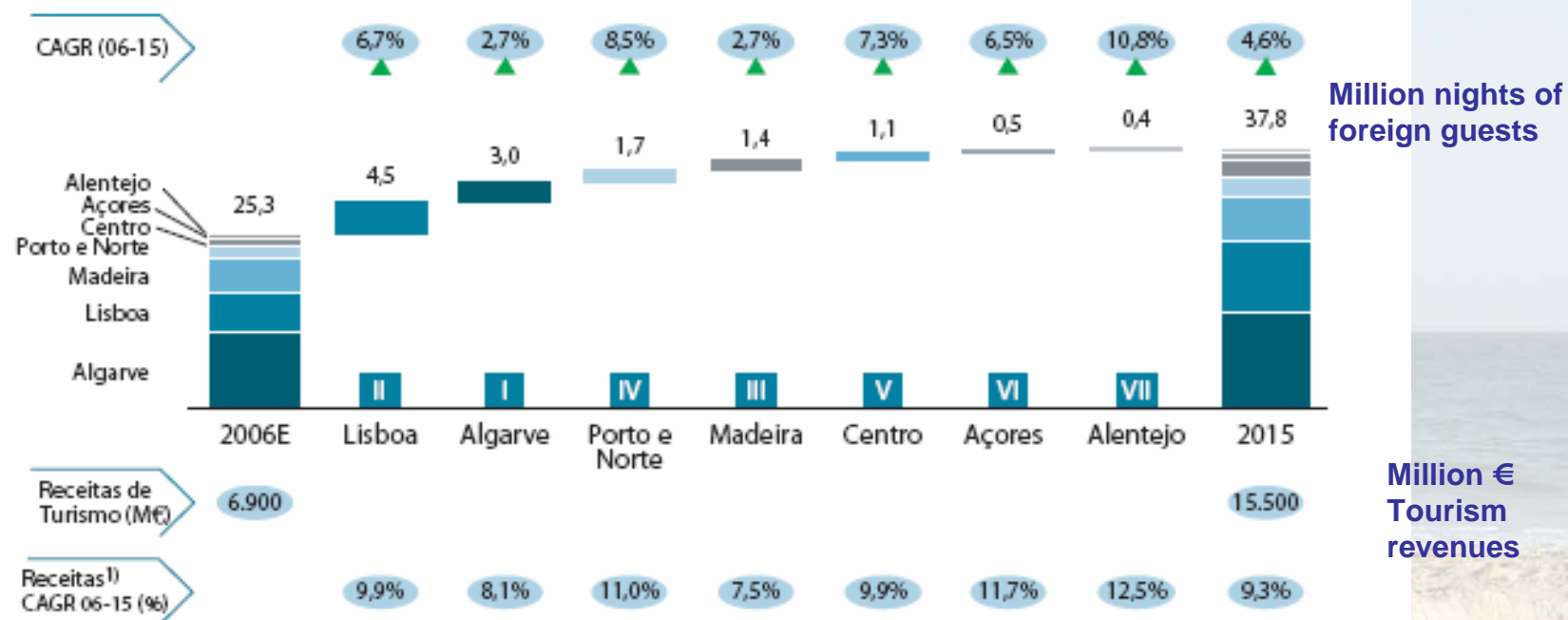
...and different supply opportunities for the Portuguese regions:



Source: National Strategic Plan for Tourism (2007)

...It also sets development objectives for 2015, for each region:

Objectivo de crescimento e peso de cada região no Turismo (milhões de dormidas de estrangeiros; 2006-2015e)



¹⁾ Índice a monitorizar através dos proveitos totais em estabelecimentos hoteleiros

Fonte: INE, Banco de Portugal – Análise Roland Berger

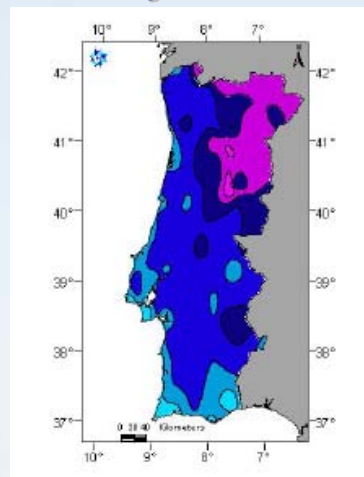
Source: National Strategic Plan for Tourism (2007)



