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PACT OF ISLANDS

Sustainable Energy Action Plan

IDALION MUNICIPALITY - CYPRUS

27 September 2011

Brief Summary

The **"Pact of Islands"** (**ISLE-PACT** project) is committed to developing **Local Energy Action Plans,** with the aim of achieving European sustainability objectives as set by the EU for 2020, that is of reducing **CO_2 emissions by at least 20% through measures that promote renewable energy, energy saving and sustainable transport.**

The Cyprus Energy Agency is a participating partner in the ISLE-PACT project and has invited Cyprus local authorities to demonstrate their political commitment by signing the "The Pact of Islands"; agreement in order to achieve the EU sustainability targets for 2020.

Cyprus participation involves 12 Municipalities and 2 Communities, including Idalion Municipality.

Idalion (Dali) is located in the Nicosia district, about 17 kilometers south of the capital, at an altitude of 220m. Covering an area of 32 square kilometers and has a population of around 9500.

The year 2009 was designated as the year of referencing/recording energy consumption and CO2 emissions in the Municipality's territory. According to actual consumption data collected by the Electricity Authority of Cyprus (utility), the oil companies, the Statistical Service of Cyprus, etc, the total energy consumption in 2009 in Idalion was 147.292 MWh. The largest consumer of energy in the municipality is transport with 71.600 MWh followed by the secondary sector 32.201 MWh and less with the household 20.110MWh.

he CO2 emissions in 2009 attributable to the overall energy consumption in the municipality are 67.945 tons.

For the forecast of CO2 emissions in the period 2010 to 2020, the scenario of expected evolution was established, where it was estimated that without taking any measures emissions will amount to 67.661 tons.

The Sustainable Energy Action Plan that was prepared for the Municipality includes additional measures / actions to achieve at least the European goal of combating climate change. That is, the measures that will be taken by the Municipality in addition to national measures in order to overcome the goal of reducing CO2 emissions by at least 20% by 2020 with respect to the reference year 2009.

The proposed measures are split into the following categories:

Description	Number
Energy Saving in Municipality public buildings	2
Energy Saving via informational campaigns	8
Energy saving in transport	5
Energy saving in street lighting	1
Municipality investments in renewable energy sources	1
Development of green spaces	1

The estimated annual emissions reduction for 2020 by applying the above measures amounts to 3.990 tons. it was estimated that the impact on Idalion Municipality from the implementation of the national measures taken to reduce carbon dioxide emissions will result to an additional decrease of 10.506 tons.

Therefore, with the implementation of the Sustainable Energy Action Plan and a total reduction of 14.496 tons, annual emissions for 2020 will be limited to 53.496 tons. That is, **21,3%** lower with respect to those in the reference year 2009.

The budget of the Action Plan for the period 2010 to 2020 amounts to € 1.292.700. Funding for the implementation of the Energy Action Plan is expected to be taken from the following resources:

- Municipality budget.
- Savings that will result from energy reduction measures in buildings, vehicles and street lighting in the Municipality.
- Revenues originating from Municipality investments on Renewable Energy technologies.
- Funding from the Grant Scheme of the Ministry of Commerce, Industry and Tourism for the promotion of Renewable Energy and Energy Conservation.
- Potential funding from the sustainable development and competitiveness program of the Planning Bureau.
- Potential funding from the Fund created for Emissions Trading Scheme.
- Potential funding from other European programs.

Contents

Tables

Figures

1. THE ISLE-PACT PROJECT

1.1. Introduction

The main objective of the ISLE-PACT project is the development of Local Sustainable Energy Action Plans, aiming at achieving European sustainability objectives as defined by the EU for 2020, namely a reduction of CO2 emissions by at least 20% through measures promoting renewable energy, energy savings and sustainable transport. The duration of the project is set at 30 months, from 1st February 2010 until 31st July 2012.

The project coordinator is the organization Comhairle nan Eilean Siar (CnES) – The Outer Hebrides of Scotland. The project is funded by the European Commission, Directorate General for Energy.

EUROPEAN COMMISSION Directorate-General for Energy

Project participants are invited to demonstrate their political commitment by signing the "The Pact of Islands", a three-page document detailing all aspects and targets that will be set by the authorities of the islands in order to achieve the EU sustainability goals for 2020.

1.2. Commitments from singing the Covenant of Islands

The Covenant of Islands is a binding instrument on which the competent island authorities will adopt political commitments in order to achieve the Project objectives. The Covenant is a three-page text and is formatted in a similar way as the Covenant of Mayors, where the specificities of European island communities are taken into account. It signifies the start of a number of important objectives such as:

- Further implementation of EU targets for 2020, reducing CO_2 emissions by at least 20% in areas of implementation,
- The preparation of the Sustainable Energy Action Plan, which includes the original recording of emissions data (Baseline Emission Inventory), and outlines the methods for achieving the objectives,
- The preparation and submission of implementation reports at least every 2 years after the delivery of the final Sustainable Energy Action Plan for evaluation, monitoring and verification of individual goals,
- To organize Energy Days, in collaboration with the European Commission and other stakeholders (e.g. Cyprus Energy Agency), providing an opportunity for citizens to have direct contact with the subject and also to benefit directly from sustainable energy use, as well as informing the local media for individual developments in local action plans,
- Participation in various conferences and workshops organized by various European institutions in connection with the Covenant of Mayors and the Pact of Islands,
- Further implementation of energy investment in the project areas.

1.3. Participating Municipalities and Communities in Cyprus

In Cyprus, twelve (12) Municipalities and three (2) Communities have signed the Pact of Islands and therefore participate in the ISLE-PACT project:

Strovolos Municipality	**Idalion Municipality**
Agios Athanasios Municipality	**Latsia Municipality**
Lakatamia Municipality	**Paralimni Municipality**
Aglantzia Municipality	**Geri Municipality**
Larnaca Municipality	**Ergates Community**
Aradippou Municipality	Psimolofou Community
Polis Chrysochous Municipality	Lefkara Municipality

Figure 1 Signing ceremony of the Pact of Islands on the 20th January 2011 in Nicosia

1.4. Ceremony of signing of the Pact of Islands

The signing ceremony of the Pact of Islands was performed in the building of the Committee of the Regions in Brussels on 12th April 2011. The event was part of the European Sustainable Energy Week, 11-15 April 2011, which brings together over 5000 participants each year in Brussels and many others elsewhere in Europe with multiple conferences, exhibitions and specialized conferences.

Figure 2 Representatives of the EU islands, mayors of island communities and representatives of the island authorities along with Mercedes Bresso, President of the Committee of the Regions and Helen Mariano, General Secretary of CPMR (Conference of Peripheral and Maritime Regions)

Figure 3 The Mayor of Agios Athanasios Kyriakos Chadjittofis (left) and the Mayor of Aglantzia Andreas Petrou (right)

Figure 4 The Mayor of Aradippou Christakis Liperis (left) and the Mayor of Idalion Leontios Kallenos (right)

Figure 5 The Mayor of Lakatamia Loukas Iatrou (left) and the Mayor of Larnaca Andreas Moyseos (right)

Figure 6 The Secretary of Latsia Municipality Michalis Sokratous (left) and the Mayor of Paralimni Andreas Evaggelou (right)

Figure 7 The Mayor of Polis Chrysochous Aggelos Georgiou (left) and the Mayor of Strovolos Savvas Iliofotou (right)

Figure 8 The Secretary of Ergates Community Kyriakos Christodoulou (left) and the President of Geri Community (Municipality) Argyris Argyrou (right)

Figure 9 The President of Psimolofou Community Ioannis Lazarides

2. CYPRUS

Cyprus is the largest island in the eastern Mediterranean and is located south of Turkey. The two main mountain ranges are Pentadactylos in the north and Troodos in the central and south-western part of the island. Between them lies the fertile plain of Mesaoria.

Cyprus has always been a crossroads between Europe, Asia and Africa and bears traces of many successive civilizations: Roman theatres and houses, Byzantine churches and monasteries, castles from the era of the crusades and prehistoric settlements.

The main economic activities of the island are tourism, clothing and craft items exports and merchant shipping. Traditional crafts include embroidery, pottery and bronze.

Traditional specialties include mezedes - appetizers served as a main course - halloumi cheese and the drink of zivania.

After the Turkish invasion in 1974 and the occupation of the northern part of the island, the Greek and Turkish communities of Cyprus have been divided by the so-called Green Line.

Cyprus is known as the island of Aphrodite, the goddess of love and beauty, as according to legend, Cyprus is the birthplace of the goddess.

In modern literature the names of Costas Montis (poet and writer) and Demetris Gotsis (writer) stand out, while Evagoras Karageorghis and Marios Tokas are distinguished composers.

Year of EU entry:	2004
Political system:	Democracy
Capital:	Nicosia(Lefkosia)
Total area:	9.250 km²
Population:	0,8 million
Currency:	euro

Source: http://europa.eu

3. IDALION MUNICIPALITY

3.1. Introduction

Idalion (Dali) is located in the Nicosia district, about 17 kilometers south of the capital, at an altitude of 220m. Covering an area of 32 square kilometers which includes two residential areas, agricultural, ranching and two industrial zones and has a population of around 9500.

Dali was originally built on the south side of the river Idalia (Yialia), now named parish Panagias Evaggelistrias. From 1983 created a new settlement in the north-east border of Dali bordering Latsia and Geri, the parish of Agios Constantinos and Agias Elenis.

The vegetation of the area is dense along the river where there are citrus, eucalyptus and olive trees, and as we move away from the river we find more olive, carob, almond and cereal crops. Older people also cultivated grapes, potatoes, vegetables and cotton. In the hills around Dali vegetation consists mainly of shrubs, herbs, and flowers.

According to tradition, the Idalion was one of the 11 kingdoms of Cyprus. Founded by King Chalkanora immediately after the Trojan war. Possible dates of foundation of the city resulting from various findings is around 1100 BC From 1971 until today, the Department of Antiquities headed by Dr. Maria Hadjicosti conducting excavations at the archaeological site. Excavations also conducted every July from Lycoming College with support from the Cyprus American Archaeological Research Institute (CAARI) led by Dr Pamela Gaber, always under the supervision of the Department of Antiquities. Since January 2008 has been launched and operates the local Archaeological Museum of Dali in which findings from the archaeological site of Dali.

Except from the archaeological site, the Dali forward and medieval churches, Agios Georgios, Agios Mamas and Agios Demetrianos, as well as the rock-cut chapel of Agios Theodoros, which have been declared as Ancient Monuments by the Antiquities Department. The Virgin Mary Annunciation Cathedral, the Church of Agios Andronikos and Agias Athanasias and the church of Agios Theodoros highlight the innate spirit of greek-christian culture. Metropolis Trimithountos of Lefkara located in the Idalion Municipality, under the Bishop of Messrs. Barnabas.

Obvious is the cohabitation of Greek Cypriots and Turkish Cypriots before the Turkish invasion of 1974. The existence and maintenance of mosque in the city center testifies with respect the cohabitation before the invasion. A cohabitation that was disturbed by the Turkish invasion of 1974 and resulted in Dali to pay the heavy price beyond the dead today counts 18 missing.

As the capital of the surrounding area in Dali, operates a Regional Health Centre which serves the surrounding communities, numbering around 25 000 inhabitants.

The cultural and spiritual development of the municipality has always been very high. Residence of Dali who excelled in the field of education, literature, poetry, music, sports, art, theater, etc., show off with pride our small town. The cultural activity of both the municipality and the residence of Dali in other organized bodies, with a long tradition, rich, versatile and quality, demonstrating the high standard of living, spiritual and social level of our small society. Within the framework supporting the cultural development of the municipality, have started work on construction of the outdoor amphitheater is expected to be completed in late 2011.

Among the most important cultural events of Dali, groundbreaking for the former data of Cyprus was the twinning of Dali with the French town Combs la Ville. The first twinning with European city beyond Greece. Thus, on October 8, 1978 was the twinning of the two cities. From 1998 became the first contacts for cooperation and cultural exchanges with the Municipality of Acharnon. Through these efforts, and since the idea seemed beneficial to both municipalities, the

Municipal Councils of the two municipalities decided to go into twinning. So the October 1, 2010 the City of Dali was twinned with the Municipality of Acharnon.

Education, with a long tradition, is one of the primary goals of development for the city of Dali. The operation of High School in the Municipality of Dali, three elementary schools and five kindergartens and childminders stations aiming to preserve this tradition. Since 1966 also serves and the Municipal Library strengthening the education sector.

The residents always been mostly occupied with farming and various other crops because of the fertile soil. Dali ranks first nationwide place in milk production. This production is 100,000 liters of milk daily. Today the main occupations of the inhabitants are in farming, construction works, several small businesses, various clerical occupations, etc. Many work in government agencies. Between 1981 created the Industrial Zone which is next to the Nicosia Limassol old road on the border with Pera Chorio-Nisou and offers a substantial income to the town hall, and many jobs for residents.

