Department of Environment
Ministry of Agriculture,
Rural Development and Environment

THE SECOND BIENNIAL REPORT OF CYPRUS UNDER THE UN FRAMEWORK CONVENTION ON CLIMATE CHANGE

April 2016

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1. Introduction

This report constitutes the second Biennial Report of Cyprus, as required by Decision 2/CP.17 of the Conference of the Parties under the United Nations Framework Convention on Climate Change (UNFCCC).

2. National Circumstances

2.1. Introduction

This chapter reports the national circumstances of the Republic of Cyprus. It illustrates a number of key characteristics that relate directly or indirectly to the greenhouse gas emissions and include energy, transport, land use, climatic conditions and trade patterns. The chapter analyses how these factors have influenced greenhouse gas emissions to-date and how the historic trends observed might influence emissions going forward.

The Ministry of Agriculture, Natural Resources and Environment is the governmental body with the overall responsibility for the preparation, approval, and submission of national communications (Contact persons: Dr Theodoulos Mesimeris and Dr Nicoletta Kythreotou, National UNFCCC focal points). Experts from governmental and non-governmental institutions participated in the preparation of the present national communication as information providers.

2.4. Population[1]

The population of Cyprus is estimated at 938.4 thousand at the end of 2014, compared with 949 thousand the previous year, recording a decrease of 1.1%.

Total population figures do not include illegal settlers from Turkey.

The population in the government controlled area of Cyprus was estimated at 847 thousand at the end of 2014, compared to 587.1 thousand in 1990, recording an increase of 44.2% (Figure 1). The share of urban population was 67.2% in 2014, the same as it was in 2013. The number of households in 2014 was 313.1 thousand, recording an increase of 0.1% compared to 2013, whilst the average household size showed a gradual decrease during the years, reaching 2.71 at the end of 2014.

The population density at the end of 2014 was 101 inhabitants/km^2. Cyprus has a relatively high population density when compared to other Parties to the UN Convention.

[1]Information on population was obtained from Ms. Loukia Makri, Cyprus Statistical Service, lmakri@cystat.mof.gov.cy, tel. (+357) 22602150

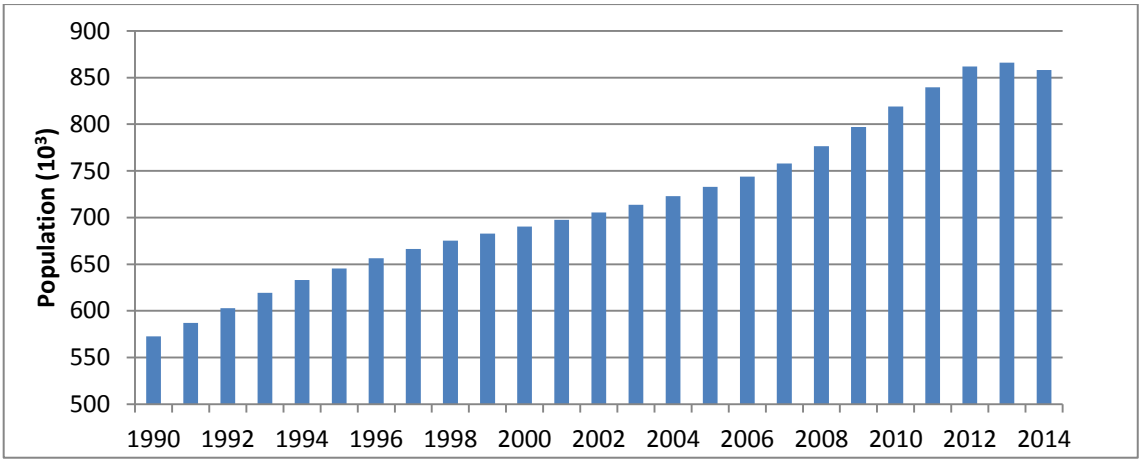

Figure 1. Population in the areas under the effective control of the Republic of Cyprus on the 31st of December of each year, 1990-2014[1]

2.6. Economy[2]

The economic profile of a country has a strong link to greenhouse gas emissions, with the overall level and types of economic activity strongly correlated to energy use. However, this is also dependent on factors such as energy efficiency and the structure of the economy. The economy of Cyprus can generally be characterised as small, open, and dynamic, with services playing a dominant role. Since the accession of the country to the European Union on 1 May 2004, its economy has undergone significant economic and structural reforms that have transformed the economic landscape. Interest rates have been liberalised, while other wide-ranging structural reforms have been promoted, covering the areas of competition, the fiscal sector, the financial sector, and the business sector.

The tertiary sector (services) is the biggest contributor to GVA, accounting for about 87% of the total GVA in 2014. This development reflects the gradual restructuring of the Cyprus economy from an exporter of minerals and agricultural products in the period 1961-73 and an exporter of manufactured goods in the latter part of the 1970s and the early part of the 80s, to an international tourist, business, and services centre since the mid-1980s. The secondary sector (manufacturing) accounted for around 10.7% of GVA in 2014. The primary sector (agriculture and fishing) continued shrinking and only reached 2.3% of total GVA in 2014.

Table 1. Main economic indicators

Indicator	2011	2012	2013	2014
GDP (in € mln)	19,547.1	19,468.9	18,064.6	17,393.7
Real GDP growth rate	0.4	-2.5	-5.9	-2.5
Per capita GDP in PPS, (EU-28 = 100)	96	91	84	82
Rate of Inflation HICP	3.5	3.1	0.4	-0.3

[2]Information on economy was obtained from Mr. Andreas Karaolis, Ministry of Finance, akaraolis@mof.gov.cy, tel. (+357) 22 60 1125

Indicator	2011	2012	2013	2014
Unemployment Rate	7.9	11.8	15.9	16.1
Employment Growth	0.5	-3.2	-6.0	-1.1

The private sector, which is dominated by small- and medium-sized enterprises, has a leading role in the production process. The government's role is mainly to support the private sector and regulate markets in order to maintain conditions of macroeconomic stability and a favourable business climate via the necessary legal and institutional framework, and to secure conditions of fair competition. Before the emergence of the global economic crisis, Cyprus had enjoyed a track record of satisfactory economic growth, low unemployment, and relatively stable macroeconomic conditions. However, the international economic crisis has had a major impact on the economy, as reflected in the main economic indicators.

Despite the still challenging economic environment, the Cyprus economy is showing signs of stabilization. The Republic of Cyprus has implemented a series of structural reforms, which have transformed the economy into a more competitive and productive place. This is also projected by the upgrades of the Cyprus economy by the various Rating Agencies, but also from the significant decline of secondary market yields, allowing the Republic to return to capital markets at competitive rates. In the real economy, the signs of economic recovery are evident, as positive growth has been recorded in the first three quarters of 2015. For the year as a whole, it is estimated that the economy will record a positive rate of growth of about 1.5%. Labour market conditions show signs of stabilization, with the unemployment rate slightly decreasing to around 15.5% of the labour force in 2015 after a peak at 16.1% in 2014. In terms of public finances, fiscal targets have been achieved with considerable margins, mainly due to prudent budget execution and better than expected economic environment. In the financial sector, the banking institutions have been adequately recapitalized and restructured, resulting in a gradual return of confidence in the sector, leading to the complete removal of the capital controls as of April 2015.

2.6.1. Trade patterns[3]

Due to the island's small domestic market and the open nature of its economy, trade and access to international markets is of utmost importance for Cyprus' well-being. The country's trade balance is traditionally in deficit because the island has to import extensively in order to satisfy domestic demand, while the island also depends on imports for its energy supplies. Trade deficit in the period January-September 2015 was €2,467.9mn compared to €2,799.1mn in the corresponding period of 2014.

Traditionally, more than half of Cyprus' trade in goods is with the European Union, and the island's main export partners are Ireland, Greece, the United Kingdom and Germany. Total exports/dispatches (covering total exports to third countries and dispatches to other Member States) in January-September 2015 were €1.341,5mn compared to

[3]Ms. Aristi Aristotelous, Bilateral and Public Relations, Trade Service, Ministry of Energy, Commerce, Industry and Tourism; 1421 Nicosia, Cyprus; Tel. +357 22 867100; email: aaristotelous@mcit.gov.cy

€1.116,6mn in the corresponding period of 2014. Half of the total exports consisted of shipments to other EU member states. Dispatches to the European Union accounted for €611,1mn in January-September 2015 of the total exports/dispatches. Exports to Near East and Middle Eastern Countries occupied the second place in importance with €237,8mn for January-September 2015. The main domestic export commodities are pharmaceutical products and electrical machinery equipment.

During the first nine months of 2015, total imports/arrivals (covering total imports from third countries and arrivals from E.U countries) amounted to €3.809,4mn, of which €2.720,4mn were arrivals from other EU member states, €231mn from other European countries and €858mn euro imports from third countries.

The leading import partners are Greece, the United Kingdom, Italy, Germany, and Israel while the chief imports are fuels and lubricants, machinery, chemicals, ships, boats and floating structures.

2.7. Energy[4]

Energy use is the largest source of GHG emissions. The following sections provide a high-level overview of the most relevant factors. Climate policy drivers have had some impact on changes in the national energy system to-date (for-example leading to improvements in energy efficiency or increases in the share of renewables), although to a large extent these have been driven by other factors. Historic trends in GHG emissions from energy-related activities are shown in later sections. However, the impacts of future climate policy in the energy sector are likely to be far more significant, particularly as a result of the new EU Climate and Energy package. These will lead to more sizeable shifts in energy use towards renewables as well as an overall impact on primary and final energy consumption due to improvements in energy efficiency; these effects should become more noticeable within these indicators in coming years.

Total primary energy consumption in Cyprus rose over the period from 1990 despite continued efforts to improve energy efficiency (Figure 2). Trends in the consumption of different energy types within the total have changed significantly since 1990. Since 1990 there has been a decrease of nearly 38% in the consumption of carbon intensive coal used in cement industry. The consumption of oil increased by 27% between 1990 and 2014.

[4]Ministry of Energy, Commerce, Industry and Tourism; 1421 Nicosia; Tel.+357 22 409303; email: energyservice@mcit.gov.cy

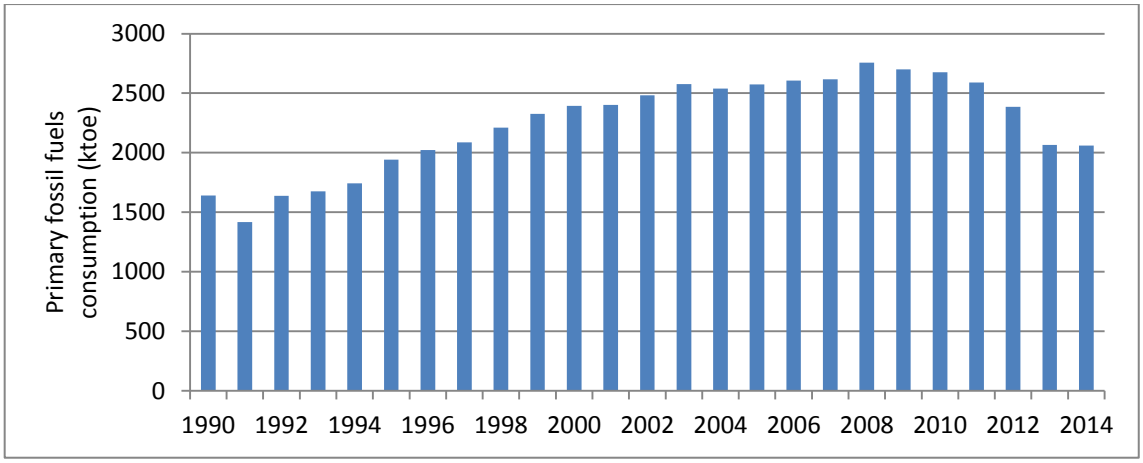

Figure 2. Primary consumption of fossil fuels in ktoe, 1990-2014

Renewables have the most marked increase with consumption increasing by 213% from 1990 levels (Figure 3).

Fossil fuels continue to dominate total energy consumption and the share of renewable energy sources remains small despite the increase in use. The overall increase in total primary energy consumption has also acted to counteract some of the environmental benefits from fuel switching.

The final energy needs of the economy of Cyprus for 2014 represent 73% of the country's primary energy consumption. There are very significant energy losses linked to the transformation and distribution of useful energy (e.g. as electricity) to the end users. Energy losses broadly depend on the average efficiency of conventional thermal power stations and CHP plants and the penetration of non-thermal renewables.

