European Green Leaf 2015

Good Practice Report

Smaller Cities, Growing Greener
The authors of the Good Practice Report are Serena Byrne and Louise Connolly RPS Group, Ireland together with the contribution of the Expert Panel.

RPS, an environmental and communications consultancy based in Ireland, is currently appointed as the European Green Leaf Secretariat. The competition application process and the work of the expert panel and the jury are facilitated by the European Green Leaf Secretariat.

The secretariat also assists with PR activities related to the European Green Leaf Competition through the European Green Capital Award website, Facebook, Twitter and LinkedIn pages, and through various communication channels such as brochures and press releases.
# TABLE OF CONTENTS

## 1 INTRODUCTION

1.1 EUROPEAN GREEN LEAF COMPETITION ............................................................. 1
1.2 THE CATEGORY AREAS ..................................................................................... 2
1.3 EGL 2015 APPLICANT CITIES ....................................................................... 3
1.4 THE AIM OF THIS REPORT .............................................................................. 4
1.5 STRUCTURE AND APPROACH OF THIS REPORT .......................................... 4

## 2 ENVIRONMENTAL GOOD PRACTICES ............................................................ 5

2.1 CLIMATE CHANGE & ENERGY PERFORMANCE ............................................. 5
2.2 MOBILITY .......................................................................................................... 11
2.3 BIODIVERSITY & LAND USE .......................................................................... 17
2.4 QUALITY OF AIR & THE ACOUSTIC ENVIRONMENT .................................... 23
2.5 WASTE & GREEN ECONOMY ........................................................................ 29
2.6 WATER MANAGEMENT (INC. WASTEWATER TREATMENT) .......................... 34

## APPENDICES

APPENDIX A Expert Panel Profiles
LIST OF FIGURES

Figure 1-1 Map of 2015 EGL Applicant Cities ................................................................. 3
Figure 2-1 ClimAdaPT.Local Logo ................................................................................. 7
Figure 2-2 Green Energy Showroom Logo ..................................................................... 9
Figure 2-3 Lappeenranta Harbour ..................................................................................... 9
Figure 2-4 Mobility Round Table in Progress ................................................................. 13
Figure 2-5 Members of the Mobility Round Table discussing Mobility Issues on Site ........ 14
Figure 2-6 Electric Commercial Vehicle .......................................................................... 15
Figure 2-7 Poster promoting the arrival date of Electric Mobility to Siena ................. 16
Figure 2-8 Satamalahti Competition Logo ...................................................................... 19
Figure 2-9 The Winning Proposal, ‘Vesireittejä’ meaning Waterways .......................... 20
Figure 2-10 Muirtown Primary School celebrating their Third Green Flag ................. 21
Figure 2-11 Lochardil Primary students conducting a recent Litter Survey .................. 22
Figure 2-12 Traffic Signs indicating LEZ Zones ............................................................. 25
Figure 2-13 Example of LEZ Windscreen Stickers ......................................................... 26
Figure 2-14 Acoustic Capacity Map ................................................................................ 27
Figure 2-15 Map of Real Noise in Mollet del Vallès ....................................................... 28
Figure 2-16 Aerial View of the EcoSairila Site ............................................................... 30
Figure 2-17 Planned Area for Two New Plants beside Metsäsairila Waste ..................... 31
Figure 2-18 Green Point Mobile Vehicle ......................................................................... 32
Figure 2-19 Inside the Green Point Mobile Vehicle ......................................................... 33
Figure 2-20 Example of the Loyalty Card for using the Green Point Mobile Service ........ 33
Figure 2-21 Automatic Irrigation Control Systems & Underground Irrigation Systems.......................... 35

Figure 2-22 The New Environmental Education Centre (EEC) in Varzea Green Park.......................... 37

Figure 2-23 EEC Interior and Learning Spaces ........................................................................................ 37

Figure 2-24 Underground Water Tanks and Buried Drop by Drop System ............................................. 38

Figure 2-25 Children Learning at the Centre ......................................................................................... 39

LIST OF TABLES

Table 1-1 Details of Applicant Cities (in alphabetical order) .................................................................. 3
1 INTRODUCTION

7th Environmental Action Programme (EAP)

The Commission commenced the 7th Environmental Action Programme (EAP) in 2013 which sets out a strategic agenda for environmental policy-making with 9 priority objectives to be achieved by 2020. It establishes a common understanding of the main environmental challenges Europe faces and what needs to be done to tackle them effectively. This programme underpins the European Green Leaf Competition in relation to policies for sustainable urban planning and design.

Protecting and enhancing natural capital, encouraging better resource efficiency and accelerating the transition to a low-carbon economy are key features of the programme, which also seeks to tackle new and emerging environmental risks and to help safeguard health and well-being of EU citizens. The results should help stimulate sustainable growth and create new jobs to set the European Union on a path to becoming a better and healthier place to live.

Cities play a crucial role as engines of the economy, as dense places of connectivity, creativity and innovation, and as centres of services for their surrounding areas. Due to their density, cities offer a huge potential for energy savings and a move towards a carbon-neutral economy.

Today more than two thirds of Europeans live in towns and cities. Most cities face a common core set of environmental problems and risks, including poor air quality, high levels of noise, greenhouse gas (GHG) emissions, water scarcity, contaminated sites, brownfields and challenges in resource efficiency. At the same time, EU cities are standard setters in urban sustainability and they often pioneer innovative solutions to environmental challenges. An ever-growing number of European cities are putting environmental sustainability at the core of their urban development strategies.

To enhance the sustainability of EU cities, the 7th EAP fixes the goals that by 2020 a majority of cities in the EU are implementing policies for sustainable urban planning and design.

1.1 EUROPEAN GREEN LEAF COMPETITION

The European Green Leaf (EGL) competition is a sister initiative to the European Commission’s European Green Capital Award (EGCA). The latter was the result of an initiative taken by 15 European cities (Tallinn, Helsinki, Riga, Vilnius, Berlin, Warsaw, Madrid, Ljubljana, Prague, Vienna, Kiel, Kotka, Dartford, Tartu & Glasgow) and the Association of Estonian cities on 15 May 2006 in Tallinn, Estonia. Their green vision was translated into a joint Memorandum of Understanding establishing an award to recognise cities that are leading the way with environmentally friendly urban practices. The initiative was launched by the European Commission in 2008.

This year, 2015, is the inaugural year of the EGL competition. The aim of the competition is to recognise smaller cities which are making an effort to improve their urban environment and in the process moving towards healthier and more sustainable living.
It is important that the smaller cities which are making these environmental efforts are recognised on the environmental scene. The prestige and associated benefits of winning a European competition can encourage cities to invest in further efforts and help to boost awareness within the city as well as in other cities. The competition will enable cities to inspire each other and share examples of the good practices that they have put in place or have planned. Winning cities will be recognised for their achievements regarding environmental standards and commitment to ambitious goals for further progress.

The objectives of the European Green Leaf Competition are:

a) To recognise cities that demonstrate a good environmental record and commitment to generating green growth;

b) To encourage cities to actively develop citizens’ environmental awareness and involvement;

c) To identify cities able to act as a ‘green ambassador’ and to encourage other cities to progress towards a better sustainability outcomes.

The overarching message that the competition aims to communicate at the local level is that Europeans have a right to live in healthy urban areas and that this is achievable in smaller cities and urban areas also. These cities should therefore strive to improve the quality of life of their citizens and reduce their footprint on the global environment. This message is brought together in the competition’s slogan ‘Smaller Cities, Growing Greener’.

1.2 THE CATEGORY AREAS

The European Green Leaf 2015 Competition is technically assessed on the following 6 environmental category areas:

1. Climate Change & Energy Performance;

2. Mobility;

3. Biodiversity & Land Use;

4. Quality of Air & the Acoustic Environment;

5. Waste & Green Economy; and

1.3 EGL 2015 APPLICANT CITIES

A total of 8 cities applied for the 2015 EGL Competition, with 7 countries from across Europe represented. The smallest city by population is Mollet del Vallès in Spain with a population of 52,242, whereas Ludwigsburg in Germany has the largest population of 88,673. Of the 8 cities who applied for the 2015 competition half are signatories of the Covenant of Mayors. Details of the 2015 applicants are described in Table 1-1 and mapped on Figure 1-1.

