climate change in loulé

development of a municipal adaptation strategy

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Author
Municipal Council of Loulé

Internal Coordination
Municipal Directorate of General Administration and Planning

Internal Technical Team
Inês Rafael (Environment, Public Spaces and Transport Division)
Lídia Terra (Planning, Geographical Information and Land Registration Division)

External Technical Team (ClimAdaPT.Local Project Team**)**
FFCUL - Faculty of Science Foundation, University of Lisbon
CEDRU – Centre for Urban and Regional Development Studies
WE CONSULTANTS
QUERCUS – Portuguese National Association for Nature Conservation
ICS – Institute of Social Sciences, University of Lisbon
FCT-UNL – Faculty of Science and Technology, University Nova of Lisbon
UA - University of Aveiro
ICETA/CIBIO – University of the Azores

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Foreword

> “... it is essential to establish a strategy to adapt to impact resulting from climate change and for it to safeguard all our human, natural, and material heritage.”

Since the beginning of the current term of office we have endeavored to make current major issues, which constitute themselves as political management concerns, an object of study, debate and knowledge in order to better deal with the near future.

This approach has been adopted for issues related to energy efficiency, mobility and the management and use of natural resources but also, and in particular, for those related to climate change.

This last issue gained a new expression and greater public exposure with the participation of Loulé Town Council in an international consortium in the scope of the ClimaAdapt project, which involves municipalities, universities and companies, among others.

The issue of global warming is now a reality, as well as a cause for concern that cannot be ignored and to which we are certainly not immune.

Closely associated with this phenomenon is the occurrence of extreme weather events, which cause all manner of consequences: economic, social, environmental and even health.

In fact, droughts, heatwaves, floods, wildfires, and heavy rainfall, among others of the so called extreme weather events, have been wreaking havoc around the globe and also among us.

What then is to be done?

Quoting Pope Francis in his Encyclical “Laudato Si”, for climate to be “a common good, belonging to all and meant for all” we surely have a contribution to make.

So, whether it is at a global, national or municipal scale it is essential to establish a strategy to adapt to impact resulting from climate change and for it to safeguard our entire human, natural, and material heritage.

Loulé Municipal Climate Change Adaptation Strategy [MCCAS] is a step in that direction and, being at the forefront, it is also a decisive element for us to prepare ourselves to meet the challenges the future always brings.

The systematization and intervention as a result of the implementation of MCCAS, that will interfere in our collective life as well as at the territorial management level, leads us to the understanding of this new climate dynamic and is extremely important for the development of sectoral public policies dealing with minimizing the risks derived from extreme climate events and to which the strategy gives voice.

Mayor of Loulé

Vitor Aleixo

Introduction

WHAT DOES ADAPTATION MEAN?

Adaptation is the process of adjustment in response to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm as well as to exploit beneficial opportunities. In natural systems, human intervention may facilitate adjustment to expected climate and its effects (IPCC, 2014b).

Loulé Municipal Council considers climate change to be one of the most important challenges of the 21st century. The development of the Loulé Municipal Climate Change Adaptation Strategy (Loulé MCCAS), started in January 2015 within the scope of ClimAdapt. Local project, intends to promote a coherent response to the various problems related to climate change throughout the municipal territory, and seeks to place Loulé Municipal Council at the nationwide forefront in these matters.

Amongst other changes, the climate projections for the Municipal Council of Loulé point to a potential reduction in total annual precipitation and to the potential increase of temperatures, in particular maximums from spring to autumn, intensifying the occurrence of hotter and drier summers. An increase in the frequency of heatwaves, as well as the occurrence of events of very intense precipitation concentrated in short periods of time, is also predicted. Despite the uncertainties related to the effects at local level, the projection of a continuous relative rise in sea level may bring new challenges in the coastal areas of the municipality.

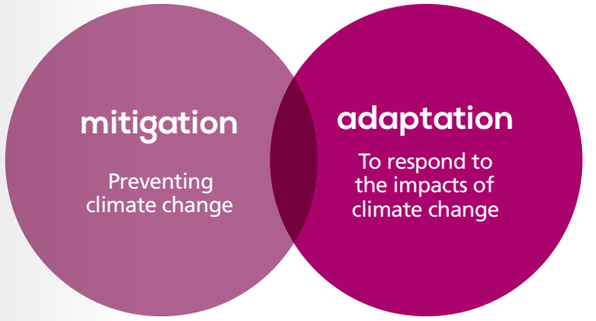
These climate projections may cause a series of impacts on the municipal territory as well as on its natural and human systems. Even when there are planned options of adaptation to meet future climate scenarios, there will always be climate risks that will affect the municipality in different aspects, such as environmental, social, and economic effects.

Loulé MCCAS is focused on the identification of options and planned adaptation measures aiming at mitigating the impact of climate change.

This MCCAS will be an instrument to be revised and updated, based on the evolution of scientific knowledge and the practices of adaptation to climate change. Being the first strategy of its kind in the municipality, it is intended to be a starting point for continuous development of coherent territorial and environmental policies, based on the needs of the different population groups and economic sectors, and that will help enhance the municipality's resilience to the impacts of climate change and of those who live here or visit us.

Although this MCCAS is more focused on questions related to adaptability, Loulé council recognizes that it is also necessary to adopt mitigating responses, amongst other actions, that may promote the reduction of greenhouse gas emissions (GHG).

Thus, and wherever possible, the municipality will promote the adoption of adaptive options that also promote the mitigation and encourage 'the correct planning and development of resilient, competitive and low-carbon society and economy', as recommended in the National Strategy of Climate Change Adaptation 2020 (NSCCA 2020).



Mitigation of and adaptation to climate change

Framework

Loulé municipality
promotional video

The municipality of Loulé is located in the south of mainland Portugal, in the Algarve region. It has an area of approximately 764.39 km² and 70,622 inhabitants[1], making it the largest municipality in the region by both area and population. It has an average population density of 92.4 people per sq. km, in line with the population density of the region (90.3 people per sq. km).

As far as territorial units are concerned, the municipality covers 3 distinct areas (from the south to the north, including coastline, crags and hills), thus presenting a diversity of territorial, heritage, landscape, ecological, and environmental features, which constitute important and unique advantages.