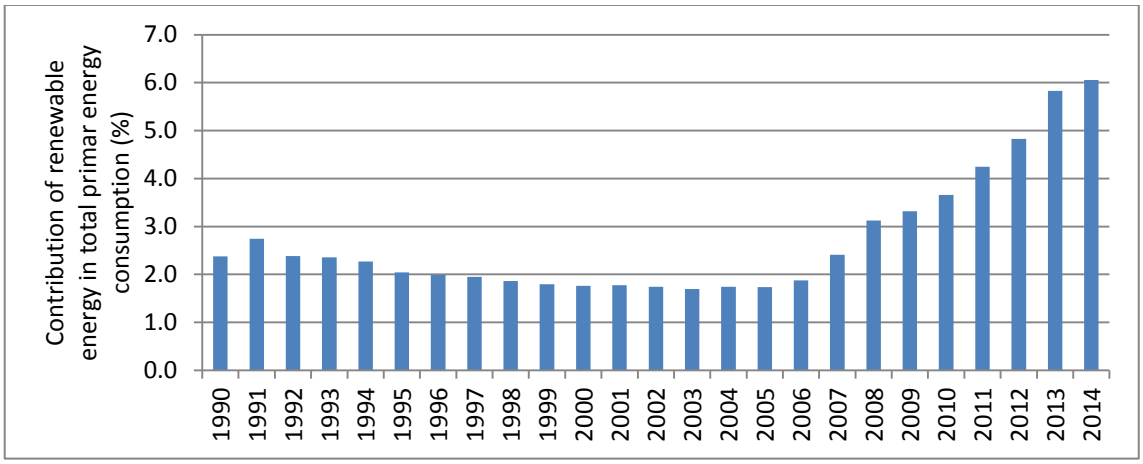

Figure 3. Share of renewable energy in total primary energy consumption in per cent, 1990-2014

2.7.1. Energy Supply

All the oil consumed is from imports and the trend, although cyclical since 1990, has been upwards of 35% in 2014 since 1990. In the case of solid fuels, overall consumption has increased by 85% between 1990 and 2004, due to the thriving constructing

industry. From 2004 until 2008, the consumption of solid fuels was stable, while after 2008, it decreases substantially to reach 1990s levels.

Although the absolute amount of electricity production from renewables has increased by more than 310 times since 2006, renewable electricity still makes only 8.0% contribution to total generation. Overall, the generation mix of electricity in Cyprus has become less carbon intensive since 2008, when the first combined cycle unit for the production of electricity entered in operation and the contribution of renewable sources started to be significant. The increase in total electricity production was 225% from 1990 to 2014.

The share of primary energy met by renewables has increased steadily over time to around 5.9% of total primary energy consumption in 2014. The bulk of renewable energy consumed, over 77.8 %, comes from solar thermal and biomass. Wind is the next biggest contributor, providing 12.12% of total renewable energy). Biofuels has seen the biggest increase - from zero 0 in 1990 to contributing around 7.73% of total renewable energy in 2014.

Based on 2014 figures, Cyprus, as all EU countries, has a significant challenge ahead to reach the new Renewable Energy Sources (RES) targets for 2020. The RES targets include all sources of electricity, heat and transport fuel. Cyprus' target is 13% of the final energy consumption to be from renewable sources by 2020.

2.7.2. Energy Consumption in Different Sectors

Final energy consumption in Cyprus increased by about 38% between 1990 and 2014 (Figure 4). The electricity sector has seen the biggest increase in overall energy consumption, increasing its consumption by over 174% since 1990. The final consumption of electricity produced from conventional fuels increased by 152% between 1990 and 2014. This is having a significant impact on GHG emissions. The Services sector has also increased its energy consumption markedly, by 358% since 1990, which correlates with an increasing share of GVA coming from this sector. Households are also one of the largest consumers of final energy in the EU. Space heating and cooling are the most significant components of household energy demand, and can vary substantially from year to year depending on climatic conditions. In the very recent years, household energy consumption has declined partly as a result of higher fuel prices. Final energy consumption in industry has fallen since 1990, largely as a result of a shift towards less energy-intensive manufacturing industries, as well as the continuing transition to a more service-oriented economy. The main energy consumers in 2013 are presented in Figure 5.

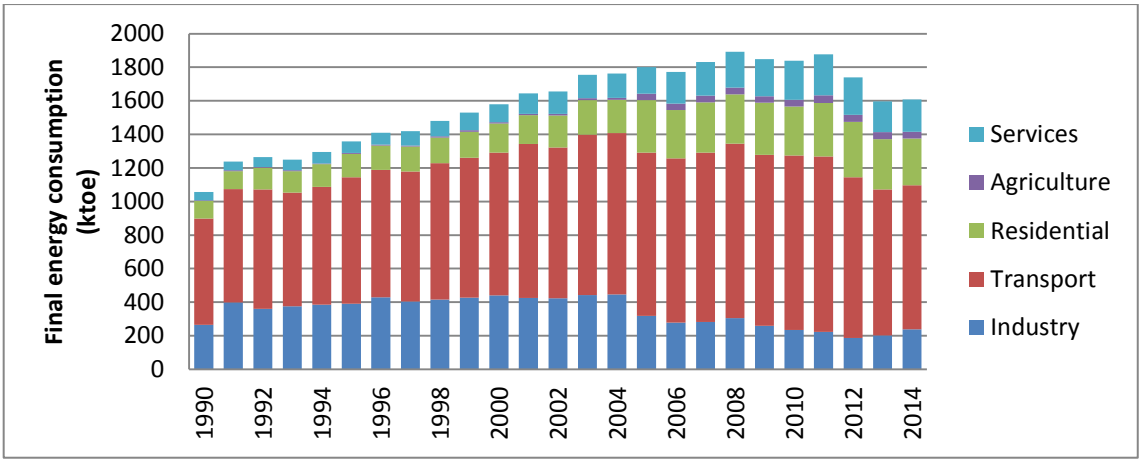

Figure 4. Final energy consumption by sector in ktoe, 1990-2014

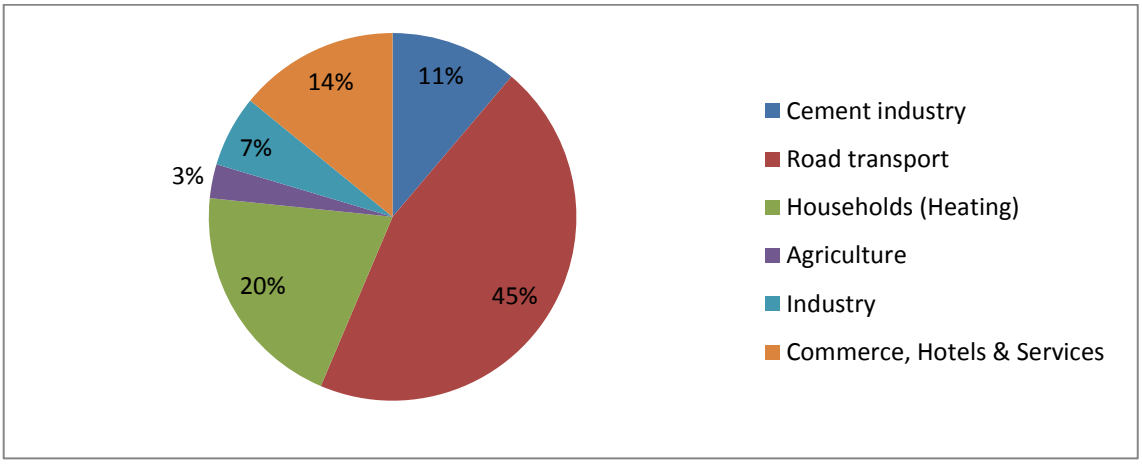

Figure 5. Main energy consumers in 2013

2.7.3. Liberalisation of Energy Markets

As far as the electricity domestic market is concerned, the new regulatory regime has been established since 2004 by liberalising 35% of the market. The proportion of the liberalised market increased from 35% to 65% from 1/1/2009, so eligible customers (those who can choose their supplier) are all non-domestic customers. From 1/1/2014, the electricity market in Cyprus was fully liberalized and eligible customers are all the customers. The main objective of the liberalization process is to provide competitive prices and improved services to all electricity customers. With respect to the further structuring of energy markets, one major change is the EU's Third Energy Package. Cyprus has achieved compliance on transposition of the 3rd Energy Package.

2.7.4. Energy Prices

Figure 6 shows how the average end-user prices of electricity have varied since 1990 for industry, households and agriculture in Cyprus. In addition, it illustrates how disposable income has varied over this period, as this provides a very broad indication of how expenditure on energy varies as a share of income.

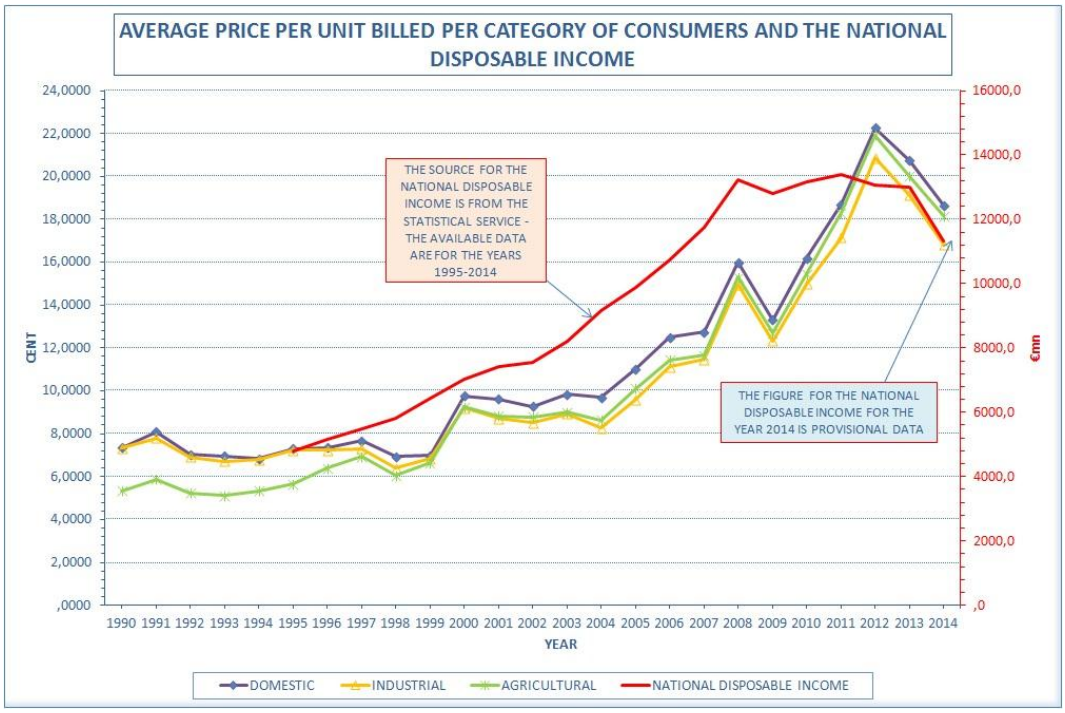

Figure 6. Change in average end-user energy prices in Cyprus compared to the gross disposable income for households, industry and agriculture, 1990-2014

2.7.5. Prices of Transport Fuels

Overall, the prices for both road transport fuels have increased between 1990 and 2014 due to substantial increases in oil prices and taxes. The tax on petrol increased by 274% (€128/1000 litres in 1990; €479/1000 litres in 2014) and the tax on diesel increased from zero to €450/1000 litres over the same period. Furthermore, the VAT tax was zero in 1990 and was 19% in 2014. Also, comparing 1990 and 2014 oil prices of transport fuels is not possible due the different quality of the fuels; e.g. in 1990 the petrol was leaded with high sulphur content, while today the petrol is unleaded and sulphur free (10 ppm). Rising prices will also help stimulate demand for more efficient vehicles. Road fuels have declined sharply from their peak in 2008 as the price of oil has declined, with (nominal) prices again similar to those in the early 2000s.

2.8. Industry

The energy and emissions intensity of different branches of manufacturing can change significantly. GVA in manufacturing in Cyprus increased by 34% from 1995 to 2011. GVA in mining changed by around 132% over the same period. The structure of industry has also changed from 1995 to 2011, showing a decrease in the share of GVA in total GVA (excluding construction) from 11.5% to 6.1%.

2.9. Waste

Greenhouse gas emissions from waste depend on the quantity of waste and how it is disposed (including recycling and landfill). All routes have an impact on emissions

through the consumption of energy in the collection, treatment and production of waste. Waste to landfill produces large methane emissions if not managed correctly (e.g. via methane recovery and diversion of biodegradable municipal waste from landfill). Recycling of waste with energy recovery generally results in lower greenhouse gas emissions than the disposing of waste to landfill, and these routes are increasingly used, in part as a result of policy drivers.

The chart below (Figure 7) shows the amount of municipal waste generated per capita broken down by different treatment routes. In 2014, 85% of waste was sent to landfill compared to 100% in 1990. No municipal waste is incinerated in Cyprus.

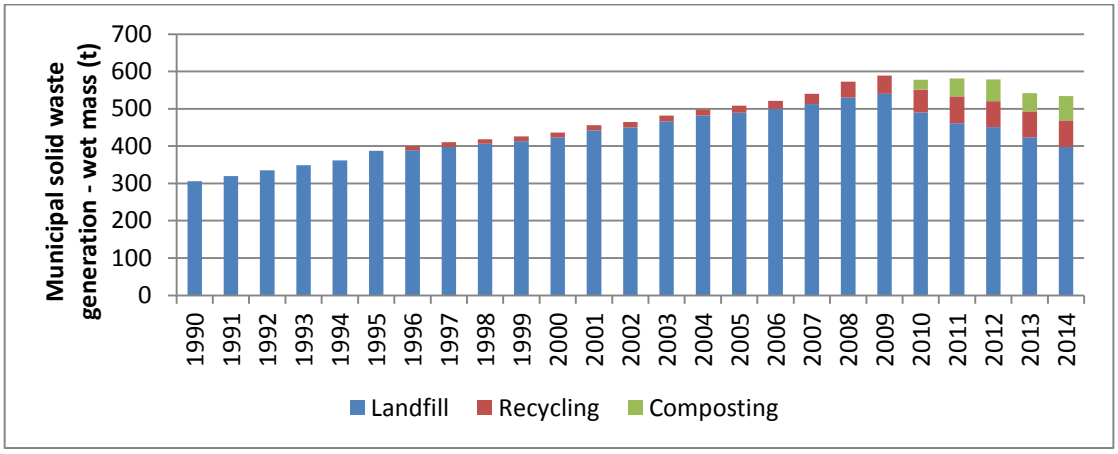

Figure 7. Generation and treatment of municipal waste 1990-2014

2.10. Building Stock and Urban Structure

Energy consumption for space heating or cooling within buildings forms a significant component of the country's energy consumption. The level of energy consumption within buildings is primarily affected by: the thermal properties of the building (in terms of insulation, building type – e.g. flat/house); the efficiency of the heating or cooling system; and the stock/efficiency of the appliances used. In general, newer dwellings are likely to be more energy efficient than older buildings.