Table 1-1 Details of Applicant Cities (in alphabetical order)

<table>
<thead>
<tr>
<th>City</th>
<th>Country</th>
<th>Inhabitants</th>
<th>Covenant of Mayors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inverness</td>
<td>Scotland</td>
<td>54,398</td>
<td>No</td>
</tr>
<tr>
<td>Lappeenranta</td>
<td>Finland</td>
<td>72,904</td>
<td>No</td>
</tr>
<tr>
<td>Ludwigsburg</td>
<td>Germany</td>
<td>88,673</td>
<td>Yes</td>
</tr>
<tr>
<td>Mikkeli</td>
<td>Finland</td>
<td>54,643</td>
<td>No</td>
</tr>
<tr>
<td>Mollet del Vallès</td>
<td>Spain</td>
<td>52,242</td>
<td>Yes</td>
</tr>
<tr>
<td>Siena</td>
<td>Italy</td>
<td>52,774</td>
<td>No</td>
</tr>
<tr>
<td>Strovolos</td>
<td>Cyprus</td>
<td>67,565</td>
<td>Yes</td>
</tr>
<tr>
<td>Torres Vedras</td>
<td>Portugal</td>
<td>72,250</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Figure 1-1 Map of 2015 EGL Applicant Cities
1.4 THE AIM OF THIS REPORT

The aim of this report is to showcase ‘Environmental Good Practice’ currently undertaken in the applicant cities for the European Green Leaf 2015 Competition.

It is anticipated that this report will be widely read throughout European cities, including current and potential applicants of the competition. In this way all cities will be inspired to adopt some of the tried and tested environmental good practices that already exist and also to learn of technologically advanced innovations that can greatly contribute to resource efficiency efforts. This in turn will lead to greater economic prosperity and job creation in accordance with the 7th EAP priorities and the EU 2020 Strategy, which are the key drivers for all European Policies.

1.5 STRUCTURE AND APPROACH OF THIS REPORT

The members of the Expert Panel (details in Appendix A) were requested, as part of their role, to identify two examples of ‘Environmental Good Practice’ for their allocated category area. These examples were to include new and innovative initiatives which may be transferable to other European cities.

The report presents, and in some cases elaborates on, the information presented by cities in their application forms. As such, all information is the most up-to-date as of the beginning of May 2015, unless otherwise stated.

The European Green Leaf Secretariat compiled and edited this information which is now presented in Section 2 in six individual sections, one per environmental category area, with two good practices in each.
2 ENVIRONMENTAL GOOD PRACTICES

2.1 CLIMATE CHANGE & ENERGY PERFORMANCE

The Inter-Governmental Panel on Climate Change (IPCC) has confirmed that climate change is a reality and that the use of energy for human activities is largely responsible for this change. Energy Performance and Climate Change are closely intertwined, with energy performance being a key element in tackling the challenge of Climate Change.

It is recognised that local and regional governments share the responsibility of tackling global warming together with national governments. Towns and cities account directly and indirectly (through the products and services used by citizens) for more than half of the GHG emissions derived from energy use related to human activity.

As the major global issue of our lifetime, climate change is at risk of simply being viewed from a macro level. However with a growing realisation that its impacts are likely to be felt locally, pressure is increasing for strategic adaptation approaches to be devised and delivered at a local level. Adaptation action is necessary to protect people, buildings, infrastructure, businesses and ecosystems. Due to the varying severity and nature of climate impacts between regions in Europe most adaptation initiatives will be taken at regional or local level.

The EU, in line with the Kyoto Protocol, is committed to limiting the mean global temperature rise to 2 °C above pre-industrial levels, through the reduction of the emission of GHGs. Focusing on the most important one, carbon dioxide (CO₂), the Europe 2020 strategy aims to turn the EU into a so-called ‘low carbon’ economy based on renewable energy sources and energy efficiency.

The Europe 2020 strategy sets three objectives for climate and energy policy, to be reached by 2020:

- Reducing GHG emissions by at least 20% compared with 1990 levels;
- Increasing the share of renewable energy in final energy consumption to 20%; and
- Moving towards a 20% increase in energy efficiency.

These targets are also known as the ‘20-20-20’ targets. Additionally, the strategy points out that ‘the EU is committed to taking a decision to move to a 30% reduction by 2020 compared to 1990 levels. The offer is conditional on other developed countries committing themselves to comparable reductions and developing countries contributing adequately’.

The Europe 2020 strategy’s three climate and energy targets are interrelated and mutually support one another.

The EU commitment to reduce emissions will be achievable only if local stakeholders, citizens and civil society share it. Therefore local and regional governments, representing the closest
administration to the citizen, need to lead action and set a good example. Many of the actions, on energy demand and renewable energy sources, necessary to tackle climate disruption fall within the scope of local governments.

While the EU is making good progress towards meeting its climate and energy targets for 2020, an integrated policy framework for the period up to 2030 is needed to ensure regulatory certainty for investors and a coordinated approach amongst Member States.

The 2030 policy framework for climate and energy was proposed in early 2014 by the European Commission and aims to make the European Union's economy and energy system more competitive, secure and sustainable.

EU leaders agreed on 23rd October 2014 the domestic 2030 greenhouse gas reduction target of at least 40% compared to 1990 together with the other main building blocks of the 2030 policy framework for climate and energy, as proposed by the European Commission. This 2030 policy framework sets a target of at least 27% for renewable energy and energy savings by 2030.

The framework seeks to drive continued progress towards a low-carbon economy. It aims to build a competitive and secure energy system that ensures affordable energy for all consumers, increases the security of the EU's energy supplies, reduces our dependence on energy imports and creates new opportunities for growth and jobs.

The following examples selected from the applications for the 2015 European Green Leaf competition showcase what smaller cities are doing in terms of Climate Change and Energy Performance in an urban environment.
Torres Vedras

**Climate Change Adaptation Plan**

In 2015, Torres Vedras committed to completing the ‘Climate Change Adaptation Plan’ in order to identify what actions the Municipality needs to take to mitigate the negative effects of climate change. The plan is going to be developed in a participatory process with representatives from many sectors, and the support of a national group of experts. It includes a vulnerability and risk assessment of expected climate change in Torres Vedras.

The ‘Climate Change Adaptation Plan’ will be developed and integrated into the ClimAdaPT.Local project. The objective is to start a process in Portugal that will lead to the continuing development of the Municipal Strategies for Climate Change Adaptation (Estratégias Municipais de Adaptação às Alterações Climáticas – EMAAC) and their integration into municipal planning tools. The project is funded by EEA Grants and will be coordinated by the Faculty of Science of the University of Lisbon. The ClimAdaPT.Local Project is integrated into the AdaPT Program, which is supervised and managed by the Portuguese Environment Agency and the Portuguese Carbon Fund.

The ClimAdaPT.Local Project receives a total of €1.5 million in funding, of which 85% (1.27 million) is co-financed by EEA Grants and 15%, €224,000 by the Portuguese Carbon Fund (FPC).

The main stages of the project are:

- Identify main current vulnerabilities;
- Identify future vulnerabilities and adaptation;
- Identify and select adaptation options.

The main goals of the project are:

- Identify the best options for adaptation to the territory;
- Increase the resilience of the territory, improving awareness to potential extreme events;
- Anticipate the changing needs in the different productive sectors, particularly the primary sector;
- Identify new opportunities for economic, social and cultural development.

There were approximately 60 impacts identified in Stage 1, of which 21 were climate events, almost...
all relating to strong winds. The key current vulnerabilities identified included:

- Rising sea levels;
- More intense rainfall;
- Increased wind speeds;
- Increased frequency of large storms;
- Increased drought frequency; and
- Warmer temperatures.

Some of the questions, uncertainties and challenges identified after Stage 1 were:

- How to promote the issue of integrating climate change thinking and measures among the various areas of municipal action?
- How to secure human and technical resources for municipal action in this area?
- How to promote and finance the development of adaptation measures in the territory?

The outcome of Stage 1 is that it has allowed Torres Vedras to identify opportunities for improvement regarding climate adaptation measures in their territory. Some of these measures include; create organic and functional structures, that link and integrate, under the same general objective, the exploration of component and scenario construction, planning and implementation of activities, and operational response to events, promoting the integration of climate change issues into different areas of municipal action, and the monitoring and modelling of natural ecosystems.