The municipality is administratively divided into 9 parishes (Almancil, Alte, Ameixial, Boliqueime, Quarteira, Salir, São Clemente (Loulé), São Sebastião (Loulé) and the parish aggregation of Querença, Tôr and Benafim), has its seat in the city of Loulé. It is the only municipality in the Algarve region with two cities, Loulé and Quarteira.

Given its privileged central location in the region, Loulé is well-served in terms of accessibility, both by road (A22, EN/ER-125, ER-270) and rail networks, as well as by its proximity to Faro International Airport, which makes it an attractive municipality in which to invest, live, work and visit.

Moreover, the municipality of Loulé boasts 10 beaches, providing users with excellent conditions for bathing, the Ria Formosa Natural Park, the largest and most important wetland in the Algarve. It also comprises Rocha da Pena and Fonte Benémola Protected Landscape areas, with around 54% of the municipal land covered by Natura 2000 network.

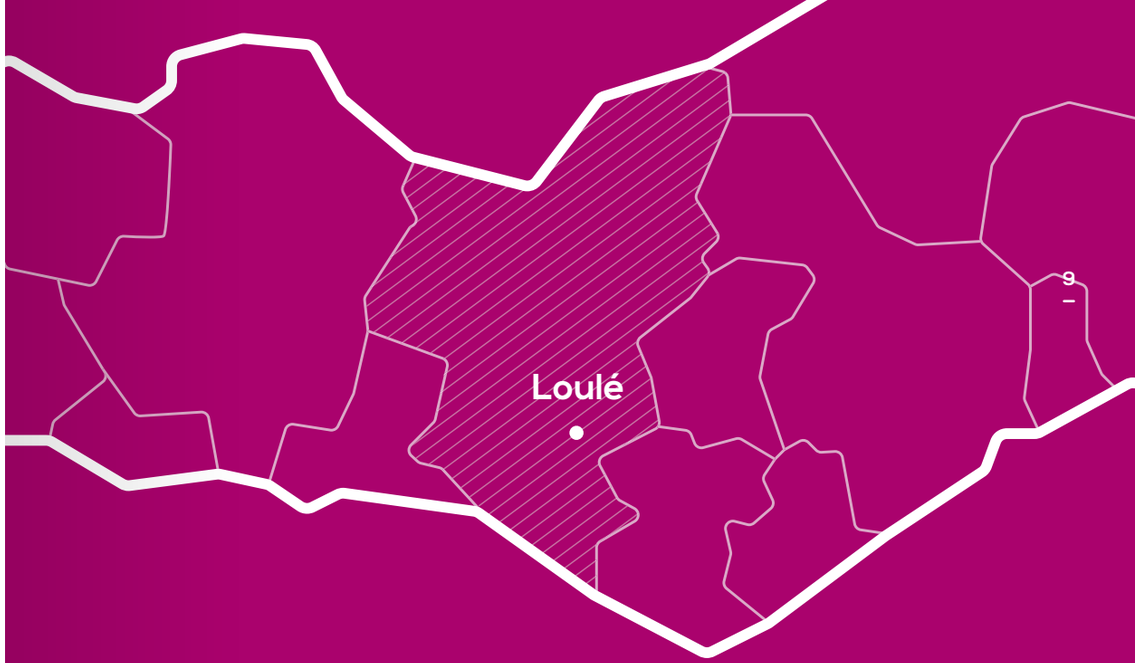
Due to its geographic location, the municipality of Loulé has a temperate Mediterranean-type climate, influenced by its proximity to the sea, as well as by mountainous areas further north.

It is also to be noted that local populations can fluctuate considerably on a seasonal basis. During high season, the municipality's population increases significantly, among permanent residents, seasonal residents and tourists.

Loulé is one of the Algarve's main business areas, showing the dynamism and capacity to attract and promote entrepreneurship in a regional context.

NOTES

[1] All the information relating to the socio-economic characterization of the municipality is based on the National Statistical Institute (INE) – Population censuses 2011



Location

South of Portugal
Region Algarve
Municipality of Loulé

Seat of the Municipality:
City of Loulé

70.622 inhabitants

Average population density:
92.4 people per sq. km

Territorial units

Coastline / Crags / Hills

Diversity of territorial, heritage, landscape, ecological, and environmental features, which constitute important and unique advantages.

9 parishes

Almancil, Alte, Ameixial, Boliqueime, Quarteira, Salir, São Clemente (Loulé), São Sebastião (Loulé), parish aggregation of Querença, Tôr e Benafim.

> It is not the strongest species that survive, nor the most intelligent, but the ones most responsive to change.
>
> Charles Darwin

Climate change:
The threat and the challenge

Adaptation to climate change - European Commission

Climate change is the most serious threat we face on the planet.

Until the Industrial Revolution, average temperatures on Earth remained unchanged for around 10,000 years. Accurate and systematic global temperature measurements began only in 1850, and since then an increase of 0.76°C was registered. If no measures are taken, the temperature is expected to rise again this century by between 1.8°C and 4.0°C, which according to an international panel of scientists who have met under the auspices of the United Nations, may even reach 6.4°C. A race against time to avoid temperatures rising by more than 2°C is already underway, the level which is increasingly thought by scientists to be the point of no return.

If temperatures on Earth should rise by more than 2°C above pre-industrial levels, climate changes may be irreversible and have serious long-term consequences. As sea-levels rise, low-lying coastal areas in many parts of the world, in which vast areas of many European countries are included, will begin to disappear. As well as this, many regions of the world will no longer have sufficient fresh water resources and extreme weather events together with material damage and economic losses arising from these will become increasingly common.

(Adapted from European Commission: 2008)

Loulé MCCAS Strategic Vision

Development of a municipality aware of, informed and able to respond to climate change and that embodies in municipal practice as well as in territorial management the factors, threats and opportunities associated with new climate dynamics.

