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PACT OF ISLANDS

ENERGY ACTION PLAN

Psimolofou Community Cyprus

9 May 2012

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.

From Cyprus are involving 12 municipalities and 2 Communities one of them Psimolofou Community

The Community of Psimolofou is one of the villages of the mountainous district of Nicosia district and is part of a complex of Tamassos. Located about 16km. Southeast of Nicosia and is built on the right bank of the river Pedieos. Located at an altitude of 330 meters.

The year 2009 was designated as the reference year / recording of energy consumption and CO2 emissions in the City. According to actual consumption data collected by the Electricity Authority of Cyprus, the oil companies, etc. Statistical Service of Cyprus total energy consumption in Psimolofou 2009 was 31.509 MWh. The largest consumer of energy in the municipality is the transport 17.830 MWh, then the residential sector with 5.446 MWh.

The CO2 emissions in 2009 attributable to the overall energy consumption in the municipality are 11.664 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 11.957 tons.

The Sustainable Energy Action Plan 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	**Αριθμός**
Energy Savings in Municipality public buildings	3
Energy savings via informational campaigns	8
Energy savings in transport	1
Energy savings in street lighting	1
Municipality investments in renewable energy	1

The estimated annual emission reduction for 2020 with the implementation of the above measures amounts to 5,201 tons. Also, it was estimated that the impact of the Community's application of the national measures taken to reduce emissions of carbon dioxide will be an additional reduction of approximately 2,598 tons.

The annual estimated emission reduction for 2020 with the implementation of the above measures is approximately 882 tons. Also, it was estimated that the impact on Psimolofou Community from the application of the national measures taken to reduce emissions of carbon dioxide will be an additional reduction of approximately 1.855 tons.

That is, 20% less than the reference year is 2009.

The budget of the Action Plan for the period 2012 to 2020 amounts to € 179.550 Funding for the implementation of the Energy Action Plan is expected to stem from the following resources:

- Budget of the Community
- From the savings that will result in energy reduction measures in buildings, vehicles and street lighting in the municipality.
- From revenues derived from investment of the municipality in Renewable Energy.
- Possible funding from the Fund will be created from the proceeds of Tender greenhouse gas emissions
- Possible funding from other European programs.

Index

Tables

Pictures

1. THE ISLE-PACT PROJECT

1.1. Intoduction

The main objective of the ISLE-PACT project is the development of Local Sustainable Energy Action Plans, aiming at achieving European sustainability objectives as set 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 Eileen Siar (CnES) – The Outer Hebrides of Scotland. The project is funded by the 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 signing 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 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 two (2) Communities have signed the Pact of Islands and therefore participate in the ISLE-PACT project:

MUNICIPALITIES-COMMUNITIES	
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

Picture1 Signing ceremony of the Pact of Island on the 20th January 2011 in Nicosia

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.

Picture 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)

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

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

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

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

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

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

Picture 9 The President of Psimolofou Community Ioannis Lazarides

2. CYPRUS

Cyprus is the largest island in the eastern Mediterranean. 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 long 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 era and prehistoric settlements.

The main economic activities of the island are tourism, clothing exports and craft items 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 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. PSIMOLOFOU COMMUNITY

3.1. Indroduction

The Community of Psimolofou is one of the villages of the mountainous district of Nicosia district and is part of a complex of Tamassos. Located about 16km. Southeast of Nicosia and is built on the right bank of the river Pedieos. Located at an altitude of 330 meters.

The name of the village, according to Jack C. Goodwin, came from a hill in the area, Late Hill, meaning one good hill for cultivation. Nearchus Clerides, explains the name of the Community of the Late again but why Hill cereals grown in this region are maturing later than cereals grown in other neighboring areas. The settlement therefore existed in the old tardive Hill over time resulted in designation Psimolofou. But according to another version, the village got its name from the shape of the hill mentioned above, who had shaped bread. The combination of two words-Hill bread, gave the name Psomolofou. However earlier on English, the village actually called Psomolophou. For others the name came from "high ground." The hill that dominates the area and is located northwest of the village and at times have been discovered in this koursemenoi graves. Now part of the hill has been flattened and there erected the present Community golf village.

Picture 10 View of the Community Psimolofou

[Source: http://www.psimolofou.org *]*

3.2. History

The settlement of Psimolofou dating from the medieval era or earlier, as there are ruins in various senior chapels. Typically referred to that in the Frankish Psimolofou was under the hegemony of Templioton Franks who were monks and had as their center the village temple in Kyrenia.

Information from the book by Jack C. Goodwin, saying that the Psimolofou had to pay taxes to the Patriarchate of Jerusalem, which had moved to Cyprus after the collapse of the Christian power there in 1291. Later, around 1326 there through written texts which seem to instructions given by

E. Rey Recherches to the Bishop of Paphos Ms. Cardinal of St. Paul of Antioch as inform him whether "tithe" which gives Psimolophou more than 120 gold florins a year.

Upon the Venetian, the village Psimolofou with neighboring Monday was part of the estate of Lord Peter Lase which he bequeathed to his great son. This year thousands of trees planted in the area of which there are quite up to date.

During the Turkish enough fertile land fell into the hands of the Turks aghas, whose descendants lived until 1960 when he left with the known facts of the time. Features have survived until today Turkish names large plains definitely belonged to Turkish agas, like "Plain of Mouroutis" and "Kouseoi." In "Kouseous" is so far damaged before coming mansion where the Turks seemed to be the seat of feudal Franks. For many Turkish residents to flee their belongings from the depredations of the Turks donate the Monastery of Macheras. So the only Machairas acquired enormous wealth. The estates were worked by the monks of the monastery, who stayed overnight in the village in large monastery with many rooms - lofts - for monks, warehouses and other premises. The shareholders and much of this property has been sold, even though several estates so far is in the possession of the monastery.

During the Liberation War of 1955-1959 and the Turkish rebellion of 1963 and the War of 1974, several residents of the community were present them. In the battles of Tylliria in 1964 killed Gregory Nicholas Cow. While the Turkish invasion of 1974, four residents of our community are still missing.

3.3. Photos from the Community

Below are some photos from the Community of Psimolofou.

Picture 11 Community Council of Psimolofou

Picture 12 Elementary School Psimolofou

Picture 13 Community Cemetery

Picture 14 Community Clinic

Picture 15 Community Kindergarten

Picture 16 Park «Fallen and Missing "

(Source: http://www.psimolofou.org)

4. THE CURRENT SITUATION IN PSIMOLOFOU COMMUNITY

4.1. Description of buildings Psimolofou Community

- The hours of operation for all Community services are 7:30 to 14:00 for the summer season (June 1 - August 31) and for the remaining months the hours are 7:30 to 14:30 and every Wednesday until 18 : 00.
- There is no central heating system that requires the consumption of oil, gas etc but the heating system is the same as for cooling buildings.

  In all buildings of the Community there are solar panels for water heating and no building is not installed photovoltaic system.