In Dali, until 1996 Administrative Authority was the Improvement Board headed by Mukhtar. In 1996 after a referendum Dali became the 24th municipality in Cyprus.

The Dali City services today consist of the following sections:

- Mayor's Office
- Office of Municipal Secretary - Archive
- Economics Department
- Cultural Department
- Health Service
- Technical Services
- Water Service
- Department of Citizen
- Department of Labor Staff
- Sewerage Service

The main characteristic of the residents of Dali is hard work, their friendliness and hospitality. The city of Dali can offer both residents and visitors enough to be considered a complete city: Culture, Antiquities, Religious Traditions, customs, cultural and other events (music, dance, theater, lectures, exhibitions, etc.) , entertainment (restaurants, cafes, nightclubs, cinema, sports, swimming pools, etc.), services (hospital, private clinics, pharmacies, etc.), all kinds of shops (clothing, footwear, supermarkets, butchers, etc.) and offices (banks , insurance, travel, etc.), etc.Source : http://www.dali.org.cy/

3.2. History

According to tradition, the Idalion was one of the 11 kingdoms of Cyprus. Founded by King Chalkanora immediately after the Trojan war. King Chalkanoras whose origin was from the nearby town of Sparta Amyklaion, returning from Troy, where he took part in the siege, arrived in Cyprus near Salamina There he advised by the oracle to travel with the army and where they would see the sun rising to build the city. So Chalkanoras with his entourage left Egkomi / Alasia and reached the part where he founded the city of Dali (where he saw sun rise). Possible dates of foundation of the city resulting from various findings is around 1100 BC.

Before the 12th BC century, the south and south-west side of the river there were settlements of the last Bronze Age, 1650-1050 BC After 1200 BC the settlements were abandoned and the city of

Dali expanded on the guidelines of the settlements. The ancient tombs results found suggest that the city of Dali inhabited continuously since the 12th BC century until the end of the Roman period around 400 AD From inscriptions and coins show also concluded that the city of Dali dominated by the Greek element.

The spot where the city was built in Dali was crucial. It was built in such a way that it covered two hills to the south and the plain to the north towards the river Yialia. The two hills covering was a natural fortress and the river vital for residents. Great importance to a location outside of the river and the fertile soil, and that was adjacent to copper-based areas (in the present area Mathiatis and Sia).

At some stage in the processing of copper was one of the main occupations of the inhabitants. Two hills were the eastern and western citadel. In eastern acropolis was a temple of Aphrodite and the West, which was the main citadel stood the temple of Apollo Amyklaios. In one of the two peaks was the temple of Athena, which was the most important deity worshiped. The temple was destroyed around 470 BC when the city was conquered by the Kitiaious. Under the two citadels spread to the north, the city which was surrounded by walls and covered an estimated area of about 100 acres.

The oldest part of the walls is estimated that it was built during the 7th-6th BC century. Elsewhere in the city there were temples dedicated to other deities, and according to legend, there were 14 temples. Also according to mythology, Aphrodite fell in love with the young Adonis, son of Zeus and Hera. Mars then transformed into wild boar and killed Adonis opponent while he was in the woods for hunting.

During the reign of Stasykyprou the city of Dali besieged by Kiti (Phoenicians) with the help of the Medes (Persians). Important evidence suggesting the siege and surrender of Dali at Kition in 470 BC about the famous "plate Dhali ', an engraved copper plate in Cyprus-syllabic script, found on the West Acropolis. From this inscription we conclude that Idalion worked with democratic institutions after the decision and the agreement was between the king and the people and Onisalou and not only between King and Onasilou. This inscription is the oldest document in Cyprus relating to land ownership. The plate must be results found shortly before 1850, since in 1850 was purchased by the Duke de Lougiens and was bequeathed to the National Library in Paris.

By the 6th-5th BC century it is estimated that the city of Dali dwelled 8-10 thousand inhabitants. Since apparently concluded that the city of Dali from its inception was democratic, autonomous and self-supporting. Over the years prospered largely because it supported and worked with a large number of population. From the studies, it was concluded that by the year 470 BC when the city was conquered by the Phoenicians with the help of the Medes, many tried unsuccessfully to conquer. Since 470 BC began the decline of the city of Dali.

After the conquest of the city by the Phoenicians in 312 BC followed the conquest of Egypt by King Ptolemy I (successor of Alexander the Great), who abolished all kingdoms of Cyprus. Since then, Cyprus became part of the kingdom and later ptolemaikou province of the Roman Empire. Through all this destruction that seemed Idalion the prosperous, rich and democratic kingdom, perhaps most importantly, in the island turned out to be a small town. From these findings it appears that the city was not abandoned, but survived in the Roman empire in the first AD century. During the Hellenistic period, 332 BC, the king appears as landowner. This changes during the Roman period. Created small individual fields and large rural farms until the early Byzantine era where there are no longer self-possession of land which they cultivate on behalf of the state or the church, called "paroikoi" and "enapografoi" obliged to surrender the fruits of the earth to their masters.

In the later Byzantine period, 800-1191 AD the smallholders land disposed. At this stage there is state land, the church, the monastery and the land of nobility.

At the time of the Byzantines and the Franks, the biggest problem they faced was invaded by the Saracens, who swept the Mediterranean during this period. Specifically when Leontio Mahara, the Saracens did squat in Dali in 1426.

From 1191-1489 AD come to Cyprus and the Crusaders Lusignan where adopting the feudal system. A system based on caste uninteresting for individual rights. During this period the earth gathered in the hands of the Frankish king, the nobility, the knights and the Latin Church. So, in 1474 Dali was given together with other villages from the Queen of Cyprus, Catherine Cornaro to the noble George Contarini.

Followed by the Ottoman Empire, where the rise and Moslem religious property. Fear of the Greeks and Turks from looting prompted them to make donations of property - land - for their churches to protect them. The result of this situation was the creation of estates after the Sultan gave fertile land in eminent military or administrators from Turkey.

From 1878 to 1960 we end up in the possession from the British Empire, until 1960 when Cyprus was declared an independent republic. Heavy is the price paid and the city of Dali in the national liberation struggle of the Cypriots for freedom. Two dead, 18 missing heroes and the struggles of 1963 and 1974. Was mixed village until 1974, when after the Turkish invasion Turkish Cypriot inhabitants left the village and went to the occupied areas of the island (in 1960 Dali lived in 2600 Greek Cypriots and 200 Turkish Cypriots). Since 1976 applied the residential housing project Greek Cypriot refugees.

Source : http://www.dali.org.cy/

3.3. Planning Areas

The following Figure shows the existing and proposed urban areas in the municipality of Idalion.

Source : http://www.dali.org.cy/

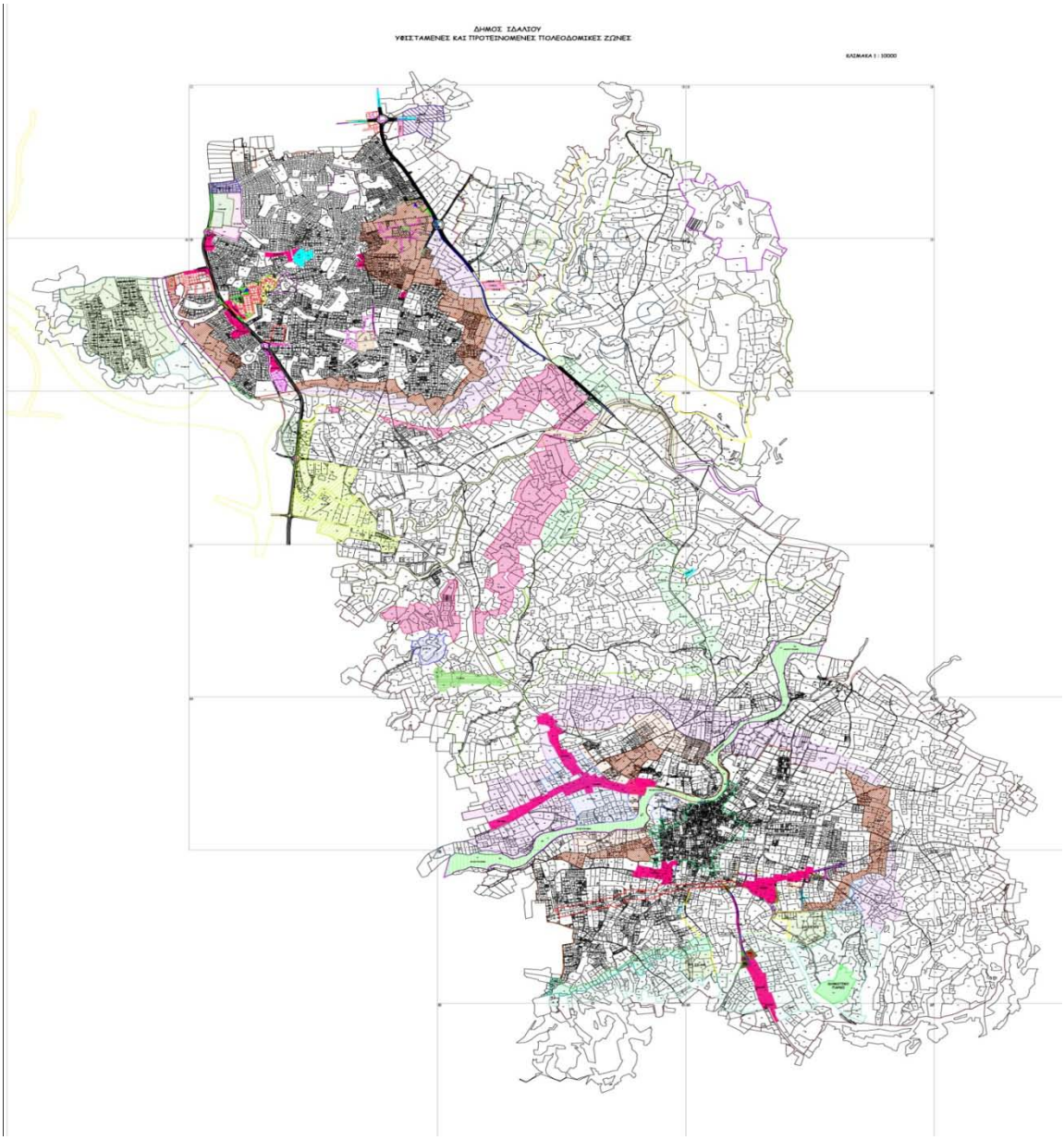


Figure 10 Proposed and existing urban areas in the Municipality of Idalion

Figure 11 Ancient Idalion

Figure 12 Ancient Idalion

Figure 13 Local Museum of Ancient Idalion

Figure 14 Municipal Library

Figure 15 Agios Constantinos Church

Figure 16 Holy Mary Cathedral

Figure 17 Panoramic view of Idalion

[Source: http://www.dali.org.cy]

4. CURRENT STATUS AT IDALION MUNICIPALITY

4.1. Description of the buildings of Idalion Municipality

4.1.1. Brief Description

1. The operating hours for all municipal services are 07:30 – 14:00 during the summer period (1 June – 31 August) and for the remaining months the hours are 07:30 – 14:30 and every Wednesday until 18:00.
2. There is no central heating system that requires the consumption of oil, gas etc but the heating system is the same as the cooling of buildings.
3. In all buildings in the municipality there are solar panels for water heating and no building is not installed photovoltaic system.

Table 1 Electricity consumption in buildings in Idalion municipality

Energy Consumption (kWh)	2009	2010
Town Hall	50.386	48.044
Cultural Center	6.259	6.294
TOTAL	**56.645**	**54.338**

4.2. Idalion Municipality Street Lighting

The total energy consumption in 2009 for street lighting was equal to 1.214.886kWh while the total energy consumption in 2010 for streetlights was equal to 1.315.333kWh

The type and power of the lamps shown in the table below:

Table 1 Types of lamps in the buildings of the Municipality of Idalion

HPS *	250 W
HPS	150 W
HPS	70 W
Compact	21 W

* High Pressure Sodium

Street lighting operating Hours: According to the EAC, the bi-monthly tariff of street lighting is Code 35. Based on this tariff electricity for the lamps will be provided daily from half an hour after sunset until half an hour before sunrise.

The period of power supply can be increased from sunset to sunrise if requested by Idalion Municipality.

4.3. Other Energy Consumption in Idalion Municipality

The following table lists the power consumption for the years 2009 and 2010 for the illumination of green space for drilling, for lighting walkways and bicycle paths and crossing lights in the municipality.