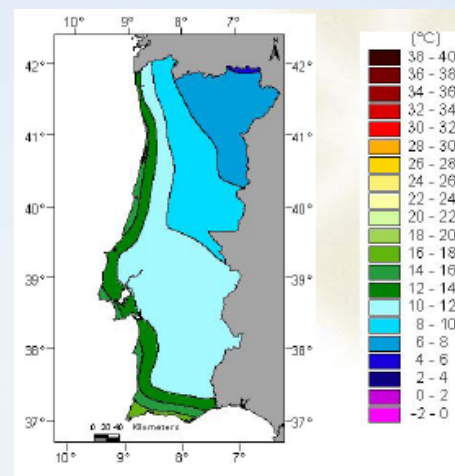
DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

...but each region has its own climate characteristics,
as shown by the SIAM II project:

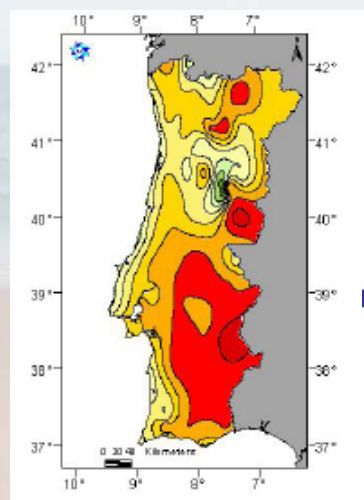
**Minimum
Temperature
(Months of DJF)**



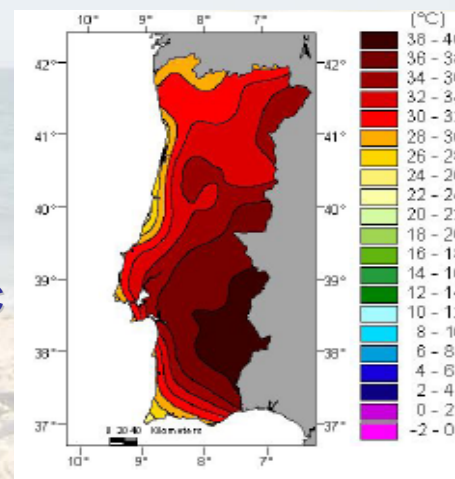
➡ + 5°C



**Maximum
Temperature
(Months of JJA)**



➡ + 7-10°C



**Observations
1961-90**

**Model GGa2 HadRM
2100**

Sources: SIAM II Project, Maps were imported from *Cavalheiro G. (2005), "Educação para as Alterações climáticas: Mensagens Principais", Ecoprogresso, Setúbal*



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

...That means energy policies and measures must be implemented in the whole country, but in a more accurate way in the southern regions: Algarve & Alentejo



Image Source: National Strategic Plan for Tourism (2007)



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

4. Touristic products & regions

What energy demand requirements?



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Touristic Products Priorities 2015

Region

Algarve

Climate



Hot & dry



Temp.



Water

Sun & sea

Business
Tourism

Golf

Nautical T.
Resorts T.
Health & Well-
being

Energy
Demand

Shift seasonality

Requirements

Accommodation

Traditional Hotels
& Hostels
Apartments
Resorts
Camping

4 & 5 Stars
Hotels

Traditional Hotels
Specific Hotels
4& 5 Stars Hotels

Traditional Hotels
& Hostels
Resorts
Camping
Boats/ Yachts

Climatization
/Cooling
Hot Water
Refrigeration
Cooking
El. Appliances

Mobility

Aviation
(Low costs)
Road
Rail
Maritime

Aviation
Inter modality

Aviation
Road

Aviation
Road & Rail
(inc. adequacy to
disabilities)
Maritime

Aviation
Road Transports
(Rent-a-car,
Coach/ Bus)
Train
Boat/ Yacht

Attractions

Swimming Pools
Nautic Sports
Recreation Events

Indoor Pools
SPAs
Cultural Events

Cultural Events

Swimming Pools
SPAs
Special Therapies
Cultural Events

Water
Pumping
&
Desalination
Street Lighting





DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Touristic Products Priorities 2015