4.2. Streetlights Community Psimolofou

The total energy consumption in 2009 for streetlights equaled 124MWh while the total energy consumption in 2010 for streetlights equaled 127MWh

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

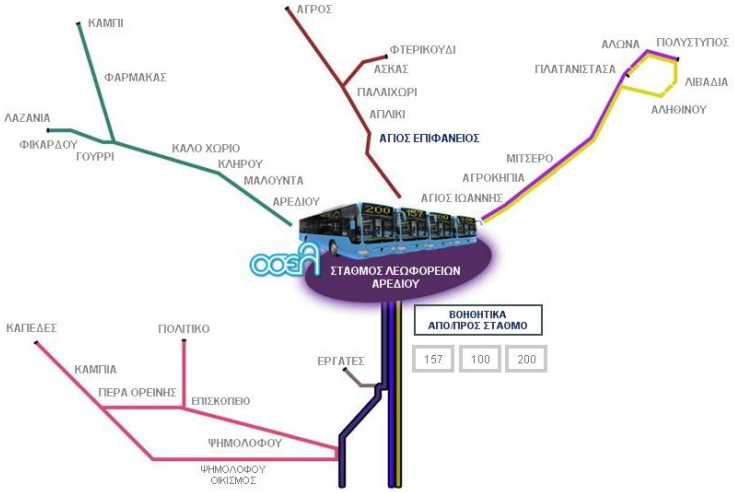
Table 1 Bulbs in Psimolofou Community

LAMP TYPE	POWER
HPS*	150 W
HPS	70 W
Compact Fluoroscent	21 W

* High pressure Sodium

4.3. Public transport

Public transport in the boundaries of the Community made by Transportation Organization of Nicosia District (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. We tried through various programs through the Department 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.



Picture 17 Bus services to the Community Psimolofou

Details of the services operated by the Community of Psimolofou available on the "OSEL" website www.osel.com.cy.

4.4. Completed and planned infrastructure

The Community of Psimolofou is a village with rapid growth, particularly in the last decade. Its geographical position which states near the capital Nicosia, but that still preserves all the advantages of a village, not only do residents not to leave here but also many foreigners to come and build in the Community. Population growth, however, brought the number of other needs, the respective Community Council tried honestly to solve planning and executing various infrastructure projects. The main ones are as follows:

1. The Community Tennis stadium electrified and placed large headlights that allow the use of the stadium at night to practice her children Mrs. community football teams of both Associations Community A.O.PS. Psimolofou and concord.

2. Was paved all the roads in the village and most of rural roads. Where was impossible blacktop improved significantly by using special materials earthen roadway.

3. Built a new house of the Community Council areas within which it operates and Clinic. Serves as possible community residents, mostly elderly and young children. Open every Thursday morning and what services are provided by a government doctor, nurses, pharmacist and health visitor.

4. Became pedestrian street in front of the Elementary School and Community Nursery and built special bends and crossing in front of the entrance of the school for the necessary child safety.

5. The beautification of the square in the center of the village is a work that adorns the Community. Beyond the sensual beauty, the area hosts the most events of social and cultural life of residents.

6. Works were completed and put into operation, alongside existing, new water tank potable water capacity of 500 metric tons, thus increasing the possibility of water supplies to 620 metric tons, which fully meets the needs of the Community.

7. Completed construction of the new Community with landscaped cemetery burial sites and premises necessary infrastructure required for easy handling of the process of burial.

4.5. Materials recycling program in the Community Psimolofou

The program is collecting recyclables to the limits of Community Psimolofou performed by a contractor of the nonprofit organization Green Dot Cyprus. Within the boundaries of Community recycling bins placed, PMD (blue), paper (brown) and glass and meditation 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 Organization Europe based in Brussels (PRO EUROPE) and includes 31 other similar systems around the world (more information on the organization's websitehttp://www.pro-e.org/ above By participating, the system became the sole manager of the Green Dot mark in Cyprus. In the Community Psimolofou 5 points are fitted with recycling bins and are the following:

1. STREET Vasilis Michaelides (PMD, paper, glass) **
(Across from the Community Council Offices)
2. STREET Tamasi (PMD, maps)
(At the junction with the road Vyzakia)
3. STREET KYRIAKOU MATSI (PMD, maps)
(Next to the entrance of the Community Stadium)
4. STREET GRIVA DIGENI (PMD, maps)
(Next to the old cemetery of the Community)
5. STREET GEROVOUNOU (PMD, maps)
(At the entrance to the road)

4.6. Population Community Psimolofou

In the 2001 Census carried out by the Statistical Service of Cyprus, the inhabitants of the village was 1,358 and now exceeds the 1,686 residents

5. INVENTORY OF ENERGY CONSUMPTION IN PSIMOLOFOU

5.1. Residential sector

Table 2 Energy demand in the residential sector MWh for 2009

Description	Electricity	Fuel Oil	LPG	Solar	Geothermal	Biomass	**Total**
Hot water	95	83	6	386	3	21	**594**
Heating and cooling	2.280	1.360	160	12	8	200	**4.020**
Lighting	127	-	-	-	-	-	**127**
Kitchen	95	-	41	-	-	0	**136**
Electrical devices or appliances	570	-	-	-	-	-	**570**
Total	**3.166**	**1.443**	**207**	**398**	**11**	**221**	**5.446**

5.2. Primary Sector

Table 3 Energy Demand in MWh in the primary sector for the year 2009

Description	Electricity	Fuel Oil	Diesel	LPG	Biomass	**Total**
Agriculture, Forestry, Fishing	1.863	1.040	729	240	745	**4.617**
Mining and Quarrying	-	-	-	-	-	**-**
Total	**1.863**	**1.040**	**729**	**240**	**745**	**4.617**

5.3. Secondary Sector

Table 4 Ζήτηση ενέργειας σε MWh στο δευτερογενή τομέα για το έτος 2009

Description	Electricity	Fuel oil	LPG	Solar	Biomass	**Total**
Processing	179	100	70	600	3	**952**
Water supply, sewerage, waste management	22	12	9			**43**
Construction	4	2	2			**8**
Total	**205**	**114**	**80**	**600**	**3**	**1.002**

5.4. Tertiary Sector

Table 5 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 motorcycles	281	157	110	10	4	**563**
Hotels and restaurants	56	31	22	1	1	**111**
Public administration and social security	25	14	10	5	-	**54**
Defence, Justice, Police and Fire station/department	-	-	-	-	-	**-**
Education	14	8	5	3	-	**30**
Human Health and Social Care	7	4	3		-	**14**
Other Services	867	484	339	13	12	**1.716**
Public Lighting	124	-	-	-	-	**124**
Total	**1.375**	**698**	**489**	**33**	**11**	**2.613**