OBJECTIVES

In accordance with the National Strategy of Climate Change Adaptation, Loulé Municipal Climate Change Adaptation Strategy proposes four core objectives:

- **To reduce vulnerability to extreme climate events and to increase municipal adaptive capacity, as well as to exploit potential opportunities** – to determine guidelines to meet the maximum number of extreme events which may come to affect the municipality (in the medium and long term), reducing the impacts expected and benefiting from possible opportunities, through the development of an integrated knowledge of the physical, socio-economic, and organizational features of the municipality;
- **Add knowledge on climate change** – to add knowledge and raise awareness, consolidating a sound basis for the development of concrete steps to adapt to climate change at the local level;
- **To create dynamics of engagement of social and economic stakeholders for the purpose of mobilizing them for change** – make local government guidelines to adapt to climate change known to all economic and social stakeholders, to highlight the need for change, to disseminate as much information as possible through specific measures (and in view of the different target groups), with an aim to increasing adaptive capacity and the resilience of all stakeholders in remedying possible extreme events;
- **To disseminate the strategic process developed** – to disseminate the strategic process constructed as well as the experience of the municipality beyond the administrative boundaries, becoming a recognized pioneer in climate adaptation.

MCCAS Methodology

INFORMATION

For more information about the ClimAdaPT.Local project visit: http://climadapt-local.pt

In January 2015 and in the scope of the ClimAdaPT.Local Project, the Municipal Council of Loulé (MCL) began the development of its own Municipal Climate Change Adaptation Strategy.

As a participant in the project, and with the support of ClimAdaPT. Local Project Team, MCL followed a basic methodology called MADS (Municipal Adaptation Decision-making Support), that has guided us through a number of steps and specific tasks.

MADS methodology was fully developed in the scope of the ClimAdaPT.Local Project and specially adapted to the Portuguese situation, based on the model developed by the UKCIP[2] (UK Climate Impacts Programme).

Starting from an analysis of and consideration of the main needs in terms of decision-making on adaptation at the municipal level, it sought replies to two key questions:

1 **What are the most important climate-related hazards that affect, or may affect, the municipality and what sort of decisions must the MCL make?**

2 **What are the main necessary and available actions of adaptation required to address such climate risks?**

MADS methodology is composed of six interrelated steps which together form a cycle of strategic development.

NOTES

[2] www.ukcip.org.uk/wizard/

Diagram representative of the MADS methodology (Municipal Adaptation Decision-making Support) developed in the scope of the ClimAdaPT.Local Project

As adaptation to climate change is a continuous process, this MADS cycle is to be repeated several times over time to be able to incorporate new knowledge and to respond fully to our citizens' new demands.

In the scope of Loulé MCCAS and in line with an engaged strategy, a workshop was held on the 24th November 2015 in Loulé municipal parliament with local institutions and stakeholders, from whom some contributions were collected.

Climate change in Loulé municipal council

In the context of MCCAS development, it is important to better understand Loulé municipality's key current and future climate vulnerabilities.

CLIMATE PROJECTIONS

The climate projections used in Loulé MCCAS development have been prepared by the ClimAdaPT local consortium technical team and were based on two regional models for Europe (CORDEX[3] project) and two greenhouse gases emission scenarios:

RCP4.5
A pathway of increasing concentration of CO_2 in the atmosphere of up to 520 ppm in 2070, albeit more slowly by the end of the century

RCP8.5
An increasing pathway similar to RCP4.5 until 2050, followed by a rapid and sharp increase, reaching a concentration of CO_2 in the atmosphere of up to 950 ppm by the end of the century

The simulated data drawn from climate patterns were then presented on a table with a spatial resolution of 11km (0.11°), where a point within Loulé municipality was selected. For this point, daily values were obtained for the following climate variables:

- Temperature (maximum, average and minimum);
- Precipitation (accumulated);
- Wind speed (maximum).

The projections of these three variables were then analyzed up to the end of the century, by yearly average values and anomalies (potential changes) in comparison with current climate.
The calculations were simulated for three periods of thirty years, so as to identify the potential changes (anomalies) between current and future climate:

- 1976-2005 (current climate);
- 2041-2070 (mid-term);
- 2071-2100 (long-term).

NOTES

[3] http://wcrp-cordex.ipsl.jussieu.fr/

Thus, the main projected changes in climate for Loulé Municipality are:

CLIMATIC VARIABLE	SUMMARY	PROJECTED CLIMATE CHANGES
	Decrease in average annual rainfall	**Annual average** Decrease in annual average rainfall, which is expected to be higher in the late twenty-first century and could vary between 6% and 44% in that period. **Seasonal rainfall** A decrease in the winter months (between 1% and 30%) is also expected, as well as with the rest of the year, 13% and 61% in Spring and between 7% and 53% in the Autumn. **More frequent and severe droughts** A decrease in the number of days with precipitation, between 10 and 28 days per year is expected. As is an increase in the frequency and intensity of droughts in southern Europe [IPCC, 2013].
	Increase in the average global annual temperature, especially the maximum	**Average annual and seasonal temperature** An annual average temperature increase of 1°C to 4°C. Strong increase in maximum temperatures in Summer (between 1°C and 4°C), Spring (between 1°C and 5°C) and Autumn (between 2°C and 5°C). **Very hot days** Increase in the number of days with very high temperatures (≥ 35°C), and of tropical nights with minimum temperatures ≥ 20°C. **Heatwaves** More frequent and severe heatwaves.
	Relative sea level rise	**Average** A relative sea level rise of between 0.17m and 0.38m in 2050, and between 0.26m and 0.82m by the end of the twenty-first century (global projections) [IPCC, 2013]. Other authors mention a rise of up to 1.10m in 2100 (global projections) [Jevrejeva *et al.*, 2012]. **Extreme weather events** Relative sea level rise with more severe impacts, when combined with an over flow of sea level associated with storms (storm surge) (global projections) [IPCC, 2013].
	Increase of extreme precipitation events	**Extreme events** Increase in extreme events, in particular of intense or very intense precipitation [Soares *et al.*, 2015]. More severe winter storms, accompanied by rainfall and strong winds (global projections) [IPCC, 2013].

Summary of the main climate change projected for Loulé Municipal Council up to the end of the century.