The Municipal Strategy for Adaptation to Climate Change will conclude in April 2016. Currently, Stage 2, focusing on the identification of future vulnerabilities and adaptation, is almost complete.

For more information about Project ClimadaPT.Local go to: http://climadapt-local.pt/en/goals/
Lappeenranta

Green Energy Showroom

The Green Energy Showroom is a network of green energy organisations operating in Lappeenranta, whose members are united in the effort to achieve a more sustainable future. The network is a business-oriented concept now implemented in the South Karelia region. The network was established by local businesses in the energy and environmental industry, the City of Lappeenranta and Lappeenranta University of Technology (LUT).

The coordinator of the Green Energy Showroom is Wirma Lappeenranta Ltd. a service provider for start-up enterprises, established businesses, and tourists in the Lappeenranta region, while developing the operating environment and competitiveness of the region.

The aim of the showroom is to provide an opportunity for local enterprises to develop and market innovative high-tech solutions in the fields of energy, environmental technology and sustainable development. The network engages with the entire region by arranging competitions and events.

It has an integrated approach aimed at putting the region's new green strategy into action. In order to implement this strategy, the expertise of LUT is combined with both existing and innovative new entrepreneurship. For local residents of the area, the network is a source of practical information about regional enterprises, actions and measures, while also serving as an incentive for them to engage and participate.

The products and services of companies and organisations that belong to the network are based on the use of renewable energy, energy-efficient solutions and competencies that promote sustainable development.
The main goals of the Green Energy Showroom are:

- To promote the region as a centre of energy and environmental technology;
- To promote local enterprises among customers, partners and prospective employees;
- To promote networking and the development of the business environment;
- To provide an infrastructure for testing and demonstrating environmental and energy solutions and their functionality in northern climate conditions;
- To present high-tech objects from the region;
- To support synergy and networking between Green Energy Showroom and LUT’s Green Campus;
- To promote energy tourism in the region;
- To attract innovative investments to the region.

2.2 MOBILITY

Mobility in an urban environment is paramount to citizens’ quality of life. However, mobility is often strongly connected to air quality problems and an adverse acoustic environment; additionally as transport is carbon driven it impacts on climate change. Policies for greening transport follow three interlinked principles:

- Optimising transport demand, i.e. avoiding or reducing trips through integration of land use and transportation planning, and localised production and consumption;
- Obtaining a more suitable modal split – shifting to more environmentally efficient modes such as public and non-motorised transport for passengers, and to rail and water transport for freight;
- Using the best available technology, i.e. improving vehicle and fuel technology to reduce the negative social and environmental effects from each kilometre travelled (EEA, 2011a; UNEP, 2011).

Studies indicate that the environmental and social costs of local air pollutants, traffic accidents and congestion, can be far in excess of the amounts required to jump-start a transition to a green economy (UNEP, 2011).

The European Commission White paper on Transport 2011 (Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system) sets out a roadmap of 40 concrete initiatives for the next decade to build a competitive transport system that will increase mobility, remove major barriers in key areas and fuel growth and employment. At the same time, the proposals will dramatically reduce Europe's dependence on imported oil and cut carbon emissions in transport by 60% by 2050. The key goals that impact on cities are: urban mobility plans and a halving in the use of ‘conventionally-fuelled’ cars in urban transport by 2030; with a complete phase out in cities by 2050; to achieve essentially CO₂-free city logistics in major urban centres by 2030.

In 2013 the European Commission published the Communication ‘Together towards competitive and resource-efficient urban mobility’ COM (2013) 913. The Communication builds on the 2011 White paper on Transport and sets out how the Commission will strengthen its actions on sustainable urban mobility in areas where there is EU added value. The Commission also encourages Member States to take more decisive and better coordinated action and provides considerations for urban mobility.

The Communication states that with their high population densities and high share of short-distance trips, there is a greater potential for cities to move towards low-carbon transport than for the

---

1 Environmental indicator report 2012, EEA - 6 Air pollution and air quality
transport system as a whole, through the development of walking, cycling, public transport – and the early market introduction of vehicles powered by alternative fuels.\footnote{4 \url{http://ec.europa.eu/transport/themes/urban/doc/ump/com(2013)913_en.pdf}}

The EEA Report, ‘A closer look at urban transport – TERM 2013: transport indicators tracking progress towards environmental targets in Europe’ includes an assessment of progress towards the transport-related environmental targets set out in the 2011 White Paper and other transport and environment regulations.\footnote{5 \url{http://www.eea.europa.eu/publications/term-2013}} The report presents an overview of progress towards transport goals, showing that European transport is currently improving its environmental performance. The latest data reveal that observed values are better than the 'target path' for the overall GHG emissions, oil consumption reduction and average CO$_2$ emissions for new passenger cars targets. However, achieving the European Union’s long-term targets requires that the improvements in environmental performance will be sufficient to avoid locking the transport system into unsustainable trends.

The Reference Framework for European Sustainable Cities (RFSC) offers guidance to cities in order to encourage its citizens to change their travel behaviour e.g. trying alternatives to the car such as cycling, walking and public transport.

The following are some examples of what smaller cities in Europe are doing to tackle mobility issues in their environment.

Mollet del Vallès

Mobility Round Table

Mollet del Vallès developed the Mobility Round Table in 2005 as a means of engaging with and allowing stakeholders to participate in debate and find solutions regarding mobility matters in the city.

The Mobility Round Table provides a space for citizen participation, and involves civic associations, municipal technicians and politicians. Each participant brings their view of mobility issues in their city to the table, which creates an environment for an enriching debate of ideas that help to mould municipal mobility policies.

This participation space was key to the public debate in the development of the Urban Mobility Plan for Mollet del Vallès. In this process the municipal technicians presented their ideas and proposals which were explained, analysed and debated, which resulted in their improvement. Additionally new proposals made by citizens were adopted.

Figure 2-4 Mobility Round Table in Progress

The citizen participation process of the Urban Mobility Plan had three phases:

1. In order to identify and locate the strengths and weaknesses of urban mobility, a citizen workshop called ‘Get moving’ was organised. This consisted of three different routes observed from a specific perspective. Two of these routes were designed for elderly people and disabled pedestrians, parents, young children and for citizens in general who make use of the streets by foot. It was comprised of a walk through the city to detect critical points, architectural barriers or those elements that hinder mobility as well as the strengths and elements that facilitate walking.

The third route consisted of a bike ride through the city to analyse the difficulties and
opportunities of the city to travel by bike.

2. The Mobility Round Table stakeholders, along with citizens who participated in the ‘Get moving’ workshop attended the presentation of the analysis of the Urban Mobility Plan. In the workshop municipal technicians explained the results of the studies conducted in the city and analysed the area of local mobility. This technical work was validated and enriched with the debate that emerged from the working groups in this meeting. Each working group debated on the different modes of transport (walking, cycling, public transport, private vehicles and parking) and later, in the municipal plenary, the findings of each working group were shared.

3. At the time when the municipal technicians completed the action proposals of the Urban Mobility Plan, a citizen workshop was held where these proposals were submitted and debated in different working groups.

Figure 2-5 Members of the Mobility Round Table discussing Mobility Issues on Site

As in Phase 2 above, each working group debated a mode of transport and in the municipal plenary presented the findings of each group. In this sense the participants could evaluate the different proposals of the Urban Mobility Plan and vote which ones they considered more relevant and important to carry out.

Once the process of the Urban Mobility Plan is finished, the Mobility Round Table is the monitoring body and forum for debate on the implementation of this plan.

More information:

http://www.molletvalles.cat/DetallContinguts/_wEovPETJ6tfjBkvseU7ypwiiYkjhiVw
Siena

Siena Carbon Free - Zero Emission Vehicles by 2019

Siena has taken many relevant measures that are being, or have been, implemented in the city regarding their efforts to be carbon free. The administration of Siena wants to encourage a smart way to move that, in addition to protecting the environment and health, triggers research and employment. One such measure is the target set for all commercial vehicles entering the city centre to be zero emission vehicles by 2019 at the very latest. If achieved, this would mean that Siena will deliver the target set in the Commission’s 2011 Transport White Paper for 2030 of achieving essentially CO₂-free city logistics eleven years earlier than proposed.