5.5. Transport

Tableα 6 Final energy consumption in MWh in transports for the year 2009

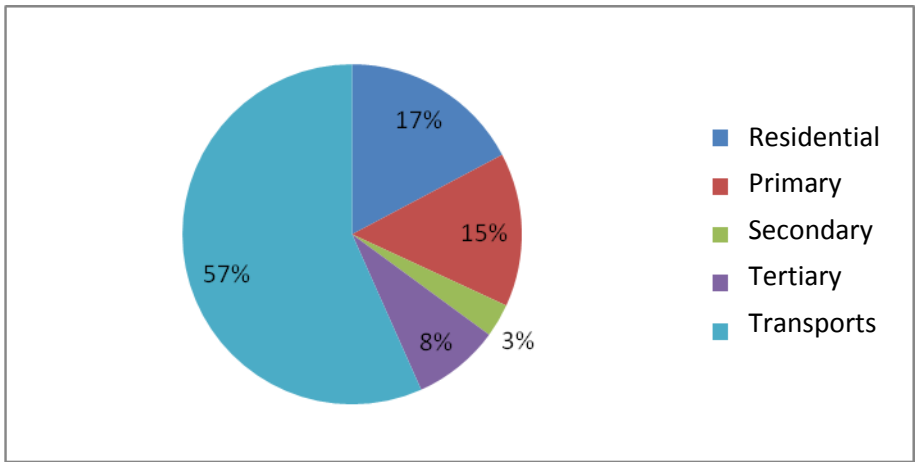
Description	Electricity	Diesel	Gasoline	Biomass	**Total**
Urban and suburban passenger transports	0	193	179	0	**357**
Other passenger transportation services (taxi, tourism, school buses, etc)	0	3.093	2.868	0	**5.706**
Commercial ground transportation services and removable services	0	0	0	0	**0**
Private Vehicles	0	6.380	5.916	0	**11.768**
Total	**0**	**9.666**	**8.963**	**0**	**17.830**

5.6. Total final energy consumption in the Psimolofou Community

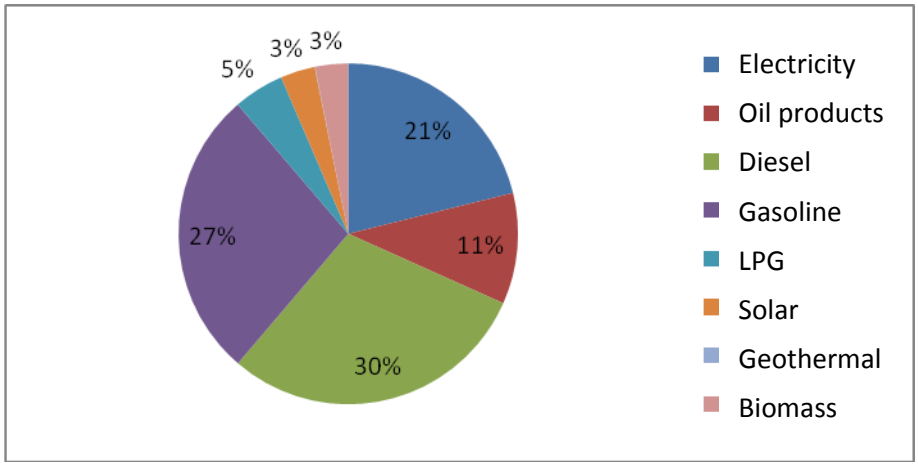
Table 7 Final energy consumption in MWh for the year 2009

Sector	Electricity	Fuel oil	Diesel	Gasoline	LPG	Solar	Geothermal	Biomass	**Total**
Residential	3.166	1.443	-	-	207	398	11	221	**5.446**
Primary	1.863	1.040	-	-	729	-	-	745	**4.617**
Secondary	205	114	-	-	80	600	-	3	**1.002**
Tertiary	1.375	698	-	-	489	33	-	18	**2.613**
Transports	-	-	9.252	8.578	-	-	-	-	**17.890**
Total	**6.610**	**3.296**	**9.252**	**8.578**	**1.505**	**1.030**	**11**	**986**	**31.509**

Picture 18 Share of final energy consumption by sector for the year 2009



Picture 19 Share of final energy consumption by energy source for the year 2009



6. CARBON DIOXIDE (CO_2) EMISSIONS INVENTORY IN PSIMOLOFOU COMMUNITY

6.1. Introduction

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

Table 8 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 9 CO_2 emissions in tonnes in the residential sector of Psimolofou Community in 2009

Description	Electricity	Fuel Oil	LPG	Solar	Geothermal	Biomass	**Total**
Hot water	83	23	1	-	-	-	**108**
Heating and Cooling	1.993	379	38	-	-	-	**2.410**
Lighting	111	-	-	-	-	-	**111**
Kitchen	83	-	10	-	-	-	**93**
Electrical devices or appliances	498	-	-	-	-	-	**498**
Total	**2.767**	**403**	**50**	**-**	**-**	**-**	**3.220**

6.3. Primary Sector

Table 10 CO_2 emissions in tonnes in the primary sector of Psimolofou Community 2009

Description	Electricity	Fuel Oil	Diesel	LPG	Biomass	**Total**
Agriculture, Forestry, Fishing	1.628	290	-	175	-	**2.093**

Mining and Quarrying	-	-	-	-	-	-
Total	**1.628**	**290**	**0**	**175**	**-**	**2.093**

6.4. Secondary Sector

Table11 CO_2 emissions in tonnes in the secondary sector at Psimolofou Community 2009

Description	Electricity	Fuel Oil	LPG	Solar	Biomass	**Total**
Processing	156	28	17	-	-	**201**
Water supply, sewerage, waste management	19	3	2	-	-	**25**
Construction	3	1	-	-	-	**4**
Total	**179**	**32**	**19**	**-**	**-**	**230**

6.5. Tertiary Sector

Table 12 CO_2 emissions in tonnes in the tertiary sector at Psimolofou Community 2009

Description	Electricity	Fuel Oil	LPG	Solar	Biomass	**Total**
Wholesale and Retail trade, repair of motor vehicles and motorcycles	246	44	5	-	-	**316**
Hotels and restaurants	49	9	0	-	-	**63**
Public administration and social security	22	4	3	-	-	**28**
Defence, Juctice, Police and Fire station/department	-	-	-	-	-	**-**
Education	12	2	2	-	-	**16**
Human Health and Social Care	6	-	2	-	-	**8**
Other Services	758	12	135	-	-	**975**
Public Lighting	109	-	-	-	-	**109**
Total	**1.202**	**195**	**117**	**-**	**-**	**1.514**

6.6. Transport

Table 13 Final energy consumption in MWh in transports for the year 2009

Description	Electricity	Fuel Oil	LPG	Solar	Biomass
Urban and suburban passenger transports	-	49	43	-	**92**
Other passenger transportation services (taxi, tourism, school buses,	-	790	684	-	**1.474**

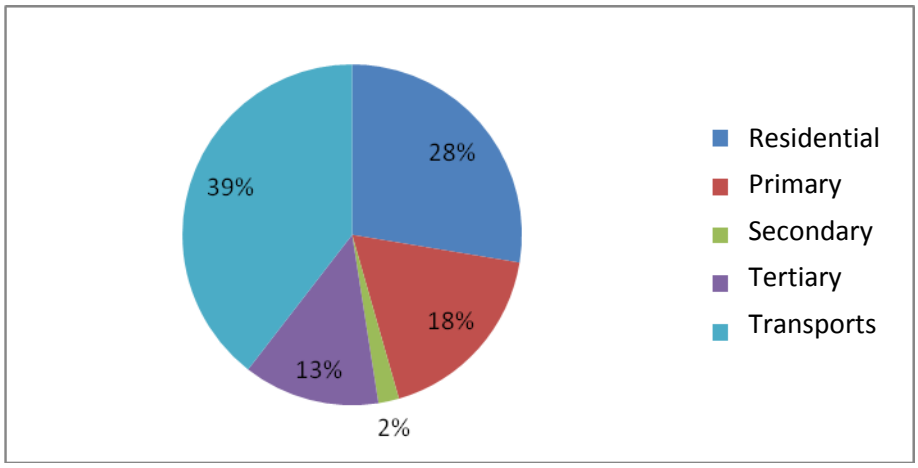
etc)					
Commercial ground transportation services and removable services	-	-	-	-	-
Private Vehicles	-	1.630	1.410	-	**3.040**
Total	**-**	**2.470**	**2.136**	**-**	**4.606**