The building sector has one of the highest potentials for improved energy efficiency, and measures to reduce the space heating/cooling demand in buildings represent a significant part of this potential. Many of these measures (such as improved insulation) are highly cost-effective, but a number of other barriers to their implementation exist. These are being addressed by a number of the policies related to end-use energy efficiency.

2.10.1. Building Permissions

The construction industry is demonstrating negative growth rates in recent years due to the country's economic downturn. This is evident from the number of building permissions issued during the period 2011-2014.

According to the Cyprus Statistical Service, during the period January-December 2014, 4933 building permissions were issued, 7.6% less than the previous year (2013).

Looking at the latest data concerning the period January-July 2015, 3286 building permissions were issued, representing a slight decrease of 0.6% over the corresponding period of the previous year, where the number of building permissions issued was 3307. Regarding the 3286 building permissions issued, 2215 (67.4%) concerned residential buildings, 646 (19.65%) non-residential buildings, 130 (3.95%) civil engineering projects, 243 (7.4%) concerned the division of plots, and 52 building permissions (1.6%) were issued for road construction projects. Figure 8 presents the number of building permissions issued during the period 1990-2013.

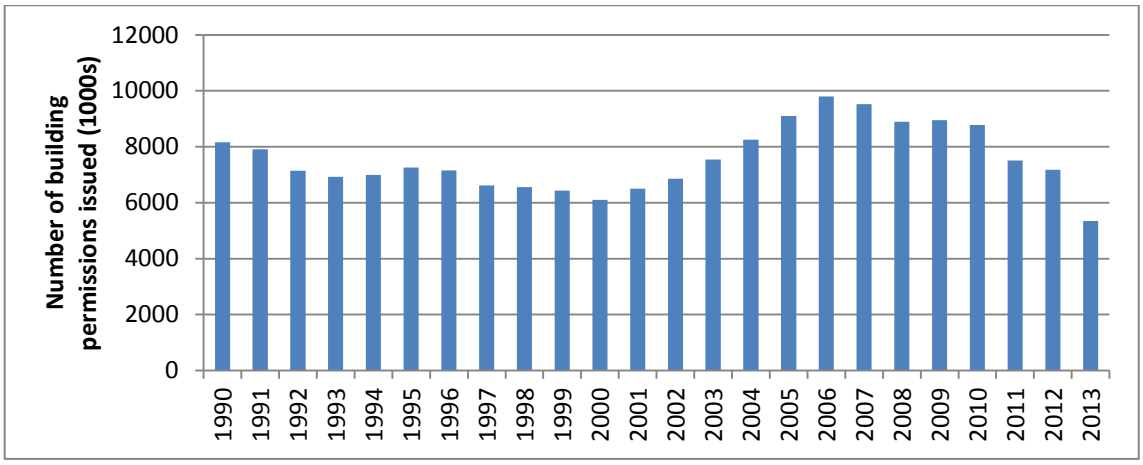

Figure 8. Building permissions authorised, 1990-2013[5]

2.10.2. Dwelling Stock

According to the Cyprus Statistical Service[5], the dwelling stock at the end of 2013 increased by 0.9% and reached 441251 units compared to 437495 in 2012. Of these dwellings, 61% were in the urban areas. The occupied living quarters in 2013 numbered 302692 units. Figure 9 presents the total dwelling stock during the period 1990-2013.

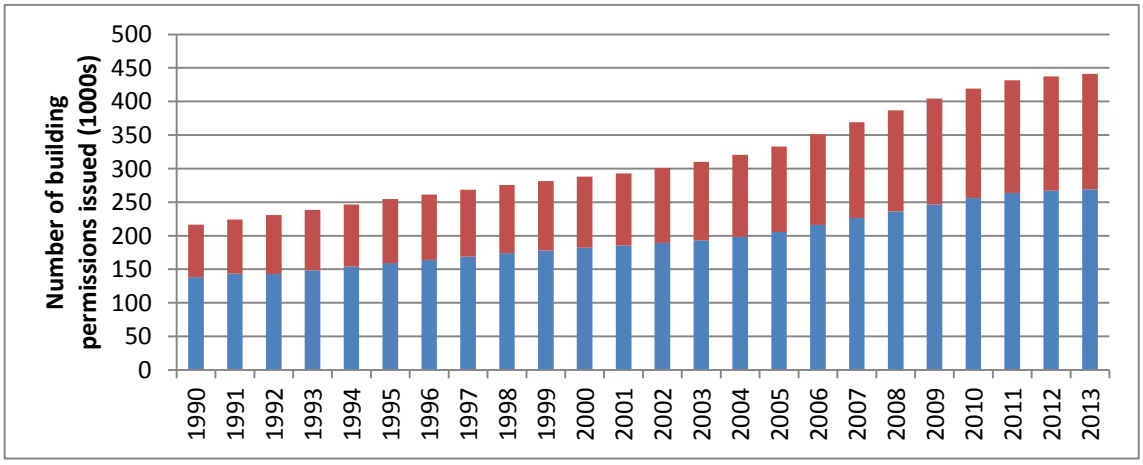

Figure 9. Dwelling Stock and occupied living quarters, 1990-2013[5]

[5] Construction and housing statistics 2013, Cyprus Statistical Service

2.11. Agriculture

Agriculture is a significant source of GHG emissions, for example, due to N_2O associated with fertilizer use and CH_4 from livestock (as well as energy consumption in the sector itself). The overall decrease in agricultural activity will have a generally positive effect on total greenhouse gas emissions. The consumption of nitrogenous fertilizer in 2013 decreased by 43% compared to 1990 (Figure 10), which will lead to an overall positive impact on the total greenhouse gas emissions. In addition, total animal population reduced by 10% during the same period (Figure 11).

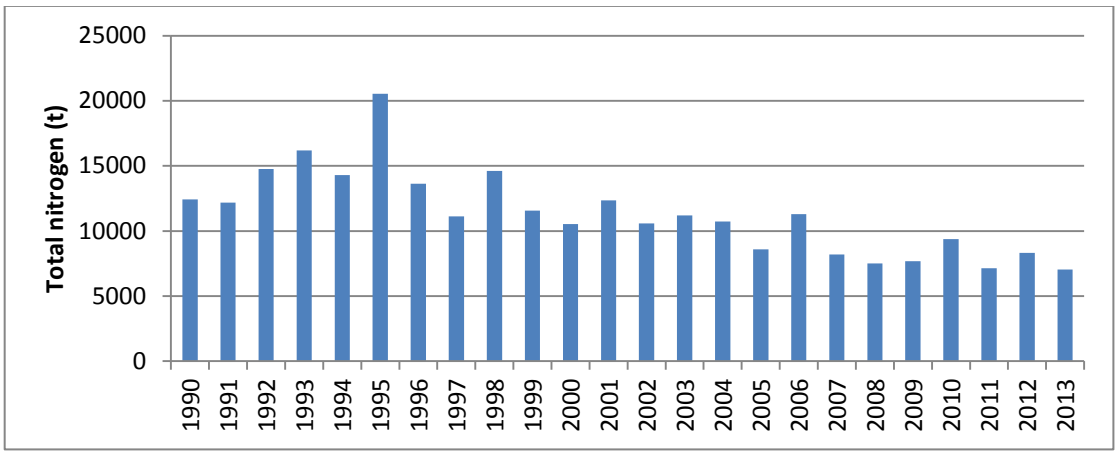

Figure 10. Total nitrogen from annual fertilizer consumption, 1990-2013

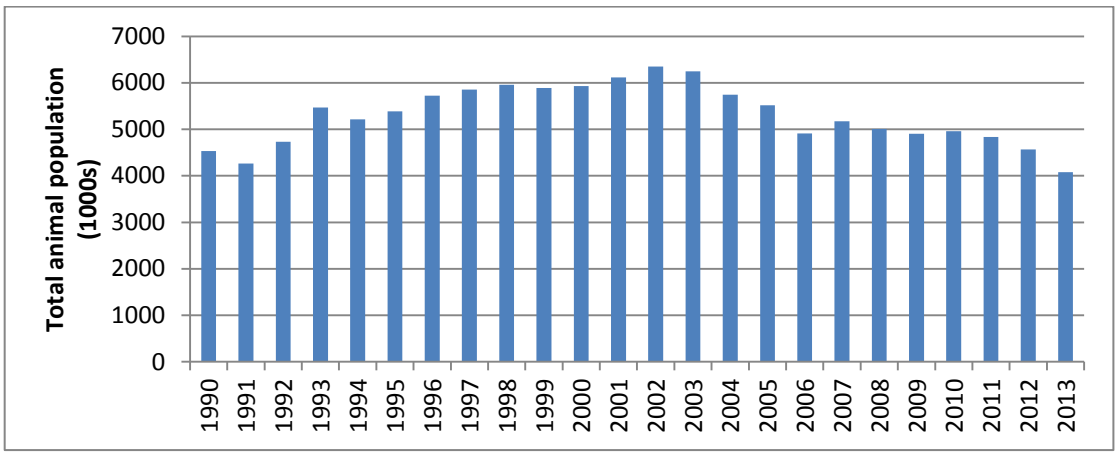

Figure 11. Total animal populations (cattle, pigs, poultry, sheep, goats, horses, mules and asses), 1990-2013

2.12. Forest[6]

Wild vegetation in Cyprus is classified in two major categories: a) forest and b) Other Wooded Land (OWL, which includes maquis and garique), which are of, either, state or private ownership. These two categories account for 41.7 % (386,167 hectares) of the total land area. The change of forest cover is almost invariable the last 15 years.

[6] Dr. Andreas K. Christou; Senior Forest Conservator; Head of Research, Publicity & Silviculture Sector; Department of Forests, 1414, Nicosia, Cyprus; Tel.: 22819490, Fax.: 22303935; Email: achristou@fd.moa.gov.cy

3. Greenhouse gas emission inventories

This section summarises information on the historic greenhouse gas (GHG) emissions since 1990.

3.1. Summary information on GHG emission trends

The emission data presented here is based on the Cyprus' national greenhouse gas inventory 1990-2013, submitted to the UNFCCC on 12 November 2015[7]. The inventory is in line with the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention (Decision 24/CP.19) and with Regulation (EU) No 525/2013.

3.1.1. Greenhouse gas emission trends

The GHG emissions in 2013 were 7667 Gg CO_2 eq. including LULUCF and 8319 Gg CO_2 eq. excluding LULUCF. Between 1990 and 2013, the total national emissions excluding LULUCF increased by 49.7% (Table 2). Emissions per capita in Cyprus increased by 2.5% between 1990 and 2013, from 9.5 t/capita to 9.7 t/capita. Gross Domestic Product (GDP) growth during 1995 and 2013 was approximately 50%, while GHG emissions increased by around 17%.

Table 2. GHG emissions in CO_2 equivalents (without LULUCF)

	1990 (Gg)	2013 (Gg)	2012-2013 (Gg)	Change 2012-2013 (%)	Change 1990-2013 (%)
Total emissions without LULUCF	5,555	8,319	9,129	-8.9%	49.7%

3.1.2. Emission trends by gas

The GHG emissions in 2013 were 7,667 Gg CO2 eq. including LULUCF and 8,319 Gg CO_2 eq. excluding LULUCF. Between 1990 and 2013, the total national emissions excluding LULUCF increased by 49.7%.

Carbon dioxide emissions accounted for 77.63% of total GHG emissions in 2013 without LULUCF and increased by 38% from 1990. Methane emissions accounted for 10.95% of the total GHG emissions in 2013 without LULUCF, and increased by 134% since 1990, while nitrous oxide emissions accounted for 4.9% of the total GHG emissions in 2013 without LULUCF and decreased by 18% since 1990. Finally, F-gases and SF6 emissions accounted for 6.5% of total GHG emissions in 2013.

The emissions by gas are presented in Table 3 and Figure 12.

[7] http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/cyp-2015-nir-13nov15.zip

Table 3. Overview of GHG emissions and removals from 1990 to 2013 (Gg CO_2 eq.)