In order to achieve to free its historical city centre from cars and commercial vehicles and to reach the 2019 target, the citizens of Siena explored how to address the issue of freight transport in the city without adversely effecting citizens’ quality of life and without compromising fundamental activities like the delivery of parcels to homes and businesses. Consequently restrictions have been put in place regarding the size of vehicle and the amount of goods that can be carried within the historical centre.

A group of Siena’s citizens has also recently invested in small sized electric commercial vehicles, which they use to deliver packages and parcels in the city centre only. The service, called ‘Taxi Merci,’ has a logistics hub which receives the goods from courier companies and subsequently delivers the goods using the electric vehicles, within the city walls.

These freight measures are complemented by many other measures that are being implemented in Siena to reduce CO₂ emissions, including: the development of on-demand public transport with the introduction of e-bikes, and car sharing.

Siena has also prioritised the use of public transport and soft mobility by expanding park and ride services at the entrances to the city and discouraging parking within the city with appropriate tariffs put in place.
The City also has a comprehensive approach to the development of electric mobility. Sustainable mobility continues to grow with electric mobility now a full reality in Siena. The City has a network of 43 electric charging points and 15 information kiosks located throughout the city. Around 33 of these charging points have been strategically positioned in various parts of the city and 10 points are also located in the neighbouring towns of Asciano, Castelnuovo Berardenga, Monteroni d’Arbia, Rapolano Terme and Sovicille, to facilitate and encourage electric vehicle use.

The use of the charging station by users is easy and secure. You have just to register to the service through the use of a special card issued by any energy company operating in the field of electric mobility. The charging stations, active 24 hours a day, will give electric vehicles full freedom of movement within the city and the municipalities of the province. Users can also recharge the vehicles at any other infrastructural point deployed throughout the country that has adopted a similar charging system. Through the internet the exact location of all electric recharging points across Italy can be located: a special smartphone application also provides the location and distance of the charging point to the position of the vehicle.
2.3 BIODIVERSITY & LAND USE

As the urban population grows, it is easy for municipalities to neglect the need for green areas, and sacrifice these spaces for Urban development such as residential, commercial and industrial growth. Green spaces, quiet streets and recreational parks are vital to the well-being of citizens and it is imperative that these areas are maintained and enhanced within the urban environment.

Closely related to the implementation of green urban areas in cities, is the need to maintain nature and biodiversity in urban settings. Biodiversity matters for Ethical, Emotional, Environmental and Economic reasons. Ecosystems have intrinsic value. They provide emotional and aesthetic experiences. They offer outstanding opportunities for recreation. They clean our water, purify our air and maintain our soils. They regulate the climate, recycle nutrients and provide us with food. They provide raw materials and resources for medicines and other purposes. They form the foundation on which we build our societies.6

The social impacts of nature and biodiversity are endless, providing aesthetic pleasure, artistic inspiration and recreation. The impact on health and well-being is also crucial. Normally associated with more rural areas, it may come as a surprise that cities can be very biologically diverse places. Cities are required to recognise the delicacy of biodiversity, the negative effect that urban sprawl can have on it and their policies which will protect it.

Urban sprawl is a natural occurrence within cities. A balance between the needs of urban, rural and residential areas is needed and sustainable land use policies and practices need to be in place to help find this balance. The Territorial Agenda of the European Union was developed and adopted informally in 2007 by EU ministers to promote spatial development plans to address sprawl and promote stronger partnerships between urban and rural areas. The EU’s Global Monitoring for Environment and Security (GMES) programme enables the monitoring of land use in Europe through mapping at continental (‘CORINE land cover’) and local hot spot (‘Urban Atlas’) areas.

The EU utilises funding programmes to foster green space initiatives such as the ‘Green and Blue Space Adaption for Urban Areas and Eco Towns’ (GRaBS) project which is supported by Cohesion Policy funds and promotes urban planning efforts aimed at preserving and adapting open spaces to improve quality of life while also combating climate change.

The EU has committed itself to the protection of biodiversity through different policy actions. It is a Party to the Convention on Biological Diversity (CBD) 1992, which seeks to ensure the conservation and sustainable use of the diversity of species, habitats and ecosystems on the planet. The EU has adopted a series of measures to implement this Protocol, the most recent of which was in March 2010. It was pledged to halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restore them in so far as feasible. CBD parties agreed in 2010 on 20 key biodiversity goals, which are known as the Aichi Biodiversity Targets. Cities play a central part in achieving these goals because they are the place where nature is at the same time most useful to people's well-being.

---

6 http://ec.europa.eu/environment/nature/biodiversity/intro/index_en.htm
and most endangered by urban sprawl and modern living – and also because cities are places of politics and decision-making, that can make a difference with nature and biodiversity-related policies.

Directives which require the integration of biodiversity concerns into spatial planning is one way the EU have employed to reach the 2020 target. These Directives are the Habitats (92/43/EEC) and Wild Birds (2009/147/EC) Directives which require Member States to protect habitats and species of EU conservation concern. Through these Directives it has been recognised that the most important sites for these habitats and species should become protected areas. This led to the establishment of the Natura 2000 network which is the largest network of protected areas in the world. It comprises of over 26,000 protected areas with an area of more than 750,000 km² which is nearly 20% of the EU’s land area.

The following are some examples of good practice in the area biodiversity and land use submitted by cities in this year’s competition:
The City of Mikkeli organised a two-stage architecture competition in 2012–2013 for the area of Satamalahti, at the shoreline of Lake Saimaa, the largest lake in Finland, and the fourth largest natural freshwater lake in Europe. Mikkeli is one of several towns on its shoreline.

The purpose of the competition was to increase the density of Mikkeli’s city structure by designing a new model area for green, ecological construction, extending the city centre to the Lake Saimaa shoreline. In the competition the City of Mikkeli was seeking a feasible, functional, innovative and high-quality sustainable solution for an area extending the city centre which would fulfil the city’s strategic aim of being a ‘Growth centre for modern services on the shore of Lake Saimaa’ and at the same time kick-start ecological development of the Saimaa shoreline. The size of the competition area was approximately 93 ha, including the water.

The competition took place in two stages:

- Phase One: 22.5.2012 – 1.10.2012

The competition entries were examined on their ecological approach and on how efficiently the entries reduced carbon footprint. Entries were at liberty to suggest measures by which carbon footprint can be minimised. Measures which required material choices were to take into account the architectural impression of the entire competition area. Various aspects to be taken into consideration when submitting to the competition were:

- Ecological Development
- Energy
- Storm Water
- Mobility – Pedestrians, Cycling, Traffic and Parking
- Tourism
- Waste and Wastewater Treatment Plant
- Noise
- Harbour, Shoreline and River Park
The competition area will be seen as an example of the opportunities for ecological community building in terms of technical realisation as well as architectural and artistic goals.

Below you can view the winning proposal, ‘Vesireittejä’ which translates as Waterways.

![Figure 2-9 The Winning Proposal, ‘Vesireittejä’ meaning Waterways](image)

The strengths of this entry was the special attention it had given to non-vehicular traffic and public transport functions, a car-free city centre, use of solar panels, use of lake water for cooling in summer, storm water absorption and retention, large uninterrupted roof gardens on the Science Centre, the size and connectivity of green areas, decontaminated soil for landscaping, wood construction, and the proposal for the heaping of cleared snow in green areas (probably better for meltwater than heaping it on the ice of the lake).
Inverness

Eco-Schools

Eco-Schools are an international initiative operated by the Foundation for Environmental Education, designed to encourage whole-school community action on Learning for Sustainability. It is an environmental management tool, a learning resource and a recognised award scheme which empowers children and young people to take action towards an economically, socially and environmentally just world.

It connects 15 million children, young people and educators through sustainable development education and is the biggest learning network in the world. The Eco-Schools programme is managed in Scotland by Keep Scotland Beautiful, and the Highland Council has partnered with them to deliver the Eco-Schools programme in Inverness. The Countryside Rangers are the key contact for schools working towards Eco-Schools status. All schools have a designated Countryside Ranger who works across associated Schools Groups.

All 50 schools in Inverness have been awarded an Eco-Schools Bronze award (or greater), with 35 reaching Silver award status, and 14 achieving Green Flag status.