6.7. Total final energy consumption at Psimolofou Community

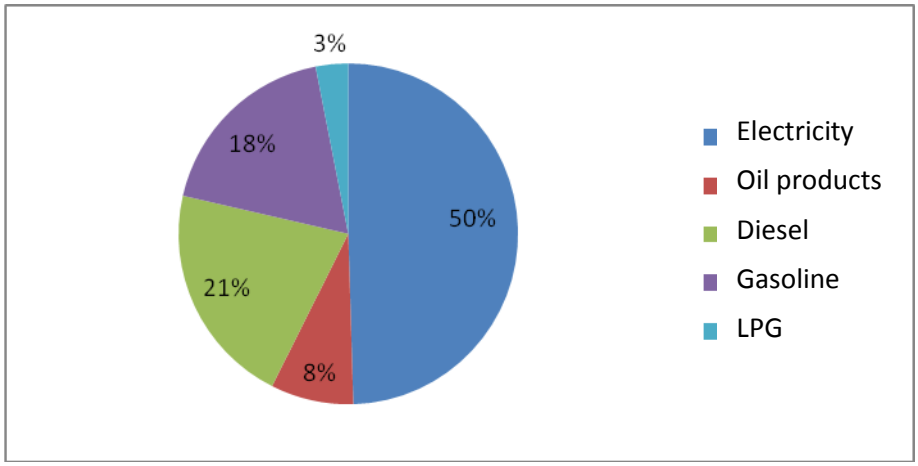
Table 14 Final energy consumption in MWh for the year 2009

Sector	Electricity	Fuel oil	Diesel	Gasoline	LPG	Solar	Geothermal	Biomass	**Total**
Residential	2.767	403	-	-	50	-	-	-	**3.220**
Primary	1.628	290	-	-	175	-	-	-	**2.093**
Secondary	179	32	-	-	19	-	-	-	**230**
Tertiary	1.202	195	-	-	117	-	-	-	**1.514**
Transports	-	-	2.470	2.136	-	-	-	-	**4.606**
Total	**5.777**	**920**	**2.470**	**2.136**	**361**	**-**	**-**	**-**	**11.664**

Picture 20 Share of final energy consumption by sector for the year 2009



Picture 21 Share of final energy consumption by energy source for the year 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 established, which includes the following main factors:

1. Use of annual growth rates of energy consumption per sector based on the statistics available during the preparation of the Energy Action Plan.
2. Use of annual growth rates of energy efficiency at the end-use due to the improvement of existing technologies.
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.
4. The gradual introduction, use and integration of natural gas into the power generating system.

Table 15 Growth rates of energy consumption per consumer used in the expected evolution scenario

Sector description	Estimated annual energy consumption growth rate
Residential	
Hot water	3%
Heating and cooling	3%
Lighting	3%
Cooking	3%
Refrigerators and freezers	3%
Washers and dryers	3%
Dishwashers	3%
Televisions	3%
Other electrical devises/appliances	3%
Primary Sector	

Agriculture, Forestry, Fishing	2,0%
Mining and Quarrying	0,0%
Secondary Sector	
Manufacturing & Processing	3,0%
Water supply, sewerage, waste management and remediation activities	1,5%
Construction	1,0%
Tertiary Sector	
Wholesale and retail trade, repair of motor vehicles and motorcycles	2,0%
Accommodation services activities and food services	2,0%
General administration and social security	2,0%
Defence services and justice, police and fire brigades	2,0%
Education	2,0%
Activities related to Human Health and Social Care	2,0%
Other Services	2,0%
Municipal / Public lighting	2,0%
Transport (vehicles)	
Private transports	1%
Urban and suburban passenger transports	2,0%
Other road passenger transport services (taxi, tourism, school buses, etc.)	0%
Freight road transports and removal services	2,5%
Secondary energy production	
Solar energy for electricity generation	3,0%
Wind energy for electricity generation	0,0%
Solar energy for heating and cooling	0,0%
Geothermal energy for heating and cooling	1,0%

Table 16 Increased efficiency in energy end use (reducing the final energy for the same useful energy)

Sector description	Estimated annual growth of efficiency in end use of energy
Residential	
Hot water	0,5%
Heating and Cooling	0,5%
Lighting	0,5%
Cooking	0,5%
Refrigerators and freezers	0,5%
Washers and dryers	0,5%
Dishwashers	0,5%
Televisions	0,5%
Other electrical devises/appliances	0,5%
Other services	0,5%

Municipal / public lighting	0,5%
Transport (vehicles)	
Private transports	0,5%

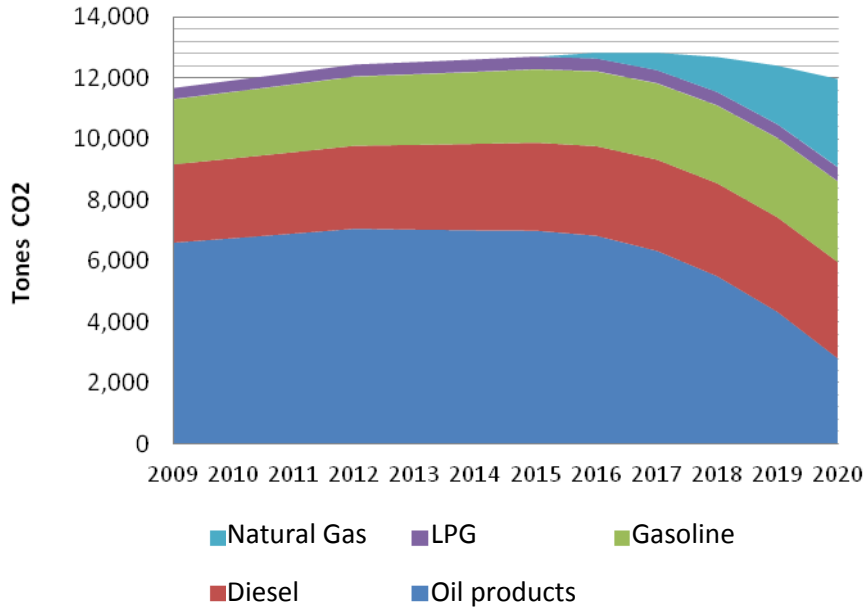
Table 17 Coefficient of energy performance for electricity generation

	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	32%	32%	32%	33%	34%	43%	43%	43%	44%	44%	44%

Table 18 Expected evolution scenario for forecasting CO_2 emissions for the period 2009 to 2020