Requirements

Region
**Lisbon &
Tagus
Valley**

Climate

Mild
 **Temp.**



Mild seasons

Reduce seasonality

Energy Demand

Accommodation

Traditional Hotels
& Hostels
Charm Hotels
City-Resorts

4 & 5 Stars Hotels
Charm Hotels

Traditional Hotels
& Hostels
Charm Hotels
City-Resorts
Boats/ Yachts

Climatization
Hot Water
Refrigeration
Cooking
El. Appliances

Mobility

Aviation
(Low costs)
Road & Rail

Road
Rail

Aviation
Inter modality

Aviation
Road & Rail
(inc. adequacy to
disabilities)
Maritime

Aviation
Road Transp.
(Rent-a-car,
Coach/ Bus)
Train
Boat/ Yacht

Attractions

Cultural Events
Recreation Events

Cultural Events
Touring
Gastronomy

Indoor Pools
SPAs
Cultural Events

Indoor Pools
SPAs
Special Therapies
Cultural Events
Recreation Events
Gastronomy

Street
Lighting
Water
Pumping



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Touristic Products Priorities 2015

Region

Madeira

Climate



Mild

↑ Temp.

Touring
(Cultural & landscape)

**Nature
Tourism**

Sun & sea
(Porto Santo)

**Cruises,
Business Tourism,
Health & well-being**

**Golf,
Resorts**
(Porto Santo)

**Energy
Demand**

Accommodation

**Traditional Hotels
& Hostels
Charm Hotels
Resorts
Country Houses
Village Tourism**

**Traditional Hotels
& Hostels
Charm Hotels
4 & 5 Stars Hotels
Resorts
Boats/ Yachts**

Climatization
Hot Water
Refrigeration
Cooking
El. Appliances

Requirements

Mobility

**Aviation
Road**

**Aviation
Road
(inc. adequacy to
disabilities)
Maritime**

**Aviation
Road Transp.**
(Rent-a-cars,
Coach/ Bus)
Boat/ Yacht

Attractions

**Cultural Events
Recreation Events
Touring
Swimming Pools
SPAs
Gastronomy**

**Swimming Pools
SPAs
Special Therapies
Cultural Events
Recreation Events
Gastronomy**

**Street Lighting
Water
Pumping
&
Desalination**



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Touristic Products Priorities 2015

Requirements

Accommodation

Mobility

Attractions

Region

**Oporto
& North**

Climate



Mild-cold

↑ Temp.

**City & short
breaks**

Touring
(Cultural, heritage
& landscape)

**Nature
Tourism**

**Business
Tourism**

**Gastron. & wine,
Health & well-being**

**Energy
Demand**

Mild seasons

Reduce seasonality

**Traditional Hotels
& Hostels
Charm Hotels
City-Resorts**

**Resorts
Country Houses
Village Tourism
Camping**

**4 & 5 Stars Hotels
Charm Hotels**

**Traditional Hotels
& Hostels
Charm Hotels**

**Climatization
Hot Water
Refrigeration
Cooking
El. Appliances**

**Aviation
(Low costs)
Road
Rail**

**Aviation
Road & Rail**

**Aviation
Inter modality
Road & Rail
(inc. adequacy to
disabilities)**

**Aviation
Road Transp.
(Rent-a-car,
Coach/Bus)
Trains**

**Cultural Events
Recreation Events**

**Cultural Events
Touring
Gastronomy**

**Indoor Pools
SPAs
Cultural Events
Recreation Events
Gastronomy
Special Therapies**

**Street
Lighting
Water
Pumping**



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Touristic Products Priorities 2015

Region

Centre

Climate



Mild-cold



Temp.