Table 2 Other Energy Consumption in Idalion Municipality

Energy Consumption (kWh)	2009	2010
Illuminate Green Spaces	34.588	23.048
Water Pumps	229.160	203.721
Traffic Lights	17.266	18.990
TOTAL	**281.014**	**245.759**

4.4. Idalion Municipality Vehicles

- The municipal vehicle fleet consists of vehicles of different types, uses and engine displacement. The table below shows the fuel costs in € for the vehicles of the Municipality for the period from 01/01/2011 until August 2011.

Table 3 Idalion Municipality Vehicle Fleet

S/N	REGISTRATION NUMBER	MODEL	TYPE	FUEL COSTS FROM 01/01/2011 - TODAY
1.	EHY470	ISUZU	LIGHT TRUCK	€1.947,40
2.	HMZ679	ISUZU	HEAVY TRUCK	€1.767,09
3.	HPK603	ISUZU	LIGHT TRUCK	€2.287,92
4.	HZX611	TOYOTA	LIGHT TRUCK	€925,50
5.	KMX713	MAZDA	LIGHT TRUCK	€3.867,45
6.	KMX795	MAZDA	LIGHT TRUCK	€3.257,00
7.	KTL408	PEUGEOT	SALOON	€4.824,95
8.	KXB855	ISUZU	LIGHT TRUCK	€2.922,00
9.	KXD460	MITSUBISHI	LIGHT TRUCK	€5.362,15
10.	KYX138	ISUZU	LIGHT TRUCK	€1.591,00

4.5. Public Transport

Public transport in the Municipality conducted by the Nicosia District Transport Organisation (O.S.E.L.). Future goals are to strengthen O.S.E.L of public passenger transport and to increase the use of the bus by 2% today to more than 10%, which is the goal of the ministry until 2019. Aims by 2013 to install integrated fleet management system and machines issuing and cancellation of tickets to the traveling public can be better and easier movement of buses. Even to enhance a

driver through frequent training of staff at all levels. Will tried through various programs through the Ministry of Education and the Ministry of Communications to promote and consolidate the use of the bus for children, changing the culture of using public means of transport.

The urban services conducted by O.S.E.L in the Municipality is route 107 (Industrial Warehouse / Daliko - General Hospital) and the nighttime route 312 (Lympia - Dali - Pera Chorio - Nisou-Kryoneri - General Hospital (Mall) - Makarios Avenue - Solomos Square - Station Makarios). Details of the routes available on the Nicosia District Transport Organisation www.osel.com.cy.

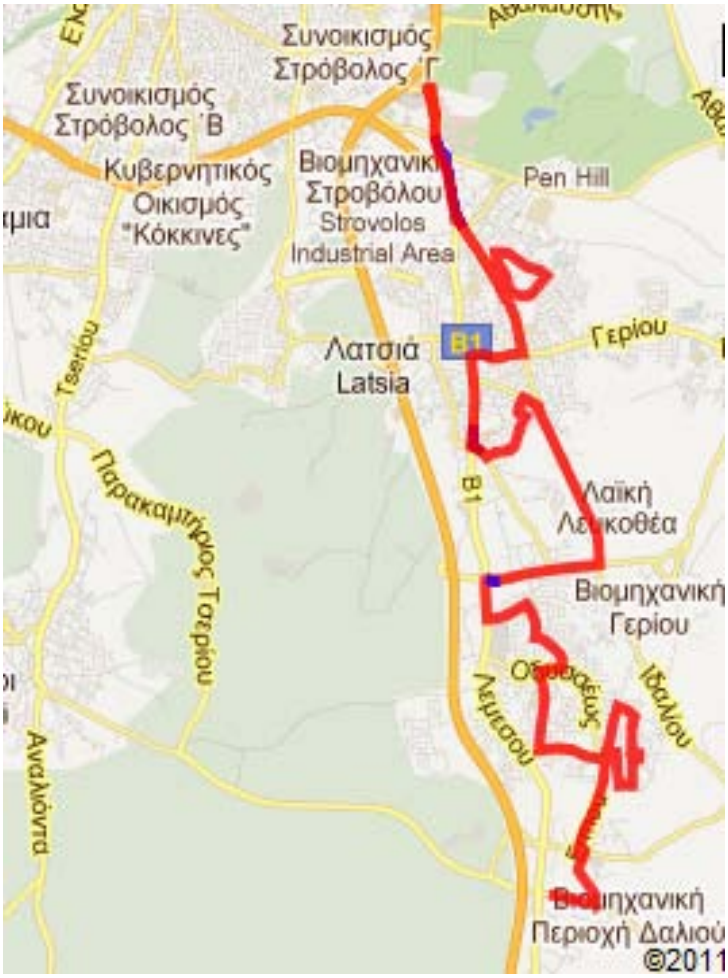


Figure 18 Route 107 (Source:www.osel.com.cy)

4.6. Idalion Street Network

The main road to Dali Municipality is shown in Figure below.

Figure 19 Idalion street network [Source: Google Earth]

4.7. Planned infrastructure and development projects

Projects completed within the five years 2006-2011:

- Creating of sidewalks and parking spaces on the street Chalkanoros
- Creating of sidewalks and installing modern street lighting Grivas Digenis
- Configuring a parking space for the needs of the Archaeological Museum
- Paving of the road Dali Geri-length 2km
- Widening of roads and sidewalks Afxentiou and Acharnon
- Paving the central axis of the Heavy Industrial Zone
- Completion of a major project of the road of the second phase of 8 ½ miles including two roundabouts
- Asphalting several kilometers of rural roads
- Expansion of the cafe's self-help settlement
- Reconstruction of the park's self-help settlement
- Create canopies for the needs of the People's Market
- Completion of landscaping projects in the new cemetery
- Completion of construction of the Archaeological Museum
- Projects landscaping of new cemetery

By the end of five years will also complete:

The landscaping projects of the church of Saint George

• The restoration works of the watermill in Agridi

• Positioning 25 bus shelters

• The completion of works for the construction of the park in Heliopolis

• The paving of the central axis of the Industrial Zone, street Tefkrou Anthias

• The paving and widening of Industrial Zone in Smyrni street

It has become the planning of large projects such as:

The start of the construction works for the erection of the atrium auditorium of our city

• The widening, installation of modern lighting and construction of 2 km cycle path on the street Gianni Grouta and Adonidos

• Create park in Kallithea and three small playground areas Constantia and Nea Ledra

• Restoration of the core Virgin Annunciation Parish

• Restoration of the house Konstantinidis which has bought by the Municipality and housing in this the Museum of Dairy and Cattle.

• In collaboration with the School Board and the CMO will convert the field of school of Dali in stadium with 3000 to accommodate fans of all sports teams Dali.

4.8. Production and Management of Solid Waste in the Municipality of Dali

Today the City of Dali is a Complex of garbage with the Community of Potamia and the collection of garbage in the municipality is three times a week by a private contractor, with two garbage vehicles.

Today the City of Dali is a Complex of garbage with the Community of Potamia and the collection of garbage in the municipality is three times a week by a private contractor, with two garbage vehicles of Dali Complex - Rivers

Concerning the production of household waste at municipal level, data are available in Nicosia area and refer to the quantities produced in the municipalities of Nicosia, and driven to the place of disposal area Kotsiatis (data up to 1999). These data, available to the Statistical Service of Cyprus and from measurements made by the Municipality of Nicosia (daily weighings of garbage who entered the disposal site, for one week). The purpose of these measurements was to calculate the annual amount of waste resulting from the disposal area municipalities and communities in order to determine the fees and disposal per Municipality and Community.

Based on the data in Table 4, it seems - as expected, that the amount of household waste, increasing over years and even have nearly doubled from year 1991 to year 1999. This is mainly due to the increase in population of Nicosia and the improvement of living standards.

Table 4: Quantities of household waste going to final disposal in Nicosia (tons / year)

Municipalities and wider Nicosia area	**1991**	**1994**	**1999**
Nicosia Municipality	27.361	30.377	36.266
Strovolos Municipality	20.499	24.560	40.522
Engomi Municipality	4.730	6.544	10.534
Ag. Dometios Municipality	5.403	4.515	8.224
Aglantzia Municipality	5.663	6.490	14.451
Latsia Municipality	3.064	3.892	13.067
Lakatamia Municipality	5.047	8.614	12.839
Defteras-Anthoupolis Complex	4.472	1.565	2.361
Dali-Pera Chorio Nisou Complex	**4.129**	**3.949**	**6.900**
Lithrodontas Complex	2.444	3.028	3.427
Ergates Complex		1.940	1.970
Kornos Complex		712	1.170
Geri Improvement Board	1.352	1.262	1.716
Klirou Improvement Board	332	286	754
Gouri-Kalo Chorio		317	369
Mathiatis			312
Palaichori			520
Arediou		260	
Ergates Industrial Area		478	
TOTAL	**84.496**	**98.789**	**155.402**

[Source: Cyprus Statistical Service]

4.9. Recycling Program in the Municipality of Dali

- The program garbage collection in the Municipality of Dali made by a contractor of the nonprofit organization Green Dot Cyprus.
- Within the boundaries of the municipality of Dali recycling bins placed , PMD (blue), paper (brown) and for glass and the collection is done every week.

About Green Dot (Cyprus) Public Co Ltd (GDC), founded by the CCCI and number of obligated packaging managers on July 17, 2003, as a non-profit organization, in accordance with the provisions of Law 32 (I) / 2002. The creation of GDC stems from N.32 (I) / 2002 which sets out the framework and responsibilities of business considered and packaging managers should ensure the recovery and recycling of packaging.

Meanwhile, the agency is part of the largest global network of collecting societies packaging of Packaging Recovery Organisation Europe based in Brussels (PRO EUROPE) and includes 31 other similar systems around the world (more information on the organization's website www.pro-e.org. By above participating, the system became the sole manager of the Green Dot mark in Cyprus.

[Source: http://www.csr-ccci.org.cy]

In the Municipality of Dali there are 10 points fitted with recycling bins and are shown in the table below:

Table 5: Positioning of recycling bins

S/N	Street	Place
D01	Griva Digeni 20A	Dali Municipality
D02	Theodorou Kolokotroni & Kyriakou Kyprianou	Old Bridge(after Laiki Bank)
D03	Leontiou Machaira	Municipal Parking
D04	Eleftherias	Municipal Parking
D05	Ampeleris from Akropolis	Dali B΄ Primary School
D06	Evaggelou Floraki	Dali High School
D07	Area Nea Lidra, Rizokarpasou street	Before overpass
D08	Area Helioupoli, Florinas Papacosta street	Green Space next to Carlsberg
D09	Area Kallithea, Agia Anna street	Opposite the New Regional Coop of Nicosia
D10	Ermou & Pigis	Green Space

4.10. Recycling Clothes Program

The Municipality Dali in collaboration with the nonprofit organization "ENVIRONMENTAL ANAKYKLOS" participates in the program for recovery and recycling clothes.

After sorting, some clothes are offered free of charge to indigent persons in Cyprus. Another part of the clothing available to people with low income, shops second hand and in bazaars, in symbolic terms, to cover the cost. The clothing will be available for shipment to countries where there is an urgent need, such as natural disaster, war, etc. The largest percentage exported to reuse. Part of the material unsuitable for reuse clothes, recycled clothes cleaning up, tow, insulation and other materials.

In Dali placed 3 metal storage collection.

[Source: *http://ecolatestnews.blogspot.com]*

4.11. Population of Idalion

According to the official census conducted in 2001, the municipality of Dali had 5,834 inhabitants. Today the number of inhabitants of the municipality is approximately 9,500.