	1990	1995	2000	2005	2010	2011	2012	2013
CO_2 emissions including net CO_2 from LULUCF	4,060	5,293	6,589	7,332	7,380	7,729	6,529	5,806
CO_2 emissions excluding net CO_2 from LULUCF	4,673	5,910	7,158	7,980	8,022	7,084	7,174	6,458
CH_4 emissions including CH_4 from LULUCF	390	622	717	803	913	935	942	912
CH_4 emissions excluding CH_4 from LULUCF	390	621	711	803	912	935	942	911
N_2O emissions including N_2O from LULUCF	492	588	591	559	477	474	454	406
N_2O emissions excluding N_2O from LULUCF	492	587	587	559	476	473	453	406
HFCs	NE,NO	NE,NO	7	251	510	557	561	544
PFCs								
SF_6	NE,NO	NE,NO	NE,NO	0.07	0.08	0.21	0.03	0.03
Total (including LULUCF)	**4,942**	**6,502**	**7,905**	**8,945**	**9,280**	**9,051**	**8,486**	**7,667**
Total (excluding LULUCF)	**5,556**	**7,119**	**8,464**	**9,592**	**9,920**	**9,694**	**9,129**	**8,319**

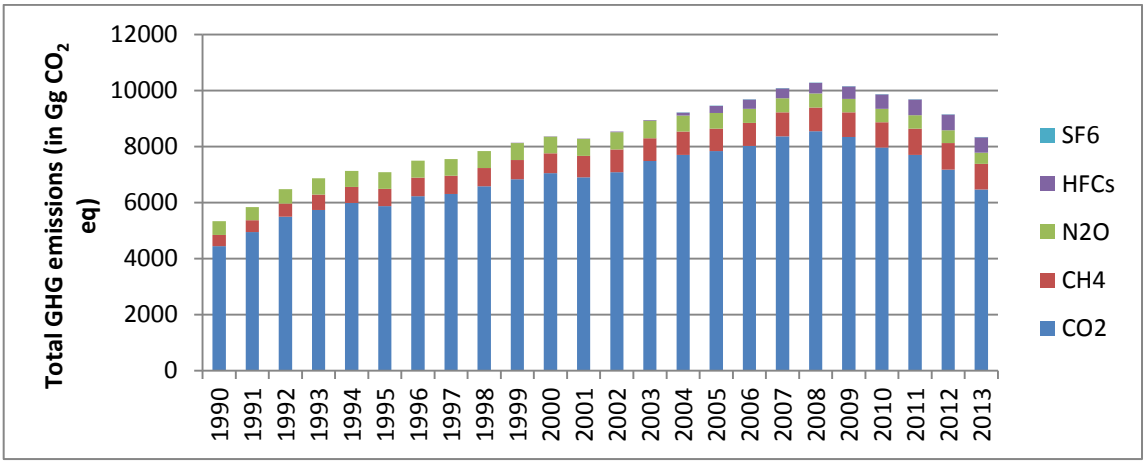

Figure 12. Total national GHG emissions by gas 1990-2013 (excluding LULUCF)

3.1.3. Emission trends by main source and sink categories

Table 4 gives an overview of the GHG emissions in the main source categories for 1990-2013. The most important sector by far is energy (i.e. combustion and fugitive emissions). The contribution of the emissions from the energy sector to the total without LULUCF in 2013 was 69% compared to71% in 1990. In 2013, the second largest sector is Industrial processes and product use (17%), followed by Agriculture (8%) and Waste (6%).

Table 4. Overview of GHG emissions in the main source and sink categories 1990 to 2013 (Gg CO_2 eq.)

	1990	1995	2000	2005	2010	2011	2012	2013
1. Energy	3,948	5,115	6,364	7,149	7,508	7,226	6,711	5,737
2. Industrial Processes	800	885	903	1,197	1,154	1,190	1,150	1,384
3. Agriculture	781	940	916	891	806	800	767	698
4. LULUCF	-613	-616	-559	-647	-640	-643	-644	-652
5. Waste	26	179	281	355	453	478	502	501
Total (including LULUCF)	**4,942**	**6,502**	**7,905**	**8,945**	**9,280**	**9,051**	**8,486**	**7,667**
Total (excluding LULUCF)	**5,556**	**7,119**	**8,464**	**9,592**	**9,920**	**9,694**	**9,129**	**8,319**

Table 5 shows the sources by contribution to total GHG emissions during 2013 (greater disaggregation than Table 4).

Table 5. Sources by contribution to total GHG emissions during 2013 (including LULUCF)

Source category	2013	Contribution to total (%)	Change between 1990-2013
1A1.Energy industries	2,839.01	37.0%	60.65
1A3.Transport	1,860.53	33.5%	53.32
2A.Mineral industry	779.50	17.5%	2.68
2F.Product uses as ODS substitutes	543.84	14.8%	
1A2. Manufacturing industries and construction	511.40	16.4%	-0.66
1A4.Other sectors	508.62	19.5%	15.08
5A.Solid waste disposal	475.00	22.6%	
3B.Manure management	409.62	25.1%	-9.76
3A.Enteric fermentation	263.63	21.6%	8.98
2G.Other product manufacture and use	60.40	6.3%	46.24
5D.Waste water treatment and discharge	25.52	2.8%	-2.14
3D.Agricultural soils	24.50	2.8%	-70.29
1A5.Other	17.32	2.0%	56.63
3F.Field burning of agricultural residues	0.25	0.0%	-44.26
3H. Urea application	0.20	0.0%	-89.01
5B.Biological treatment of solid waste	0.01	0.0%	
4A.Forest land	-652.07	-78.7%	6.29
Aviation	719.34		-1.57
Navigation	761.50		312.88

3.2. The national inventory arrangements

3.2.1. Summary information on national inventory arrangements

The Ministry of Agriculture, Rural Development and Environment (MARDE) is the governmental body responsible for the co-ordination of all involved ministries, as well as any relevant public or private organisations, in relation to the implementation of the provisions of the national and European legislation associated with climate change. In this context, the MARDE has the responsibility for the planning, preparation, management, compilation of the national GHG inventory report (Contact person: Dr. Nicoletta Kythreotou, Address: Department of Environment, 1498 Nicosia, Cyprus, tel.: +357 22 408947, e-mail: nkythreotou@environment.moa.gov.cy). No legal framework is available that defines the roles, responsibilities and the co-operation between the MARDE and contact points of the involved Ministries and agencies.

The preparation of the Cypriot GHG emissions inventory is the responsibility of the Climate Action Unit of the Department of Environment of the Ministry of Agriculture, Rural Development and Environment.

The preparation of the Cypriot GHG emissions inventory is based on the application of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. The compilation of the inventory is completed in three main stages:

- *Stage 1*: The first stage consists of data collection and checks for all source/sink categories. The main data sources used are the National Statistical Service, the national energy balance, the government ministries/agencies involved, along with the verified reports from installations under the EU ETS. Quality control of activity data include the comparison of the same, or similar, data from alternative data sources (e.g. National Statistical Service, EU ETS reports and energy balance), as well as time-series assessment in order to identify changes that cannot be explained. In cases where problems and/or inconsistencies are identified, the agency's representative, responsible for data providing, is called to explain the inconsistency and/or help solving the problem.

- *Stage 2*: Once the reliability of input data is checked and certified, emissions/removals per source/sink category are estimated. Emissions estimates are then transformed to the format required by the CRF Reporter. This stage also includes the evaluation of the emission factors used and the assessment of the consistency of the methodologies applied in relation to the provisions of the IPCC Guidelines, the IPCC Good Practice Guidance and the LULUCF Good Practice Guidance. Quality control checks, when at this stage, are related to time-series assessment as well as to the identification and correction of any errors/gaps while estimating emissions/removals and entering the data in the CRF Reporter.

- *Stage 3*: The last stage involves the compilation of the NIR and its internal check. During this period, the Inventory Team has to revise the report according to the

observations and recommendations of the supervisor of the team. On the basis of this interaction process, the final version of the report is compiled. The Director of the Department of Environment approves the inventory and then the contact points submit the NIR to the European Commission for compliance with Regulation (EU) No 525/2013 and thereafter to the UNFCCC secretariat.

3.2.2. Summary information on changes to the national inventory arrangements

No changes have been made to the national inventory arrangements since the last Biennial Report.

4. Quantified economy-wide emission reduction target

4.1. The EU target under the Convention

In 2010, the EU submitted a pledge to reduce its GHG emissions by 2020 by 20% compared to 1990 levels[8].

The EU has also committed to raising this target to a 30% emission reduction by 2020 compared with 1990 levels, provided that other developed countries also commit to achieving comparable emission reductions, and that developing countries contribute adequately, according to their responsibilities and respective capabilities. This offer was reiterated in the submission to the UNFCCC by the EU-28 and Iceland on 30 April 2014[9].

The following assumptions and conditions apply to the EU's 20% target under the UNFCCC:

- The EU Convention pledge does not include emissions/removals from Land Use, Land-Use Change and Forestry, but it is estimated to be a net sink over the relevant period. EU inventories also include information on emissions and removals from LULUCF in accordance with relevant reporting commitments under the UNFCCC. Accounting for LULUCF activities only takes place under the Kyoto Protocol. The target refers to 1990 as a single base year for all gases and all Member States.
- Emissions from international aviation, to the extent it is included in the EU Emission Trading Scheme, (EU ETS) are included in the target[10].
- A limited number of CERs, ERUs and units from new market-based mechanisms may be used to achieve the target. Under EU ETS, the use of international credits is capped (up to 50% of the reduction required from EU ETS sectors by 2020). Quality standards also apply to the use of international credits in the EU ETS, including a ban on credits from LULUCF projects and certain industrial gas projects. In the ESD sectors (non-ETS), the annual use of international credits is limited to up to 3% of each Member State's ESD emissions in 2005, with a limited number of Member States being permitted to use an additional 1% from projects in Least Developed Countries (LDCs) or Small Island Developing States (SIDS), subject to conditions.

[8] First steps to a safer future: Introducing the United Nations Framework Convention on Climate Change http://unfccc.int/essential/_background/convention/items/6036.php

[9] European Union, its Member States and Iceland submission pursuant to par 9 of decision 1/CMP.8' http://ec.europa.eu/clima/policies/international/negotiations/docs/eu_submission_20140430_en.pdf

[10] In the EU, total emissions covered by category 'international aviation' would go beyond the scope of the EU target, as emissions from international aviation are included in the EU Climate and Energy Package and the EU target under the UNFCCC to the extent to which aviation is part of the EU ETS. As such emissions cannot be separated in the EU inventory nor in the projections for the entire time series, emissions from international aviation have been considered in their entirety throughout the report. Over the period, total emissions from international aviation were between 1.2-2.9% of the annual total EU GHG emissions.

- The Global Warming Potentials (GWPs) used to aggregate GHG emissions up to 2020 under EU legislation were those based on the Second Assessment Report of the IPCC when the target was submitted. In its submission to clarify the 2020 target, dated 20 March 2012, the EU announced that the implications of the CMP Decision to revise the GWPs to those from the IPCC Fourth Assessment Report (AR4) were under review. This review has been completed and revised GWPs from AR4 were adopted for the EU ETS. For the revision of ESD targets the revised GWPs were taken into account. For the implementation until 2020, GWPs from AR4 will be used consistently with the UNFCCC reporting guidelines for GHG inventories.
- The target covers the gases CO_2, CH_4, N_2O, HFCs, PFCs and SF_6.

The information above is summarised in Table 6.

Table 6. Key facts of the Convention target of the EU-28

Parameter	Target
Base year	1990
Target year	2020
Emission reduction target	-20% in 2020 compared to 1990
Gases covered	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6
Global warming potential	AR4
Sectors covered	All IPCC sources and sectors, as measured by the full annual inventory, partly international aviation
Land Use, Land-Use Change and Forestry (LULUCF)	Excluded
Use of international credits (JI and CDM)	Possible to certain extent under the EU-ETS and the ESD.
Other	Conditional offer to move to a 30% reduction by 2020 compared to 1990 levels as part of a global and comprehensive agreement for the period beyond 2012, provided that other developed countries commit themselves to comparable emission reductions and that developing countries contribute adequately according to their responsibilities and respective capabilities

4.2. The EU target compliance architecture

In 2009 the EU established internal rules under its "2020 climate and energy package"[11] – these underpin the EU implementation of the target under the Convention. The package introduced a clear approach to achieving the 20% reduction of total GHG emissions from 1990 levels, which is equivalent to a 14% reduction compared to 2005 levels. This 14% reduction objective is divided between the ETS and ESD sectors. These two sub-targets are:

- a 21% reduction target compared to 2005 for emissions covered by the ETS (including domestic and international aviation);

[11] http://ec.europa.eu/clima/policies/package/index_en.htm

- a 10% reduction target compared to 2005 for ESD sectors, shared between the 28 Member States (MS) through individual national GHG targets.

The distribution of the total target across the ETS and ESD is shown in Figure 13.