**Energy
Demand**

Requirements

Accommodation

**Traditional Hotels
& Hostels
Charm Hotels
Resorts
Country Houses
Village Tourism
Camping**

**Traditional Hotels
Specific Hotels
4& 5 Stars Hotels
Resorts**

**Traditional Hotels
& Hostels
Charm Hotels**

Climatization
Hot Water
Refrigeration
Cooking
El. Appliances

Mobility

**Aviation
Road
Rail**

**Aviation
Road & Rail
(inc. adequacy to
disabilities)**

**Aviation
Road Transp.
(Rent-a-car,
Coach/ Bus)
Train**

Attractions

**Cultural Events
Recreation Events
Touring
Gastronomy**

**Indoor Pools
Specific SPAs
Special Therapies
Cultural Events**

**Street
Lighting
Water
Pumping**



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Touristic Products Priorities 2015

Region

Azores

Climate



Mild



Temp.

**Nature
Tourism**

**Touring
(Landscape)**

**Nautical Tourism,
Health & well-being**

Golf

**Energy
Demand**

Accommodation

**Traditional Hotels
& Hostels
Charm Hotels
Resorts
Country Houses
Village Tourism**

**Traditional Hotels
& Hostels
Charm Hotels
4 & 5 Stars Hotels**

Climatization
Hot Water
Refrigeration
Cooking
El. Appliances

Requirements

Mobility

**Aviation
Road
(inc. adequacy to
disabilities)
Maritime**

**Aviation
Road Transp.
(Rent-a-car,
Coach/ Bus)
Boat/ Yacht**

Attractions

**Cultural Events
Recreation Events
Touring
Specific SPAs
Special Therapies
Gastronomy**

**Street Lighting
Water
Pumping**



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Touristic Products Priorities 2015

Region

Alentejo

Climate



Hot & dry



Temp.



Water



**Energy
Demand**

Requirements

Accommodation

**Traditional Hotels
& Hostels
Resorts
Apartments
Camping**

**Traditional Hotels
Specific Hotels
4& 5 Stars Hotels
Charm Hotels
Resorts**

**Traditional Hotels
& Hostels
Resorts**

**Climatization
/Cooling**
Hot Water
Refrigeration
Cooking
El. Appliances

Mobility

**Aviation
(Low costs)
Road
Rail
Maritime**

**Aviation
Road
Rail
(inc. adequacy to
disabilities)
Maritime**

**Aviation
Road Transp.
(Rent-a-car
Coach/ Bus)
Train
Boat**

Attractions

**Cultural Events
Recreation Events
Swimming Pools
Nautic Sports**

**Swimming Pools
SPAs
Special Therapies
Cultural Events
Recreation Events
Gastronomy**

**Water
Pumping
&
Desalination
Street Lighting**



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

5. Measures for a sustainable generation & consumption of energy & reduction of CO₂ emissions in the Tourism Sector



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Decomposition analysis

The Kaya Formula* :

$$\text{CO}_2 \text{ emissions} = \text{carbon intensity} \times \text{consumption intensity} \times \text{population}$$

(in Anderson, K. et al (2006), "Decarbonising Modern Societies: Integrated Scenarios Process and Workshops", Tyndall Centre for Climate Change Research, Technical Report 48, UK)



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Adaptation of the Kaya Formula to the tourism sector:

...One possibility...

Six driving forces:

$$CO_2 = \frac{CO_2}{FEC} \times \frac{FEC}{GVA} \times \frac{GVA}{Tourists} \times \frac{Tourists}{Lodgings} \times \frac{Lodgings}{Mobility} \times Mobility$$

CO₂ – CO₂ Emissions

FEC – Final Energy Consumption in the tourism sector

GVA – Gross Value Added in the tourism sector (*or tourism revenues*)