Year	Fuel Oil	Diesel	Gasoline	LPG	Natural Gas	Total	Increase compared to 2009
2009	6.597	2.569	2.136	361	0	**11.664**	0%
2010	6.746	2.621	2.178	369	0	**11.914**	2%
2011	6.898	2.673	2.221	377	0	**12.168**	4%
2012	7.054	2.726	2.265	385	0	**12.429**	7%
2013	7.025	2.780	2.310	393	0	**12.507**	7%
2014	7.002	2.835	2.355	401	0	**12.594**	8%
2015	6.990	2.887	2.402	410	0	**12.688**	9%
2016	6.823	2.940	2.449	418	190	**12.821**	10%
2017	6.329	2.994	2.497	427	573	**12.820**	10%
2018	5.498	3.050	2.547	436	1.149	**12.680**	9%
2019	4.325	3.107	2.597	446	1.920	**12.394**	6%
2020	2.800	3.165	2.648	455	2.889	**11.957**	3%

Picture 22 Expected evolution scenario for forecasting CO_2 emissions for the period 2009 to 2020



7. PSIMOLOFOU COMMUNITY SUSTAINABLE ENERGY ACTION PLAN FROM 2011 TO 2020

7.1. Indrotuction

The Sustainable Energy Action Plan that has been prepared for the Communityi includes additional measures/actions so as to achieve at least the European goal of combating climate change. This includes measures taken by the Community, 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.

Annual base emissions in 2009 (tn CO_2/year)	**Expected annual emissions in 2020 (tn CO_2/year)**	**Average emissions growth (tn CO_2/year)**	**Minimum emissions target in 2020 (tn CO_2/year)**	**Desired minimum (20%) emissions reduction (tn CO_2/year)**
11.664	11.957	27	9.331	2.626

Despite estimating and aggregating the contribution of national measures in the Sustainable Energy Action Plan, the achievement of the national goals cannot be determined by the Community. 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 key areas:

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

7.2. Energy efficiency in public buildings

Measure: EE 1 – Lamps Replacement

This measure is about the replacement of all inefficient light bulbs in the buildings of the Community. The indirect application cost of this measure is not particularly important as lamps purchase and replacement is required by technical and financial criteria.

Measure implementation period: 2012

Measure Code	**EE1**			
Measure Name	**Lamps Replacement**			
APPLICATION COST				
Cost of investment	**Cost (€)**			
Replacement Lamp (30)	**150**			
Cost of operation				
Replacement lamp	**0 €**			
Indirect costs				
	☐ **– High** ☐ **– Medium** ☒ **– Low**			
APPLICATION BENEFITS				
Energy	**Εξοικονόμηση Ενέργειας (kWh/year)**			
	1.150			
Financial	Energy Saving (kWh/year)	Average electricity price (€/kWh)	**Saving (€/year)**	
	1.150	0.25	**287,5**	
Environmental	**Emissions Saving (kg_{CO2}/ year)**			
	1.005			
RESULTS – EVALUATION				
Estimated Unit Cost (€/kg CO_2)	**0,15 €/ $kg_{CO2\ annual\ saving}$**		**Proposed for Implementation** ☒	
MEASURE TO IMPLEMENT				
Total Cost	**Income**	**Emission Reduction**	**Repayment /Depreciation**	
150 €	**287,5 €**	**1.005 Kg_{CO2}/ year**	**0,52 years**	

Measure: EE2 Maintenance of heating and air conditioning

The indirect cost of the measure is small and includes maintenance equipment and spare parts required for air conditioning and heating. Required to determine competence in the technical staff of the Community will be responsible for maintenance of the heating and cooling of buildings by Community 6 months.

Period of application of the measure: 2012-2020

Measure Code	**EE2**		
Measure Name	**Maintenance of heating Air Conditioning Systems**		
APPLICATION COST			
Cost of investment	**Cost (€)**		
Heating Air Conditioning Maintenance	**0**		
Cost of operation			
Heating and Air Conditioning Maintenance	**200 €/year**		
Indirect costs			
	☐ **– High** ☐ **– Medium** ☒ **– Low**		
APPLICATION BENEFIT			
Energy	**Energy Saving (kWh/year)**		
	2.000		
Economics	Energy Saving (kWh/year)	Average electricity price (€/kWh)	**Saving (€/year)**
	2.000	0.25	**500**
Environmental	**Emission Saving (kg_{CO2}/ year)**		
	1458		
RESULTS – EVALUATION			
Unit Cost (€/$kgCO_2$) ***Roof insulation***	**0,147€/ $kg_{CO2\ annual\ saving}$**	**Proposed for implementation** ☒	
ΜΕΤΡΟ ΠΡΟΣ ΥΛΟΠΟΙΗΣΗ			
Total Cost **200 €**	**Saving** **250 €**	**Emission Reduction** **1458Kg_{CO2}/ year**	**Repayment / depreciation** **0,4 years**

Measure: EE 3 Renewable electricity in buildings with PV Community

This included the installation of electricity with photovoltaic panels. The total installed power is 20 kW and will cover an area of approximately 200 m2.

The indirect cost of the measure is not very significant because it requires (a) the preparation conditions for receipt of tenders (b) tender evaluation by technical and economic criteria, (c) completion form (request) to secure grants from the Grant Scheme 2009-2013 the MCIT. It must also be the process of linking the PV EAC network.

Photovoltaic systems are sold to a grant kWh (price € 0,25). Implementation Period 2013-2016

Measure Code	**EE3**		
Measure Name	**Renewable electricity in buildings Community**		
APPLICATION COST			
Cost of investment	**Total (€)**		
20 kW photovoltaic system	**50.000**		
Cost of operation			
20 kW photovoltaic system	**0 € (negligible cost for periodic cleaning of frames)**		
Indirect costs			
	☐ **– High** ☒ **– Medium** ☐ **– Low**		
APPLICATION BENEFIT			
Energy	Power (kW)	Electricity generation (kWh/kW.year)	Green Energy (kWh/year)
Photovoltaic System 20 kW	20	1500	**30.000**
Financial	Green Energy (kWh/year)	Subsidized price of electricity (€/kWh)	**Income (€/year)**
Photovoltaic System 20 kW	30.000	0.25	**7.500**
Environmental	Emission reduction factor (kg_{CO2}/kW.year)	Power (kW)	Emission reduction **(kg_{CO2}/ year)**
Energy	1.183	20	**23.660**
RESULTS – EVALUATION			
Unit Cost (€/$kgCO_2$) ***Photovoltaic System 20 kW***	**2,11€/ $kg_{CO2\ annual\ saving}$**		**Proposed for implementation** ☒
MEASURE FOR IMPLEMENTATION			
Total Cost **50.000 €**	**Income** **7.500 €**	**Emission Reduction** **23.660 Kg_{CO2}/ year**	**Repayment** **6.67 years**

7.3. Energy Saving through Awareness Raising Campaigns

Measure: ESAC1 - Seminar on Renewable Energy

The organization of an annual seminar on Renewable Energy Sources (RES) in Psimolofou 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: 2013 - 2015

Measure Code	**ESAC1**	
Measure Name	**Organizing an annual seminar for RES**	
APPLICATION COST		
Cost of measure	**2.000 €**	
Indirect cost	☒ **– High** ☐ **– Medium** ☐ **– Low**	
APPLICATION BENEFIT		
Energy Financial (in Green. € / year) Environmental (kg CO2-eq)	**54.000 kWh/year** The cost benefit for stakeholders **42.606 kg_{CO2}/year**	
RESULTS - EVALUATION		
Unit Cost (€/kg CO_2)	**0.047€/ $kg_{CO2\ annual\ saving}$**	**Recommended 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: ESAC 2 -Organization annual seminar on energy saving

The organization of an annual seminar on Energy Saving in Psimolofou 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	**3.000 €**	
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 **20.283 kg_{CO2}/year**	
RESULTS - EVALUATION		
Unitary Cost (€/kg CO_2)	**0,10€/ $kg_{CO2\ annual\ saving}$**	**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: ESEAC 3– 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 3 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.