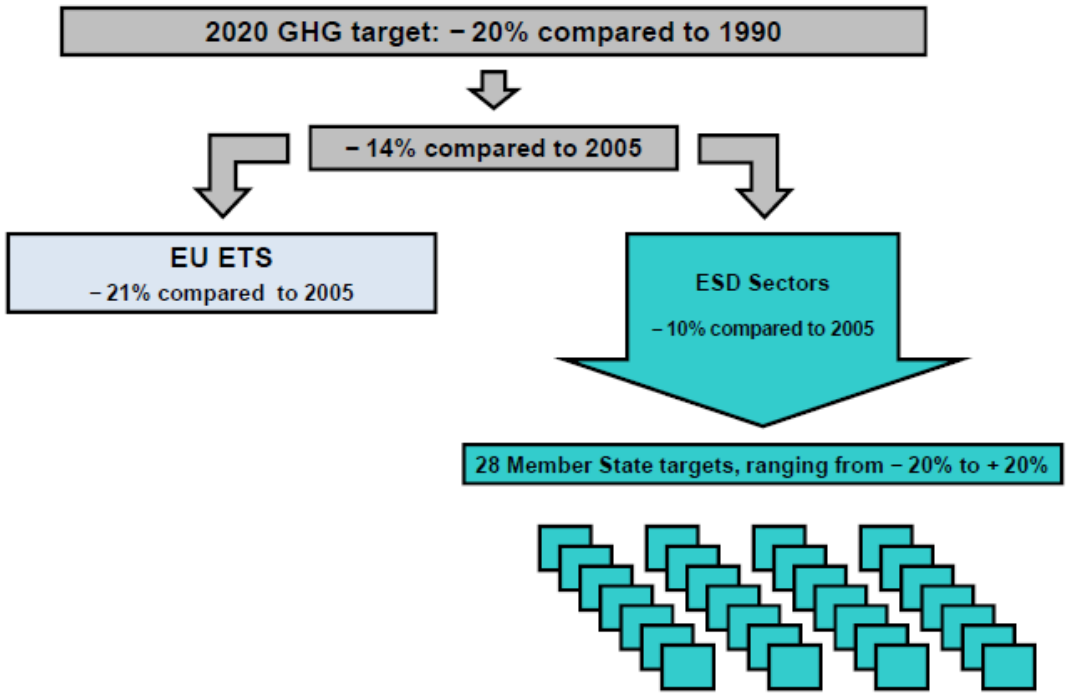

Figure 13. GHG targets under the 2020 climate and energy package (source EEA 2013 Trends and Projections Report[12]

The amended EU-ETS Directive 2009/29/EC (Article 11a(8)) sets the upper limit for credit use for the period 2008–2020 at 50% of the reduction effort below 2005 levels. This is further specified into installation-level limits in the Commission Regulation on International Credit Entitlements (RICE)[13]. Since 2013, it is no longer possible to track the use of flexible mechanisms in the EU-ETS directly via information on the EUTL public website: CERs and ERUs are exchanged for EUAs, and after the exchange they cannot be tracked as CERs or ERUs. These exchanges will become public at the installation level two years after transfers are conducted; thus, the first information reflecting their use in 2013 will become available in 2016.

Non-ETS emissions are addressed under the Effort Sharing Decision (ESD)[14], which covers emissions from all sources outside the EU-ETS, except for those from international maritime and domestic and international aviation (which were included in the EU-ETS from 1 January 2012), and emissions and removals from land use, land-use change and forestry (LULUCF). It thus includes a diverse range of small-scale emitters in

[12]Trends and projections in Europe 2013: Tracking progress towards Europe's climate and energy targets until 2020, EEA Report No 10/2013
[13] Commission Regulation (EU) No 1123/2013 of 8 November 2013 on determining international credit entitlements pursuant to Directive 2003/87/EC of the European Parliament and of the Council
[14]Decision No 406/2009/EC

a wide range of sectors: transport (cars, trucks), buildings (in particular heating), services, small industrial installations, fugitive emissions from the energy sector, emissions of fluorinated gases from appliances and other sources, agriculture and waste. Such sources currently account for about 55% of the total GHG emissions in the EU.

Whereas the EU-ETS target is to be achieved by the EU as a whole, the ESD target was divided into national targets to be achieved by individual Member States (see figure 3.1). National emission targets for 2020, expressed as percentage changes from 2005 levels, are laid down in the ESD. These changes have been converted into binding quantified annual reduction targets for the period 2013–2020 (EC 2013)[15,16], expressed in Annual Emission Allocations (AEAs).

The monitoring process is harmonised for all Member States, as laid down in the Monitoring Mechanism Regulation[17]. The use of flexible mechanisms is possible under the EU-ETS and the ESD. More information on the use of CERs and ERUs under the ETS is available in the European BR2.

The ESD allows Member States to use flexibility provisions to meet their annual targets, with certain limitations. The use of project-based credits is subject to an annual limit of 3% for each Member State. For the Netherlands the annual limit for the use of international credits (CERs and ERUs) is 3.2 Mt. If these are not used in any specific year, the unused part for that year can be transferred to other Member States or be banked for own use until 2020.

As Cyprus (together with Austria, Belgium, Denmark, Ireland, Italy, Luxembourg, Portugal, Slovenia, Spain, and Sweden) fulfils the additional criteria laid down in ESD Article 5(5), an additional use of credits is possible from projects in Least-Developed Countries (LDCs) and Small Island Developing States (SIDS) up to an additional 1% of Belgium's verified emissions in 2005. These credits are not bankable and transferable.

4.3. Cyprus' reduction target under the ESD

Cyprus is committed to reducing its emissions in sectors covered under the Effort Sharing Decision (ESD, non-ETS) by 5% compared to 2005 emissions. The quantified annual reduction targets set by EU Decisions[18] for Cyprus are 5.91 million AEA in 2013, increasing to 5.94 million in 2020 (according to AR4 GWPs). The cumulative amount of

[15] Commission decision of 26 March 2013 on determining Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/EC of the European Parliament and of the Council (2013/162/EU)

[16] Commission Implementing Decision of 31 October 2013 on the adjustments to Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/ EC of the European Parliament and of the Council (2013/634/EU)

[17] Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC

[18] Decision 2013/162/EU (http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D0162&rid=1) and 2013/634/EU (http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D0634&rid=1)

AEAs for the period 2013-2020 is set at 47.4 Mt CO_2 eq. The annual allocation is presented in Table 7 and Figure 14.

Table 7. Cyprus' ESD annual emission allocations (t CO_2 eq.) for the period 2013–2020, using GWPs according to AR4.

Year	Annual Emission Allocations (t CO_2 eq.)
2013	5 919 071
2014	5 922 555
2015	5 926 039
2016	5 929 524
2017	5 933 008
2018	5 936 493
2019	5 939 977
2020	5 943 461
TOTAL	**47 450 128**

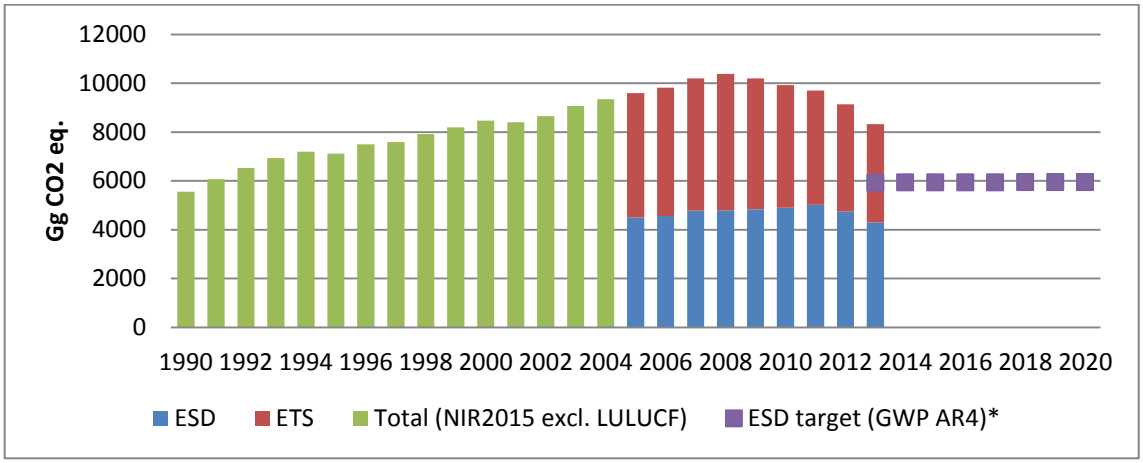

Figure 14. Cyprus' total greenhouse gas emissions for the period 1990-2013, including a breakdown of the emissions 2008-2013 in emissions under ETS and emissions under ESD (non-ETS) and the ESD target[19] for 2013-2020 (Gg CO_2 eq).

[19] * Decision 2013/162/EU (http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D0162&rid=1)

4.4. CTF tables (for EU and MS reporting)

CTF Table 2. Description of the quantified economy wide emission reduction target: Tables 2(a)-2(f)

Emission reduction target: base year and target				
Base year/ base period	1990	Legally binding target trajectories for the period 2013-2020 are enshrined in both the EU-ETS Directive (Directive 2003/87/EC and respective amendments) and the Effort-Sharing Decision (Decision No 406/2009/EC). These legally binding trajectories not only result in a 20% GHG reduction in 2020 compared to 1990 but also define the EU's annual target pathway to reduce EU GHG emissions from 2013 to 2020. The Effort-Sharing Decision sets annual national emission targets for all Member States for the period 2013-2020 for those sectors not covered by the EU emissions trading system (ETS), expressed as percentage changes from 2005 levels. In March 2013, the Commission formally adopted the national annual limits throughout the period for each Member State. By 2020, the national targets will collectively deliver a reduction of around 10% in total EU emissions from the sectors covered compared with 2005 levels. The emission reduction to be achieved from the sectors covered by the EU ETS will be 21% below 2005 emission levels.		
Emission reductions target (% of base year/base period)				
Emission reductions target (% of 1990)	20%			
Period for reaching target	by 2020			
Gases and sectors covered. GWP values				
Gases covered	**Covered**	**Base Year**	**GWP reference source**	**Comments**
CO_2	Yes	1990	4th AR	As adopted in the UNFCCC reporting guidelines for national GHG inventories of Annex I Parties and as adopted under the EU Monitoring Mechanism Regulation
CH_4	Yes	1990	4th AR	
N_2O	Yes	1990	4th AR	
HFCs	Yes	1995	4th AR	
PFCs	Yes	1995	4th AR	
SF_6	Yes	1995	4th AR	
NF_3	No	1995	4th AR	Reporting on NF3 takes place within the framework of the Kyoto Protocol
Sectors covered				
Energy	Yes			
Transport	Yes			
Industrial processes	Yes			
Agriculture	Yes			
LULUCF	No			
Waste	Yes			
Aviation in the scope of the EU-ETS		In principle, the EU ETS should cover CO2 emissions of all flights arriving at, and departing from, airports in all EU Member States, Norway, Iceland and Liechtenstein and closely related territories. However, since 2012, flights to and from airports from other countries have not been included in the EU ETS. This exclusion was taken in order to facilitate negotiation of a global agreement to address aviation emissions in the forum of the International Civil Aviation Organisation (ICAO). The EU has decided on a reduced scope in the 2013–2016 period (EU, 2014c).		
Role of LULUCF sector				
LULUCF in base year level and target	Excluded	The EU pledge does not include emissions/removals from Land Use, Land-Use Change and Forestry to deliver its firm independent commitment to reduce greenhouse gas emissions by at least 20% compared to 1990 by 2020. The EU LULUCF sector is however estimated to be a net sink over that period.		
Contribution of LULUCF is calculated using				
Possible scale of contributions of market-based mechanisms				
Possible scale of		The 2020 Climate and Energy Package allows Certified Emission		

contributions of market-based mechanisms under the Convention (estimated kt CO2 eq)		Reductions (CERs) and Emission Reduction Units (ERUs) to be used for compliance purposes, subject to a number of restrictions in terms of origin and type of project and up to an established limit. In addition, the legislation foresees the possible recognition of units from new market mechanisms. Under the EU ETS, the limit does not exceed 50% of the required reduction below 2005levels. In the sectors not covered by the ETS, annual use must not exceed to 3% of each Member States' non-ETS greenhouse gas emissions in 2005.
CERs		The use of these units under the ETS Directive and the Effort-Sharing Decision is subject to the limits specified above which do not distinguish between CERs and ERUs, but include additional criteria for the use of CERs.
ERUs		The use of these units under the ETS Directive and the Effort-Sharing Decision is subject to the limits specified above which do not distinguish between CERs and ERUs, but include additional criteria for the use of CERs.
AAUs		AAUs for the period 2013-2020 have not yet been determined. The EU expects to achieve its 20% target for the period 2013-2020 with the implementation of the ETS Directive and the ESD Decision in the non-ETS sectors, which do not allow the use of AAUs from non-EU Parties.
Carry-over units		At CMP.9, the EU made a declaration, when adopting the Doha amendment to the Kyoto Protocol, that the European Union legislation on 2020 Climate and Energy Package for the implementation of its emission reduction objectives for the period 2013-2020 does not allow the use of surplus AAUs carried over from the first commitment period to meet these objectives.
Other mechanism units under the Convention (specify)		There are general provisions in place in the EU legislation that allow for the use of such units provided that the necessary legal arrangements for the creation of such units have been put in place in the EU, which was not the case when this report was provided.
Any other information		
In December 2009, the European Council reiterated the conditional offer of the EU to move to a 30% reduction by 2020 compared to 1990 levels as part of a global and comprehensive agreement for the period beyond 2012, provided that other developed countries commit themselves to comparable emission reductions and that developing countries contribute adequately according to their responsibilities and respective capabilities.		
Possible scale of contributions of other market-based mechanisms		
None. Cyprus does not recognise the use of market-based mechanisms other than those under the Convention for the achievements of quantified economy wide emission reduction targets		

5. Progress in achievement of quantified economy-wide emission reduction targets and relevant information

5.1. National policies and measures and their effects

5.1.1. Introduction

The national policies are prepared, updated, and monitored by the Ministry of Agriculture, Rural Development and Environment (MARDE), in collaboration with the responsible Ministry for each measure or policy. Currently, the main focus of the policy related to reduction of greenhouse gas emissions is energy. Energy in 2013 accounted for 69% of the total GHG emissions (without LULUCF) and increased by 45% compared to 1990 levels. The sector of energy for which most measures are implemented is energy production.

