

**DEVELOPING LOCAL PLANS FOR CLIMATE CHANGE MITIGATION BY 2020
LIFE07 ENV/GR/000282**

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Abstract:

The CLIM-LOCAL2020 project, titled “Developing Local Plans for Climate Change Mitigation by 2020”, aims at the active participation of the local authorities in the global and national efforts made for climate protection. The main objectives of the project implementation were to:

Develop a systematic approach and appropriate tools that would enable local authorities to substantially reduce Greenhouse Gases (GHG) emissions in their region.

- Promote awareness,
- Initiate GHG emission reductions at local level

The implemented methodology, included:

1. Calculation of present local GHG emissions
2. Projection of local GHG emissions
3. Identification of GHG emissions reduction options
4. Economic and environmental evaluation of GHG emission reduction measures
5. Defining priorities for GHG emissions reduction measures
6. Public consultation and finalization of the Local Action Plan (LAP).
7. Implementation of measures in the LAP
8. Communication and dissemination

The overall goal of the Local Action Plan on Climate Change for the greater Volos area is to reduce GHG emissions by 7% below 2007 levels, by 2020. According to current estimations GHG will be reduced by 70 thousand tons CO₂ eq., by 2020.

The main results concerning tools, plans and awareness material:

Training activities and development of educational material on climate change addressed to schools (teachers and students), including the board game “change for climate”

Awareness raising material and activities on energy consumption and house composting

A pilot compost plant for the city of Volos and a pilot house composting program.

Interventions in municipal buildings and municipal lighting, to reduce their energy consumption, new municipal vehicles.

Keywords: *GHG emissions, Local Action Plan, GHG emissions calculation tool, awareness raising*

Description:

The European Union (EU) has long been committed to international efforts to tackle climate change. At European level a comprehensive package of policy measures to reduce Greenhouse Gas (GHG) emissions has been initiated, in 2000, through the European Climate Change Programme (ECCP). Each of the EU Member States (MS) has also put in place its own domestic actions that build on the ECCP measures or complement them.¹ (¹European Climate Change Programme: http://ec.europa.eu/clima/policies/eccp/index_en.htm)

The European Commission has taken many climate-related initiatives since 1991, when it issued the first Community strategy to limit carbon dioxide (CO₂) emissions and improve energy efficiency. The Second European Climate Change Programme (ECCP II), launched in 2005, has explored further cost-effective options for reducing greenhouse gas emissions in synergy with the EU’s Lisbon strategy’ for increasing economic growth and job creation.

The EU Prime Ministers also agreed to an internal EU target, which is to reduce EU emissions of GHG by at least 20% by 2020 compared to 1990. Based on recent estimates² (² EEA: Greenhouse gas emission trends and projections in Europe 2012, EEA Report No 6/2012) the total GHG emissions in the EU decreased by 2.5% in 2011, standing approximately 17,6% below their 1990 levels. This important drop followed a 2% increase in emissions observed in 2010 and substantial emission reductions in 2009 in all MS. Projections from MS indicate that total EU emissions will continue to fall slightly until 2020. Some MS (including Greece) are not expected to achieve their targets through domestic emission reductions alone, even if the currently planned measures were to be implemented. However, it should be noted that Greece showed the largest emission reductions within the EU (-5,1%) in 2010 compared to 2009.³ (³ EEA: Tracking progress towards Kyoto and 2020 targets: <http://www.eea.europa.eu/publications/ghg-trends-and-projections-2012>) The significant decline in emissions was mainly due to fuel related emissions decreases in public electricity and heat, road transportation, manufacturing industries and households as well as process related emissions from cement production. This trend mainly reflects the continuing effects of the economic crisis.

Apart from actions related to large emitters (i.e. industry) which are at present covered to a large extent by the Emissions Trading Directive, a large part of the remaining effort will inevitably fall to the large number of small emitters. Since the local authorities are the closest to citizens and can often deal more effectively with regional particularities than the central administration, a major challenge towards sustainable development and climate change mitigation is to stimulate the local potential for GHG emissions reductions through a set of systematic, well-designed and well-monitored activities, which can have significant ancillary benefits for local environmental

problems as well. In the above context, the CLIMLOCAL2020 project, titled “Developing Local Plans for Climate Change Mitigation by 2020” was proposed and subsequently accepted for co-funding by the EC LIFE+2007 program, aiming at the active participation of the local authorities in the global and national efforts made for climate protection. The main EU policies targeted by the CLIMLOCAL2020 project include Emissions Trading Scheme (EU ETS based on the 2003/87/EC Directive) and Energy Policy for Europe.