Start of Implementation: 2013

Measure Code	**ESAC 3**	
Measure Name	**Organization of educational presentations to students**	
APPLICATION COST		
Measure Cost	**600 €**	
Indirect Cost	☒ **– High** ☐ **– Medium** ☐ **– Low**	
APPLICATION BENEFIT		
Energy Financial (Green energy. €/year) Environmental ($kgCO_2$-eq)	**36.000 kWh/year** The financial benefits for interested parties **25.524kg_{CO2}/year**	
RESULTS - EVALUATION		
Μοναδιαίο Κόστος (€/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: Energy Saving per person (kWh)
Calculation: ES= 100*3*0.4*3*100kWh/year= 36.000 kWh/year

Measure: ESAC 4 – Organization of day without lighting

The organization of an annual day without lighting in Psimolofou was examined. The measure will apply for a period of 8years.

The indirect cost of the measure application can be considered as low.

Implementation on 30 March 2012 (and every following year for 8 years)

Measure Code	**ESAC 4**	
Measure Name	**Organization of days without lighting**	
APPLICATION COST		
Measure Cost	**1000 €**	
Indirect Cost	☒ **– High** ☐ **– Medium** ☐ **– Low**	
APPLICATION BENEFIT		
Energy Financial (Green energy. €/year) Environmental ($kgCO_2$-eq)	**230.400 kWh/year** The economic benefit for those concerned **201.370kg_{CO2}/year**	
RESULTS – EVALUATION		
Unit Cost (€/$kgCO_2$)	**0.005/ $kg_{CO2\ annual\ saving}$**	**Proposed for Implementation** ☒

Equation: ES=v*ε*n*νδ*ESPP
ES: Energy Saving (kWh) v: participation number **ε: Application years**
Calculation: ES= 400*8*0.20*3*120kWh/year= 230.400 kWh/year

Measure: ESAC 5– Information about energy in the Municipality website and newspaper

The posting of information on Renewable Energy Sources (RES) and Energy Saving (ES) in Psimolofou website was examined. In addition, there will be a special article on energy in the Municipality quarterly newspaper. The measure will apply for a period of 8 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: 2012 (and every following year for 8 years)

Measure Code	**ESAC 6**	
Measure Name	**Information about energy in the Community website and newspaper**	
APPLICATION COST		
Measure Cost	**0 €**	
Indirect Cost	☒ **– High** ☐ **– Medium** ☐ **– Low**	
APPLICATION BENEFIT		
Energy Financial (Green energy. €/year) Environmental ($kgCO_2$-eq)	**36.000 kWh/year** The economic benefit for those concerned **25.524 kg_{CO2}/year**	
RESULTS – EVALUATION		
Unit Cost (€/$kgCO_2$)	**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=100*8*0.15*3*100kWh/year=36.000 kWh/year

Measure: ESAC 6– Organization of Mobility days

The organization of an annual Mobility day in Psimolofou Community was examined. The measure would have a period of implementation 7 years.

The indirect cost of the measure application can be considered as low as, apart from organizing the event, there will be no participation cost for the interested party.

Start of implementation: September 2013

Measure Code	**ESAC 6**	
Measure Name	**Organization of mobility days**	
APPLICATION COST		
Measure Cost	**1.000 €**	
Indirect Cost	☐ **– High** ☐ **– Medium** ☒ **– Low**	
APPLICATION BENEFIT		
Energy Financial (Green energy. €/year) Environmental ($kgCO_2$-eq)	**174.069 kWh/year** The economic benefit for those concerned stems from fuel saving **44.039 kg_{CO2}/year**	
RESULTS – EVALUATION		
Unit Cost (€/$kgCO_2$)	**0.023€/ $kg_{CO2\ annual\ saving}$**	**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*7*0.3*3*921kWh/year= 174.069 kWh/year

Measure: ESAC 7– Information and public awareness through leaflets and information messages

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

The indirect cost of the measure application can be considered as high as apart from leaflets preparation and distribution, the interested party (to be aware) should bear their own any investment or savings.

Measure Code	**ESAC 7**			
Measure Name	**Informational leaflets and messages**			
ΚΟΣΤΟΣ ΕΦΑΡΜΟΓΗΣ				
Measure Cost	**Total(€)**			
(a) Leaflets for RES and ES	**1.000 €**			
(b) Leaflets for sustainable mobility	**1.000 €**			
Indirect Cost				
	☒ **– High** ☐ **– Medium** ☐ **– Low**			
APPLICATION BENEFIT				
Energy	Number/ Recipients	Percentage of awareness	Energy Profit (kWh/person.year)	**Energy Saving (kWh/year)**
(a) Leaflets for RES and ES	1.000	15%	1000	**150000**
(b) Leaflets for sustainable mobility	1.000	15%	1000	**150000**
Financial				
	The economic benefit for those concerned stems from energy saving			
Environmetal	**Emissions Saving (kg_{CO2}/ year)**			
(a) Leaflets for RES and ES	106.350			
(b) Leaflets for sustainable mobility	37.950			
RESULTS – EVALUATION				
Unit Cost (€/$kgCO_2$)			**Emissions reduction**	
(a) Leaflets for RES and ES	**0.009 €/ $kg_{CO2\ annual\ saving}$**		☒	
(b) Leaflets for sustainable mobility	**0.05€/ $kg_{CO2\ annual\ saving}$**		☒	
MEASURE TO IMPLEMENT				
Total Cost **2.000 €**		**Emission reduction** **144.300 Kg_{CO2}/ year**		

Measure: ESAC 8 Organization of eco-driving seminar

The organization of an annual seminar on eco-driving in Psimolofou was examined. The measure would applied for 8years

The indirect application cost can be considered low

Start of Implementation: June of 2012

Measure Code	**ESAC 8**	
Measure Name	**Organization of eco driving seminar**	
APPLICATION COST		
Measure Cost	**1600 €**	
Indirect Cost	☐ **– High** ☒ **– Medium** ☐ **– Low**	
APPLICATION BENEFIT		
Energy **Financial** (Energy saving. €/year) Environmental($kgCO_2$-eq)	**442.080 kWh/year** The economic benefit for those concerned stems from fuel saving **111.846 kg_{CO2}/year**	
RESULTS – EVALUATION		
Unit Cost (€/$kgCO_2$)	**0.014€/ $kg_{CO2\ annual\ saving}$**	**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= 40*8*0.05*3*9210kWh/year= 442.080 kWh/year

7.4. Energy savings in transport

Measure: EST1 – Energy saving in the Community fleet

The possibility of purchase one vehicle with low CO2 emissions was examined.