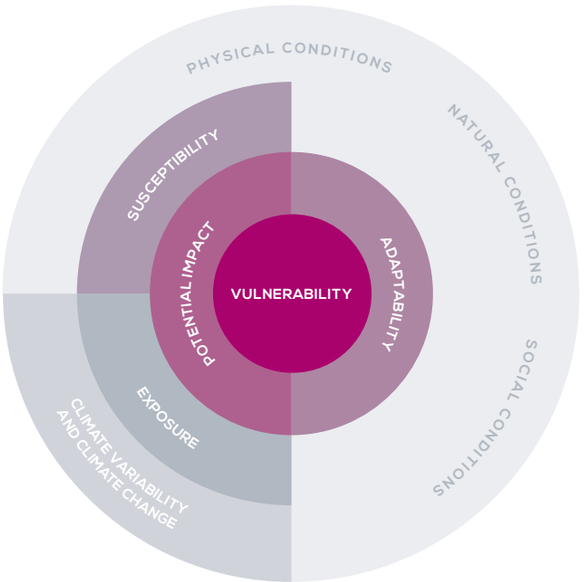
WHAT ARE CLIMATE VULNERABILITIES?

Vulnerability is the propensity or predisposition [of a system] to be adversely affected. Vulnerability comprises a variety of concepts such as exposure, sensitivity, susceptibility, severity, ability to cope with adversities and adaptive capacity (IPCC, 2014b)

Causes and consequence of Climate changes (European Commission)

IMPACTS AND VULNERABILITIES

The projected climate change may represent a diverse set of impacts, vulnerabilities and risks to Loulé municipality.



Components of vulnerability (Source: Adapted from Fritzsche, K. [et al.], 2014)

The impacts and vulnerabilities to which the municipality is already exposed are:

1.0. High temperatures and heatwaves

1.1. Increasing the risk of forest fires
1.2. Damage to human health
1.3. Lifestyle changes
1.4. Damage to vegetation and changes in biodiversity
1.5. Damage to the supply chain and changes in the use of equipment

2.0. Droughts

2.1. Disruption or reduction of water supply and/or reduction in water quality
2.2. Damage to vegetation and changes in biodiversity
2.3. Damage to the supply chain and changes in the use of equipment
2.4. Lifestyle changes

3.0. Relative sea level rise

3.1. Coastal erosion
3.2. Damage to buildings and infrastructures
3.3. Changes in the use of the equipment and services
3.4. Damage to vegetation and biodiversity

4.0. Excessive rainfall (floods)

4.1. Lifestyle changes
4.2. Damage to buildings and infrastructures
4.3. Damage to the supply chain and changes in the use of equipment
4.4. Damage to human health
4.5. Damage to vegetation

5.0. Increase in average temperature of the oceans

5.1. Changes in biodiversity
5.2. Changes in the use of the equipment and services

6.0. Strong winds

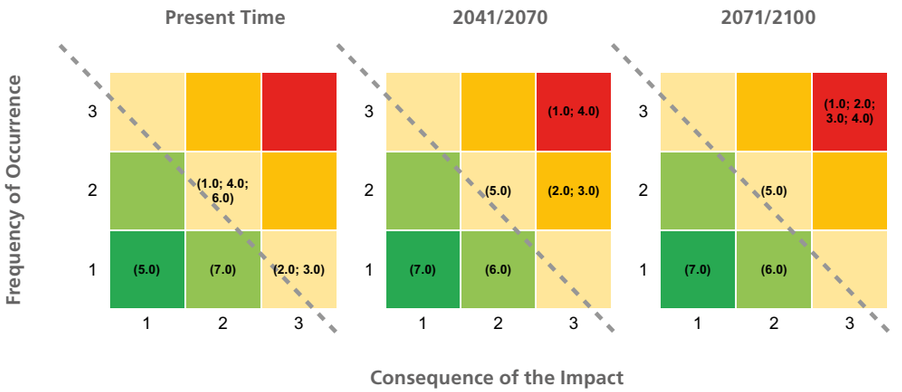
6.1. Damage to buildings and infrastructures
6.2. Damage to vegetation
6.3. Lifestyle changes

7.0. Low Temperatures and cold snaps

7.1. Damage to human health
7.2. Damage to the supply chain
7.3. Damage to vegetation
7.4. Lifestyle changes

Summary of major impacts of climate change with consequences observed for the municipality of Loulé.

The figure below is a schematic presentation of the evolution of risk for the major impacts of climate change in the municipality. Thus, every impact resulting from a weather event risk with values equal to or greater than 3 (three), at the present time or in any of the future periods referred to is considered a priority.



Evolution of the climatic risk of major impacts of climate change with consequences for the municipality of Loulé.

This assessment made by the municipal council was based on the assumption of the need for action when facing weather events in relation to which risks of greater magnitude are projected for the future, principally:

1.0. High temperatures and heatwaves;
2.0. Droughts;
3.0. Relative sea level rise;
4.0. Excessive rainfall (floods);
5.0. Increases in ocean temperatures.

Thus, the main climate impacts projected for the municipality may be linked to:

- Increase in risk of fires, fires and their consequences;
- Changes in municipal biodiversity, in the environmental and natural heritage;
- Increase in flash floods and urban floods;
- Adjustments for restrictions in water supply and consumption;
- Changes in the run-off and in the refilling of aquifers and consequently, in the water resources available;
- Decrease in the quality of water resources;
- Increase in damage to health;
- Increase in soil erosion in coastal areas;
- Increase in lifestyle changes;
- Increase in damage to equipment, infrastructures and roads;
- Increase in various types of damage in sectors such as tourism, agriculture, fisheries, and forestry.

RISK = FREQUENCY OF OCCURRENCE X CONSEQUENCE OF THE IMPACT

Loulé MCCAS Adaptation Options to Climate Change

In order to respond to the needs, the objectives, the vulnerabilities and climate risks (current and future) to which the municipality is exposed, several adaptation options capable of integrating Loulé MCCAS have been identified, mainly:

ADAPTATION OPTIONS

Alternative ways (decisions) to implement an adaptation strategy. They are the basis on which the measures to be implemented are defined and address the adaptation needs identified.

The implementation of this integrated set of adaptation options identified for the municipality of Loulé, aims at promoting throughout the municipal territory a coherent response to the many problematic areas related to climate change. In this way, it is hoped to achieve in the medium/long term a reduction in the municipality's climate vulnerabilities, an increase in resilience, the adaptive capacity of the municipal territory and enable citizens to be better prepared in the field of climate change.