The CLIMLOCAL2020 project and its accompanying actions had a significant *added value* in the following respect:

- (a) The project demonstrated that local societies can actively contribute to considerable GHG emissions reductions, through implementing necessary actions and measures in due time in order to reach their full emission reduction potential in the future. In addition, a large part of the expected emissions reductions will derive from energy conservation measures, to the implementation of which local communities have a decisive role to play.
- (b) Since the GHG emission reduction measures that were applied at local level included the exploitation of renewable energy, the reduction of biodegradable material from waste disposed in landfills and energy conservation interventions in buildings etc., the project contributed to the implementation of a number of EC Directives promoting clean energy, proper waste management practices and sustainable use of resources.
- (c) As the majority of emission sources covered in the developed Local Action Plan for GHG emissions reductions did not fall under the scope of the 2003/87/EC Directive (the Emissions Trading Directive), the formulation and implementation of this Plan assisted the reduction of emissions in the non-trading sectors and thus promoted the achievement of the Kyoto Protocol quantitative commitments inside the EU Member States.
- (d) Measures for the reduction of GHG emissions have, in many cases, ancillary environmental benefits, especially with respect to air pollution. Thus, fuel conservation through the use of public transport instead of private cars, fuel switch in central heating, exploitation of renewable energies for electricity generation etc. represented measures which contributed to the improvement of air quality in the city of Volos. This represents a major EU environmental objective supported by the Directive 96/62/EC on ambient air quality assessment and management and its affiliate Directives.

The project was implemented from January 2009 until June 2012 in the city of Volos under the coordination of the Municipality of Volos, in association with the Municipal Enterprise for Water Supply and Sewage Treatment of the greater Volos Area (DEYAMV), the Volos Development Company (ANEVO, Initially participated in the project under the name DEMEKAV) and the private consulting firm Environmental Planning, Engineering and Management (EPEM SA).

The project’s *main objectives* included:

- Development of a systematic approach and appropriate tools that would enable local authorities to substantially reduce GHG emissions in their region.
- Development of appropriate monitoring and assessment activities related to GHG emissions reduction at local level.
- Promotion of awareness, provide training and disseminate of information on climate change and its mitigation.
- Initiation of GHG emission reductions at local level (the Municipality of Volos) within a 10-15 years horizon with the active participation of citizens.

The **project location** was the Municipality of Volos, in the Region of Thessalia (marked red in the map), located in central Greece (~326 km north of Athens). The Municipality had (before the implementation of Kalikratis project) a population of ~145.000 (2011) and a surface area of ~387 km². Volos, a coastal city, is the capital of the Magnesia Regional Unit and consists of an important agricultural and industrial centre, while its port provides a bridge between Europe, the Middle East and Asia.



The *implemented methodology* in accordance with the project Actions, consisted of:

1. Action 1: Calculation of present local GHG emissions
2. Action 2: Projection of local GHG emissions
3. Action 3: Identification of GHG emissions reduction options
4. Action 4: Economic and environmental evaluation of GHG emission reduction measures
5. Action 5: Defining priorities for GHG emissions reduction measures
6. Action 6: Public consultation and finalization of the Local Action Plan (LAP):
 - o Formulation of a draft LAP, internal project meetings and public consultation (invitation for written comments & open workshop / public consultation).
 - o Finalization of the “*Volos Local Action Plan on Climate Change 2010 – 2020*” that consists of the CLIMLOCAL2020 project main output. It was officially approved and endorsed by the Municipal Council of Volos in April 2010.

The Plan is wide enough to cover not only energy consumption and carbon dioxide (CO₂) emissions, but all greenhouse gases (GHG) and all the sectors of the economy that emit GHG, in line with the national inventories, obligations and programmes for GHG emissions. It includes the activities of the greater Volos area that emit GHG, but do not operate under specific national legal or institutional rules.

Considering the national GHG emission obligations and the carbon footprint of the Volos area, the **overall goal of the Local Action Plan on Climate Change for the greater Volos area is to reduce GHG emissions by 7% below 2007 levels, by 2020**. According to current estimations **GHG will be reduced by 70 thousand tons CO₂ eq., by 2020**.