Eco-Schools activities are decided by the school, and cover a wide range of activities including:

- Improving the school’s environment
- Reducing litter and waste
- Reducing energy and water use
- Devising sustainable ways of travelling to and from school
- Promoting healthy lifestyles
- Encouraging active citizenship
- Building strong partnerships with a variety of community groups
- Developing international and global links

Schools can choose to dedicate specific time to Eco-Schools projects, as well as include them in the wider curriculum. For example, Lochardil Primary School has integrated the Eco-Schools programme across all areas of the curriculum. Recently Primary 5 pupils (9 year olds) conducted a litter survey on the school grounds as part of their maths work on data handling, which also fit into their current Eco-Schools theme of waste and litter. After the children analysed the results in their maths lessons, they found that the majority of the litter was from sweet wrappers. They reported back to the Eco Group.
with suggestions to reduce littering, and improve healthy eating choices at the school.

Another example of this kind of integrated approach is from Dalneigh Primary School, which have recently achieved their second Eco-School certification, achieving the Silver award and Green Flag status. Some recent activities include the Primary 6 class (10 year olds) hosting a Rainforest Café to explore the links between deforestation, chocolate production, fair trade and healthy eating.

A requirement for Eco-Schools status is that both pupils and adults are actively involved in deciding what sustainability and environmental themes they want to focus on. Muirtown Primary School’s Eco Committee decides on the topics each year will cover. This year topics included litter and waste, water resources, healthy eating, biodiversity, Fairtrade and energy. Pupils are also working on a new project called Grounds for Learning, in partnership with a local community group, which provided a polytunnel to help teach pupils about growing different types of plants, to plant new gardens to help improve the biodiversity of the school grounds as well as growing vegetables to eat, to help discussions on healthy eating and food production.

Figure 2-11 Lochardil Primary students conducting a recent Litter Survey
2.4 QUALITY OF AIR & THE ACOUSTIC ENVIRONMENT

Clean air is vital to our well-being and cities play a vital role in delivering programmes to maintain air quality in the urban environment. Economic activities, in particular those related to road transport, power and heat production, industry and agriculture, emit a range of air pollutants. These have direct and indirect effects on human health, and also adversely affect both ecosystems and cultural heritage.

In December 2013 the Commission adopted a Clean Air Policy Package consisting of a new Clean Air Programme for Europe with new air quality objectives for the period up to 2030 and a revised National Emission Ceilings Directive with stricter national emission ceilings for the six main pollutants, namely sulphur dioxide (SO₂), nitrogen oxides (NOₓ), ammonia (NH₃), fine particulate matter (PM₂.₅), methane (CH₄) and non-methane volatile organic compounds (NMVOC).

Particulate Matter (PM), Ozone (O₃) and Nitrogen Dioxide (NO₂) are broadly considered to be Europe's most problematic atmospheric pollutants in terms of harm to human health. In particular, both high PM and O₃ pollution have been linked to reduced life expectancy and to cardiovascular and chronic respiratory problems. Ozone is a secondary pollutant formed in the atmosphere by the chemical reaction of hydrocarbons and nitrogen oxide ions in the presence of sunlight. As part of Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe, a target value was set for 2010 whereby 120 μg/m³ is not to be exceeded on more than 25 days per calendar year averaged over three years. For other pollutants limit and target values are also set.

The quality of the acoustic environment is an important element of the urban environment and a challenging issue facing city administrations. It impacts on the quality of life of the population of a city. Ambient sound levels that are beyond comfort levels are referred to as environmental noise pollution. This can be caused by many different sources, such as traffic, construction works and industry as well as some recreational activities. Excess levels of noise can cause damage to hearing, increased stress levels and unnatural sleeping patterns. According to World Health Organisation (WHO) research it is estimated that one in five Europeans are regularly exposed to sound exceeding 55dB at night.

The Environmental Noise Directive (2002/49/EC) relates to the assessment and management of environmental noise. Its principle aim is to ‘define a common approach intended to avoid, prevent or reduce, on a prioritised basis, the harmful effects, including annoyance, due to the exposure to environmental noise’. The Directive refers to noise that people are exposed to continuously and not to noise created by persons themselves, their neighbours, their workplaces or while in transit. Its aim is to provide a basis for developing EU measures to reduce noise emitted by major sources, in particular road and rail vehicles and infrastructures, aircraft, outdoor and industrial equipment and mobile machinery. The underlying principles of the Directive include:
- Monitoring environmental noise pollution through the development of ‘strategic noise maps’ for major roads, railways, airports and agglomerations, using harmonised noise indicators Lden and Lnight.

- Informing and consulting the public about noise exposure, its effects, and the measures considered to address noise.

- Addressing local noise issues by developing action plans to reduce noise where necessary and maintain environmental noise quality in areas where it is good.

- Developing a long-term EU strategy, which includes objectives to reduce the number of people affected by noise in the longer term, and provides a framework for developing existing Community policy on noise reduction from source.

EU regulations on noise management have been based on internal market objectives such as setting harmonised noise limits for motor vehicles, household appliances and other noise-generating products. These laws have encouraged the development of innovations that can help limit noise pollution, such as low noise tyres and more silent road surfaces, as well as noise barriers and soundproofing.

A number of applicant cities for the 2015 competition have demonstrated the use of noise reduction and air pollutants’ emission control measures, two examples of which are outlined as follows:
Ludwigsburg

Low Emissions Zone (LEZ) and Emissions Control Windscreen Stickers

Since 1st March 2008 the city of Ludwigsburg, as part of the state of Baden-Württemberg, has introduced a low emission zone in an aim to mitigate air pollution caused by fine particles in the city centre. This measure, together with the adoption of an identifiable green windscreen sticker on allowed vehicles, which respect the emission limits, was set down. Low emission zones have been introduced in many German cities to mitigate air pollution caused by fine particles (PM) and nitrogen oxide (NOx).

In 2013, the first regional low emission zone came into force, called ‘Ludwigsburg and environs’. These low emission zones are helping to contribute to meeting the Europe-wide limit for fine particles. These measures have also contributed to the clean air plan of the City of Ludwigsburg.

What is a Low Emission Zone?

Low emission zones are generally in urban areas where a ban on vehicles with high emission levels applies. The control over road traffic is an important factor in the endeavour to provide clean air. The quality of air is improved by restricting traffic in low emission zones. There is a marked reduction in emissions of diesel soot, which is especially harmful to health owing to its carcinogenic properties.

![Traffic Signs indicating LEZ Zones](image)

Low emission zones are identified by traffic signs and additional signs; these indicate the colour sticker that vehicles must have in order to enter a low emission zone. A traffic sign has been incorporated in the Road Traffic Regulations to designate low emission zones.

Vehicles are divided into emissions groups according to their particulate emissions and they receive a sticker with a colour matching them to their specific emissions group; red for emissions group 2, yellow for emissions group 3 and green for emissions group 4. Vehicles belonging to emissions group 1 will not be issued a sticker. Electric vehicles and vehicles belonging to emissions group 5 and 6 also receive a green sticker. All vehicles must be marked with stickers (on the windscreen inside the vehicle) and a vehicle must meet certain criteria for the each of the different colour stickers. These stickers are valid for all low emission zones in Germany. A driver may only drive their vehicle in a zone for which they have a sticker that is permitted in that low emission zone. Vehicles which are not
given a sticker due to their high emission levels may not enter low emission zones.

<table>
<thead>
<tr>
<th>Schadstoff-gruppe</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plakette</td>
<td>keine Plakette</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Diesel</td>
<td>Euro 1 schlechter</td>
<td>Euro 2 schlechter</td>
<td>Euro 3 schlechter</td>
<td>Euro 4 schlechter</td>
</tr>
<tr>
<td></td>
<td>mit Partikelfilter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benziner</td>
<td>ohne geregelten</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Katalysator</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 2-13 Example of LEZ Windscreen Stickers**

Driving in a low emission zone where a ban on vehicles applies is only allowed if a vehicle has special permission or if general exceptions have been issued for certain kinds of trips. Driving in a low emission zone without a sticker or with a sticker that does not conform to the regulations in the low emission zone (except in cases where exceptional permission has been granted) will incur a fine of 80 euros.

The stickers serve to label vehicles in accordance with their emission levels. This facilitates the control of traffic restrictions for vehicles with poor exhaust emission values. The labelling scheme applies throughout Germany and involves four emissions groups based on the European exhaust emission standards (Euro standards).