4.12. Organized Bodies

In Dali clubs and groups are active in various sectors such as:
1) Adonis
2) Municipal Choir
3) Vamos
4) Municipal Youth Council
5) Theater of Idalion «Amyklaios Apollon»
6) Theater of Idalion Rizes

7) Hunting Club Artemis
8) Lefteros
9) Michael Olympios
10) Civil Defence
11) 74^{o} Scout
12) Association of Cattle
13) Local Large Families Commission
14) Xalkanoras
15) Christian Association "Evaggelismos"
16) Local Committee of Blood Donation

Also there are several social welfare bodies:
1) Employment office
2) Community Welfare Council
3) Local Committee of Blood Donation
4) Municipal Prevention Group
5) Social Solidarity Fund Latouros
6) Children's house Anaptiksi
7) Help Station Ithaki
8) Health Center of Idalion
9) Elderly Housing «Agios Demetrianos»

5. INVENTORY OF ENERGY CONSUMPTION IN IDALION MUNICIPALITY

5.1. Residential Sector

Table 6 Energy Demand in MWh in the Residential Sector in 2009

Hot water	**Electricity**	**Fuel Oil**	**LPG**	**Solar**	**Geothermal**	**Biomass**	Total
Heating and cooling	351	307	22	1.425	11	77	**2.192**
Lighting	8.419	5.022	591	44	30	739	**14.844**
Kitchen	468	-	-	-	-	-	**468**
Electrical appliances	351	-	150	-	-	0	**501**
Total	2.105	-	-	-	-	-	**2.105**
Hot water	**11.693**	**5.329**	**763**	**1.469**	**41**	**815**	**20.110**

5.2. Primary Sector

Table 7 Energy Demand in MWh in the Primary Sector in 2009

Description	**Electricity**	**Fuel Oil**	**Diesel**	**LPG**	**Biomass**	Total
Agriculture, Forestries and Fisheries	2.948	617	0	412	1.179	**5.357**
Mining and Quarrying	0	0	0	0	0	**0**
Total	**2.948**	**617**	**0**	**412**	**1.179**	**5.397**

5.3. Secondary Sector

Table 8 Energy Demand in MWh in the Secondary Sector in 2009

Description	**Electricity**	**Fuel Oil**	**LPG**	**Solar**	**Biomass**	Total
Processing	22.071	4.622	3.087	974	325	**31.078**
Water supply, wastewater treatment, waste management	751	157	105	0	0	**1.013**
Construction	81	17	11	0	0	**109**
Total	**22.903**	**4.796**	**3.203**	**974**	**325**	**32.201**

5.4. Tertiary Sector

Table 9 Final Energy Consumption in MWh in the Tertiary Sector for the Year 2009

Description	**Electricity**	**Fuel Oil**	**LPG**	**Solar**	**Biomass**	Total
Wholesale and Retail trade, repair of motor vehicles and	1.698	356	237	73	24	**2.388**

motorcycles						
Hotels and restaurants	521	109	73	22	7	**733**
Public administration and social insurance	258	54	36	11	4	**363**
Defence, Justice, Police and Fire stations/departments	152	32	21	7	2	**214**
Education	2.074	434	290	89	30	**2.917**
Human Health and social care	114	24	16	5	2	**160**
Other Services	7.080	1.483	990	303	101	**9.957**
Public Lighting	1.252	-	-	-	-	**1.252**
Total	**13.149**	**2.491**	**1.664**	**510**	**170**	**17.984**

5.5. Transport

Table 10 Final Energy Consumption in MWh in Transports for the Year 2009

Description	**Electricity**	**Diesel**	**Gasoline**	**Biomass**	Total
Urban and suburban passenger transports	0	198	172		**1.432**
Other passenger transportation services (taxi, tourism, school buses, etc)	0	3.174	2.745		**22.912**
Commercial ground transportation services and removable services	0	0	0		**0**
Private Vehicles	0	6.547	5.661		**47.256**
Total	**0**	**9.920**	**8.578**		**71.600**

5.6. Total Final Energy Consumption in the Municipality of Idalion

Table 11 Final Energy Consumption in MWh in 2009

Sector	**Electricity**	**Fuel Oil**	**Diesel**	**Gasoline**	**LPG**	**Solar**	**Geothermal**	**Biomass**	Total
Residential	11.693	5.329	-	-	763	1.469	41	815	**20.110**
Primary	2.948	617	-	-	412	-	-	1.179	**5.397**
Secondary	22.903	4.796	-	-	3.203	974	-	325	**32.201**
Tertiary	13.149	2.491	-	-	1.664	510	-	170	**17.984**
Transports	-	-	37.152	34.448	-	-	-	-	**71.600**
Total	**50.693**	**13.234**	**37.152**	**34.448**	**6.043**	**2.953**	**41**	**2.489**	**147.292**

Figure 20 Share of Final Energy Consumption by Sector in 2009

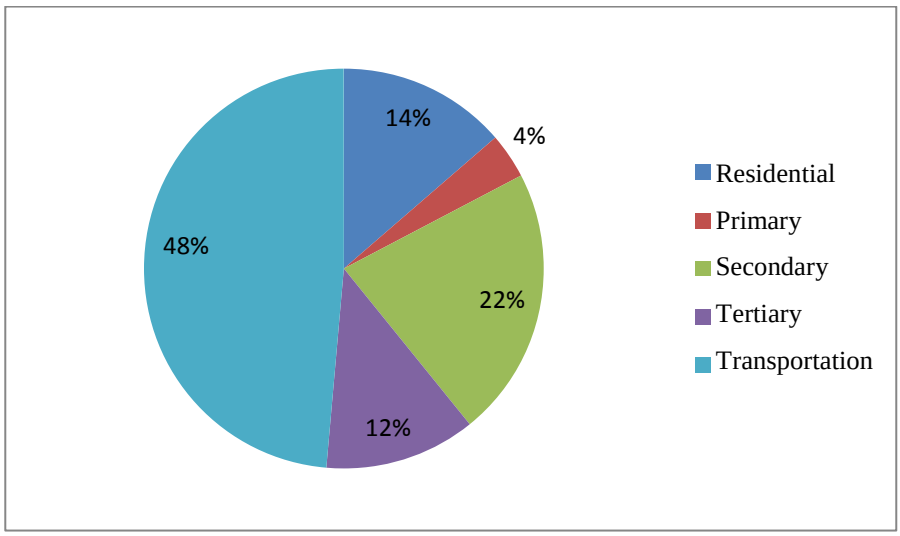
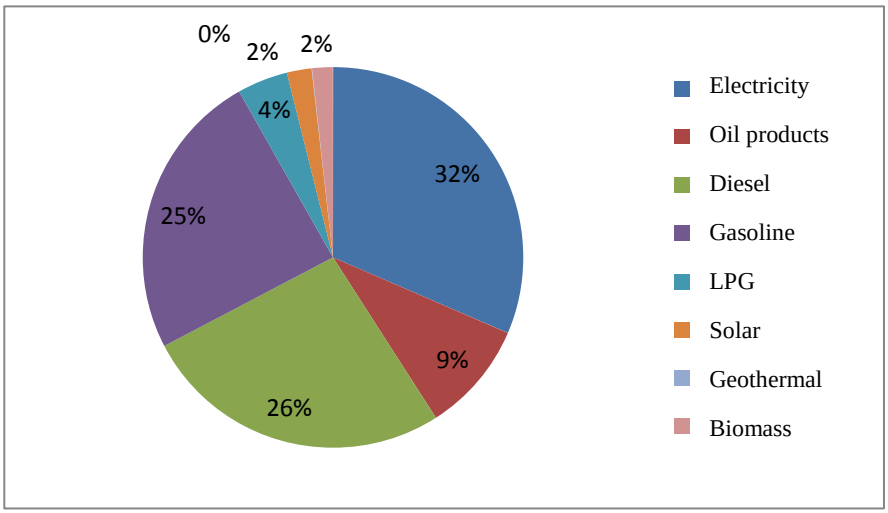


Figure 21 Share of Final Energy Consumption by Energy Source in 2009



6. INVENTORY OF CARBON DIOXIDE (CO_2) EMISSIONS AT IDALION MUNICIPALITY

6.1. Introduction

Carbon dioxide emissions were calculated using standard emission factors on consumption based on the energy source and use. According to these factors Renewable Energy Sources (RES) are considered to have zero carbon emissions.

Table 12 Coefficients for Calculating CO_2 Emissions

	Energy Source	IPCC emission factors
FOSSIL FUELS	Fuel oil	0,279
	Diesel	0,267
	Gasoline	0,249
	Natural Gas	0,202
	LPG	0.240
	Electricity	0,874
RENEWABLE ENERGY SOURCES	Wind	0
	Hydro	0
	Solar	0
	Geothermal	0
	Biomass	0

6.2. Residential Sector

Table 13 CO_2 Emissions in tones in the Residential Sector of Larnaka Municipality in 2009

Description	**Electricity**	**Fuel Oil**	**LPG**	**SOLAR**	**Geothermal**	**Biomass**	Total
Hot water	307	86	5	-	-	-	**397**
Heating and cooing	7.358	1.401	142	-	-	-	**8.901**
Lighting	409	-	-	-	-	-	**409**
Kitchen	307	-	36	-	-	-	**343**
Electrical appliances	1.840	-	-	-	-	-	**1.840**
Total	**10.220**	**1.487**	**183**	**-**	**-**	**-**	**11.890**

6.3. Primary Sector

Table 14 CO_2 Emissions in tones in the Primary Sector of Larnaka Municipality in 2009

Description	**Electricity**	**Fuel Oil**	**Diesel**	**LPG**	**Biomass**	Total
Agriculturee, Forestries and Fisheries	2.577	172	0	99	-	**2.848**
Mining and Quarring	0	0	0	0	-	**0**
Total	**2.577**	**172**	**0**	**99**	**-**	**2.848**

6.4. Secondary Sector

Table 15 CO_2 Emissions in tones in the Secondary Sector of Larnaka Municipality in 2009

Description	**Electricity**	**Fuel Oil**	**LPG**	**Solar**	**Biomass**	Total
Processing	19.290	1.290	741	-	-	**21.320**
Water supply, wastewater treatment, waste management	656	44	25	-	-	**725**
Construction	71	5	3	-	-	**78**
Total	**20.017**	**1.338**	**769**	**-**	**-**	**22.124**

6.5. Tertiary Sector

Table 16 CO_2 Emissions in tones in the Tertiary Sector of Larnaka Municipality in 2009

Description	**Electricity**	**Fuel Oil**	**LPG**	**Solar**	**Biomass**	Total
Wholesale and Retail trade, repair of motor vehicles and motorcycles	1.484	99	57	-	-	**1.640**
Hotels and restaurants	455	30	17	-	-	**503**
Public administration and social insurance	225	15	9	-	-	**249**
Defence, Justice, Police and Fire stations/ departments	133	9	5	-	-	**147**
Education	1.813	121	70	-	-	**2.003**
Human health and social care	100	7	4	-	-	**110**
Other services	6.188	414	238	-	-	**6.839**
Public lighting	1.094	-	-	-	-	**1.094**
Total	**11.492**	**695**	**399**	**-**	**-**	**12.587**

6.6. Transport

Table 17 CO_2 Emissions in for Transports in Larnaka Municipality in 2009

Description	**Electricity**	**Diesel**	**Gasoline**	**Biomass**	Total
Urban and suburban passenger transports	-	198	172	-	**370**
Other passenger transportation services (taxi, tourism, school buses, etc)	-	3.174	2.745	-	**5.919**
Commercial ground transportation services and mobile services	-	-	-	-	**-**
Private vehicles	-	6.547	5.661	-	**12.208**

Total	-	9.920	8.578	-	18.497

6.7. Total CO_2 emissions in Idalion Municipality

Table 18 Total CO_2 emissions in Larnaka Municipality in 2009

Sector	Electricity	Fuel Oil	Diesel	Gasoline	LPG	Solar	Geothermal	Biomass	Total
Residential	10.220	1.487	-	-	183	-	-	-	**11.890**
Primary	2.577	172	0	-	99	-	-	-	**2.848**
Secondary	20.017	1.338	-	-	769	-	-	-	**22.124**
Tertiary	11.492	695	-	-	399	-	-	-	**12.587**
Transports	-	-	9.920	8.578	-	-	-	-	**18.497**
Total	**44.306**	**3.692**	**9.920**	**8.578**	**1.450**	**-**	**-**	**-**	**67.945**

Figure 22 Share of CO_2 Emissions by Sector in 2009

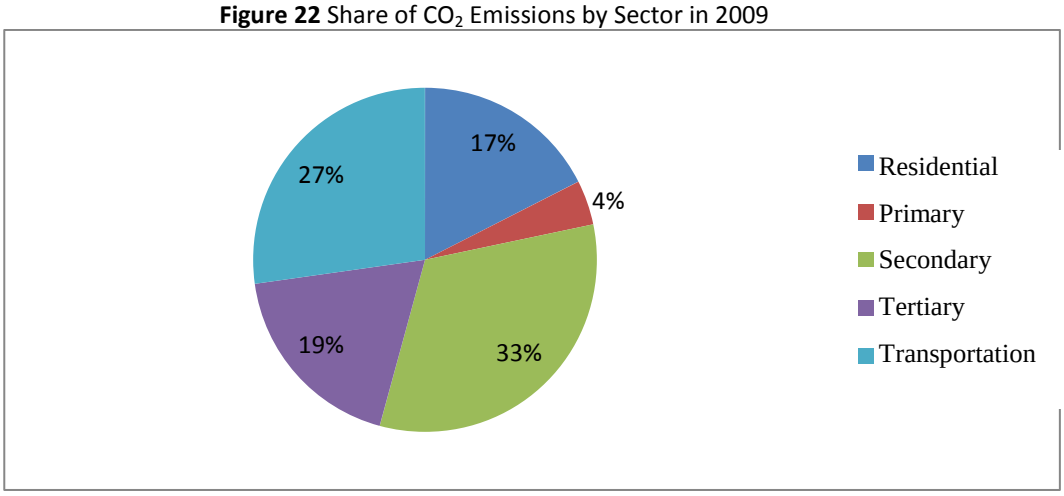
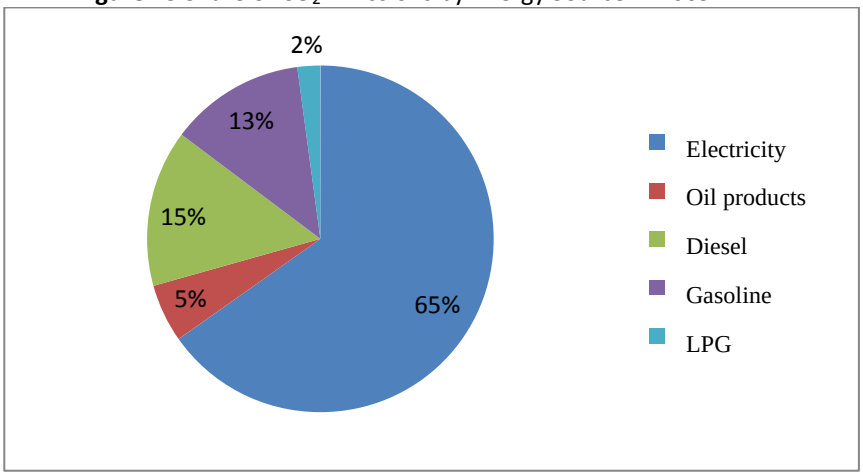