The purchase cost of the measure application is not particularly important, as the following requirements must first be fulfilled: (a) preparation of the call for tenders (b) Evaluation of offers against specific technical and financial criteria of low emissions cars which is sponsored by the Scheme of the Ministry of Commerce, Industry and Tourism. 700 € for low emissions vehicle and 1200€ for a hybrid.

Measure Code	**EST1**	
Measure Name	**Energy saving in the Community fleet**	
APPLICATION COST		
Measure Cost	**Total (€)**	
Purchase of 1 eco cars	**15.000 €**	
Indirect Cost		
	☐ **– High** ☐ **– Medium** ☒ **– Low**	
APPLICATION BENEFIT		
Energy	**Energy Saving (kWh/year)**	
Purchase of 1 eco cars	**9.210**	
Financial	**Saving (€/year)**	
Purchase of 1 eco cars	**1000**	
Environment	**Emission Saving (kg_{CO2}/ year)**	
Purchase Of 1 eco cars	**2.330**	
ΑΠΟRESULTS-EVALUATION		
Unit Cost €/$kgCO_2$		**Proposed for Implementation**
Purchase of 1eco cars	**6.44 €/ $kg_{CO2\ annual\ saving}$**	☒
MEASURE TO IMPLEMENT		
Total Cost **15.000 €**	**Emissions Reduction** **2.330 Kg_{CO2}/ year**	

7.5. Energy saving in street lighting

Measure: ESSL1 – ENERGY SAVING IN STREET LIGHTING

The possibility of saving energy in street lighting was examined. The street lighting is one of the major costs of the Community. The electricity consumption of the street lighting in Psimolofou Community in 2009 was 124 MWh.

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

The indirect application cost can be considered low.

Year of Measure Implementation: 2013

Measure Code	**ESSL1**			
Measure Name	**Energy saving in street lighting**			
APPLICATION COST				
(a) Lamp replacement with LED	**Total (€)**			
(b) Optimization of street lighting function	**100.000 €**			
Indirect Cost	**2.000 €**			
Maintenance Cost	☐ **– High** ☐ **–Medium** ☒ **– Low**			
	☐ **– High** ☐ **–Medium** ☒ **– Low**			
APPLICATION BENEFIT				
Energy	Number	Electricity Consumption per lamp (kWh/year)	ES per lamp per year (%)	**EnergySaving (kWh/year)**
(a) Lamp replacement with LED	200	800	50	**80.000**
(b) Optimization of street lighting function	200	800	5	**8.000**
Financial	EnergySaving (kWh/year)	Average price of electricity (€/kWh)	**Saving (€/year)**	
(a) Lamp replacement with LED	80.000	0.25	**20.000**	
(b) Optimization of street lighting function	8.000	0.25	**2.000**	
Environmental	**Emissions Saving (kg_{CO2}/ year)**			
(a) Lamp replacement with LED	**17.480**			
(b) Optimization of street lighting function	**1.748**			
RESULTS - -EVALUATION				
Unit Cost (€/kg CO_2)	**Proposed for Implementation**			

(a) Lamp replacement with LED	**5,72 €/ $kg_{CO2\ annual\ saving}$**	☒
(b) Optimization of street lighting function	**1,144 €/ $kg_{CO2\ annual\ saving}$**	☒

MEASURE TO IMPLEMENT ESSL			
Total cost **102.000 €**	**Saving** **22.000€**	**Emissions Reduction** **19.228 Kg_{CO2}/ year**	**Repayment** **4.63 years**

7.6. Development of green spaces in Psimolofou Community

Measure: DGS1 – Development of green spaces in Psimolofou

Was examined: (a) trees planting, (b) care of green spaces

The indirect cost of the measure application can be considered limited

Measure Code	**DGS1**	
Measure Name	**Development of green space in Psimolofou Community**	
APPLICATION COST		
Measure Cost	**Total (€)**	
(a) Tree Planting (2000 trees)	**1000 €**	
(b) Care of green spaces	**1000 €**	
Indirect Cost		
	☐ **– High** ☐ **– Medium** ☒ **– Low**	
APPLICATION BENEFIT		
Environmental	**Emissions Saving (kg_{CO2}/ year)**	
(a) Tree Planting (2000 trees)	**40.000**	
(b) Care of green spaces	**20.000**	
RESULTS - -EVALUATION		
Unit Cost (€/kg CO_2)		**Proposed for Implementation**
(a) Tree Planting (2000 trees)	**0.04 €/ $kg_{CO2\ annual\ saving}$**	☒
(b) Care of green spaces	**0.10 €/ $kg_{CO2\ annual\ saving}$**	☒
ΜΕΤΡΟ ΠΡΟΣ ΥΛΟΠΟΙΗΣΗ ΕΕΠ11(α),(β) Προώθηση αυτοκινήτων με χαμηλές εκπομπές CO_2		
Total Cost **2.000 €**	**Emissions Reduction** **50.000 Kg_{CO2}/ year**	

7.7. Summary of proposed measures at Psimolofou Community

Table 19 Brief Presentation of Measures Taken by Psimolofou Community and Included in the Sustainable Energy Action Plan

Measure / Action	Application	Cost (€)	Emissions Reduction (Kg_{CO2}/ year)	Depreciation /Repayment
Energy Saving in public buildings				
EE1 - Interventions of insulation	2012	150	1.005	0,52 χρόνια
EE2 - Maintenance of heating and air conditioning	2012-2020	200	1.458	0,4 χρόνια
EE3 - -Renewable electricity with PV in the building or in the parking lot of the Community	2013-2016	50.000	23.660	6,67 χρόνια
Energy Saving through awareness raising campaigns				
ESAC1 - Organizing an annual seminar on Renewable Energy Sources	2013-2015	2.000	42.606	-
ESAC2 - Organizing an annual seminar on energy saving	2013-2015	2.000	20.283	-
ESAC3 - Organization of educational presentations to students	2013-2020	600	102.096	-
ESAC4: Organizing day without lighting	2012-2020	1.000	201.370	-
ESAC5: Information on energy in the Community website	2012-2020	0	127.620	-
ESAC6: Organizing of mobility day	2013-2020	1.000	44.039	-
ESAC7: Information sensitization with documents	2012-2020	2.000	144.300	-
ESAC8: Organizing eco-driving seminar	2012-2020	1.600	111.846	
Saving energy in transports				
EST 1: Saving energy in the Community fleet	2014	15.000	2.330	-
Energy savings in street lighting				
ESSL 1: Energy saving in street lighting	2013	102.000	19.228	4,63 χρόνια

Development of green spaces				
Development of green spaces in Psimolofou	2012-2020	2.000	40.000	-
TOTAL		**179.550**	**881.841**	

7.8. Contribution of National Measures on Sustainable Energy Action Plan of Psimolofou Community

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 20 Total presentation of energy saving from national measures