The LAP explicitly presents **the selected measures** (49 proposed in total) that were grouped in six sectors / emission sources: buildings, transportation, water supply and sanitation, municipal solid waste, city operation and prospect actions:

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| <i>(A) Buildings</i> | The measures aim at enhancing the energy efficiency of the buildings through energy conservation, renewable energy applications (e.g. solar collectors, photovoltaics) and energy efficient systems (e.g. cogeneration). The proposed actions refer to (i) building shell (ii) cooling and air conditioning systems, (iii) energy generation and consumption and (iv) new building infrastructure. |
| <i>(B) Transportation</i> | The measures focus on three targets: (i) increase energy efficiency of municipal vehicle fleet (ii) invest in transit improvements and infrastructure (iii) initiatives to citizens. |
| <i>(C) Water supply and sanitation</i> | The measures mostly relate to the operation of DEYAMV enterprise (apart from its buildings and vehicles). The activities under consideration are the water supply system, the sewage treatment plant and the energy production from renewable energy sources. |
| <i>(D) Municipal solid waste management</i> | This sector provides measures to increase paper and biodegradable waste recycling. These two solid waste fractions significantly contribute to methane emissions when disposed to landfills. |
| <i>(E) City operation</i> | This sector includes measures that reduce energy consumption in public lighting and adaptation measures (urban tree planting). |
| <i>(F) Prospect actions</i> | This sector provides the actions to be taken for future infrastructure, including prospects in regards to land rehabilitation. |

The actors responsible for implementing the measures were classified in four broad categories, which are presented below.

Local government: the Municipality of Volos (and potentially other adjacent municipalities, whenever feasible). The Municipality of Volos has the central role in the implementation, coordination and monitoring of the proposed measures. In addition, the Municipality of Volos supports the promotion of the actions that will be taken by residents and enterprises. The latter could be realized through awareness campaigns and active policies (e.g. municipal taxes).

Public sector: public utilities such as DEYAMV (Municipal Enterprise for Water Supply & Effluent Treatment and Discharge in the greater Volos area), ANEVO (Volos Development Company), the University of Thessaly and the General Hospital of Volos. DEYAMV has a discrete role for the actions of the sector “water supply and sanitation”.

Private sector: enterprises of the tertiary sector (banks, hotels, commercial shops, offices etc.)

Residents: citizens of the greater Volos area.

- o Development of “Practical guidelines per measure” that describe the competent bodies, the preparatory actions needed for their implementation, as well as practical steps with respect to supply of required devices / machinery / appliances, operational and maintenance tips etc.
- o Formulation of a Monitoring Plan (MP) in order to measure and review the progress of the LAP in a systematic way.

. **Action 7:** Implementation of measures in the LAP

The Pilot demonstration part of the CLIM-LOCAL2020 project was carried out on 2011 and the first semester of 2012. During this period, the following activities were performed by project partners, according to the provisions of the Local Action Plan.

a) **Management of organic waste (household bins and pilot composting plant)**

It was decided to implement measures in two levels. The first was the household level. As such, a pilot project started, during which 350 garden-composters (bins) were distributed to the citizens of Volos.

In order to obtain high dissemination of this information and to enable citizens to apply for obtaining a compost bin, a separate webpage was created on the Volos municipality website (<http://www.volos-city.gr/>), with useful information on house composting and an electronic application form. Also, a leaflet was prepared and distributed to the citizens from various info points. A questionnaire-application form was prepared in paper, as well, to give more choices to the citizens, in case they didn't have internet access. The Mayor of Volos had a press conference for the same purpose and articles were written in all the local newspapers. During the period given for applications, 540 citizens of Volos applied for a compost bin. Consequently, a lottery was made, in order to choose 350 among them. This was an open procedure that took place in the Town Hall of Volos in front of the local TV channels and many citizens. The names were published both on Volos website and all local newspapers.

Furthermore, an open seminar was organised, where more than 400 citizens of Volos attended the presentations and asked questions about home composting (as foreseen). An office to support citizens on house composting was established in the “Department of Green Maintenance” and the names and telephone numbers were announced and published. The distribution of the compost bins started the next day and the citizens were signing a concession agreement, stating their responsibility for the good use and good condition of the compost bin. A random checking on these compost bins is taking place.



Installation of the Pilot Composting Plant After the preparation of the necessary technical study, the proper municipal area was found and the necessary equipment was purchased, in order to create a composting plant capable to accept all green waste from the maintenance of parks and trees in the city of Volos, as well as green waste (bio-waste) produced by households and put by the citizens in the special and appropriately marked bins. Forty (40) such bins were initially purchased.

It was estimated that the amount of 190.000 Euro was paid every year before at SIDISA (the Municipal Sanitary Landfill Organisation) for the disposal of the green waste. The profit, therefore, for Volos Municipality is double: there will be no payment for disposal and the lifetime of the sanitary landfill will be extended. A small information kiosk was prepared within the area of the

Plant, where the procedure is depicted and explained.



b) Recycling

Due to the fact that paper recycling is an essential element to reduce greenhouse gas emissions (as described in the proposed LAP measures), special attention was given to enhance this activity. In the Municipality of Volos the existing recycling system includes special street bins (in blue colour), where citizens can dispose all packaging materials like paper, plastic, aluminium and glass. Under the current conditions, it is impossible to collect and recycle paper separately.