Figure 23 Share of CO_2 Emissions by Energy Source in 2009



6.8. Forecasting/ Projection Scenario of CO_2 Emissions

For the forecasting/projection of CO_2 emissions in the period 2010 to 2020, a scenario of expected evolution was compiled, which includes the following main assumptions:

1. Use of annual growth rates of energy consumption per sector based on the statistics available during the preparation of the Energy Action Plan (see Table 19)
2. Use of annual growth rates of energy efficiency at the end-use due to the improvement of existing technologies (see Table 20)
3. Estimation of the coefficient of performance of Cyprus Power Plants in subsequent, years, taking into account the technology improvement and the modernization of the existing equipment (see Table 21).
4. The gradual introduction, use and integration of natural gas into the power generating system.

Table 19 Growth Rates of Energy Consumption per Consumer used in the expected evolution scenario

Sector Descripion	**Estimated annual energy consumption rate**
Residential	
Hot water	3%
Heating and Cooling	3%
Lighting	3%
Cooking	3%
Refrigerators and freezers	3%
Washing and drying machines	3%
Dishwashers	3%
Televisions	3%
Other electrical appliances	3%
Primary Sector	
Agriculture, forestries and fisheries	1,5%
Mining and quarring	0%

Secondary Sector	
Processing	3,5%
Water supply, wastewater treatment, waste management and remediation activities	1,5%
Construction	1%
Tertiary Sector	
Wholesale and retail trade, repair of motor vehicles and motorcycles	2%
Accommodation services activities and food services	1,5%
General public administration and social insurance	1%
Defense and justice services, police and fire stations/ departments	1%
Education	2,5%
Activities relatd to human health and social care	2%
Other servics	2,5%
Municipal/ Public lighting	2,5%
Transports (vehicles)	
Private transports	1%
Urban and suburban passenger transports	2%
Other road transport services (taxi, tourism, school buses, etc.	0%
Freight road transports and removal services	2%
Secondary energy production	
Solar energy for electricity generation	3,0%
Wind energy for electricity generation	1,0%
Solar energy for heating and cooling	2,0%
Geothermal energy for heating and cooling	2,0%

Table 20 Increased Efficiency in Energy End-use (Reducing the Final Energy for the same Useful Energy)

Sector Description	**Estimated annual energy consumption rate**
Residences	
Hotwater	0,5%
Heating and cooling	0,5%
Lghting	0,5%
Cooking	0,5%
Refrigerators and heaters	0,5%
Washing and drying machines	0,5%
Dishwashers	0,5%
Televisions	0,5%
Other electrical appliances	0,5%
Other services	0,5%
Municipal/ Public lighting	0,5%
Transprts (Vehicles)	
Private transports	0,5%

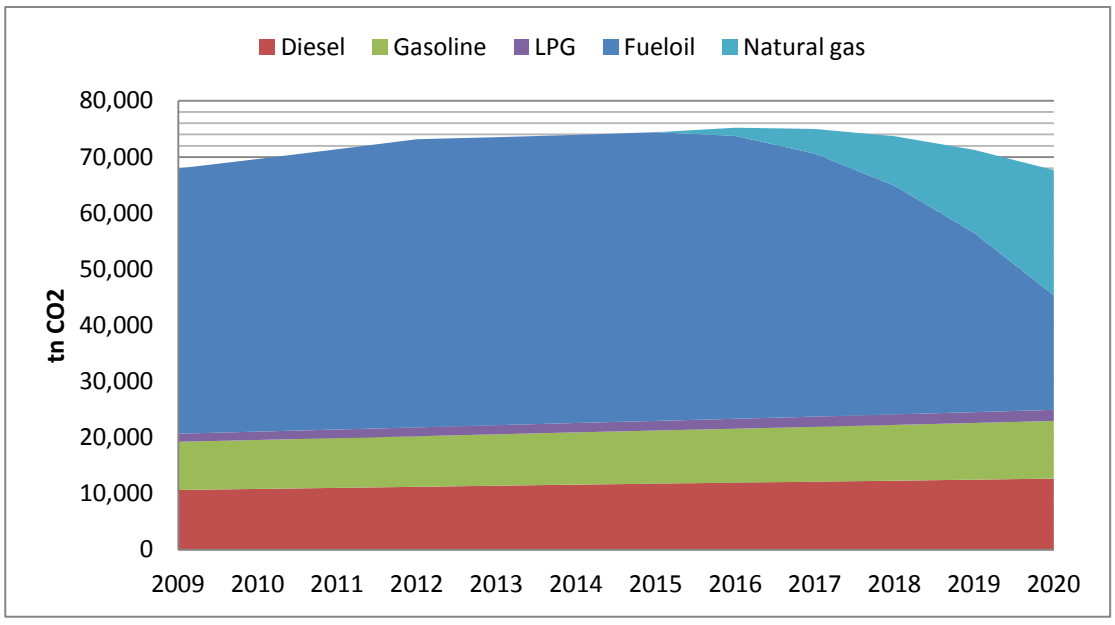
Table 21 Coefficients of Energy Performance of Electricity Generation

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Fuel Oil	32%	32%	32%	33%	34%	35%	35%	35%	35%	35%	35%
Diesel	25%	25%	25%	25%	25%	26%	27%	28%	29%	30%	31%
Natural Gas	-	-	-	-	-	43%	43%	43%	44%	44%	44%

Table 22 Expected Evolution Scenario for Forecasting CO_2 Emissions for the Period 2009 - 2020

Year	Fuel Oil	Diesel	Gasoline	LPG	Natural Gas	Total	Percentage increase based on 2009
2009	47.240	10.678	8.578	1.450	0	**67.945**	0%
2010	48.564	10.862	8.719	1.492	0	**69.637**	2%
2011	49.928	11.050	8.862	1.535	0	**71.374**	5%
2012	51.333	11.241	9.008	1.579	0	**73.160**	8%
2013	51.305	11.436	9.156	1.624	0	**73.521**	8%
2014	51.327	11.634	9.307	1.671	0	**73.938**	9%
2015	51.425	11.801	9.460	1.719	0	**74.406**	10%
2016	50.393	11.973	9.616	1.769	1.460	**75.210**	11%
2017	46.844	12.149	9.774	1.820	4.400	**74.988**	10%
2018	40.708	12.330	9.935	1.873	8.843	**73.690**	8%
2019	31.911	12.514	10.099	1.928	14.813	**71.265**	5%
2020	20.377	12.703	10.266	1.984	22.332	**67.661**	0%

Figure 24 Expected Evolution Scenario for Forecasting CO_2 Emissions for the Period 2009 -2020



7. IDALION MUNICIPALITY SUSTAINABLE ENERGY ACTION PLAN FROM 2011 TO 2020

7.1. Introduction

The Sustainable Energy Action Plan that has been prepared for Idalion Municipality includes additional measures/actions so as to achieve at least the European goal of combating climate change. This includes measures taken by the Municipality, in addition to national measures, to overcome the goal of reducing CO_2 emissions by at least 20% by 2020 compared to the reference year 2009.

Emissions Reference Year 2009 (tn CO_2/year)	Expected annual emissions in 2020 (tn CO_2/year)	Minimum emissions target in 2020 (tn CO_2/year)	Desired minimum (20%) emissions reduction (tn CO_2/year)
67.945	67.661	54.356	13.589

Although the contribution of national measures is estimated and included in the Sustainable Energy Action Plan, the municipality cannot determine the achievement of National Goals. However, several of the measures proposed to be implemented at a local level, will support and complement national measures, in order to enable the achievement of the main objectives.

The measures are divided in the following main areas:

- Energy saving in public buildings
- Energy saving through awareness raising campaigns
- Energy saving in transports
- Energy saving in street lighting
- Investments in Renewable Energy Sources (RES)
- Development of green spaces

7.2. Energy Saving in Public Buildings

Measure ENEF 1 – Creation of a new Municipal Building with low CO2

The indirect cost of the application of this measure is not particularly important, as the following requirements must first be fulfilled: (a) preparation of terms for receiving tenders, (b) evaluation of the offers by technical and financial criteria.

Implemented period 2016.

S/N	BUILDING/ USE	CONSTRUCTION YEAR	CONSUMPTION IN 2010 (KWH)	PROPOSED INTERVENTION	SAVING RATE
1	New Town Hall	2015	*48.044	Διορθωτής τάσης	15%
1	New Town Hall	2015	*48.044	Βιοκλιματικός Σχεδιασμός	20%
1	New Town Hall	2015	*48.044	Αγορά εξοπλισμού χαμηλής κατανάλωσης	15%

* Consumption used is the current of the Town Hall

Measure code	**ENEF 1**		
Measure name	**Creation of a new Municipal Building with low CO2**		
APPLICATION COST			
Investment cost	**Cost (€)**		
Voltage Corrector Installation	**10.000**		
Bioclimatic Design	**15.000**		
Low Consumption Equipment	**10.000**		
Operation cost			
Voltage Corrector Installation	**0 €**		
Bioclimatic Design	**0 €**		
Low Consumption Equipment	**0 €**		
Indirect cost			
	☐ **– High** ☐ **– Average** ☒ **– Low**		
APPLICATION BENEFITS			
Energy	**Energy Saving (kWh/year)**		
	21.620		
Financial	Energy Saving (kWh/year)	Average electricity and fuel oil price (€/kWh)	**Saving (€/year)**
	24.022	0,18	**4.323**
Environmental	**Emissions Saving (kg_{CO2}/ year)**		
	20.995		

RESULTS – EVALUATION			
Estimated Unit Cost (€/kg CO_2)	**1,67 €/ $kg_{CO2\ annual\ saving}$**		**Proposed for Implementation** ☒
DELIVERABLE			
Estimated Total Cost 35.000€	**Saving 4.323€**	**Emissions Reduction 20.995 Kg_{CO2}/ year**	**Depreciation 8 years**

Measure ENEF2: Renewable Electricity from Photovoltaic Systems on Municipal Buildings

The installation of electricity generating systems with Photovoltaic panels in the two parishes of the municipality (Holy Mary Parish and Parish of Agios Constantinos and Agias Helenis). was studied. The total power from the PV installation will be 2*20 kW and will cover an area of approximately 2*300 m2.