Since 2013, Ludwigsburg has now achieved the third level of the low emission environmental zones. Since reaching this level, all vehicles must now have a green emission sticker displayed in its windscreen in order to be allowed to drive in the municipal area.
Mollet del Vallès

**Acoustic Zoning**

The municipality of Mollet del Vallès has carried out Acoustic zoning of the municipal area by identifying and classifying the different types of land use. This zoning is a very important management tool for improving and maintaining the quality of the acoustic environment in Mollet.

The city of Mollet is surrounded by main roads and rail infrastructure and added to this there is an internal circulation of vehicles that produce a high level of road traffic, this provides the main source of noise in the city.

With the aim of minimizing harmful effects on people and the environment and to also comply with European, national and regional regulations in relation to noise pollution, the city of Mollet created the Ordinance of Noise and Vibration in 2007, to establish rules and criteria of a good acoustic environment based on noise levels and vibrations caused by neighboring activities and internal traffic as well as to help prevent and correct this kind of noise pollution. The ordinance also included a Map of the Acoustic Capacity of the municipality, which expresses the values of noise that the City aims to achieve.

![Figure 2-14 Acoustic Capacity Map](image)

In July 2012, a new Map of Acoustic Capacity was approved which adapted changes in the regulations. This was drawn up from a Map of Real Noise in the city, based on the Map of Land Uses.
from city regulations and the results of extensive surveying of real measures of noise taken during the day, evening and night time. Some of these measures were taken thanks to citizen collaboration.

Acoustic capacity maps help establish acoustic zones and immission limit values of noise in the external ambient in accordance with sound sensitivity areas, fixing the maximum immission levels for each zone for a specific period of time; day, evening and night. All of them expressed in decibels (dB).

The acoustic zoning takes into account urbanised areas, new urban developments, sectors of the territory affected by general systems of transport infrastructure and other public facilities, as well as areas of natural interest or special protection against noise pollution.

![Figure 2-15 Map of Real Noise in Mollet del Vallès](image)

Through this zoning, there can be regulation of both the activities and noise from the neighborhood, as well as appropriate transport infrastructure. It is therefore a basic tool for the resolution of sound conflicts in the municipality.

Finally, it is useful for the City Council to use a Map of Noise Conflicts, and overlay it with the Map of Real Noise and the Map of Acoustic Capacity, in order to obtain areas where noise exceeds the limits of sound for periods of the day, evening and night to plan actions to reduce the noise of the town, especially on streets.

For more information:
[http://www.molletvalles.cat/DetallContinguts/_wEovPETJ6tdIs0ftIv8lEoiWdklYMgc8](http://www.molletvalles.cat/DetallContinguts/_wEovPETJ6tdIs0ftIv8lEoiWdklYMgc8)
2.5 WASTE & GREEN ECONOMY

In waste management, it is important to encourage the shift towards prevention and recycling in tandem with a green economy. The development of a green circular economy is one that can significantly reduce environmental risks, the demand for virgin resource materials and the impact on the network of ecological sites across Member States. The transformation of our economies in this manner has the potential to improve the well-being of citizens and contribute towards a more equitable society. In the past, economic growth often seemed to depend on using up natural resources as though resource supplies were unlimited. The consequence of our actions has significantly increased the pressure on our natural resources, with the risk of resource shortages and rising prices a tangible concern which requires immediate action.

Today, growing numbers of citizens and economists are looking to different economic models, where wealth can be created without harming the environment. Managing waste materials as a valuable resource with potential for reuse, recycling or recovery has now become a growing focus across Europe. Waste that is merely disposed of is a loss of resources and represents an inefficiency of the economy which needs to be tackled.

The EU Waste Framework Directive (2008/98/EC) is the cornerstone of EU waste policy. It introduced the five-step waste hierarchy, with waste prevention as the best preferred environmental option, followed by preparing for reuse, recycling and other forms of recovery including energy recovery. Disposal is the least preferred option and with the implementation of landfill bans and economic instruments e.g. taxes is now an obsolete waste treatment in many EU Member States. Furthermore, life-cycle thinking was also introduced as a new waste policy concept. Today EU waste legislation has a strategic approach to waste and resource efficiency, setting out legislative frameworks for the management of different waste streams accompanied by material specific recycling and recovery targets. For example, the 2015 target for recycling of vehicles will be 85% and the recovery target (including energy recovery) will be 95%. The EU 'Roadmap to a Resource Efficient Europe' sits alongside the waste framework directive and reinforces this approach.

In 2013 approximately 481 kg of municipal waste\(^7\) was generated per person in the European Union. This represents almost a 9% decrease since 2002 and shows a downward trend in waste generation across Europe. This is a positive result but across Europe consumption patterns remain resource intensive and as a result the generation of waste remains high. The challenge into the future will be to decouple waste further from economic growth as part of a widespread transition to more resource efficient economic models.

The following examples showcase what some of the EGL applicant cities are doing in terms of Waste and Green Economy:

\(^7\) Municipal waste is defined as ‘waste generated by households, and also includes similar waste from sources such as shops, offices and public institutions’.

Data on municipal waste generation in the Netherlands is not available as municipalities in the Netherlands are by law only responsible for the collection and environmentally safe treatment of household waste.
EcoSairila

EcoSairila, is an innovative project under development which is a key part of the City of Mikkeli’s development strategy, encompassing waste and resource efficiency it aims to create a new growth centre for green industry in Mikkeli. The EcoSairila coordination project 2015-2016 is funded by EU Structural Funds.

The project will provide a unique environment to develop and pilot new techniques and concepts for the circular economy and eco-efficient treatment solutions.

The location of the project centre is approximately seven kilometres from Mikkeli’s city centre, at the Metsäsairila waste handling centre which covers 60 hectares. The planned land use in the project will allow for more than 100 hectares of new industrial area alongside the waste treatment centre.

The area offers ideal operating conditions for environmental technology companies. A Research, Development and Innovation (RDI) plan is also being developed for EcoSairila to support environmental research, training and innovation activities.

A new wastewater treatment plant is being constructed in connection with the waste treatment centre at Metsäsairila in Mikkeli, and a biogas plant is also planned in the same area. Locating the waste treatment centre and new wastewater treatment plant in the same area creates industrial symbiosis opportunities to develop a strong R&D and business environment for eco-business operations in the area.
Possibilities for Industrial Symbiosis

- Refining waste and recycled materials;
- Wastewater reuse;
- Production of biogas fuel for transport;
- Nutrient recovery from sludges and biowaste: fertilizers and soil improvers, also for organic farming;
- Local energy production from waste wood;
- Shared online monitoring platform: environmental and process monitoring, reporting; and
- Showroom, new innovative ideas.

RDI Co-operation

- Lappeenranta University of Technology;
- Mikkeli University of Applied Sciences;
- Companies; and
- Innovation and Technology Centre Miktech Ltd.

The core objective of this project is to take process management and environmental protection to new level by means of smart measurements, monitoring and information management. In addition to the potential economic benefits, this would achieve significant environmental and social benefits.

![Figure 2-17 Planned Area for Two New Plants beside Metsäsairila Waste](image)
Mollet del Vallès

Green Point Mobile Initiative and Vehicle

At the end of 2008, the Catalan Government granted financial support to Mollet del Vallès City Council, for the implementation of a special waste collection vehicle project to provide citizens with greater access to outlets to recycle waste materials. The Green Point Mobile vehicle was introduced to act as a collection point for waste throughout the municipality.

The Green Point Mobile vehicle cost approximately €72,000 and it is a class two dump vehicle. It has stairs at the rear of the vehicle where users can enter to deposit their waste items in allocated bins. Items are source separated by different material type.

In November 2009 the Green Point Mobile vehicle service was fully implemented in the city. A single staff member spends 80% of his working time in the Green Point Mobile vehicle. The vehicle operates from Tuesday to Sunday each week, travelling throughout the municipality, parking for up to five hours at various points in the city’s neighborhoods allowing citizens to drop off waste to the vehicle.

The following items are accepted:

- Small bulky items;
- Mineral and vegetable oils;
- Batteries, fluorescent lights, bulbs, CDs, WEEE (electronics), etc.;
- Paints and solvents;
- Paper and cardboard, glass and packaging;
- Clothing; and
- Other items.

These different waste items are then transported in the vehicle to the Green Point Fix waste facility for recovery, recycling or appropriate treatment.