Therefore our effort through the CLIMLOCAL2020 project was focused on recycling. It was observed that most offices within the Municipality (about 1.000 employees) did not recycle at work, where mostly white paper, newspapers and plastic bottles were thrown together with other garbage. The same happened in many schools.

For this purpose, it was decided to supply these places with recycling bins for offices and school classes. About 650 big paper bins with a LIFE+ logo and the slogan “*In Volos we change our mentality, we change our climate*” on them, were produced and distributed to all municipal offices and many schools. Instead of printing a leaflet, it was decided to send an e-mail to all municipal staff and to organise an informative meeting with all municipal cleaning personnel, as it was on their decision where these recyclable material would end up. The cleaning staff was very cooperative and accepted the new initiative with great enthusiasm.



c) Reduction of electricity consumption in municipal lighting

Municipal lighting, concerning both buildings and streets, is consuming a lot of energy and money. Thus, an attempt was made to reduce costs by introducing energy saving light bulbs. This idea existed before the CLIMLOCAL2020 project and was therefore promoted through the Local Action Plan.

During the years 2009 – 2012 about 2 800 light bulbs were replaced in the streets. Within the CLIMLOCAL2020 project 1.155 energy saving light bulbs were put in the classrooms of 10 different schools of Volos. Also, 13.000 new energy saving bulbs will be put in the next 1-2 years.



d) Reduction of energy consumption in municipal buildings

By the end of 2011, ANEVO had implemented energy audits for 15 municipality buildings.

The energy audits were implemented in four stages:

1. Preparation and collection of the necessary information about the buildings,
2. Inspection of the building,
3. Processing of the collected data and
4. Calculations and analysis of results.

By taking into account the analysis of the results from the calculations, ANEVO's auditors made suggestions of alternative scenarios in improving the energy performance of the buildings.

After the performed energy audits, two school buildings were selected by the Municipality of Volos, as those with the most deficiencies concerning energy consumption. The contractor's works included insulation and changing of windows and frames.



e) Purchase of environmental friendly vehicles and promotion of environmental friendly driving behaviour

The Municipality of Volos, as of 2010, decided to buy, through leasing, six new vehicles for the Department of Cleansing Services: 3 vehicles for waste (garbage) collection, 2 vehicles for street cleansing and 1 vehicle for washing the waste bins in the streets. These vehicles were in accordance / products of the "green" EURO 5 technology. They were delivered to the Municipality of Volos in the end of 2010 and are being used since then.



In order to promote an environmental friendly driving behaviour, a seminar on eco-driving was organised. The seminar was addressed to municipal drivers, those from the "Department for Waste Collection and Streets Cleaning" (Department of Cleansing Services). The drivers are periodically assessed by the instructor through a special platform for the next two years. The seminar was successful and the drivers were very enthusiastic and asked for more education in their work.

f) Activities related to water utilities

Several interventions were performed in the Volos Municipal Enterprise of Water and Sewage (DEYAMV), concerning the upgrade of the electromechanical equipment (capacitor, governor and electrical material) and replacement of water pumps systems in order to reduce electrical energy consumption. At the same time a study was compiled, in order to research the available technologies and procedures for the treatment of sludge produced by Waste Water Treatment Plant of DEYAMV, to have less power consumption (and less CO₂ emissions) and a system upgrade for a larger percentage of drying.

8. Action 8: Communication and dissemination:

Awareness raising activities to citizens and students

As it was presented in the LAP measures, in order to achieve the emissions' reduction of GHG and the further mitigation of climate change, it is quite important to stimulate

environmental awareness in all local levels. For this purpose, the CLIMLOCAL2020 project targeted to all citizens, through various means:

- a) Four (4) different radio spots were created, concerning maintenance of oil or gas burners, installation of A++ energy class air-conditioning, installation of solar water heaters and use of low energy consumption lamps. Two spots were played during the winter season (regarding burners and lamps) and two during the summer season (regarding air-conditioning and water heaters). The spots were played at the Municipal radio station of Volos.
- b) A board game concerning climate change, the hottest topic among the current environmental issues, was prepared by the Municipality of Volos, named “*change for the environment*”, together with 4 teachers from the Local Department of Primary Education. The board game was distributed to all students of the fifth and sixth grade of the primary schools in Volos (about 3.500 students). The board game was approved by the Pedagogic Institute, Ministry of Education before distribution.