The policies and measures currently in implementation are presented in Table 8. The impact of these policies and measures is presented in detail in Chapter 6.

Policy making process

The Ministry of Agriculture, Rural Development and Environment is the main governmental body entrusted with the development and implementation of environmental policy in Cyprus. The responsibilities of the Ministry include, among others, the formulation of policies concerning environmental protection for the coordination of implementation efforts, and to ensure compliance with the current legislative framework. For this purpose, MARDE cooperates both with other competent ministries and with regional, prefectural and local authorities. Other ministries are responsible for integrating environmental policy targets within their respective fields.

Climate change mitigation is one of the main targets identified in the Cypriot strategy for sustainable development launched by MARDE in 2007. The objective of the strategy is the development of a set of principles for the formulation of an action plan in line with international challenges, and in accordance with EU policy directions and adjusted to the specific national circumstances.

Policies and measures, as well as all other issues and actions regarding mitigation are discussed with other involved ministries.

Monitoring & Evaluation

MARDE is responsible for the monitoring of the implementation of policies and measures for achieving of the national targets with respect to GHG emissions. A reporting template provided by EU (developed by the EEA's European Topic Centre on Air and Climate Change) is used for the monitoring and evaluation of policies and measures, along with additional working files in spreadsheet format. The reporting template is in a spreadsheet format and is organized in working sheets related to

information and data about: GHG projections, projection parameters and indicators, policies and measures, summary of results, consistency checks, graphs, etc., as required under Article 3(2) of the Monitoring Mechanism Decision (EU Commission Decision 280/2004/EC) and elaborated in Articles 8, 9 and 10 of the Implementing Provisions (EU Commission Decision 2005/166/EC), and UNFCCC reporting guidelines for national communications (FCCC/CP/1999/7).

Table 8. List of Policies and measures

A. Energy
A1. Natural Gas
A2. Renewable Energy Sources
A2.1. Renewable Energy Sources in Electricity Production
A2.2. Renewable Energy Sources for Heating and Cooling
A2.3. Renewable Energy Sources in Transport
A3. Energy efficiency and savings
A3.1. Savings from Energy Efficiency in Residential Buildings
A3.2. Savings from Energy Efficiency in Tertiary Buildings
A3.3. Savings from Efficient Bulbs
A3.4. Savings from Insulation in Residential Sector
A3.5. Savings in Existing Companies
A4. Energy savings from promotion of biomass and alternative fuels in industry
B. Transport
B1. Reduction in fuel consumption for transport from the promotion of public transport
B2. Reduction in CO_2 emissions from road transport from promotion of low CO2 vehicles
C. Agriculture
C1. Reduction of emissions from manure management from the promotion of AD for animal waste
D. Waste
D1. Reduction of emissions from controlled waste management sites from biogas recovery
D3. Reduction of emissions from wastewater treatment from the promotion of AD
D4. Reduction of organics to landfill
D5. Separate organics collection
E. F-gases
E1. F-gases recovery

Reduction of emissions from uncontrolled waste management sites from management of uncontrolled disposal sites was a measure included in the previous submissions, which is not included in this submission. This measure has been fully implemented by 2013.

5.1.2. Sectoral policies and measures: Energy

The emissions of the energy sector except transport increased from 2735 Gg CO_2 eq. in 1990 to 3876 Gg CO_2 eq. in 2013, corresponding to 42% increase. In 2013, emissions decreased by 16% compared to 2012. Energy is the sector which has to contribute the most in the reduction of greenhouse gases of Cyprus. The import of natural gas, and its initial use for electricity production, is expected to contribute considerable reductions of emissions in 2020.

Cyprus is the southernmost region of the European Union at the crossroads of three continents, with a dominant position in the Mediterranean and South East. In general Cyprus presents the common energy problems of most islands:

(a) Isolated energy system.
(b) High cost of energy supply.
(c) High dependence on petroleum products - small supply security.
(d) Seasonal variations in energy demand.
(e) Maximum operation of the system of production and distribution of electricity in peak load demand.
(f) Strict limitations of protection and promotion of the island environment that act as a disincentive to develop initiatives in energy investments.

The competent authority in relation to energy policies is the Energy Service of the Ministry of Energy, Commerce, Industry and Tourism.

A1. Natural gas

The Government of Cyprus, recognizing the positive contribution that the introduction and use of natural gas will have on the economy and the environment of Cyprus, has decided to introduce natural gas primarily for use in electricity generation. It is however expected that after its arrival, natural gas will also be used in other sectors of the economy (commercial, industrial and transport).

Currently, efforts are being made for the introduction of natural gas initially for power generation. Consequently, the Electricity Authority of Cyprus (single conventional fuel electricity producer) has included natural gas in its development strategies. By importing natural gas, apart from the reduction of emissions from the actual use of the natural gas, there would also be a positive contribution to emission reductions through the increased efficiency of the newer technologies used.

Competent authority	Energy Service, Ministry of Energy, Commerce, Industry and Tourism
Other involved authorities	- Cyprus Energy Regulatory Authority - Public Natural Gas Company (DEFA) - Electricity Authority of Cyprus - Department of Environment
Status of implementation	Adopted
Type	Political, Regulatory
National legislation	- Κ.Δ.Π. 115/2006 - N. 183(I)/2004 as amended
Relevant EU legislation	Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC
Measures towards attainment	- Import and use of natural gas for electricity production - Installation of combined cycle electricity production units using natural gas as fuel - Decommissioning or conversion of existing electricity production units
Mitigation impact 2020	672 Gg CO_2 eq.

A2. Renewable energy sources

The share of renewable energy sources in the primary energy consumption, based on the energy balance of Cyprus, has increased from 1.7% in 2007 to 5.9% in 2014 (Energy Service, 2016). Table 9 shows the distribution of the renewable energy sources according to the type of renewable technology and consumer.

Table 9. Renewable energy sources in the energy balance of Cyprus in toe, 2014 (Energy Service, 2016)

	Biofuels	**Solar Thermal**	**Geothermal**	**Biomass**	**Electricity - Biomass**	**Electricity - Wind**	**Electricity - PV Systems**	**TOTAL**
Cement industry				6610				6610
Road transport	10030							10030
Households		66770	1551	6072			1484	75877
Agriculture					1125			1125
Industry				2427				2427
Commerce, Hotels & Services		10018		4546		37	6	14607
TOTAL	**10030**	**66788**	**1551**	**19655**	**4347**	**15725**	**7189**	**125285**
Electricity to Grid					3222	15688	5699	24609

Renewable energy sources and energy efficiency is promoted to the public by provisions of financial support schemes. On-going schemes promoting small and disperse electricity production and prosumers through the installation of Photovoltaic Systems (net-metering and auto production) in households and businesses, taking full advantage of the favourable weather conditions.

The present status of RES (as of the end of 2015) in the electricity sector is encouraging since almost 80 MW of photovoltaic systems, 10.7MW of biomass units and 157.5MW of wind parks have already been installed. The energy production from RES systems in 2014 was equivalent to 129.730 toe, corresponding to a share of 8.06% in final Energy Consumption.

According to Directive 2009/28/EC, the share of renewable energy in gross final energy consumption in the European Union for 2020 should at least reach 20%. The specific binding target for Cyprus is 13%. Also, the share of energy from renewable sources in all forms of transport (vehicles, trains, metro) in 2020 should represent at least 10% of the final consumption of energy in transport. Each Member State is obliged to submit to the Commission their National Action Plan for Renewable Energy, which includes, inter alia, the target path for achieving the targets for the share of RES in electricity, heating and cooling, and transport. The estimated target trajectory of energy from renewable sources for the years 2010, 2015, and 2020 for Cyprus to reach the goal of 13% and the

intermediate targets to reach the 10% renewables in transport by 2020 are presented in Table 10.

Table 10. Summary of the targets trajectory for Renewable energy sources in Cyprus (according to the National Renewable Energy Action Plan)

	2010	2015	2020
Renewable energy sources to reach 13% in 2020 in the gross final energy consumption			
Heating and cooling	16.2%	20%	23.5%
Electricity production	4.3%	8.4%	16%
Transport	2.2%	3.1%	4.9%
Total share of RES	6.5%	9.0%	13%
Renewable energy sources to reach 10% of final energy consumption in transport in 2020			
Transport	2.2%	3.3%	10%

Details on how Cyprus will achieve the targets are available in the National Renewable Energy Action Plans that has been prepared according to Article 4 of the renewable energy Directive (2009/28/EC) and submitted in July 2010.

The National Renewable Energy Action Plan is under revision due to the recent developments in the energy sector concerning primarily the potential use of imported or indigenous natural gas and electricity cost reduction by optimizing the penetration of renewables in the competitive environment of the internal market.

A2.1. Renewable energy sources in electricity production

Electricity production contributed 49% to the emissions of the energy sector in 2013, which corresponds to 34% to the total emissions of the country (excluding LULUCF). This corresponds to 2839 Gg CO2 eq., whereas the total emissions of the country without LULUCF were 8319 Gg CO2 eq. All units producing electricity in Cyprus for public use running on conventional fuels are operated by the Electricity Authority of Cyprus. The main fuel is HFO and some contribution of gas oil. Electricity production is regulated by the Emissions Trading System.

Competent authority	Energy Service, Ministry of Energy, Commerce, Industry and Tourism
Other involved authorities	- Cyprus Energy Regulatory Authority - Transmission System Operator - Distribution System Operator - Ministry of Finance - Department of Town Planning and Housing, Ministry of Interior, Department of Environment, - Ministry of Agriculture, Rural Development and Environment
Type	Regulatory, voluntary
National legislation	- Law No. 112(I)/2013 on the promotion and encouragement of the use of renewable energy sources which has repealed the old one (N.33(I)/2013) - Law No. 110(I)/2011 establishing a European emissions trading system and other relevant issues - Law No. 248(I)/2015 & 157(I)/2015 amending Law No. 112(I)/2013

Relevant EU legislation	- Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity from renewable energy sources in the internal electricity market (Directive 2001/77/EC is repealed by Directive 2009/28/EC from 1 January 2012. Moreover, from 1 April 2010, Article 2, paragraph 2 of Article 3 and Articles 4 to 8 will be deleted) - Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC - Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community
Target	RES share in electricity production - 2010 4.3% - 2015 8.4% - 2020 16%
Measures towards attainment	- RES support schemes, - Informational campaigns, - Implementation of relevant legislation
Cost so far	€96,738,396

A2.2. Renewable energy sources for heating and cooling

Heating and cooling for industrial, housing and tertiary sectors, contributed 9% to the emissions of the energy sector in 2013, and 6.1% to the total emissions of the country (excluding LULUCF). The RES technologies promoted through the scheme are solar thermal, biomass, and geothermal.

Competent authority	Energy Service, Ministry of Energy, Commerce, Industry and Tourism
Other involved authorities	- Department of Town Planning and Housing, Ministry of Interior - Department of Environment, Ministry of Agriculture, Natural Resources and Environment - Department of Labour Inspection, Ministry of Labour and Social Insurance
Type	Regulatory, voluntary
National legislation	- Law No. 112(I)/2013 on the promotion and encouragement of the use of renewable energy sources, which has repealed the old one (N.33(I)/2013) - Law No. 142(I)/2006 regulating energy efficiency in buildings - Law No. 30(I)/2009 amending Law No. 142(I)/2006 regulating energy efficiency in buildings - Law No. 56(I)/2003 on Integrated Pollution Prevention Control (with amending laws no. 15(I)/2006, 12(I)/2008) - Law No. 248(I)/2015 & 157(I)/2015 amending Law No. 112(I)/2013
Relevant EU legislation	- Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity from renewable energy sources in the internal electricity

	market (Directive 2001/77/EC is repealed by Directive 2009/28/EC from 1 January 2012. Moreover, from 1 April 2010, Article 2, paragraph 2 of Article 3 and Articles 4 to 8 will be deleted) - Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC - Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community - Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control and related amendments
Target[20]	RES share in energy consumption for heating and cooling - 2010: 16.2% - 2015: 20% - 2020: 23.5%
Measures towards attainment	- RES support schemes - Informational campaigns - Implementation of relevant legislation
Cost so far	€47,527,618
Comments	- Directive 2009/29/EC and its predecessor, 2003/87/EC indirectly promote the production of energy conservation through the use of alternative technologies using RES - EU on waste and IPPC are indirectly promoting anaerobic digestion to livestock breeding units.

A2.3. Renewable energy sources in transport

According to the Directive 2009/28/EC on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC, 2003/30/EC and 2009/30/EC and the action plan submitted by Cyprus for the achievement of the target set, RES for transport in gross final consumption should be 2.2% in 2010, 3.1% in 2015 and 4.9% in 2020. As of the end of 2014 the share of RES in transport was 2.62%. RES share in final consumption for transport calculated according to the methodology set by the directive 2009/28/EC.