The average number of users of the mobile waste collection point has reached over in 7,500 per year. In order to encourage citizens to use the Green Point Mobile service, the municipality has
implemented a loyalty card system which allows citizens to receive a 10% discount on waste tax, after they have used the service at least 5 times a year.

![Image of loyalty card system]

**Figure 2-19 Inside the Green Point Mobile Vehicle**

With the aim of increasing the recovery and recycling of materials in Mollet, a new service of dismantling furniture has also been implemented at the Green Point Fix facilities.

![Image of furniture dismantling service]

**Figure 2-20 Example of the Loyalty Card for using the Green Point Mobile Service**

For more information:
http://www.molletvalles.cat/DetallContinguts/_wEovPETJ6te0_deY3ed6fdCx0nq5AiTN

http://molletmesnet.molletvalles.cat/deixalleria.php
2.6 WATER MANAGEMENT (INC. WASTEWATER TREATMENT)

The EU Water Framework Directive (WFD) acknowledges that modern water management needs to take account of the environmental, economic and social functions of water resources throughout an entire river basin (EEA, 2007). Indeed, more and more countries are considering both supply and demand in their river basin management plans, and particularly in their public water management (EEA, 2010).

Water pricing and governance are among the strategies and measures employed to encourage sustainable use. The WFD requires Member States to take account of recovery of the costs of water services (including environmental and resource costs) from users including farmers, industry and ordinary household consumers, based on the polluter-pays principle (EEA, 2007, 2010a).8

Water metering provides a high incentive to save water, and experience shows that households with water meters (and associated charges) generally use less water than those without them. Currently, only some European countries meter the majority of water uses; often metering is still limited, especially relating to agricultural water use.

The treatment of wastewater is a vital step in the continuous water cycle but also in terms of protecting the natural environment. With great advances in wastewater treatment and the corresponding increase in the quality of water discharged into the received environment, all stakeholders are benefiting.

A clean urban environment is among the goals of the Urban Waste Water Treatment Directive (91/271/EEC). Its objective is to protect the environment from the adverse effects of urban wastewater discharges and discharges from certain industrial sectors.

This Directive requires all cities and towns with populations of 2,000 or more to have sewage collection systems in place and to treat the wastewater to certain minimum standards before it is discharged into the environment. This legislation has helped to clean up rivers, lakes and coastal areas and has been essential for meeting the health-based standards of the Bathing Water Directive (2006/7/EC).

The following examples showcase what cities are doing in terms of Water Management and Wastewater Treatment.

---

Strovolos

Use of Boreholes and Ground Water in Strovolos Municipality

Strovolos Municipality reuses ground water through boreholes for the irrigation needs in parks and green areas within the municipal boundaries. The ongoing drought and reduced water reserves in Cyprus prompted the municipality to find alternative water sources. Drinking water is not used for irrigation of green areas.

The Environmental Development Department of the municipality manages approximately 102 boreholes. The Municipality ensures the necessary permits are obtained from the Ministry of agriculture, environment and natural resources for the excavation of boreholes, drilling then takes place and a water pump is fitted into each borehole in order to be connected to the automatic water system of the park. National legislation in Cyprus requires all boreholes to have water meters installed.

The Department of Environmental Development gets a monthly recording from the water meters for each borehole and can therefore evaluate water consumption. Due to this water register analysis the department is able to detect the loss of water or the excessive consumption of water from boreholes.

Figure 2-21 Automatic Irrigation Control Systems & Underground Irrigation Systems

Automatic irrigation control systems are used and installed in all parks, these systems include:

- Time switches which let the electricity pass for the pump to start working on specific hours each day;
- Irrigation computers which provide specific work days and hours for each irrigation system;
- Solenoid valves (AC) or DC valves (with battery) which let the water pass from the borehole into the water pipes;
- Press controllers which give the order to the pump to start working when the pressure of the
irrigation system is low. Booths with pressered air of specific set pressures are connected with the irrigation pipes and the electronic control system give the order to the valve to open and let water through it at any time starting the pump. When the valve closes the pressure in the system is increased and the pump stops working;

- In areas where boreholes do not have large amounts of water, water tanks are used to store water and with a second pump the water from tanks can be used for irrigation.

Each irrigation system is designed by the agriculturalists working in the Municipality, which are adapted according to the water needs of the city, the season and local temperatures along with the size of the plants. By taking all these aspects into account it ensures that the quantities of water pumped out of boreholes are not more than that is actually necessary at the time. Other water saving methods are incorporated into the irrigation systems like the use of drippers on polyethylene pipes to ensure that the amounts of irrigation water for each plant is only what is required.

Furthermore, underground irrigation systems are installed for the irrigation of grass on main roads since 2006 in an effort to reduce water loss. The aim is to reduce water evaporation and benefit the plant roots with the soil moisture, as a result less water is required to cover the plants irrigation needs. It has low maintenance costs and there is no water loss due to wind as is the case with sprinklers. The reduced water flow on the roadway provides safety to drivers and pedestrians.

Strovolos Municipality has a skilled set of workers who maintain and repair irrigation systems and drinking water taps in all green areas and parks daily. Automatic water taps are used in parks for drinking water to prevent water loss and the District Water Board informs the municipality directly if there is excessive consumption of drinking water in parks and building premises.
The Environmental Education Centre (EEC) in Torres Vedras came about through participation in the Greenmed Project on green public procurement, which was funded by the EU LIFE program.

The centre was originally founded in 2005 to provide environmental education and activities for citizens. However, the building became too small for all the activities, and so the development of a new sustainable pilot building took place in order to suit the needs and goals of the centre.

The new EEC, located in Varzea Green Park, was inaugurated in September 2013. It encompasses an enclosed area of 661 m², and an open area of 432 m². The new building establishes connections between the centre and the surrounding natural environment through diverse paths and routes, connecting the city and the sights of the park.

The building helps to achieve the multiple objectives of educating and raising public awareness of the benefits of sustainable and environmentally effective construction, the use of renewable energy sources and the inherent savings with this method of building design, construction and occupation.
The EEC is a sustainable pilot building which aims to integrate a large number of sustainable energy and bioclimatic systems. The building has achieved a Class A+ environmentally sustainable building Certification, and also has (LiderA) Certification, a voluntary National Certification System, for Sustainable Construction developed by the Instituto Superior Técnico, Lisbon University.

Below are some of the key sustainable systems incorporated into the building:

- **Water**: The building has an energy saving water system which incorporates the recovery and reuse of gray water and rainwater. A routing system for rainwater was made by installing two 10,000 litre underground water tanks located outside the building, ensuring that rainwater is protected from light and temperature variations, to prevent against the formation of algae and certain micro-organisms.

- **The water** is treated by a filtering process control and chlorine injection and is then pressurised to feed alternative network cisterns.

- **A buried drop by drop system** was installed as an alternative method to the traditional spraying, which achieves approximately 25% water savings. Due to reduced evaporation, the effect of the wind is cancelled, particularly in the coverage area. The watering area of the garden corresponds to an area of 1,653 m² and includes green roofs and courtyards of the building.

![Underground Water Tanks and Buried Drop by Drop System](image)

- **Sun**: The building has been designed to take advantage of natural light and shading. Walls, windows and ceilings have been designed in order to make the best use of the building’s location, orientation and design with respect to solar radiation, ventilation and natural lighting. A Solar Thermal System and Photovoltaic System, with 11 modules, were installed, producing an estimated production of 4010 kWh/year.

- **Wind**: A Wind Turbine System produces up to 3.2 kW peak, and the nominal speed of 12 m/s has a power of 2.5 kW.

- **Land**: Geothermal System function is cooling in summer and heating in winter.
Resources: Some inner walls are to be constructed using recycled materials.

The Municipality has received a Sustainable Procurement Award sponsored by LNEG (National Laboratory of Energy and Geology), due to the public procurement process with environmental criteria used in the Environmental Education Centre Building.

**Environmental Education**

The building contains areas for interactive games with environmental themes, a laboratory, a restaurant with incorporated environmental education activities, and a permanent exhibition on the different topics related to environmental sustainability. In the first year the centre held 437 environmental education activities for 17,010 participants.

A broad range of activities are developed in the Centre, including: awareness raising sessions, thematic daily sessions, laboratory sessions, study visits, commemorative dates, afternoons in the centre, workshops, contests, blue flag activities, holiday workshops and beach clean-up actions.