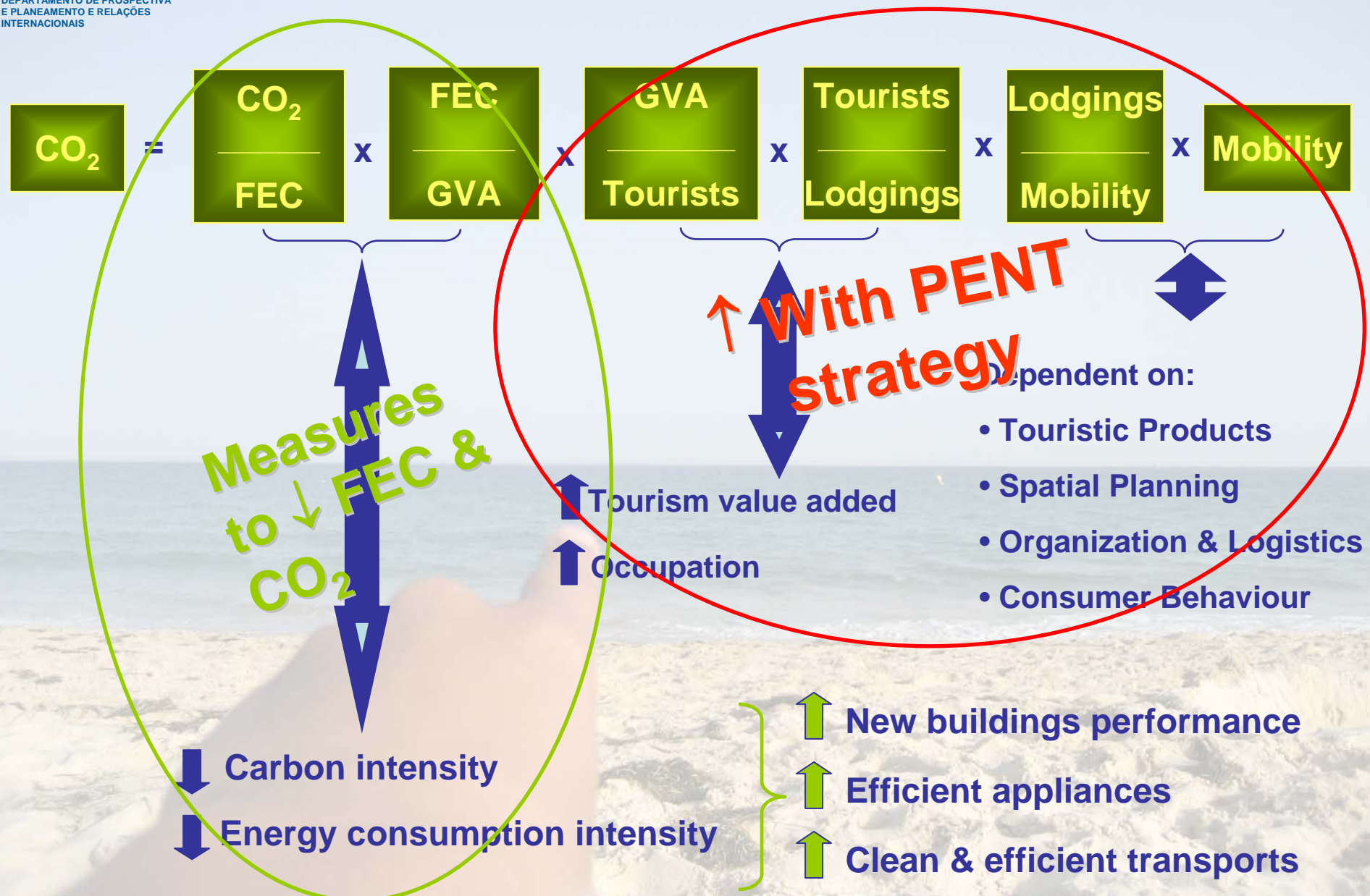
Tourists – Nights in hotels and similar establishments

Lodgings – Lodging capacity (*nº establishments*)

Mobility – Passengers kilometre



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS





DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Measures to reduce carbon intensity

$$\text{CO}_2 = \frac{\text{CO}_2}{\text{FEC}} \times \frac{\text{FEC}}{\text{GVA}} \times \frac{\text{GVA}}{\text{Tourists}} \times \frac{\text{Tourists}}{\text{Lodgings}} \times \frac{\text{Lodgings}}{\text{Mobility}} \times \text{Mobility}$$