The indirect cost of the measure application is not particularly important, as the following requirements must first be fulfilled: (a) preparation of call for tenders, (b) evaluation of the tenders by specific technical and financial criteria, (c) completion of form (application) to ensure the subsidy from the 2009-2013 Grant Scheme of the Ministry of Commerce, Industry and Tourism. Additionally, the process of connecting the PV systems with the electricity network grid of EAC should be performed. Photovoltaic Systems receive a subsidy on the sold kWh (selling price is €0,35)

Measure implementation period: 2012 - 2015

Measure Code	**ENEF 2**		
Measure Name	**Renewable Electricity on Municipal Buildings**		
APPLICATION COST			
Investment Cost	**Total (€)**		
2*Photovoltaic Systems 20 kW	**100.000**		
Operation Cost			
2*Photovoltaic Systems 20 kW	**0 € (negligible cost for the periodical panels cleaning)**		
Indirect Cost			
	☐ **– High** ☒ **– Average** ☐ **– Low**		
APPLICATION BENEFITS			
Energy	Power (kW)	Electricity Generation (kWh/kW.year)	**Green Energy (kWh/year)**
2*Photovoltaic Systems 20 kW	40	1500	**60.000**
Financial	Green Energy (kWh/year)	Subsidized price of electricity (€/kWh)	**Income (€/year)**
2*Photovoltaic Systems 20 kW	60.000	0.35	**21.000**
Environmental	Emission Reduction Factor (kg_{CO2}/kW.year)	Power (kW)	**Emissions Saving (kg_{CO2}/ year)**
2*Photovoltaic Systems 20 kW	1.183	40	**50.719**
RESULTS - EVALUATION			
Unitary Cost (€/kg CO_2) ***2*Photovoltaic Systems 20 kW***	**1,97 €/ kg_{CO2} annual saving**		**Proposed for Implementation** ☒
DELIVERABLE			
Total Cost **100.000 €**	**Income** **21.000 €**	**Emissions Reduction** **50.719 Kg_{CO2}/ year**	**Depreciation** **4.8 years**

7.3. Energy Saving through awareness raising campaigns

Measure ESAC1: Organization of an annual seminar on Renewable Energy Sources

The organization of an annual seminar on Renewable Energy Sources (RES) in Idalion Municipality was examined. The all-day seminar will be held at the Town Hall, annually for a total of 3 years.

The indirect cost for the application of this measure can be considered high as apart from the organization of the seminar (speakers, invitations, space, catering etc), interested parties will have to bear the costs of implementing RES at home on their own.

Measure implementation period: 2012 - 2014

Measure Code	**ESAC 1**	
Measure Name	Organization of an annual seminar on Renewable Energy Sources	
APPLICATION COST		
Cost of Measure	**2.000 €**	
Indirect Cost	☒ **– High** ☐ **– Average** ☐ **– Low**	
APPLICATION BENEFITS		
Energy Financial (Green Energy €/year) Environmental (kg CO_2-eq)	**54.000 kWh/year** The financial benefits for interested parties **42.606 kg_{CO2}/year**	
RESULTS - EVALUATION		
Unitary Cost (€/kg CO_2)	**0.047€/ $kg_{CO2\ annual\ saving}$**	**Proposed for Implementation** ☒

Equation: ES=v*ε*n*vδ*ESPP
ES: Energy Saving (kWh) v: participation number ε: application years n: Awareness Percentage (0-100%) vδ: number of diffuse influence ESPP: Green Energy per person (kWh)
Calculation: ES= 20*3*0.3*3*1000kWh/year= 54.000 kWh/year

Measure ESAC2: Organization of annual seminar on Energy Saving

The organization of an annual seminar on Energy Saving in Idalion Municipality was examined. The all-day seminar will be held at the Town Hall, annually for a total of 3 years.

The indirect cost for the application of this measure can be considered high as apart from the organization of the seminar (speakers, invitations, space, catering etc), interested parties will have to bear the costs of implementing energy saving technologies at home on their own.

Measure implementation period: 2012 - 2014

Measure Code	**ESAC 2**	
Measure Name	**Organization of annual seminar on Energy Saving**	
APPLICATION COST		
Cost of Measure	**1.500 €**	
Indirect Cost	☐ **– High** ☒ **– Average** ☐ **– Low**	
APPLICATION BENEFITS		
Energy Financial (Energy saving. €/year) Environmental (kg CO_2-eq)	**31.500 kWh/year** The financial benefits for interested parties **6.761 kg_{CO2}/year**	
RESULTS - EVALUATION		
Unitary Cost (€/kg CO_2)	**0,22€/ $kg_{CO2\ annual\ saving}$**	**Proposed for Implementation** ☒

Equation: ES=v*ε*n*vδ*ESPP
ES: Energy Saving (kWh) v: participation number ε: application years n: Awareness Percentage (0-100%) vδ: number of diffuse influence ESPP: Green Energy per person (kWh)
Calculation: ES= 20*3*0.25*3*700kWh/year= 31.500 kWh/year

Measure ESAC3: Organization of educational presentations to students

The organization of educational presentations to students on renewable energy sources and energy saving was examined. The measure includes a set of four (4) presentations.

The indirect cost of the measure can be considered as high as apart from the organization of the presentations, the interested party (who will become aware of the measure through their children) should bear the costs of implementing energy saving measures or renewable energy sources in their home, on their own.

Measure implementation period: 2010

Measure Code	**ESAC 3**	
Measure Name	**Organization of educational presentations to students**	
APPLICATION COST		
Cost of Measure	**1.200 €**	
Indirect Cost	☒ **– High** ☐ **– Average** ☐ **– Low**	
APPLICATION BENEFITS		
Energy Financial (Energy saving. €/year) Environmental (kg CO_2-eq)	**1.344.000 kWh/year** The financial benefits for interested parties **667.000kg$_{CO2}$/year**	
RESULTS - EVALUATION		
Unitary Cost (€/kg CO_2)	**0.002€/ kg$_{CO2\ annual\ saving}$**	**Proposed for Implementation** ☒

Equation: ES=v*ε*n*νδ*ESPP
ES: Energy Saving (kWh) v: participation number ε: application years n: Awareness Percentage (0-100%) νδ: number of diffuse influence ESPP: Green Energy per person (kWh)
Calculation: ES= 350*4*0.4*3*800kWh/year= 1.344.000 kWh/year

Measure ESAC4: Organization of "Day without lighting"

The organization of an annual day without lighting in Idalion Municipality was examined. The measure will apply for a period of 10 years.

The indirect cost of the measure application can be considered as high as, apart from the event organization, the interested party should bear their own costs of implementing energy saving measures or renewable energy sources at home.

Implementation on 30 March 2012 (and every following year for 10 years)

Measure Code	**ESAC 4**	
Measure Name	**Organization of "Day without lighting"**	
APPLICATION COST		
Cost of Measure	**1.000 €**	
Indirect Cost	☒ **– High** ☐ **– Average** ☐ **– Low**	
APPLICATION BENEFITS		
Energy Financial (Energy saving. €/year) Environmental (kg CO_2-eq)	**360.000 kWh/year** The financial benefits for interested parties **314.640kg$_{CO2}$/year**	
RESULTS - EVALUATION		
Unitary Cost (€/kg CO_2)	**0.003€/ kg$_{CO2\ annual\ saving}$**	**Proposed for Implementation** ☒

Equation: ES=v*ε*n*vδ*ESPP
ES: Energy Saving (kWh) v: participation number ε: application years n: Awareness Percentage (0-100%) vδ: number of diffuse influence ESPP: Green Energy per person (kWh)
Calculation: ES= 500*10*0.20*3*120kWh/year= 360.000 kWh/year

Measure ESAC5: Energy Information in the Municipality website

The posting of information on Renewable Energy Sources (RES) and Energy Saving (ES) in the Municipality of Idalion website was examined. The measure will apply for a period of 10 years.

The indirect cost of the measure application can be considered as high as the interested party should bear the costs of implementing energy saving measures or renewable energy sources at home, on their own.

Start of Implementation: 2011

Measure Code	**ESAC 5**	
Measure Name	**Energy Information in the Municipality website**	
APPLICATION COST		
Cost of Measure	**0 €**	
Indirect Cost	☒ **– High** ☐ **– Average** ☐ **– Low**	
APPLICATION BENEFITS		
Energy Financial (Energy saving. €/year) Environmental (kg CO_2-eq)	**614.250 kWh/year** The financial benefits for interested parties **536.855 kg_{CO2}/year**	
RESULTS - EVALUATION		
Unitary Cost (€/kg CO_2)	**0.00 €/ $kg_{CO2\ annual\ saving}$**	**Proposed for Implementation** ☒

Equation: ES=v*ε*n*vδ*ESPP
ES: Energy Saving (kWh) v: participation number ε: application years n: Awareness Percentage (0-100%) vδ: number of diffuse influence ESPP: Green Energy per person (kWh)
Calculation: ES= 300*10*0.15*3*455kWh/year= 614.250kWh/year

Measure ESAC6: Organization of "Cycling Day"

The organization of an annual "Cycling Day" in Idalion Municipality was examined. The measure will apply for 10 years.

The indirect application cost of this measured is considered to be low as apart from the organization of the event, the participants will not be burdened with further costs.

Start of Implementation: September 2012

Measure Code	**ESAC 6**	
Measure Name	**Organization of "Cycling Day"**	
APPLICATION COST		
Cost of Measure	**1000 €**	
Indirect Cost	☐ **– High** ☐ **– Average** ☒ **– Low**	
APPLICATION BENEFITS		
Energy Financial (Energy saving. €/year) Environmental (kg CO_2-eq)	**165.780 kWh/year** The financial benefits for interested parties in terms of fuel saving **144.892 kg_{CO2}/year**	
RESULTS - EVALUATION		
Unitary Cost (€/kg CO_2)	**0.007€/ $kg_{CO2\ annual\ saving}$**	**Proposed for Implementation** ☒

Equation: ES=v*ε*n*vδ*ESPP
ES: Energy Saving (kWh) v: participation number ε: application years n: Awareness Percentage (0-100%) vδ: number of diffuse influence ESPP: Green Energy per person (kWh)
Calculation: ES= 30*10*0.2*3*921kWh/year= 165.780 kWh/year

Measure ESAC7: Informational leaflets and messages

The preparation of information material to be used for updating, information and public awareness was examined.

The indirect application cost of this measure can be considered high, as apart from the preparation and distribution of informational material the interested party should bear their own cost for any investment or saving they proceed to.

Measure Implementation Period: June 2012-2020

Measure Code	**ESAC 7**			
Measure Name	**Informational leaflets and messages**			
APPLICATION COST				
Measure Cost	**Total (€)**			
(a) Leaflets on RES and ES	**3.000 €**			
(b) Leaflets on sustainable mobility	**2.000 €**			
Indirect Cost				
	☒ **– High** ☐ **– Average** ☐ **– Low**			
APPLICATION BENEFITS				
Energy	Number/ receivers	Awareness Percentage	Energy Benefit (kWh/person.year)	**Energy Saving (kWh/year)**
(a) Leaflets on RES and ES	5.000	5%	500	**125.000**
(b) Leaflets on sustainable mobility	5.000	5%	500	**125.000**
Financial				
	The financial benefits for interested parties in terms of energy saving			
Environmental	**Emissions Saving (kg_{CO2}/ year)**			
(a) Leaflets on RES and ES	109.250			
(b) Leaflets on sustainable mobility	109.250			
RESULTS - EVALUATION				
Unitary Cost (€/kg CO_2)			**Proposed for Implementation**	
(a) Leaflets on RES and ES	**0,027 €/ $kg_{CO2\ annual\ saving}$**		☒	
(b) Leaflets on sustainable mobility	**0.018€/ $kg_{CO2\ annual\ saving}$**		☒	
DELIVERABLE				
Total Cost **5.000 €**		**Emission Reduction** **218.500 Kg_{CO2}/ year**		

Measure ESAC8: Organization of an annual seminar on "Energy Saving in Industry"

Organization of an annual seminar on "Energy Saving in Industry" in Idalion Municipality was examined. The all-day seminar will be held in the Town Hall for 3 consecutive years.

The indirect cost for the application of this measure can be considered high as apart from the organization of the seminar (speakers, invitations, space, catering etc), stakeholders will have to bear the costs of implementing energy saving technologies in industry on their own.

Measure Implementation Period:2013-2015

Measure Code	**ESAC 8**	
Measure Name	**Organization of an annual seminar on "Energy Saving in Industry"**	
APPLICATION COST		
Cost of Measure	**3.000€**	
Indirect Cost	☐ **– High** ☒ **– Average** ☐ **– Low**	
APPLICATION BENEFITS		
Energy Financial (Energy saving. €/year) Environmental (kg CO_2)-eq)	**648.000 kWh/year** The financial benefits for interested parties **508.700 kg_{CO2}/year**	
RESULTS - EVALUATION		
Unitary Cost (€/kg CO_2)	**0.006€/ $kg_{CO2\ annual\ saving}$**	**Proposed for Implementation** ☒

Equation: ES=v*ε*n*vδ*ESPP
ES: Energy Saving (kWh) v: participation number ε: application years n: Awareness Percentage (0-100%) vδ: number of diffuse influence ESPP: Green Energy per industry (kWh)
Calculation: ES= 30*3*0.8*1.5*6000kWh/year= 648.000 kWh/year

7.4. Energy Saving in Transport

Measure EST1: Promotion of vehicles with low CO_2 emissions

The possibility of the promotion of vehicles with low CO_2 emissions by providing facilities was examined. Two cases were examined: (a) free parking space and (b) charging points for electric vehicles. The facilities should be provided for 5 years.

The indirect application cost of this measure can be considered low since interested parties would bear the cost of purchasing an eco-car on their own.