Competent authority	Energy Service, Ministry of Energy, Commerce, Industry and Tourism
Other involved authorities	- Department of Customs - Department of Environment, Ministry of Agriculture, Rural Development and Environment; - Department of Labour Inspection, Ministry of Labour and Social Insurance
Type	Regulatory, voluntary

[20]% includes the target from measure A5, i.e. use of waste as fuel for cement industry; does not include the use of waste as fuel for cement industry

National legislation	- Law No. 112(I)/2013 on the promotion and encouragement of the use of renewable energy sources, which has repealed the old one (N.33(I)/2013); - Law No.148 (I)/2003 on the petroleum products and fuels specification; - Decrees 63/2008 and 16/2009 on the content of biofuels in transport conventional fuels; - Law No. 248(I)/2015 & 157(I)/2015 amending Law No. 112(I)/2013
Relevant EU legislation	- Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity from renewable energy sources in the internal electricity market (Directive 2001/77/EC is repealed by Directive 2009/28/EC from 1 January 2012. Moreover, from 1 April 2010, Article 2, paragraph 2 of Article 3 and Articles 4 to 8 will be deleted); - Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC; - Directive 2009/30/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC; - Decision 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020
Target	RES share in transport: - 2010 2.2% - 2015 3.3% - 2020 10%
Measures towards attainment	- Implementation of grant scheme for installations producing biofuels; - Implementation of relevant legislation
Cost so far	€3,976,108

A3. Energy efficiency and savings

According to the Directives 2006/32/EC and 2012/27/EU, the member states have submitted to the European commission their National Energy Efficiency Action Plan (NEEAP) to achieve the targets for energy savings in final and primary consumption. Measure A3, presents some of the measures included in NEEAPs submitted in 2007, 2011 and 2014. These shall be revised during 2017 for the new national submission. Tables in the pages that follow describe some of the measures included in National Energy Efficiency Action Plan.

A3.1. Savings from energy efficiency in residential buildings

Competent authority	Energy Service, Ministry of Energy, Commerce, Industry and Tourism
Other involved authorities	- Ministry of Interior; - Municipalities
Type	Legislative, compulsory and incentives, voluntary
National legislation	- Laws that Regulate the Energy Performance of Buildings, Law No. 142(I)/2006, Law No. 30(I)/2009 and Law No. 210(I)/2012
Relevant EU legislation	- Decision 406/209/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020; - Directive 2010/31/EU on the energy performance of buildings (recast); Directive 2012/27/EU on energy efficiency
Target[21]	Energy savings - 2015 87.101 toe - 2020 87.101 toe - 2030 37.192 toe
Measures towards attainment	- Minimum energy performance requirements for new buildings, existing buildings that undergo major renovation and building elements that are substituted or retrofitted Energy Performance Certificates for new buildings and for buildings that are for sale or rent; - Promotion of Nearly Zero Energy Buildings (NZEB); - Incentives for renovating existing houses to save 40% energy or to reach energy class B or to reach NZEB levels; - Regular inspection of heating systems with boiler and large air conditioning systems
Comments	Decision 406/2009/EC is also requiring the sector of buildings to reduce its emissions.

A3.2. Savings from energy efficiency in tertiary buildings

Competent authority	Energy Service, Ministry of Energy, Commerce, Industry and Tourism
Other involved authorities	- Ministry of Interior; - Municipalities
Type	Legislative, compulsory and incentives, voluntary
National legislation	- Laws that Regulate the Energy Performance of Buildings, Law No. 142(I)/2006, Law No. 30(I)/2009 and Law No. 210(I)/2012
Relevant EU legislation	- Decision 406/209/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020; - Directive 2010/31/EU on the energy performance of buildings

[21]% includes the target from measure A5, i.e. use of waste as fuel for cement industry; does not include the use of waste as fuel for cement industry

	(recast); Directive 2012/27/EU on energy efficiency
Target	Energy savings - 2015 8891 toe - 2020 8891 toe - 2030 4850 toe
Measures towards attainment	- Minimum energy performance requirements for new buildings, existing buildings that undergo major renovation and building elements that are substituted or retrofitted Energy Performance Certificates for new buildings and for buildings that are for sale or rent; - Promotion of Nearly Zero Energy Buildings (NZEB); - Incentives for renovating existing houses to save 40% energy or to reach energy class B or to reach NZEB levels; - Regular inspection of heating systems with boiler and large air conditioning systems
Comments	Decision 406/2009/EC is also requiring the sector of buildings to reduce its emissions.

A3.3. Savings from efficient bulbs

Competent authority	Energy Service, Ministry of Energy, Commerce, Industry and Tourism
Other involved authorities	Department of Environment
Type	Legislative, compulsory
National legislation	- Law No. 31/2009 on energy end-use efficiency and energy services; - Law No. 56(I)/2014 amending Law No. 31(I)/2009; Law No 149(I)/2015 amending Law No. 31(I)/2009
Relevant EU legislation	- Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC; - Directive 2012/27/EU on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC; - Decision 406/209/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020
Target	Energy savings - 2015 15002 toe - 2020 10491 toe - 2030 0 toe
Measures towards attainment	- Information campaign and promotion of energy efficient lambs
Cost so far	€2,710,840

A3.4. Savings from insulation in residential sector

Competent authority	Energy Service, Ministry of Energy, Commerce, Industry and Tourism
Other involved authorities	Department of Environment
Type	Legislative, compulsory
National legislation	- Law No. 31/2009 on energy end-use efficiency and energy services; - Law No. 56(I)/2014 amending Law No. 31(I)/2009; Law No 149(I)/2015 amending Law No. 31(I)/2009
Relevant EU legislation	- Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC; - Directive 2012/27/EU on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC; - Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings - Decision 406/209/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020
Target	Energy savings - 2015 11089 toe - 2020 11089 toe - 2030 10985 toe
Measures towards attainment	Grant scheme for energy conservation
Cost so far	€34,174,630

A3.5. Savings in existing companies

Competent authority	Energy Service, Ministry of Energy, Commerce, Industry and Tourism
Other involved authorities	Department of Environment
Type	Legislative, compulsory
National legislation	- Law No. 31/2009 on energy end-use efficiency and energy services; - Law No 56(I)/2014 amending Law No. 31(I)/2009; Law No 149(I)/2015 amending Law No. 31(I)/2009
Relevant EU legislation	- Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC; - Directive 2012/27/EU on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC; - Decision 406/209/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to

	reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020
Target	Energy savings - 2015 13016 toe - 2020 12424 toe - 2030 3486 toe
Measures towards attainment	Grant scheme for energy conservation
Cost so far	€7,623,842

A4. Improvement of electricity distribution system

The electricity Distribution System is under the management of the Distribution System Operator of Cyprus. No specific target is available for the reduction of losses; the target was set as annual reduction of emissions from losses by 0.1% (reduction from electricity emissions). Competent authority is the National Transition System Operator of Cyprus, whereas other involved authorities are the Electricity Authority of Cyprus and the Department of Environment.

Some of the actions taken in order to improve the electricity distribution system include the following:

(a) In order to maintain voltage levels within permissible limits, the Electricity Authority of Cyprus installed 4 x 16MVAr (64 MVAr) inductor VAR Compensators at medium voltage (distribution system);
(b) Currently, Technical Assistance is on-going for assessing the current state of the transmission and distribution electricity systems and proposing optimum solutions for increasing the amount of Renewable Energy Sources (RES) generation that can be fed on the electricity system;
(c) Better grid and load management via smart meters/grids; the Electricity Authority of Cyprus is currently deploying a pilot system which will indicate best technical solutions as well as the costs and benefits of a potential full roll-out

5.1.3. Sectoral policies and measures: Transport

In 2013, road transport emissions contributed 22% of the total national emissions excluding LULUCF. The emissions of road transport increased by 53.5% compared to 1990. According to information from the International Road Federation, Cyprus has the highest car ownership rate in the world with 742 cars per 1,000 people (International Road Federation, 2009). Other means of transport are very low compared to other countries: 3% public transport and bicycle less than 2% (Ministry of Communications and Public Works, 2010).

In addition to the importance for emissions, transport has been an issue of particularly great interest to the society of Cyprus, due to the very large growth of the number of privately owned cars and the associated problems in traffic that are experienced, especially in the capital, Nicosia. Even though many studies have been completed since

the 1990s on how to deal with traffic in the urban areas of Cyprus and especially Nicosia, only recently (end of 2009) action has been taken and measures are implemented.

The following two measures are currently under study. However, the preparation of the measures is not mature enough to estimate the reduction in GHG emissions or cost.

a. Deployment of electric vehicle infrastructure: The Department of Electrical and Mechanical Services and the Ministry of Energy, Commerce, Industry & Tourism are preparing a regulatory framework in order to promote the electric vehicle and also facilitate the deployment of the electric vehicle infrastructure. The regulatory framework will consist of direct financial incentives (through structural funds proposals) for the installation of charging stations, tax incentives and also public procurements for the deployment of infrastructure. Furthermore, it will consist of policy measures with non-financial incentives such as preferential access to parking areas, roadside parking, building and parking permits etc.

b. Permission of Liquid Petroleum Gas to be used as Transport Fuel: it is expected that the usage of liquid petroleum gas (LPG) as a transport fuel will be permitted in the following years. Depending on the usage of the LPG on private vehicles is expected to have an impact on the greenhouse gases emissions.

B1. Promotion of public transport

According to the plans of the Ministry of Transport, Communications and Works, the target is to increase the mode share of public transport from 2% in 2009 to 10% by 2020 (Department of Environment, 2010). Towards this end, at the end of 2009 the legal framework concerning public transport was revised, which allowed the introduction and development of new urban, suburban and intercity bus routes and schedules.

Competent authority	Ministry of Communications and Public Works
Other involved authorities	Department of Environment
Type	Regulatory, Fiscal
National legislation	- Law No. 101(I)/2009 on the access to the profession of road transport (amending) - Law No. 96(I)/2009 on the regulation of road transport (amending)
Relevant EU legislation	- Decision 406/209/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020
Target	Reduction in fuel consumption for transport - 2015: 1.9% - 2020: 4.4% - 2025: 4.4% - 2030: 4.4%
Measures towards attainment	- Development and implementation of mobility master plans and land use transportation studies for the four large urban areas in

	the areas under the effective control of the Republic of Cyprus - Development of infrastructure for public transport (bus lanes, bus priority lanes, new bus stops, new bus stations) - Development and implementation of "park-and-ride" systems - Study for the development of a tram system - Feasibility Study for the development of a tram system in Nicosia
Comments	Approximately 50% of the non-ETS emissions of Cyprus are from transport, therefore considerable effort is needed by the sector to reduce the overall non-ETS emissions

B2. Promotion of low CO2 vehicles

The Motor Vehicle and Road Traffic Law of 2013 has brought changes to the registration and licence of a motor vehicle. The new road tax charge for vehicles registered from 1/1/2014 will depend on their CO_2 emissions. Vehicles registered by 31/12/2013 do not have to pay road tax based on their CO_2 emissions, but their owners will be charged an additional fee depending on engine size.

Electric cars and vehicles with CO_2 emissions of less than or equal to 120g/km (combined cycle) are exempted from the additional registration fee.

The registration fee for vehicles with CO_2 emissions over 120g/km and up to 150g/km will be €25 per gram over 120g. A €750 fee will be charged for vehicles emitting between 150g/km and 180g/km and a €2,250 fee for emissions above that, plus €400 for every gram over 180.

The new road tax will be charged as follows: vehicles emitting 120g/km, €0.5 per gram, 120g/km – 150g/km, €3, 150g/km – 180g/km, €3, and over 180g/km, €8.

For already registered vehicles (cars and motorcycles), the law provides for a special fee – above and beyond the current road tax – of €10 for low emissions, €20 for vehicles with engine displacements up to 2050 cc, and €30 for vehicles with engine displacements higher than 2050 cc.

Competent authority	Ministry of Communications and Public Works
Other involved authorities	Department of Environment
Type	Regulatory, voluntary
National legislation	Motor Vehicle and Road Traffic Law of 2013 (no. 100(I)/2013)
Relevant EU legislation	- Decision 406/209/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020
Target	Reduction in CO_2 emissions from road transport - 2015: 2% - 2020: 5% - 2025: 5%

	- 2030: 5%
Comments	Approximately 50% of the non-ETS emissions of Cyprus are from transport, therefore considerable effort is needed by the sector to reduce the overall non-ETS emissions

5.1.4. Sectoral policies and measures: Industry

Under the provisions of Art. 9 of Regulation 517/2014/EC, on fluorinated greenhouse gases, without prejudice to existing Union legislation, Member States shall encourage the development of producer responsibility schemes for the recovery of fluorinated greenhouse gases and their recycling, reclamation or destruction.

Cyprus has recently adopted and harmonized the above Regulation. The next step is to forward a national Law regarding a producer's responsibility scheme. The main provision of this Law will follow the "polluter pays" principle and each producer will have to participate in an appropriate scheme for management of F-gases that have been recovered for any reason.

At the same time, under the provisions of the same scheme, certified technicians will be encouraged to return to the scheme any fluorinated gases that have been recovered, for a pre-decided profit.

So far, no details are available, but the main target is to annually increase recovery from 0% in 2020 to target 10% in 2030.

5.1.5. Sectoral policies and measures: Agriculture

D1. Promotion of anaerobic digestion - livestock breeding waste treatment

Even though anaerobic digestion is not clearly stated in the European or national legislation, the technology is preferred by large livestock breeding plants to comply with the terms stated on the wastewater and air disposal permits. The technology is strongly promoted by the Department of Environment, especially for the large installations that fall under the IPPC directive. Relevant national legislation that encourages the promotion of anaerobic digestion is (a) the Control of Water Pollution (Waste Water Disposal) Regulations 2003, Κ.Δ.Π. 772/2003; (b) the Control of Water Pollution (Sensitive Areas for urban waste water discharges) Κ.Δ.Π. 111/2004. It is a voluntary measure which is expected to increase by 1% annually, starting from additional 1% in 2012, until 2015; after 2015, the increase in the reduction will reduce to 0.5% annually.