↓ Carbon intensity

Acting in the energy mix:

- Low-carbon fuels (NG, LPG)
- Renewables
- Fuel cells (hydrogen from renewables)



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Measures to reduce energy consumption intensity

$$\text{CO}_2 = \frac{\text{CO}_2}{\text{FEC}} \times \frac{\text{FEC}}{\text{GVA}} \times \frac{\text{GVA}}{\text{Tourists}} \times \frac{\text{Tourists}}{\text{Lodgings}} \times \frac{\text{Lodgings}}{\text{Mobility}} \times \text{Mobility}$$

↓ Energy consumption intensity

Acting in the energy efficiency:

- Efficient technologies
- Demand side management
- Efficient use of water
- Buildings performance
- Efficient transports

...and decentralized energy:

- Microgeneration
- Cogeneration (CHP)
- Trigeneration (CHCP)
- Microgrids / Smartgrids



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Energy efficiency in buildings / accommodation



New lodgings performance

Acting in buildings performance:

- Solar passive architecture
- Thermal efficient materials
- Building certificates
- Efficient use of water



Efficient appliances

Using efficient appliances:

- Climatization (cooling and heating)
- Laundering
- Hot water
- Cooking
- Dish washing
- Efficient lighting



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Water efficiency

The picture:

“The average run-off in Southern European Rivers is projected to fall due to rising temperature and decreasing precipitation. In particular, some river basins in the Mediterranean region, which already face water stress, may see marked decreases in water availability” *

- ✓ **Touristic lodging and leisure activities consume large volumes of water**
- ✓ **Increasing Tourism activity will tend to put strong pressure in water consumption, mainly in coastal areas, in summer**
- ✓ **Portugal is one of the European Countries with the worse picture of water scarcity and droughts* , mainly in summer , when fresh water resources are limited**

* (in EC, SEC(2007) 993, “Addressing the challenge of water scarcity and droughts in the European Union. Impact Assessment”, Brussels, 18 July 2007)



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Water efficiency

The measures:

✓ **To exploit new reservoirs** (including aquifer recharging and waste water re-use) **or desalination units**

=> huge amounts of energy consumption

=> high costs, (depending on the salinity of the feed water; seawater desalination remains particularly expensive)

✓ **To adopt water efficiency and saving measures** (according with (*, **))

“Europe continues to waste at least 20% of its water due to inefficiency” *,**

=> the volume saved could constitute a potential new water resource for the future

* EC, SEC(2007) 993, “Addressing the challenge of water scarcity and droughts in the European Union. Impact Assessment”, Brussels, 18 July 2007

** Report on “EU Water Saving Potential”, July 2007, Ecologic



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Renewable energies

Benefits:

- ✓ Zero emissions technologies

Some technologies:

- ✓ **Renewables on heating and cooling** (despite the Commission promises in 2006 to propose binding targets, it will be up to member states to decide on the targets)
- ✓ **Use of solar collectors, geothermal energy and bioenergy, for heating and cooling, hot water, swimming pools,...**
- ✓ **Use of wind, geothermal, wastes, or photovoltaic energy to produce electricity** (associated with decentralized electricity and smartgrids)



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Decentralized energies (local generation for local consumption)

Benefits:

- ✓ Electricity generation with high quality, and **better efficiencies** at the place of consumption
- ✓ **Reduction of losses** in transmission & distribution grids
- ✓ **Heat recovering** from the electric generation

Some generation & distribution technologies:

- ✓ **Microgeneration** (micro gas turbines using natural gas or biofuels, micro wind turbines, fuel cells, photovoltaic panels)
- ✓ **Cogeneration or Combined Heat and Power (CHP)** – Small & micro cogeneration (using natural gas, wastes or biomass) and **Trigeneration or Combined Heat, Cooling and Power (CHCP)**
- ✓ **Microgrids / Smartgrids** - local generation technologies can be directly connected to LV networks (Low Voltage – typically 1 kW to 100 kW), allowing peak load reductions; smartgrids – the concept involves connection with communications (GSM) devices