Measure Implementation Period: June 2012 – 2017

Measure Code	**EST1**			
Measure Name	**Promotion of vehicles with low CO_2 emissions**			
APPLICATION COST				
Cost of Measure	**Total (€)**			
(a) Free Parking Spaces (4 spaces)	**10.000 € * loss of income**			
(b) Charging points for electric vehicles (2 points)	**2.500 €**			
Indirect Cost	☐ **– High** ☐ **– Average** ☒ **– Low**			
APPLICATION BENEFITS				
Energy	Number of spaces	Traffic (5 years)	ES per visit + ES from diffuse information (kWh/ year)	**Energy Saving (kWh/year)**
(a) Free Parking Spaces (4 spaces)	4	1.000	70	**280.000**
(b) Charging points for electric vehicles (2 points)	2	500	80	**80.000**
Financial	*			
	The financial benefits for interested parties from ES			
Environmental	**Emissions saving (kg_{CO2}/ year)**			
(a) Free Parking Spaces (4 spaces)	**70.840**			
(b) Charging points for electric vehicles (2 points)	**20.240**			
RESULTS - EVALUATION				
Unitary Cost (€/kg CO_2)			**Proposed for Implementation**	
(a) Free Parking Spaces (4 spaces)	**0,14 €/ kg_{CO2} annual saving**		☒	
(b) Charging points for electric vehicles (2 points)	**0.12 €/ kg_{CO2} annual saving**		☒	
DELIVERABLE				
Total Cost **12.500 €**	**Emissions Reduction** **91.080 Kg_{CO2}/ year**			

Measure EST2: Energy saving in the Municipality's fleet

The possibility of purchasing to vehicles with low CO_2 was examined.

The indirect application cost of the measure can be considered low since interested parties (to be aware of the eco-car market) would bear the cost of purchase on their own.

The indirect application cost of the measure is not particularly important, as the following requirements must first be fulfilled: (a) preparation of the call for tenders (b) Evaluation of offers by specific technical and financial criteria (c) completion of form (application) to ensure the subsidy from the 2009-2013 Grant Schemes of the Ministry of Commerce, Industry and Tourism.

The purchase of low emissions vehicles is sponsored by the Scheme of the Ministry of Commerce, Industry and Tourism. 700 € for low emissions vehicle and 1200€ for a hybrid.

Measure Implementation Period: 2013-2020

Measure Cost	**EST 2**	
Measure Name	**Energy saving in the Municipality's fleet**	
APPLICATION COST		
Cost of measure	**Total (€)**	
Purchase of 2 eco-cars	**30.000 €**	
Indirect Cost		
	☐ **– High** ☐ **– Average** ☒ **– Low**	
APPLICATION BENEFITS		
Energy	**Energy Saving (kWh/year)**	
Purchase of 2 eco-cars	**20.000**	
Financial	**Saving (€/year)**	
Purchase of 2 eco-cars	**2.000**	
Environmental	**Emissions saving (kg_{CO2}/ year)**	
Purchase of 2 eco-cars	**5.060**	
RESULTS - EVALUATION		
Unitary Cost (€/kg CO_2)		**Proposed for implementation**
Purchase of 2 eco-cars	**5,93€/ $kg_{CO2\ annual\ saving}$**	☒
DELIVERABLE		
Total Cost **30.000 €**	**Emissions Reduction** **5.060 Kg_{CO2}/ year**	

Measure EST3: Energy saving in transports by promoting the use of bicycles (Bicycle Rental System)

The possibility of promoting bicycle use by installing a bicycle rental system was examined.

The application period is for 6 years starting in 2014.

The indirect application cost of the measure can be considered low as interested parties (to be aware of bicycle use) would have to bear the minimal cost of bicycle rental.

Measure Code	**EST 3**			
Measure Name	**Bicycle Rental Systems**			
APPLICATION COST				
Cost of measure	**Total (€)**			
2 spaces and 20 bicycles	**30.000 €**			
Indirect Cost				
	☐ **– High** ☐ **– Average** ☒ **– Low**			
APPLICATION BENEFITS				
Energy	Number of Bicycles	Traffic per yeas	ES per bicycle + ES from diffuse information (kWh/ year)	**Energy Saving (kWh/year)**
2 spaces and 20 bicycles	20	250	40	**200.000**
Financial				
	The financial benefits for interested parties from fuel saving			
Environmental	**Emissions saving (kg_{CO2}/ year)**			
2 spaces and 20 bicycles	**174.800**			
RESULTS - EVALUATION				
Unitary Cost (€/kg CO_2)			**Proposed for implementation**	
2 spaces and 20 bicycles	**0.17 €/ $kg_{CO2\ annual\ saving}$**		☒	
DELIVERABLE				
Total Cost 30.000 €	**Emissions Reduction 174.800Kg_{CO2}/ year**			

Measure EST4: Energy Saving in Transport by Upgrading the Cycle Path Network in Idalion

The upgrade of the cycle path network in Paralimni aiming to promote bicycle use was examined.

The indirect application costs is considered low.

Start of Implementation: 2014 (for 6 years)

Measure Code	**EST 4**			
Measure Name	**Upgrade of Cycle Path Network**			
APPLICATION COST				
Cost of measure	**Total (€)**			
Upgrade of Cycle Path Network	**15.000 €**			
Indirect Cost				
	☐ **– High** ☐ **– Average** ☒ **– Low**			
APPLICATION BENEFITS				
Energy	New Cycle Paths (km)	Traffic per Year (Number of routes)	ES per Km + ES from diffuse information (kWh/ year)	**Energy Saving (kWh/year)**
Upgrade of Cycle Path Network	3	10.000	20	**600.000**
Financial				
	The financial benefits for interested parties from fuel saving			
Environmental	**Emissions Saving (kg_{CO2}/ year)**			
Upgrade of Cycle Path Network	**524.400**			
RESULTS - EVALUATION				
Unitary Cost (€/kg CO_2)			**Proposed for implementation**	
Upgrade of Cycle Path Network	**0,03€/ $kg_{CO2\ annual\ saving}$**		☒	
DELIVERABLE				
Total Cost **15.000 €**	**Emissions Reduction** **524.400Kg_{CO2}/ year**			

Measure EST5: Pedestrianization of squares

The possibility pedestrianization 2 central squares in the municipality of Dali was examined. The period of the measure is 5 years starting in 2016.

The indirect cost of the measure can be considered limited.

Measure Code	**EST 5**			
Measure Name	**Pedestrianization of squares**			
APPLICATION COST				
Cost of measure	**Total (€)**			
Pedestrianization of squares	**400.000 €**			
Indirect Cost				
	☐ **– High** ☐ **– Average** ☒ **– Low**			
APPLICATION BENEFITS				
Energy	Squares	Visiting per year	ES from diffuse information (kWh/ year)	**Energy Saving (kWh/year)**
Pedestrianization of squares	2	50.000	20	**1.000.000**
Financial				
	The financial benefits for interested parties from fuel saving			
Environmental	**Emissions saving (kg_{CO2}/ year)**			
Pedestrianization of squares	**253.000**			
RESULTS - EVALUATION				
Unitary Cost (€/kg CO_2)			**Proposed for implementation**	
Pedestrianization of squares	**1,58 €/ $kg_{CO2\ annual\ saving}$**		☒	
DELIVERABLE				
Total Cost **400.000 €**	**Emissions Reduction** **253.000Kg_{CO2}/ year**			

7.5. Energy Saving in Street Lighting

Measure ESSL1: Energy Saving in Street Lighting

The possibility of energy saving in street lighting was examined. Street lighting is one of the major expenses of the Municipality. The electricity consumption for street lighting in Idalion Municipality in 2010 was 1.315.333 kWh.

Two cases were examined: (a) replacement of current lamps with economic LED lamps and (b) optimization study of street lighting operating hours.

The indirect application cost can be considered low.

Year of Measure Implementation: 2013

Measure Code	**ESSL 1**			
Measure Name	**Energy Saving in Street Lighting**			
APPLICATION COST				
Cost of measure	**Total (€)**			
(a) Replacement of current lamps with economic LED lamps	**200.000 €**			
(b) Optimization of Street Lighting operation hours	**1.500 €**			
Indirect Cost				
	☐ **– High** ☐ **– Average** ☒ **– Low**			
Maintenance Cost				
	☐ **– High** ☐ **– Average** ☒ **– Low**			
APPLICATION BENEFITS				
Energy	Number	Electricity consumption per lamp (kWh/year)	ES per lamp per year (%)	**Energy Saving (kWh/year)**
(a) Replacement of current lamps with economic LED lamps	1000	400	50	**200.000**
(b) Optimization of Street Lighting operation hours	1000	400	5	**20.000**
Financial	Energy Saving (kWh/year)	Average Electricity Price (€/kWh)	**Saving (€/year)**	
(a) Replacement of current lamps with economic LED lamps	200.000	0.13	**26.000**	
(b) Optimization of Street Lighting operation hours	20.000	0.13	**2.600**	
Environmental	**Emissions Saving**			

	(kg_{CO2}/ year)	
(a) Replacement of current lamps with economic LED lamps	**174.800**	
(b) Optimization of Street Lighting operation hours	**17.480**	
RESULTS - EVALUATION		
Unitary Cost (€/kg CO_2)		**Proposed for implementation**
(a) Replacement of current lamps with economic LED lamps	**1,14 €/ $kg_{CO2\ annual\ saving}$**	☒
(b) Optimization of Street Lighting operation hours	**0.086 €/ $kg_{CO2\ annual\ saving}$**	☒

DELIVERABLE			
Total Cost **201.500 €**	**Saving** **28.600€**	**Emissions Reduction** **192.280 Kg_{CO2}/ year**	**Depreciation** **7 years**

7.6. Investments of Idalion Municipality in RES

Measure RES1: Renewable Electricity with Photovoltaic Systems

The creation of two Photovoltaic Parks was examined.

The indirect application cost is not particularly important as the following requirements must first be fulfilled: (a) preparation of the call for tenders (b) Evaluation of offers by specific technical and financial criteria (c) completion of form (application) to ensure the subsidy from the 2009-2013 Grant Schemes of the Ministry of Commerce, Industry and Tourism. Additionally, the process of connecting the Photovoltaic Parks with the electricity network grid of EAC should be performed. Photovoltaic Systems (Parks) receive a subsidy on the sold kWh (selling price is €0,31)

Measure Implementation Period: 2014-2016

Measure Code	**RES 1**		
Measure Name	**Renewable Electricity with Photovoltaic Systems**		
APPLICATION COST			
Investment Cost	**Total (€)**		
2 photovoltaic systems total power 150 kW	**450.000**		
Operational Cost			
2 photovoltaic systems total power 150 kW	**0 € (negligible cost for the periodical cleaning of the frames)**		
Indirect Cost	☐ **– High** ☒ **– Average** ☐ **– Low**		
APPLICATION BENEFITS			
Energy	Power (kW)	Electricity Generation (kWh/kW.year)	**Green Energy (kWh/year)**
2 photovoltaic systems total power 150 kW	150	1500	**225.000**
Financial	Green Energy (kWh/year)	Subsidized price of electricity (€/kWh)	**Income (€/year)**
2 photovoltaic systems total power 150 kW	225.000	0.31	**69.750**
Environmental	**Emissions Saving (kg_{CO2}/ year)**		
2 photovoltaic systems total power 150 kW	**177.525**		
RESULTS - EVALUATION			
Unitary Cost (€/kg CO_2)		**Proposed for Implementation**	
2 photovoltaic systems total power 150 kW	**2.535 €/ kg_{CO2} annual saving**	☒	
DELIVERABLE			
Total Cost	**Income**	**Emission Reduction**	**Depreciation**
450.000 €	**69.750 €**	**177.525 Kg_{CO2}/ year**	**6.5 years**

7.7. Development of Green Spaces in Idalion Municipality

Measure DGS1: Development of green spaces

Regarding the development of green spaces in Idalion Municipality, two cases were examined: (a) planting of trees and (b) care of green spaces.

The indirect application cost can be considered low.