ADAPTATION OPTIONS

- To set up a proper Forecasting, Information and Warning system at local scale (for various types of events);
- To develop and implement a Municipal Contingency Plan for Periods of Drought;
- To develop and implement a Municipal Sustainable Energy Action Plan;
- To develop and implement a Municipal Programme for the Efficient Use of Water;
- To ensure that the measures set out in the Municipal Plan to Protect Forests from Fires are respected and implemented and ensure its revision and monitoring;
- To develop and implement a Municipal Heatwave Contingency Plan;
- To promote Municipal Sustainable Mobility;
- To ensure the implementation and monitoring of measures to protect coastlines;
- To implement specific Flood Risk Management Measures;
- To develop and implement an Environmental Education Program on Climate Change (CC) in the Environmental Centre;
- To create an Environment Observatory
- To develop and implement an Education, Information and Public Awareness Campaign on Climate Change (CC) extended to various sectors;
- To reinforce green spaces and promote solutions/initiatives for environmental sustainability;
- To update the Local Climate Impacts Profile (PIC-L) regularly;
- To define and implement a programme related to the impact of Climate Change (CC) on human health;
- To incorporate the adaptation to Climate Changes (CC) criteria to Municipal Regulations, Plans and Projects;
- To revitalize streams and riparian galleries associated with them;
- To expand the Urban Gardens Project to other municipal urban areas;
- To support, promote and cooperate with research projects related to Climate Change (CC);
- To build up a Climate Change (CC) Adaptation Plan specific to the protected areas managed by the Municipal Council (PPL Rocha da Pena and PPL da Fonte Benémola);
- To promote panel discussions and training sessions to propagate new and more efficient farming and forestry methods ;
- To develop and implement a Municipal Programme for the Prevention, Combat and Treatment of pests and diseases in tree species;
- To develop and implement a Municipal Sustainable Tourism Plan;
- To define and implement the Green Seal / Sustainable Seal project;
- To include in Public Procurement Procedures criteria that take into account the whole issue of Climate Change (CC);
- To extend the Integrated Management System (IMS) (mainly the Environmental Management System) to as many services and sectors of the Municipal Council as possible;
- To create, or support the creation of the Marine Resources Observatory;
- To create, promote, and implement innovative strategies for urban sustainability.

Municipal good practices

The Municipal Council of Loulé now demonstrates a set of good practices which enhance response capacity (or adaptive capacity to the current climate.

ENVIRONMENTAL AWARENESS

Aware of the key role municipalities play in providing environmental information to its citizens, the Municipal Council of Loulé periodically publishes and distributes various publications on the environment, including a number of leaflets on water saving, waste management and recycling, forest fires, protected landscapes, an environmental handbook for the citizen and the newsletter 'LC Sustentável'.

You can follow municipal initiatives for environmental awareness through the municipal site www.cm-loule.pt or through social networks (Facebook: Loulé Ambiente).

ENVIRONMENTAL EDUCATION

Over the past few years, contributing to the environmental education of children and young people to become more aware of and informed about sustainable habits, as well as the need to adopt the same, has been a source of concern for Loulé Municipal Council. The Environmental Center, through its centers in Loulé and Pena, has played an important role in this area. It was created with the aim of meeting environmental education needs at a local level, integrated development and promotion and enhancement of the cultural and environmental heritage of the region.
The Environmental Center's activities are developed through a cooperation agreement established in 1992 between the Municipal Council of Loulé and Almargem – Algarve Environmental and Cultural Protection Association.

To find out more about the Environmental Center Activities Program and to keep up with their initiatives, please see the municipal website on www.cm-loule.pt or on facebook "Centro Ambiental de Loulé"

PRESERVATION OF PROTECTED AREAS

A large part of the Municipal Council of Loulé land is designated as a protected area and covers a wide range of natural habitats rich with nature and wildlife, geological heritage and other resources that should be visited.

From the mountains to the coast, there are several noteworthy landscapes and protected areas.

- **Protected Landscape of Fonte Benémola**

The Protected Landscape of Fonte Benémola (PPL Fonte Benémola) is protected area with unique characteristics, located on the border of the crags with the mountains. It is an exquisitely beautiful place, home of habitats of great interest, not only from the point of view of its geological and landscape features, but also of its fauna and flora.

The Protected Landscape of Fonte Benémola (PPL Fonte Benémola) is protected area with unique characteristics, located on the border of the crags with the mountains. It is an exquisitely beautiful place, home of habitats of great interest, not only from the point of view of its geological and landscape features, but also of its fauna and flora.

There are over 300 different species of plants in this Protected Landscape area.

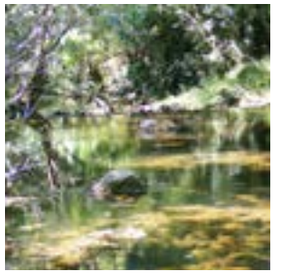
- **Protected Landscape of Rocha da Pena**

The Protected Landscape of Rocha da Pena (PPL Rocha da Pena) is located in the parish of Salir and in the parish aggregation of Querença, Tôr and Benafim, and covers an area of 637 ha in the transition between the crags and the mountains.

The creation of this Protected Landscape was intended to preserve and protect crags' physical, aesthetic, scenic, and biological value, a magnificent environmental monument of great natural beauty, not only from the point of view of its geological features but also of its biodiversity.

- **Ria Formosa Natural Park**

Ria Formosa Natural Park (RFNP) is the Algarve's largest and most important wetland. It is located between Ancão, in the municipality of Loulé, and Manta Rota, in the municipality of Vila Real de Santo António. It stretches along 60 Km of coastline, covering an area of 18,400 ha of which 893 ha are located in Loulé municipal territory.



Much of this protected area belongs to the Ria Formosa Lagoon system, a string of sandy islands and peninsulas parallel to the coast, protecting a lagoon that forms a maze of marshes, canals, and area of mud flats and islets.

Two Nature Trails have been created in Loulé's RFNP area, with the purpose of making this important protected area better known – São Lourenço and Quinta do Lago. These allow visitors to enjoy the true splendour of the landscape and be able to see its immense biological diversity.