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Clean & efficient transports

↑ Clean Transports

Acting in modal shifts & fuels used:

- Reduce Air Travelling
- Increase Rail Travelling
- Increase Clean vehicles (Hybrid, GPL, GN, Biofuels)

↑ Efficient Transportation

Acting in organization & logistics:

- Spatial planning
- Efficient mobility



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Clean transports

Some possible measures:

✓ Air Transport

- Reserved for specific purposes: transatlantic travelling, business trips...

✓ Road Transport

“Greener” transport options:

- Coaches / Concept bus
- Hybrid & electric vehicles (including rent a cars)
- Efficient vehicles (using vehicles with good performances - specific energy consumption and CO₂ emissions; efficient driving)

✓ Modal shift

- From air & road to railway; water transports (including short distance maritime transports); encourage cycling & walking when possible
- Reinforce intermodality (transeuropean networks; high speed rail)



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Efficient transportation

Some possible measures:

✓ Spatial Planning

- **Deciding the location** of new tourist accommodations (planning the accessibilities)
- **Improving the urban spatial planning** (to avoid traffic congestions)
- **Improving accessibilities infrastructures**
- **Using new “intelligent” technological devices** (Intelligent Transport System) to manage infrastructures and parking

✓ Organization & logistics

- **Acting in logistics** (organization of group travelling according to consumer preferences, adapting vehicle dimensions to guests number and avoiding empty cover distances)
- **Improving integration** between different types of transport services
- **New concepts of mobility** – to hire a mobility service, not a car



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Two possible extreme scenarios for energy & water production & consumption patterns:

**Scenario I - No changes in energy & water
production & consumption patterns**

**Scenario II - Strong changes in energy & water
production & consumption patterns**



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Scenario I - No changes in energy & water production & consumption patterns

- ✓ **Accommodation** → spatial planning in quantity rather than in quality; climatization (cooling and heating) mainly electricity from the central grid; hot water mainly from fossil fuels
- ✓ **Water demand** → widespread of desalination units, mainly in the south
- ✓ **Transportation** → mainly aviation & road transports, using fossil fuels



Strong increase of energy consumption & CO₂ emissions
Aggravation of present situation in the medium & long run
Tourism becomes the victim of its own “success”
Unsustainable development



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Scenario II – Strong changes in energy & water production & consumption patterns

- ✓ **Accommodation** → spatial planning in quality rather than in quantity; climatization (cooling and heating) mainly from renewables in association with decentralized production of electricity & development of smart grids; hot water mainly from renewables; widespread energy-saving culture
- ✓ **Water demand** → occasional use of desalination units, mainly in the south; widespread water-saving culture
- ✓ **Transportation** → strong reduction of aviation travelling, mainly through the shift to high speed rail; use of clean & efficient road transports



Sustainable patterns of energy consumption & CO₂ emissions
Tourism succeeds in the medium & long run
Win-Win solution



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

6. Conclusions

- ✓ **Both in the short and long run Tourism activity is expected to increase in the world and in Portugal**
- ✓ **Environmental issues will be more prominent in the future, being a top priority for the several players in the Tourism activity:**
Multinational Companies, Small and Medium Enterprises, Travel Agents, Transport Companies & Consumers
- ✓ **Energy & water prices will tend to increase in the near future**
- ✓ **Tourists are becoming more sensitive to environmental issues**
- ✓ **Tourism agents have good opportunities to invest in sustainable patterns of production & consumption of energy & water (reasonable pay-back periods); a win-win way to preserve their business (Portuguese Tourism) in the long run**



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

The best strategies:

- ✓ Energy in accommodation:
 - to adopt a strategy based on energy efficiency, use of renewables, and decentralized energy
- ✓ Energy in transports:
 - to adopt a strategy based on rational use of transports and promotion of clean energies
- ✓ Water:
 - to adopt a strategy based on “*more value per drop*”



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

***“Every player involved with
tourists should be creative”***

*(adapted from EU (2003) “Structure, performance and competitiveness of
European Tourism and its enterprises”)*



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Thank you for your attention.