Measure Code	**DGS 1**	
Measure Name	**Development of green spaces**	
APPLICATION COST		
Cost of measure	**Total (€)**	
(a) Planting of trees (1000 trees)	**2000 €**	
(b) Care of Green Spaces	**2000 €**	
Indirect Cost		
	☐ **– High** ☐ **– Average** ☒ **– Low**	
APPLICATION BENEFITS		
Environmental	**Emissions Saving (kg_{CO2}/ year)**	
(a) Planting of trees (1000 trees)	**40.000**	
(b) Care of Green Spaces	**20.000**	
RESULTS - EVALUATION		
Unitary Cost (€/kg CO_2)		**Proposed for Implementation**
(a) Planting of trees (1000 trees)	**0.05 €/ $kg_{CO2\ annual\ saving}$**	☒
(b) Care of Green Spaces	**0.10 €/ $kg_{CO2\ annual\ saving}$**	☒
DELIVERABLE		
Total Cost **4.000 €**	**Emission Reduction** **60.000 Kg_{CO2}/ year**	

7.8. Summary of Measures of Idalion Municipality

Table 23 Brief Presentation of Measures Taken by Idalion Municipality and Included in the Sustainable Energy Action Plan

Measure/ Action	Application	Cost (€)	Emissions Reduction (Kg_{CO2}/ year)	Depreciation (years)
Energy Saving in Public Buildings				
ENEF1:Creation of a new Municipal Building with low CO2	2015	35.000	20.995	8 years
ENEF2: Renewable Electricity from Photovoltaic Systems on Municipal Buildings	2012-2015	100.000	50.719	4,8 years
Energy Saving through Awareness Raising Campaigns				
ESAC1: Organization of an annual seminar on Renewable Energy Sources	2012-2014	2.000	42.606	-
ESAC2: Organization of an annual seminar on Energy Saving	2012-2014	1.500	6.761	-
ESAC3: Organization of educational presentations to students	2010-2020	1.200	667.000	-
ESAC4: Organization of "Day without lighting"	2012-2020	1.000	314.640	-
ESAC5: Information about energy in the Municipality website	2011-2020	0	536.855	-
ESAC6: Organization of "Cycling Day"	2012-2020	1.000	144.892	-
ESAC7: Raising awareness through informational leaflets and messages	2012-2020	5.000	218.500	-
ESAC8: Organization of an annual seminar on Energy Saving in Industries	2013-2015	3.000	508.700	-
Energy Saving in Transports				
EST1: Energy saving in transports by promoting eco-cars (hybrid and electric)	2012-2017	12.500	91.080	-

EST2: Energy saving in the Municipality's fleet	2013-2020	30.000	5.060	-
EST3: Energy saving in transports by promoting the use of bicycles (Bicycle Rental System)	2014-2020	30.000	174.800	-
EST4: Energy Saving in Transport by Upgrading the Cycle Path Network in Paralimni	2014-2020	15.000	524.400	-
EST5: Pedestrianization of squares	2016-2020	400.000	253.000	
Energy Saving in Street Lighting				
ESSL1: Energy saving in street lighting	2013	201.500	192.280	3.5 years
Investments of Idalion Municipality in RES				
RES1: Investments of Larnaka Municipality in renewable electricity	2014-2016	450.000	177.525	6.5 years
Development of Green Spaces in Idalion Municipality				
DGS1: Ανάπτυξη χώρων πρασίνου στο Δήμο	2012-2020	4.000	60.000	-
TOTAL		**1.292.700**	**3.989.813**	

7.9. Contribution of National Measures on the Sustainable Energy Action Plan of Larnaka Municipality

Energy saving and carbon dioxide emissions reduction for 2020 from the contribution of national measures, were calculated and are presented in the tables below.

Table 24 Brief Presentation of Energy Saving from National Measures

NATIONAL MEASURES FOR ENERGY EFFICIENCY		Energy Saving (MWh/year)			
		Residential	Tertiary	Industry	Transports
1	Legislation on Energy Building Performance (Equation 1)	474	326	697	0
2	Legislation for the inspection of air conditioning and heating systems (Equation 1)	227	156	335	0
3	Grant Schemes for the installation of solar thermal systems (Equation 1)	80	55	117	0
4	Grant Schemes for the installation of geothermal systems (Equation 1)	57	39	84	0
5	Legislation on energy efficiency of appliances (Equation 1)	337	301	725	0
6	Grant Schemes for the installation of Photovoltaics Systems (Equation 2)	309	257	515	0
7	Legislation for mandatory integration of solar water heaters (Equation 1)	42	35	85	0
8	Legislation on energy efficiency of buildings with area larger than 1000 m^2 (Equation 1)	0	326	279	0
9	Grant Schemes for cogeneration in Industry (Equation 1)	0	0	1.589	0
10	Plan of single urban transport system (Equation 3)	0	0	0	10.029
11	Mandatory inspection of Vehicles MOT (Equation 3)	0	0	0	6.643
12	Withdrawal Plan of old vehicles (Equation 3)	0	0	0	1.594
13	Grant Schemes for hybrid vehicles and vehicles with low CO_2 emissions (Equation 3)	0	0	0	850
14	Discounts on vehicles registration for vehicles with low CO_2 emissions (Equation 3)	0	0	0	1.063
	TOTAL PER SECTOR	1.526	1.495	4.425	20.178
	GRAND TOTAL	27.625			

Table 25 Brief Presentation of CO_2 Emissions Reduction from National Measures

NATIONAL MEASURES FOR ENERGY EFFICIENCY		Emissions Reduction (t CO_2/year)			
		Residential	Tertiary	Industry	Transports
1	Legislation on Energy Building Performance (Equation 1)	336	240	508	0
2	Legislation for the inspection of air conditioning and heating systems (Equation 1)	161	115	244	0
3	Grant Schemes for the installation of solar thermal systems (Equation 1)	56	40	85	0
4	Grant Schemes for the installation of geothermal systems (Equation 1)	40	29	61	0
5	Legislation on energy efficiency of appliances (Equation 1)	239	221	529	0
6	Grant Schemes for the installation of Photovoltaics Systems (Equation 2)	219	189	375	0
7	Legislation for mandatory integration of solar water heaters (Equation 1)	30	25	62	0
8	Legislation on energy efficiency of buildings with area larger than 1000 m^2 (Equation 1)	0	240	203	0
9	Grant Schemes for cogeneration in Industry (Equation 1)	0	0	1.159	0
10	Plan of single urban transport system (Equation 3)	0	0	0	2.533
11	Mandatory inspection of Vehicles MOT (Equation 3)	0	0	0	1.678
12	Withdrawal Plan of old vehicles (Equation 3)	0	0	0	403
13	Grant Schemes for hybrid vehicles and vehicles with low CO_2 emissions (Equation 3)	0	0	0	215
14	Discounts on vehicles registration for vehicles with low CO_2 emissions (Equation 3)	0	0	0	268
	TOTAL PER SECTOR	1.082	1.100	3.227	5.097
	GRAND TOTAL	10.506			

Table 26 Equations Used for the Estimation of the Contribution of the National Measures to Energy Saving

(1) ES=EC*np*nc*ns
ES: Energy Saving (MWh) EC: Energy Consumption (MWh) np: Number of Participation (0-100%) nc: Consumption rate per consumption category (0-100%) ns: Saving Percentage by applied measure (0-100%)

(2) GE=N*P*np
GE: Green Energy (MWh) N: Population P: Production per application (MWh) np: Participation percentage (rate) (0-100%)

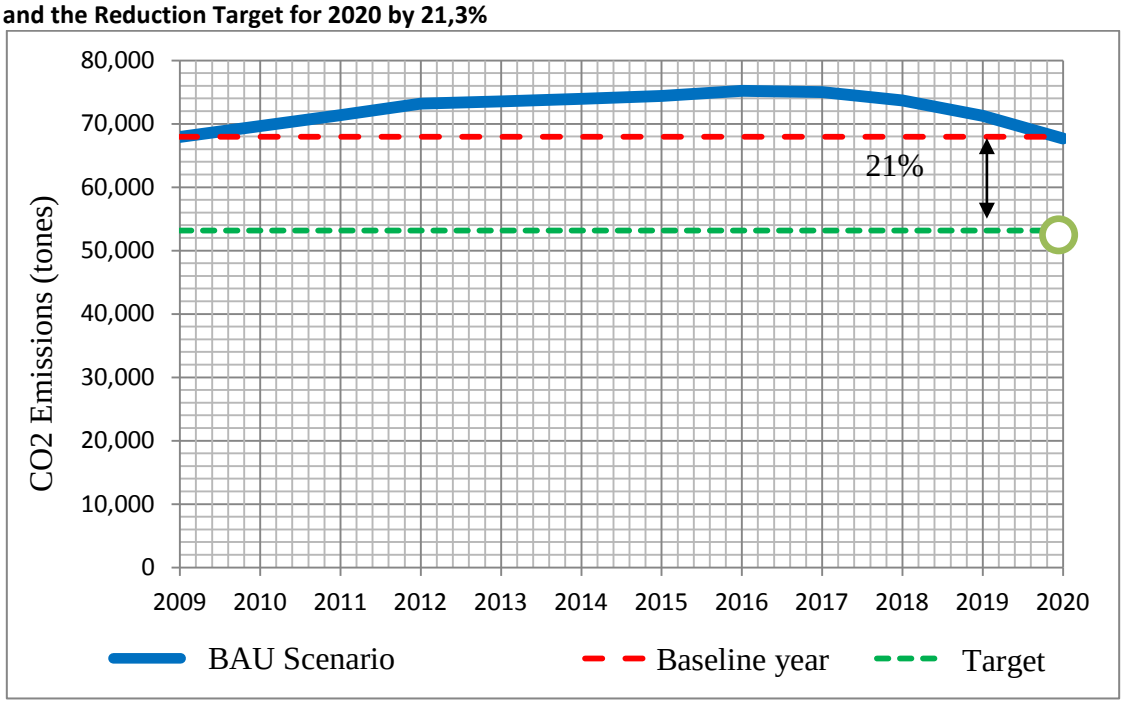
(3) EOS=(N*FO*np)+(ΔO*FO*np)
EOS: Energy Saving in terms of Fuel (MWh) N: Population FO: Fuel Saving per person (MWh) np: Participation percentage (rate) (0-100%) ΔO: Passing Vehicles

7.10. Description of Achieving CO2 Emission Reduction for 2020

The overall goal of reducing carbon dioxide emissions achieved by implementing the action plan for 2020, is 21% reduction compared to the reference year 2009. The achievement of this objective is presented in the table below.

Emission inventory for reference year 2009 (tn CO_2/year)	67.945
Expected emissions for 2020 – Expected Development Scenario (tn CO_2/year)	67.661
Estimated emission reduction from national measures for 2020 (tn CO_2/year)	10.506
Estimated emission reduction by the Municipality for 2020 (tn CO_2/year)	3.990
Total estimated emission reduction for 2020 (tn CO_2/year)	14.496
Estimated emissions for 2020 through the application of the Action Plan (tn CO_2/year)	**53.165**
Emission reduction percentage by 2020 compared with 2009	**21,3%**

Figure 25 Schematic of the Expected Evolution Scenario of CO2 Emissions in Paralimni Municipality and the Reduction Target for 2020 by 21,3%



Therefore by implementing the Sustainable Energy Action Plan, the Municipality of Dali will reduce carbon dioxide emissions by **21,3%** compared to 2009 (reaching 53.165 tons CO_2), thus exceeding by 1.3% the overall objective of the project to reduce emissions by 20%.

7.11. Financing the Sustainable Energy Action Plan

Funding for Energy Action Plan implementation is expected to be derived from the following resources:

- Municipality budget
- Savings that will result from energy reduction measures in buildings, vehicles and street lighting in the Municipality
- Incomes form the investments of the Municipality in Renewable Energy Sources
- Funding from the Grant Scheme of Ministry of Commerce, Industry and Tourism for Renewable Energy Sources and Energy Saving promotion.
- Possible funding from the Sustainable Development and Competitiveness Program of the Planning Bureau.
- Potential funding from the Fund created for Emissions Trading Scheme.
- Possible funding from other European Programmes.

Sources of energy data

- Consumption of fuels and heating fuels from oil companies within the administrative limits of Paralimni Municipality.
- LPG consumption from the Statistical Service of Cyprus (Reduction at local level based on the population) [www.mof.gov.cy/cysta*]*
- Annual growth rates from the Statistical Service of Cyprus and estimates of scholars [www.mof.gov.cy/cysta*]*
- National Action Plan for reducing CO_2 emissions from the Department of Environment [http://www.cyprus.gov.cy/moa/agriculture.nsf]
- National Action Plans for the share of RES from the Energy Service. [http://www.mcit.gov.cy/mcit/mcit.nsf]
- National Action Plans for Energy Saving at end-use from the Energy Service. [http://www.mcit.gov.cy/mcit/mcit.nsf]
- Grant Schemes for RES and ES from the Energy Service

  [http://www.mcit.gov.cy/mcit/mcit.nsf]
- Development of Public Transport Plans from the Department of Road Transport [www.mcw.gov.cy/mcw/rtd/rtd.nsf*]*
- Electricity Consumption data in the Municipality of Paralimni from the Electricity Authority of Cyprus [www.eac.com.cy*]*
- Energy consumption data in municipal buildings in Idalion
- Information concerning the installation of more efficient electricity generators (combined cycle) from EAC [www.eac.com.cy*]*
- Information about the advent of Natural Gas from the Energy Service [http://www.mcit.gov.cy/mcit/mcit.nsf]

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