- **Natura 2000 network**

Natura 2000 is an ecological network which aims to ensure that biodiversity is maintained through the conservation of different types of natural habitat and wild flora and fauna within the European Union.

It comprises special areas of protection (SAPs) and special areas of conservation (SACs). For the purposes of the Natura 2000 Network Sectoral Plan (PSRN2000), only the areas classified as sites in the National List are taken into consideration (their status given at the mid-point of the process leading to inclusion in the Natura 2000 network).

The Municipal Council of Loulé covers some classified areas that belong to the Natura 2000 network aimed at preserving animal and plant species, namely: Barrocal, Caldeirão, Ribeira do Vascão, Ribeira de Quarteira and Ria Formosa.

Keep up with the initiatives promoted by the municipal council in these protected areas through the municipal website (www.cm-loule.pt) or on social networks – Facebook: ROCHA DA PENA: Protected Landscape Local (Loulé) / FONTE BENÉMOLA: Protected Landscape Local (Loulé).

SPATIAL PLANNING

Over the past few years, various actions have been carried out by the Council of Loulé in order to revitalise public spaces, by giving them not only a new look, but above all a new purpose.

Some of the most recent examples that stand out in this regard include the 'Passeio das Dunas' and the implementation of the Quarteira North-Northeast Urbanization Plan.

The urban rehabilitation of the western coastal zone of Quarteira-Vilamoura, better known as "Passeio das Dunas", consists of the construction of a boardwalk connecting Quarteira to Vilamoura, with the creation of new green spaces and leisure areas. Here, priority is given to pedestrian and cycling routes as well as energy efficient lighting. Also worthy of note is the recuperation of the dunes and the renovation of Vala Real and its surrounding area, making the most of its contact with the sea.

The Quarteira North-Northeast Urbanization Plan (PUQN_NE), covering approximately 76ha, has as one of its main objectives the promotion of public spaces, embodied in the proposal for an urban park located in the most sensitive area ecologically speaking (coinciding with a set of small drainage basins, the tributaries of Pernada da Ribeira de Almargem). It aims to safeguard and value the ecological corridor of the existing wet ecosystem.

The main character proposed for the Urban Park was that of a space where flora, fauna and native ecosystems could be protected, valued and regenerated. Infrastructures have been created only to the extent necessary to ensure its full and safe enjoyment by the people as a recreational and leisure area.

Quarteira Via Distribuidora, opened with the name "Avenida Papa Francisco", is to be found within the area of the above-mentioned Urbanization Plan.

It provides structured access to the city of Quarteira, working as an alternative road link between Ceuta and Dr. Francisco Sá Carneiro Avenues. This new road infrastructure forms a direct connection between the EN 396 and EM 527-2 in order to divert traffic away from Quarteira city centre.

This new avenue has brought profound changes to the way people perceive and enjoy living in the city of Quarteira and is to a great extent due to a good collaboration between the municipality and the owners of the land where it was constructed.

DID YOU KNOW THAT...

There are currently 50 kms of cycle lanes in Loulé municipality?

ENERGY EFFICIENCY MEASURES

Over recent years, the Municipal Council of Loulé has implemented measures aimed at rational energy use, namely by installing a variety of equipment aimed at reducing consumption of electric energy, as well as CO_2 emissions, without prejudicing the quality of the services rendered by the updated facilities. Energy efficiency initiatives and the use of alternative energies have also been applied.

Of particular note are:

- The replacement of incandescent light bulbs by energy saving bulbs in municipal buildings;
- LEDs used for public lighting in some municipal access routes;
- The replacement of conventional traffic lights by LEDs;
- The municipality of Loulé has already installed solar panels in 29 municipal buildings and infrastructures;
- Construction of more energy-efficient buildings.

MOBILITY AND ACCESSIBILITY

The management of mobility is of particular importance at the local level, and it is under the competences of the municipal council that some of the most relevant measures are defined and implemented, namely in the adaptation of urban space to "soft mobility".
This is both a challenge and a priority to the municipal council.

Below are some examples of actions implemented:

- Optimization of the urban transport system (Loulé, Quarteira and Vilamoura);
- Promotion of urban transport use (Loulé, Quarteira and Vilamoura);
- Celebration of annual European Mobility Week;
- Participation in ongoing training/awareness programmes on sustainable mobility;
- Promotion of Eco-Driving principles ;
- Promotion and use of 'smarter mobility' solutions, for example communication technologies that support mobility and communication with users (iParque Mobile solutions for car park payment using mobile devices, etc.);
- Campaigns for the implementation of "soft" means of transportation;
- Vilamoura cycling circuit and Vilamoura Public Bikes system (system of bikes for shared use);
- Bikes for shared use in Loulé;
- Almancil - Quinta do Lago cycling circuit;
- Participation in, and development of, studies and mobility related plans.

OTHER MUNICIPAL SUSTAINABLE DEVELOPMENT PROJECTS

- **Creative Tourism**

The Creative Tourism Project is a commitment of the municipal council to the promotion of the area's identity. It supports training and innovation as well as craftsmen and professionals in the creative sector.

All project-related activities can be found online at www.loulecriativo.pt.

- **Social Vegetable Gardens**

The role of Loulé Social Vegetable Gardens is to promote the important relationship between Man and the Earth as a means of balance, interaction and integration with the social setting and the environment.

For further information:
http://www.cm-loule.pt/pt/menu/607/hortas-sociais-de-loule.aspx
Facebook: Hortas Sociais de Loulé

- **Participatory Budgeting**

Participatory Budgeting (PB) is an important municipal governance tool for the involvement of citizens. Its main aim is to contribute to informed, active, and responsible participation in Loulé's governance process.

For further information:
http://www.cm-loule.pt/pt/menu/827/orcamento-participativo.aspx

- **The Portuguese Network of Smart Cities**

Loulé is part of the Portuguese Network of SmartCities, whose objective is to share information, knowledge, good practice and innovative experiences between member municipalities, with the possibility of reproducing initiatives between them.

- **Loulé Educating City**

"An Educating City is an Inclusive City" that, among other assumptions, aims to promote the sustainable use of resources in the scope of the Educating City Project (2014-2016).