NATIONAL MEASURES FOR ENERGY EFFICIENCY		Energy Saving (MWh/year)			
		Residential	Tertiary	Industrial	Transports
1	Legislation on Energy Building Performance (Equation 1)	128	47	94	0
2	Legislation for the inspection of air conditioning and heating systems (Equation 1)	62	22	45	0
3	Grant Schemes for the installation of solar thermal systems (Equation 1)	22	8	16	0
4	Grant Schemes for the installation of geothermal systems (Equation 1)	15	6	11	0
5	Legislation on energy efficiency of appliances (Equation 1)	91	43	97	0
6	Grant Schemes for the installation of Photovoltaics Systems (Equation 2)	69	58	115	0
7	Legislation for mandatory integration of solar water heaters (Equation 1)	11	5	11	0
8	Grant Schemes for thermal insulation of buildings	0	47	37	0
9	Grant Schemes for cogeneration in Industry (Equation 1)	0	0	214	0
10	Plan of single urban transport system (Equation 3)	0	0	0	1.844
11	Mandatory inspection of Vehicles MOT (Equation 3)	0	0	0	1.209
12	Withdrawal Plan of old vehicles (Equation 3)	0	0	0	290
13	Grant Schemes for hybrid vehicles and vehicles with low CO2 emissions (Equation 3)	0	0	0	155
14	Discounts on vehicles registration for vehicles with low CO2 emissions (Equation 3)	0	0	0	193
	TOTAL PER SECTOR	399	235	641	3.692
	TOTAL	4.966			

Table 21 Total presentation of reducing CO2 emissions from national measures

NATIONAL MEASURES FOR ENERGY		Emission Reduction (tCO_2/year)			
		Residential	Residential	Residential	Residential
1	Legislation on Energy Building Performance (Equation 1)	91	34	68	0
2	Legislation for the inspection of air conditioning and heating systems (Equation 1)	44	17	33	0
3	Grant Schemes for the installation of solar thermal systems (Equation 1)	15	6	11	0
4	Grant Schemes for the installation of geothermal systems (Equation 1)	11	4	8	0
5	Legislation on energy efficiency of appliances (Equation 1)	65	32	71	0
6	Grant Schemes for the installation of Photovoltaics Systems (Equation 2)	49	42	84	0
7	Legislation for mandatory integration of solar water heaters (Equation 1)	8	4	8	0
8	Legislation on energy efficiency of buildings with area larger than 1000 m^2 (Equation 1)	0	34	27	0
9	Grant Schemes for cogeneration in Industry (Equation 1)	0	0	156	0
10	Plan of single urban transport system (Equation 3)	0	0	0	466
11	Mandatory inspection of Vehicles MOT (Equation 3)	0	0	0	305
12	Withdrawal Plan of old vehicles (Equation 3)	0	0	0	73
13	Grant Schemes for hybrid vehicles and vehicles with low CO_2 emissions (Equation 3)	0	0	0	39
14	Discounts on vehicles registration for vehicles with low CO_2 emissions (Equation 3)	0	0	0	49
	TOTAL PER SECTOR	283	173	467	933
	GRAND TOTAL	1.855			

Table 22 Equations used for access contribution of the national measures to save energy

(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: Number of participation (0-100%)

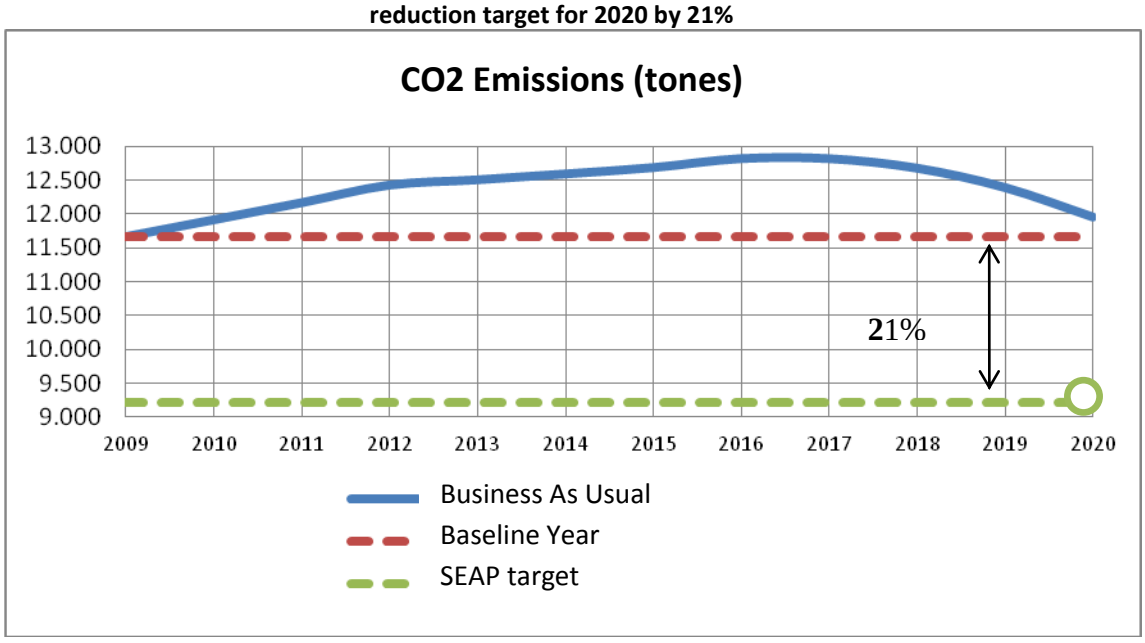
(3) EOS=(N*FO*np)+(ΔO*FO*np)
EOS: Energy Saving from fuel MWh) N: Population FO: Saving Energy per person (MWh) np: Number of participation (0-100%) ΔO: Passing Vehicles

7.9. Description of Achieving CO2 Emission Reduction by 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. Achieving this objective is presented in the table below.

Emission inventory for reference year 2009 ($tnCO_2$/year)	11.664
Expected emissions for 2020 – Expected Development Scenario (tn CO_2/year)	11.957
Estimated emission reduction from national measures for 2020 (tn CO_2/year)	1.855
Estimated emission reduction by the Municipality for 2020 (tn CO_2/year)	882
Total estimated emission reductions for 2020 (tn CO_2/year)	2.737
Estimated emissions for 2020 of the Action (tn CO_2/year)	**9.220**
Emission reduction percentage by 2020 compared with 2009	**21%**

Picture 23 Schematic of the Expected Evolution Scenario of CO2 emissions in Psimolofou and the reduction target for 2020 by 21%



Therefore the implementation of Energy Action Plan, Psimolofou Community will reduce carbon dioxide emissions by 21% compared to 2009 (reaching 9.220tons of CO_2)

7.10.Financing the Sustainable Energy Action Plan

Funding for Energy Action Plan implementation is expected to be derived form 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 structural funds.
- Possible funding from the Fund created by the Tender incomes og greenhouse gas emissions.
- Possible funding from other European Programmes.

Sources of energy data

- Fuel/heating fuel consumption from oil companies within the administrative limits of Psimolofou Community.
- 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 Plan for Energy Efficiency 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 from the Electricity Authority of Cyprus [www.eac.com.cy]
- Energy consumption data in communall buildings from the Psimolofou Community.
- 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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