My contact:

angela.lobo@dpp.pt



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

7. Bibliography

National Policy:

Ministry of Economy and Innovation, Tourism of Portugal (April 2007), **National Strategic Plan for Tourism 2006-2015 (PENT)**

<http://www.turismodeportugal.pt/>

Council of Ministries Resolutions nº63/2003 , nº 169/2005, and changes introduced in January 2007, **National Energy Strategy**

<http://www.min-economia.pt/>

Council of Ministries Resolution nº 104/2006, DR nº 162, I Serie, 23 August 2006, **National Program for Climate Change (PNAC 2006)**

<http://www.iambiente.pt/portal/>

Council of Ministries Resolution nº109/2007, DR nº 159, I Serie, 20 August 2007, **National Strategy for Sustainable Development 2005-2015 (ENDS)**

<http://www.dre.pt/pdf1sdip/2007/08/15900/0540405478.PDF>



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

National Legislation:

DL nº 78/2006, 4 April, **National System of Energy Certification & Inside Air Quality for Buildings**

DL nº 80/2006, 4 April, **Regulation for the Characteristics of Thermal Performance of Buildings**

DL nº 79/2006, 4 April, **Regulation for the Energy Systems for Climatization of Buildings**

DL nº 108/2007, 12 April, **Tax System for Low Efficiency Lighting**

Other National Publications:

Santos FD, Miranda P (2006), **Climate Change in Portugal. Scenarios, Impacts and Adaptation Measures**. SIAM II Project, Gradiva, Lisbon

SAER / CTP (2005), **Reinventing Tourism in Portugal. Strategy for the Portuguese Touristic Development in the first quarter of the 21st century**, Lisbon

IQP (2005), **The Tourism in Portugal**, Sectorial Studies Serie, Lisbon



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

National Statistics:

National Statistics Institute, **National Accounts 1995-2004**

National Statistics Institute, **Satellite Accounts for Tourism 2000-2003**

National Statistics institute, **NAMEA Air 1995-2004**

http://www.ine.pt/portal/page/portal/PORTAL_INE/DEstatisticos?menuBOUI=16950

Bank of Portugal, **Current Accounts 1996-2005**

http://www.bportugal.pt/default_e.htm

EDP Distribuição (2006), **Study on the Ownership and Use of Electric Appliances in the Services Sector in Portugal Mainland**, Final Report



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

European Policy:

European Commission, Communication (2007) 1 final, **Energy Policy for Europe**

European Commission, Communication (2007) 414 final, **Addressing the Challenge of Water Scarcity and Droughts in the EU**

European Commission, Communication (2003) 716 final, **Basic Orientations for the Sustainability of European Tourism**

European Commission, Communication (2006) 134 final, **A Renewed EU Tourism Policy: Towards a stronger partnership for European Tourism**

European Commission, Report of the Tourism Sustainability Group (February 2007), **Action for more Sustainable European Tourism**

European Commission, DG Enterprise (2004), **Feasibility and preparatory study regarding a Multi-stakeholder European Targeted Action for Sustainable Tourism & Transport**

<http://ec.europa.eu>



DEPARTAMENTO DE PROSPECTIVA
E PLANEAMENTO E RELAÇÕES
INTERNACIONAIS

Others:

Decomposition Analysis (Kaya Formula):

Anderson K, Bows A, Mander S, Shackley S, Agnolucci P, Ekins P, (2006), **Decarbonising Modern Societies: Integrated Scenarios Process and Workshops**, Tyndall °Centre for Climate Change Research, Technical Report 48, UK.

Anderson K, Bows A, Mander S, Shackley S, (2005), **Decarbonising the UK: Energy for a Climate Conscious Future**, Tyndall °Centre for Climate Change Research, Technical Report 33, UK.

http://www.tyndall.ac.uk/publications/tech_reports/tech_reports.shtml