An example of this is the `Loulé Network of Hosts´ initiative that aims to guide visitors to localities within the municipality, drawing attention to local populations, agriculture and livestock farming.

"Loulé Network of Hosts" was created in the scope of this Local Educational Project and has facilitated experiences among communities from the interior of the municipality. Pupils from Vilamoura International School learnt how honey and 'aguardente de medronho' are produced and also how cattle are reared in Ameixial parish. In turn, the pupils from Eng. Duarte Pacheco School visited an Iberian black pig and sheep farm.

After this experience, the pupils took note of proposals for new projects in the area of entrepreneurship and/or in the area of research.

AT THE MUNICIPAL LEVEL

- **Assessment of Municipal Energy Consumption**

In 2014, a working group within the municipal council structure was set up to assess energy consumption of the different electricity meters installed at municipal facilities/equipment.

The assessment of energy consumption is the first phase in the process leading to understanding the energy situation in municipal facilities and subsequent decision making about changes to be made towards a better and more rational use of energy. That task has allowed us to identify and distinguish a number of systems including equipment installed and its operating state, type of use, opening hours and occupants for the municipal buildings, etc. From this, relevant energy channels can be identified and thus planning action leading to possible reduction of consumption.

- **Integrated Management System**

Loulé municipal council currently has an Integrated Quality and Environmental Management System in some of its services and sectors, which was implemented and certified in accordance with NP ISO 9001 and NP ISO 14001 standards respectively.

- **Solution of Dematerialization**

The Municipal Council of Loulé is implementing the new solution of dematerialization to council meetings. The main intention of this is to eliminate paper-based documents on issues addressed in the sessions and to speed up the decision-making process both at the level of hierarchies and of voting in council meetings.

This tool is a further step towards the implementation of an administrative modernisation policy, removal of red tape and dematerialization of municipal services, while making processes faster and more environmentally sustainable, in order to become closer to the population with the use of new technologies.

NOTES:
The municipal council is particularly committed to this kind of actions, with other actions already at the planning stage.

RECOGNITION FOR ENVIRONMENTAL BEST PRACTICE

What is the ECOXXI Municipal award?

This prize is the recognition of Environmental Best Practice and Environmental quality.

The ECOXXI award grew out of a project begun in 2005 by the European Blue Flag Association (EBFA) and is awarded based on application. Its main objective is to reward Portuguese Municipalities that show good performance on 21 sustainable development indicators as well as to acknowledge the effort being made to implement pro-environmental measures at the municipal level.

The ECOXXI Municipal award (green flag) is flown at the Municipal Council building.

For further information:
http://www.cm-loule.pt/pt/menu/682/municipio-eco-xxi.aspx

DID YOU KNOW THAT...

The Municipal Council of Loulé as a candidate for "Município Eco XXI" has already taken first place for five times at national level (in 2009, 2012, 2013, 2014 and 2015)? In 2015 the Municipal Council of Loulé achieved an Eco XXI rate of 85,6%?

How to help fight climate change?

ADAPTATION AND MITIGATION ON A DAILY BASIS

Building a sustainable world depends on each gesture, on each attitude and on our performance no matter what the context or the situation.

In order to succeed in this challenge, citizens, companies, and institutions have to change their attitudes and behaviour, in order to reduce greenhouse gas emissions. In fact, we all need to be prepared to change our lifestyle.

Learn about simple strategies which help to respect the environment and to reduce costs.

DID YOU KNOW THAT...

The individual efforts of each citizen have an extremely positive and important impact on the reduction of greenhouse gas emissions and consequently in the mitigation of climate change?

Change the way you travel, adopting more sustainable forms of mobility.

Increase the amount of trips by public transport, cycling and walking.

When using cars, adopt the principles of Eco-Driving and car pooling.

Water is one of the natural resources most severely affected by climate change. It is urgent to manage it more effectively.

- If a tap is leaking have it repaired immediately;
- Do not leave the tap running when washing dishes;
- Take a shower instead of a bath;
- Water your garden in the late evening or early morning to avoid wasting water;
- The water used to wash fruit and vegetables can be used to water plants;
- Use low-volume flush toilets. Do not flush the toilet unless it is absolutely necessary;
- Turn off the tap while brushing your teeth or shaving;
- Use the washing machine or dishwasher only when they are full;
- Use a broom to clean the streets.

Energy is one of Europe's main problems nowadays. Save it!

- Switch off the lights in an empty room;
- Replace your traditional incandescent lamps with energy saving light bulbs or light-emitting diode (LED) lamps;
- Switch off all electronic equipment;
- Don't leave your mobile phone charger plugged in when you have finished charging your phone;
- Cover pots and pans when cooking to avoid heat loss;
- Defrost your food in advance, thus avoiding the use of the microwave;
- Use the economy cycle on the washing machine and the dishwasher;
- Hang your washing out to dry if possible instead of using an electric drier;
- Reduce the time your fridge door is open;
- Chose a dual-tariff electricity meter, for periods when the cost of electricity is cheaper, especially during the night.

Invest in renewable energies, in biofuels and in energy-efficient vehicles with cleaner engines (hybrids, electric, etc.)

Re-use, Recycle and Repair.

Doing this reduces consumption and consequently CO_2 emissions from industrial production.

Additional Information:

- Plant a tree! Five trees will absorb 1 ton of CO_2 over their lifetime;
- Eat local seasonal products. They are healthier, more environmentally friendly, and require less energy to be produced and transported;
- Reduce the amount of paper you use;
- Promote climate change mitigation and adaptation measures in your home, in your workplace and in your neighbourhood.

Share these strategies with those closest to you: acting together is more inspiring!

FURTHER INFORMATION ON ADAPTATION

Extreme weather events have adverse effects that present an effective danger to civilian population and property, also causing serious environmental, economic and social damage.

Adaptation/prevention is essential. For their safety and security, each citizen should observe the following recommendations.

Heatwave - Protect yourself!