The working team also decided to educate the teachers and give them educational material concerning climate change, energy and water consumption. Also, awareness raising activities took place in 10 primary schools for the students of various grades.



- c) Awareness raising campaign for energy consumption: 65.000 leaflets were created, printed and distributed to all municipal households, together with their water bills. The leaflets' main objective was to inform and/or remind the citizens of Volos about how much energy and money they can save by adopting simple practices in their own households. Also, 20 posters were raised at certain bus stops in strategic places in the city of Volos. The posters remained there for about three months and provided information on how energy savings may be obtained in a household.



- d) Awareness raising campaign for water consumption: an informational leaflet was printed and delivered through mail (DEYAMV's bills) to all its clients (85.000 households of Volos), informing them on the possibilities of water consumption reduction.
- e) A brochure was designed with informative material on climate change and mitigation / adaptation for the tertiary sector, addressed to the users of stores and offices, in order to raise awareness on climate change and energy saving methods.



f) A project website was developed and it became available to the public through the main web pages of the project (<http://www.volos-city.gr/> , <http://www.epem.gr/climlocal/>)

At the end of the awareness raising campaign the Municipality of Volos carried out a “door to door” survey, to determine the awareness raising campaign effectiveness. According to the results, 88,3% of the people taken part, stated a reduction in energy consumption, while the average reduction is estimated at 22,4% of the household consumption. People were also highly willing (9,4 and 9,1 out of 10 accordingly) in recycling and composting. The overall feedback of the CLIM LOCAL2020 campaign was very positive. The dissemination activities successfully promoted the environmental awareness of citizens and stakeholders with respect to climate change, supported the implementation of the LAP

9. *Action 9*: Overall evaluation of the LAP’s progress and planning of its future operation

Project Results:

The *main results* of the CLIM LOCAL2020 project, concerning tools, plans and awareness material were the following:

- A set of user-friendly tools for the calculation of emissions of GHG and basic air pollutants per emission source at local level
- A local GHG emissions inventory
- A set of tools for the projection of GHG emissions at local level up to 2020
- A set of methodologies for assessing the emissions reduction potential of measures
- A calculation tool for undertaking Cost-Benefit analyses of GHG emissions reduction measures, including environmental externalities
- A Local Action Plan for drastic and long-term GHG emissions reductions
- A set of practical guidelines for measures’ implementation
- A monitoring plan and relevant indices for evaluating the progress of the implementation of GHG emissions reductions measures
- Training activities and development of educational material on climate change addressed to schools (teachers and students), including the board game “change for climate”
- A pilot compost plant for the city of Volos and a pilot house composting program.
- Interventions in municipal buildings and municipal lighting, to reduce their energy consumption, new municipal vehicles.
- Dissemination and awareness activities

In February 2014, Volos Municipality -taking a step further- took the decision to implement the European Initiative, the Covenant of Mayors, setting a goal of 20% reduction of GHG by 2020.

The Action Plan has been already prepared – based on this Local Action Plan- and sent. The Municipality is being working towards this direction using various tools and financial instruments.

Project transferability:

A key *innovative aspect* of the project, relevant not only to local authorities in Greece but also in the EU, was the development of a consistent methodological framework for the formulation of a LAP. The description of the methodological framework developed in the technical reports prepared and the tools developed for applying this framework (all available in the project web-site) allows for the *transferability* of the process to other municipalities. The multi-parametric structure of the tools enables their replicability to other municipalities, as long as a minimum set of data / information is available. The applicability of the methodologies and tools developed was demonstrated in a pilot scale in real conditions, by their application in the Municipality of Volos. As the LAP addresses all emission sources in the area and there are no similar programs at municipal level elsewhere in Greece, the project can be considered to be a pilot for the application of these methodologies and tools, while implementation constitutes a first full scale application. The CLIMLOCAL2020 project desires to serve as a prototype approach for a decentralized effort in achieving future and much stricter national emission reduction targets, with beneficial multiplication effects if applied to other municipalities in Greece and the EU. It should be noted that until 2012, Volos was the only municipality in Greece having a Local Action Plan for GHG emissions reductions. Finally, it should be mentioned that the CLIMLOCAL2020 project could serve (e.g. though the project implemented measures, dissemination activities etc., as an example to other Municipalities to get involved on climate change mitigation issues in their jurisdiction. Such an involvement could have a positive impact in the overall implementation of the associated EU Directives in order to reach the targets set for Greece.