The main topics covered in the activities are: Water, Waste, Composting and Recycling, Biodiversity, Sustainable Consumption, Mobility, Energy, Climate Change, Noise, Coastal Areas, Oceans, Tree and Forests, Environment and Nature Conservation.

![Children Learning at the Centre](image)

**Figure 2-25 Children Learning at the Centre**

The ideas and concepts that were realised through the development of this sustainable building can be reproduced in other projects. The know-how and background work has been done in order for the building to have achieved the A+ Class and this can be re-used and applied to other projects. The knowledge gained through this project is transferable to everyone who aims to build a sustainable building.
APPENDIX A

Expert Panel Profiles
Category No. 1 – Climate Change & Energy Performance

Expert: Mr. F. Javier González Vidal, Atmospheric pollution technical advisor, Regional Government of Valencia – D.G. Environmental Quality, Spain

F. Javier González Vidal is an Industrial Engineer by the Polytechnic University of Valencia. Throughout his professional career he has always focused on the promotion of environmental respect, both at the regional and international level.

For the last 13 years he has been working for the Regional Government of Valencia in the D.G. Environmental Quality, where the activities and responsibilities of the job have provided him with a wide view of the situation related to the intensive use of energy, climate change, polluting emissions and air quality.

The development and implementation of policies to fight air pollution and climate change have been one of his priorities, having used emissions inventories as a key tool to assess effectiveness. During this period some of the main tasks he has been involved in have been the development, implementation and monitoring of the policies included in the regional Climate Change Strategy and the implementation of the EU ETS, the management of the PRTR register, and the air quality network analysis and subsequent development of air quality actions plans.

He was a member of the Climate Change Committee of the European Commission as a representative of the regional governments of Spain in order to express their opinion during the negotiations of the European policies.

Since 2005, as a member of the Roster of Experts of the United Nations Framework Convention on Climate Change, Javier contributes to the review of national communications and inventories, focusing in the energy chapter, according to the Kyoto Protocol commitments. He has cooperated actively with D.G. Enlargement providing technical support to EU partner countries with regard to the approximation, application and enforcement of EU environmental legislation through the Technical Assistance and Information Exchange instrument.

During 2013 he has worked with the Ministry of Environment of Brazil, in the context of the sectorial dialogues between the EU and Brazil, on the Climate Change and Energy Efficiency Chapter.

Category No. 2 – Mobility

Expert: Dr. Ian Skinner, Director of Transport and Environmental Policy Research, London, UK.

Ian Skinner is an independent researcher and consultant with over 20 years of experience in undertaking research and consultancy projects focusing on the environmental impacts of transport.

His PhD from University College London was on the implementation of sustainable transport policies in South East England and he has also undertaken research at the University of Kent on the marginal cost pricing of transport.
Since his PhD, Ian has worked at the Institute for European Environmental Policy (IEEP) and AEA (now Ricardo-AEA) before co-founding TEPR in 2009. Ian’s work focuses on the implementation and evaluation of sustainable transport policies for national and international organisations. Much of Ian’s work has been undertaken at the European level for the European Commission, which has involved impact assessments and evaluations of various EU transport and environmental policies.

He has also worked for UNEP, including in support of their EST goes EAST project, and been an independent evaluator for the European Commission. Ian was invited to draft the chapter on European transport policy for an Edgar Elgar book Research Handbook on Climate Change Mitigation Law (Van Calster and Vandenberghhe (eds)), which was published in early 2015.

Category No. 3 – Biodiversity and Land Use

Expert: Ms Ir. Hedwig van Delden, Director, Research Institute for Knowledge Systems (RIKS), Maastricht, The Netherlands & Associate Professor, the University of Adelaide, Australia

Hedwig van Delden is the Director of the Research Institute for Knowledge Systems (RIKS) in Maastricht, the Netherlands and Associate Professor at the University of Adelaide, Australia. After graduating from the University of Twente as a Civil Engineer in Water Engineering and Management, she started working at RIKS as a Policy Analyst and in the following years rose to the position of Director.

Over the years she has taken on many roles ranging from Researcher to Project Manager and Project Leader in projects worldwide working on integrating models from a broad range of fields such as land use change, hydrology, economics and transport and making them applicable for policy support.

Her academic work focuses on issues relating to land use change modelling, integrating socio-economic and bio-physical processes, bridging the science-policy gap and scenario studies. In this capacity she has authored or co-authored a long list of peer-reviewed journal articles and book chapters. She recently gave a keynote lecture at the 20th International Congress on Modelling and Simulation in Adelaide, Australia on integrated modelling for policy support.

Category No. 4 – Quality of Air & the Acoustic Environment

Expert: Prof Dr Diogo Alarcão, Specialist in Acoustic Engineering. Principal Researcher and Professor at Instituto Superior Técnico University of Lisbon, Portugal & the Polytechnic Institute of Lisbon, Portugal.

Diogo Alarcão is a Physics Engineer with a PhD in Acoustics. He is Principal Researcher and a Professor in the scientific area of Acoustics at Instituto Superior Técnico, University of Lisbon, Portugal.

He is a Chartered Acoustical Engineer, member of the board of the Portuguese Acoustical Society and member of the executive commission for the Specialization in Acoustic Engineering of Ordem dos Engenheiros.

He has been responsible for major projects in Environmental Acoustics and Noise Control, including Noise Mapping and Action Plans for large urban areas in various Portuguese cities and for many large transport infrastructures. He has also been responsible for various projects in the area of Room
Acoustics and Virtual Acoustics including real time simulation and auralization of sound fields in enclosures.

**Category No. 5 – Waste and Green Economy**


Warren Phelan is a Technical Director with the Waste, Energy and Environment Section of RPS. Warren is a Chartered Waste Manager and a Chartered Civil Engineer with a Master’s degree in Engineering Science from University College Dublin.

Since joining RPS in early 2001, Warren has worked in the resource and waste management sector developing specialised skills in policy and legislation, strategy and planning, stakeholder consultations, data analysis and collation methodologies, waste prevention and online resource applications.

Warren has extensive knowledge and experience in the strategic approach to managing wastes at a city, regional and national level. Warren is currently the project manager for the development of the waste management plans covering the Irish State including the preparation of strategic environmental assessment and appropriate assessment documentation supporting the plans.

The ability to source, compile, analyse and present data is essential for the development of robust waste management systems and plans. In recent years Warren has led a team appointed by the Irish Environmental Protection Agency required to collate and analyse data gathered from all of the major waste treatment facilities in Ireland. Warren has also prepared data for the Irish government benchmarking Ireland’s performance in the sector against comparable international countries.

Warren has applied his waste management skills and developed waste management plan for large infrastructure projects, international airports, industrial operations and university campuses. Clients have included INTEL and Aeroport de Paris.

Warren has worked on waste projects in the UK, across Europe and in the Middle East. Warren’s clients include the European Commission and the World Bank among others. Warren is currently acting as the Irish country agent on a European Commission Horizon 2020 funded project on Sustainable Innovation (CASI project).

Warren has also worked on the design of many waste facilities including baling stations, transfer stations, material recovery facilities and recycling centres and is currently he is working for WRAP on the redesign of a waste facility in Wales.

**Category No. 6 – Water Management (inc. Wastewater Treatment)**

Expert: Dr Ana Lončarić Božić, Associate Professor, Faculty of Chemical Engineering and Technology, University of Zagreb, Croatia

Ana Lončarić Božić is an associate professor involved in teaching and research in the field of Chemical and Environmental engineering. Ana holds a PhD in Chemical Engineering. Her research interests include advanced technologies for water and wastewater treatment, advanced oxidation technologies, photocatalysis, degradation of recalcitrant
pollutants and contaminants of emerging concern and ecotoxicity.

She participated in 5 national and international research projects with academia and industry in the field of advanced wastewater treatment. She is the author/co-author of more than 30 scientific papers published in peer-reviewed journals (cited over 500 times, h-index 12). Ana sits on 3 editorial boards and is a regular reviewer for more than 20 scientific journals. She is also an Environmental Management System Auditor.

With a background in Chemical and Environmental Engineering and the expertise in the wastewater treatment and water management, Ana was involved as an evaluator for FP7-ENV-2012, FP7-ENV-2013 and NCBR-Core 2012 calls.