Protect yourself by adopting the following measures:

- Keep windows open and shades closed during the day to allow air to circulate;
- Open windows at night to refresh your home;
- If you feel very hot, have a tepid shower - never a cold one;
- Stay in a cool place for at least 2-3 hours a day;
- Pay special attention to people who are alone, elderly, fragile or with dependency needs. Help them to protect themselves from the heat;
- Avoid exposure to direct sunlight especially between 11 am and 5 pm. Go to the beach either early in the morning or late in the afternoon;
- Drink water or natural fruit juice regularly, even when you are not thirsty;
- Encourage elderly people to drink 1 litre or more of water a day than usual;
- Wear light cotton clothing;
- NEVER leave children, elderly people, or sick people inside vehicles exposed to the sun.

High temperatures – Reduce the risk of fire!

Contribua da seguinte forma:

- Remove dry undergrowth and grass from around your house in an area of at least 50m;
- Keep your property clear of dry undergrowth, as well as from waste from farming or forestry (pruning, dead branches etc);
- Ask your neighbours to keep their properties clean;
- Always keep the paths on your property clear;
- Store wood, flammable fuels and chemicals away from the house and secure them in a safe isolated place;
- Keep flammable materials (wood, paper, clothes etc.) away from possible sources of ignition (candles, paraffin or gas lamps);
- Place 6kg fire extinguisher, a spark restraint system and flash back arrestors in the exhaust pipes of agricultural or forestry machinery;
- During the critical period and also outside of it, whenever the risk of fire is high, no bonfires should be lit;
- Outside of the critical period, never light an open fire in windy conditions, only in damp weather and far from the forest limits. NEVER leave bonfires to burn unattended;
- Do not carry out any fumigation or disinfestations in apiaries using fumigators not fitted with a spark restraint system;
- Remove dry leaves, pine needles and branches from your roof;
- Cut trees that pose a threat of fire to the dwelling;
- Divide cultivable land areas with fire protection closures (paths) to prevent the passage of flames from one to another;
- Keep some tools (picks, shovels and hoses) in an easily accessible place to help in firefighting;
- Pyrotechnic products must not be used during the critical period.

In case of fire:

- Call 112 immediately or the fire department of your area (Loulé Fire Brigade – 289 400 560).

Drought – Redouble your efforts to save water!

What to do during a severe drought:

- Do not fill ponds or swimming pools. You may be consuming water other people need;
- Slightly close safety taps, thereby reducing the water flow;
- In the case of water cuts, store only the amount you will need. Do not waste left-over water, reuse it!;
- During a drought, water quality may deteriorate. Where there is any doubt concerning the quality of drinking water, boil it for ten minutes before drinking;

Floods – Know the warning signs!

It is very important:

- To know the warning signs of floods and evacuation procedures;
- To get home and contents insurance;
- To keep calm and convey calm to others;
- To turn off power and disconnect the gas and water supplies;
- To be prepared for possible evacuation that can only be ordered in duly justified cases of absolute necessity. Obey immediately!;
- Keep away from affected areas.

Glossary

CLIMATE CHANGE

Refers to any change in climate over time, whether due to natural variability or as a result of human activity.

This usage differs from that in the 'United Nations Framework Convention on Climate Change' (UNFCCC), which defines "climate change" as: "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time period"
(Avelar, D. and Lourenço, T.C., 2010).

ADAPTIVE CAPACITY

The ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to cope with the consequences (IPCC, 2014).

HEATWAVE

A heatwave occurs when, in a period of at least 6 consecutive days, the maximum daily temperature is 5°C higher than the daily average value for the reference period (the average of the past 30 years).

CLIMATE PROJECTION

A projection of the response of the climate system to emission or concentration scenarios of greenhouse gases and aerosols, or radiative forcing scenarios, often based upon simulations by climate models. Climate projections depend upon the emission/concentration/radiative forcing scenario used, which are based on assumptions, concerning, for example, future socioeconomic and technological developments that may or may not be realized and are therefore subject to substantial uncertainty (IPCC, 2012).

RESILIENCE

The capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation (IPCC, 2014a).

CLIMATE RISK

Is defined as the probability of the occurrence of harmful consequences or losses (death, injuries, assets, means of production, interruption of economic activities or environmental impacts), as a result of the interaction between climate, man-made hazards and the conditions of vulnerability of systems (adapted from ISO 31010, 2009, UNISDR, 2011).

SENSITIVITY / SUSCEPTIBILITY

Sensitivity is the degree to which a system is affected, either adversely or beneficially, by exposure to external climate. Sensitivity or susceptibility is typically conditioned by the natural and physical conditions of the system such as land topography, the soil's ability to resist erosion processes or land use and by the human activities that affect the natural and physical conditions of the system such as agricultural practices, water resource management, the use of other resources and forms of settlement and population related pressures. Since many systems have been modified in light of their adaptation to current climate conditions (dams, dykes and irrigation systems for instance), sensitivity assessment is also related to the current ability to adapt. Social factors, such as population density, should only be regarded as sensitive when they directly contribute to climate impacts (FRITZSCHE [et al.], 2014).

VULNERABILITY

It consists on the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt (adapted from IPCC, 2014).

Find out more...

Portuguese Environment Agency
http://www.apambiente.pt

ClimAdaPT.Local – Municipal Climate Change Adaptation Strategies
http://climadapt-local.pt/

Climate – ADAPT – European Climate Adaptation Platform
http://climate-adapt.eea.europa.eu/

MCL – Municipal Council of Loulé
http://www.cm-loule.pt/

COP21 – 21st Sustainable Innovation Forum
http://www.cop21paris.org/

Ecocasa – Consumption Simulator
http://ecocasa.pt/simuladores.php

EU Strategy on Adaptation to Climate Change
http://ec.europa.eu/clima/policies/adaptation/what/index_en.htm

IPCC – Intergovernmental Panel on Climate Change
https://www.ipcc.ch/

UKCIP (United Kingdom Climate Impacts Programme) – UK national climate change adaptation platform
http://www.ukcip.org.uk/

Acronyms

CC – Climate Change

EBFA – Europe's Blue Flag Association

EC – Environmental Centre

GHG – Greenhouse Gases

MADS – Municipal Adaptation Decision-making Support

MCCAS – Municipal Climate Change Adaptation Strategy

MCL – Municipal Council of Loulé

MCPS – Municipal Civil Protection Service

RCPs – Representative Concentration Pathways

UKCIP – UK Climate Impacts Programme

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