5.1.6. Sectoral policies and measures: Forestry

One of the goals set out in the Policy Statement of the Department of Forests is the Adaptation in climate change and enhancing the contribution of forests to combat climate change. This goal aims to the qualitative improvement of the structure and resilience of forest stands to biotic and abiotic factors due to climate change. Even though the measures taken by the Department of Forests are expected to contribute to the increase of CO2 absorbance, sufficient information is not available to estimate this contribution.

5.1.7. Sectoral policies and measures: Waste

Reduction of emissions from municipal solid waste

With the Landfill Directive being the main guiding force, in combination to the improvement of the infrastructure of the country, Cyprus has been developing during the recent years the revised strategy for solid waste management. The management of the municipal solid waste is under the competence of the Department of Environment.

The adopted policies and measures are guided by EU Directives into national legislation and set future targets with a goal in reducing emissions. The Waste Framework Directive 2008/98/EC introduces recycling and recovery targets to be achieved by 2020 for 50% of the household waste, and national Law on Waste No. 185(I)/2011 harmonizes the targets.

Biodegradable municipal waste to landfills is also targeted for reduction to 35% by weight of the total municipal waste produced in 1995, following the Landfill Directive 1999/31/EC, and is adopted by the national Regulatory Administrative Act (Κ.Δ.Π.) 562/2003 on Solid and Hazardous Waste for the year 2020.

Additionally, Article 1 of the Landfill Directive encourages the separate collection of biodegradable waste, which is ratified in Κ.Δ.Π.562/2003.

Competent authority	Department of Environment
Other involved authorities	Ministry of Interior
Type	Legislative, compulsory
National legislation	- Solid and Hazardous Waste Law of 2002 (Κ.Δ.Π.562/2003) - Waste Law of 2011 (No. 185(I)/2011)
Relevant EU legislation	- Landfill Directive 1999/31/EC - Waste Framework Directive 2008/98/EC
Target	Recycling and recovery of household waste - 2020: 50% Reduction of biodegradable municipal waste to landfills - 2020: 35% Separate collection of biodegradable waste

Reduction of emissions from the promotion of anaerobic digestion for urban wastewater treatment

Even though anaerobic digestion is not clearly stated in the European or national legislation, the technology is preferred by large wastewater treatment plants to comply with the terms stated on the wastewater and air disposal permits. The technology is strongly promoted by the Department of Environment. Relevant national legislation that encourages the promotion of anaerobic digestion is (a) the Control of Water Pollution (Waste Water Disposal) Regulations 2003, Κ.Δ.Π. 772/2003; (b) the Control of Water Pollution (Sensitive Areas for urban waste water discharges) Κ.Δ.Π. 111/2004. It is a voluntary measure which is expected to increase by 1% annually, starting from

additional 1% in 2012, until 2015; after 2015, the increase in the reduction will reduce to 0.5% annually.

5.2. EU policies and measures and their effects

The EU and its 28 Member States, have been jointly implementing domestic and international actions against climate change now for a considerable number of years, which resulted in significant emission reductions.

To respond to challenges and investment needs related to climate action, the EU has agreed that at least 20% of the EU budget for 2014-2020 – as much as €180 billion – should be spent on climate change-related action. This represents a significant increase compared to climate action related expenditure in the previous budget, which represented 6.8% of the EU budget for 2007-2013. To achieve this, mitigation and adaptation actions are integrated into all major EU spending programmes, in particular cohesion policy, regional development, energy, transport, research and innovation and the Common Agricultural Policy.

The EU and its Member States are continuously strengthening legislation to enable GHG reductions and the transition to a low carbon economy. Key policy developments since the submission of the first biennial report include developments to the EU ETS, new legislative instruments in the transport sector and a strengthened F-gas Regulation.

Since 2013, the EU ETS operates under the improved and harmonised rules of Phase 3 covering the period 2013-2020. A well-functioning, reformed EU ETS is needed as the main instrument to achieve the reduction of EU ETS emissions to 43% in 2030 compared to 2005. Europe's flagship tool is therefore undergoing significant structural reforms to place the EU on track towards a low carbon economy.

As a first step, in order to address the challenge of a growing surplus of emission allowances that has built up in the EU ETS, the auctioning of 900 million allowances was postponed. As a second step, a market stability reserve was agreed that will both address the surplus of allowances and improve the system's resilience to major shocks by adjusting the supply of allowances to be auctioned. Finally, in July 2015 the Commission proposed a revision of the EU ETS in order to implement a reduction of EU ETS emissions to 43% in 2030 compared to 2005. This is the final step to make the EU ETS fit to play its full strength in the 2030 context.

Key policy developments also occurred in the transport sector, with new EU legislation setting binding emission targets for new car and van fleets to be met by 2021. The Heavy Duty Vehicle Strategy, adopted in May 2014 is the EU's first initiative to tackle the fuel consumption of, and CO2 emissions from, trucks, buses and coaches. In April 2015, the EU adopted a legislative instrument providing for an EU-wide monitoring, reporting and verification system for shipping as the first step in the EU strategy towards cutting emissions in this sector.

The revised F-gas Regulation applies from 1 January 2015, strengthening previously existing measures (e.g. containment of gases through the detection of leaks, installation of equipment by trained personnel, recovery of used gases) and introducing a phase-

down in the use of F-gases that will cut total EU F-gas emissions by two-thirds by 2030 compared to 2014 levels. It also prohibits the placing of F-gases on the market in certain circumstances where alternatives are available, e.g. domestic refrigerators and freezers that contain HFCs with a GWP in excess of 150.

Moreover, building up on the 2020 Climate and Energy Package, and in line with the objective of moving towards a competitive low carbon economy, the European Council reached an agreement in October 2014 on the main building blocks of the EU 2030 Climate and Energy Framework: a binding target of at least 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990; a target of at least 27% renewable energy by 2030, binding at the EU level; an indicative energy efficiency target of at least 27% for 2030, to be reviewed in 2020 having in mind a 30% target.

6. Projections

6.1. Introduction

This section describes a "without measures" or "business as usual" (BaU) scenario, a "with measures" scenario, and a "with additional measures" (WAM) scenario concerning the national projections of greenhouse gas emissions by sources and their removals by sinks for the years 2015, 2020, 2025, and 2030.

The "without measures" scenario assumes that no additional emission reduction policies and measures are implemented than the existing ones. The "with measures" scenario assumes that no additional emission reduction policies and measures are adopted than the existing ones. The "with additional measures" scenario assumes the implementation of additional policies (planned). The three scenarios are presented in the following sections.

The policies and measures included in each scenario are presented in Table 11 and the resulting impact is presented in Figure 15.

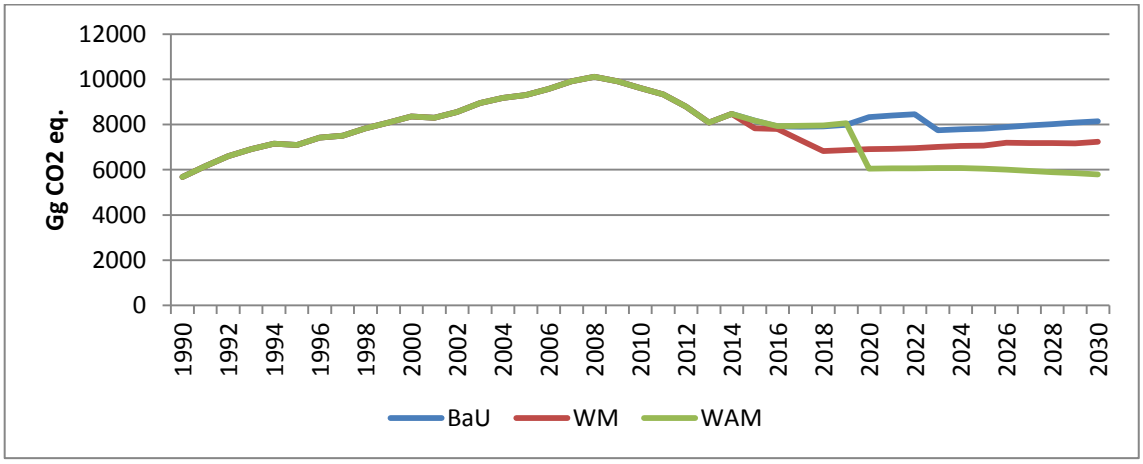

Figure 15. Total GHG emissions by scenario (Gg CO2 eq.) 1990-2030

Three important things that should be noted for these projections are the following:

(a) The change noticed during the recent years in the types of HFCs used is not taken into consideration due to the high uncertainty associated to any prediction of such changes.
(b) The emissions from the possible exploitation of natural gas in the Exclusive Economic Zone are not taken into account due to the high uncertainty associated to any prediction of such changes.
(c) All the projections for the sector of energy take into consideration the same targets for energy efficiency and renewable energy sources. The main differences between the three scenarios are energy demand, price of fuel and time at which natural gas will be available for use. These factors have an impact in the investments in renewable energy sources technologies and as a consequence the amount of energy produced by fossil fuels.

Table 11. Summary of policies and measures included in each scenario

	With measures				With Additional Measures			
	Target				Target			
	2015	2020	2025	2030	2015	2020	2025	2030
A. Energy								
A1. Natural Gas								
A2. Renewable Energy Sources								
A2.1. Renewable Energy Sources in Electricity Production	8.40%	16%			8.40%	16%		
A2.2. Renewable Energy Sources for Heating and Cooling	20%	23.50%			20%	23.50%		
A2.3. Renewable Energy Sources in Transport	3.30%	10%			3.30%	10%		
A3. Energy efficiency and savings								
A3.1. Savings from Energy Efficiency in Residential Buildings (toe)	87101	87101		37192	87101	87101		37192
A3.2. Savings from Energy Efficiency in Tertiary Buildings (toe)	8891	8891		4850	8891	8891		4850
A3.3. Savings from Efficient Bulbs (toe)	15002	10491		0	15002	10491		0
A3.4. Savings from Insulation in Residential Sector (toe)	11089	11089		10985	11089	11089		10985
A3.5. Savings in Existing Companies (toe)	13016	12424		3486	13016	12424		3486
A4. Energy savings from promotion of biomass and alternative fuels in industry	3.60%	3.80%	4%	4%	3.60%	3.80%	5.00%	10%
B. Transport								
B1. Reduction in fuel consumption for transport from the promotion of public transport	1.90%	4.40%	4.40%	4.40%	1.90%	4.40%	5.00%	10%
B2. Reduction in CO2 emissions from road transport from promotion of low CO2 vehicles	2%	5%	5%	5%	2%	5%	10%	10%
C. Agriculture								
C1. Reduction of emissions from manure management from the promotion of AD for animal waste	6%	8.50%	8.50%	8.50%	6%	8.50%	11%	13.50%
D. Waste								
D1. Reduction of emissions from controlled waste management sites from biogas recovery	10%	70%	70%	70%	10%	70%	80%	80%
D3. Reduction of emissions from wastewater treatment from the promotion of AD	6%	8.50%	8.50%	8.50%	6%	8.50%	11%	13.50%
D4. Reduction of organics to landfill		≤95 kt*	≤95 kt	≤95 kt		≤95 kt*	≤95 kt	≤95 kt
D5. Separate organics collection		12%		15%		12%		15%
E. F-gases								
E1. F-gases recovery		0%	5%	10%		0%	5%	10%

* from 2016

6.2. Without measures

The emissions for the without measures scenario have been estimated using the IPCC 2006 guidelines and projected activity data (Annex I). The resulting emissions by sector are presented in Table 12 and Figure 16. Emissions for LULUCF have not been estimated. The latest inventory year used as reference is 2013[22]. The emissions by gas are presented in Table 13. Energy projections are based on the assumptions and scenarios described in the report "Renewable Energy Roadmap for the Republic of Cyprus" prepared by IRENA (2015)[23].

Emissions based on the "with measures" scenario are projected to increase by 39% in 2030 compared to 1990 and decrease by 15% compared to 2005.

Table 12. Total GHG emissions by sector (Gg CO2 eq.) 2013-2030

	2013	2015	2020	2025	2030
1. Energy	5744	5590	5626	5003	5233
1.A.1.a. Public electricity and heat production	2839	2658	2758	2183	2456
1.A.2. Manufacturing industries and construction	470	612	564	554	545
1.A.3. Transport	1936	1875	1861	1824	1790
1.A.3.a. Domestic aviation	36	39	67	53	56
1.A.3.b. Road transportation	1898	1834	1793	1770	1733
1.A.3.d. Domestic navigation	2	1	2	2	1
1.A.4. Other sectors	499	445	442	441	441
1.A.4.a. Commercial/Institutional	90	78	77	77	76
1.A.4.b. Residential	339	305	303	301	301
1.A.4.c. Agriculture/Forestry/Fishing	70	63	62	63	63
2. Industrial processes	1157	1457	1466	1473	1481
2.A. Mineral Industry	765	1080	1081	1083	1084
2.A. of which cement production	752	1068	1068	1068	1068
2.A. of which other non cement production	13	12	13	14	15
2.D. Non-energy products from fuels and solvent use	4	4	4	4	4
2.F. Product uses as substitutes for ODS(2)	327	313	319	325	330
2.G. Other product manufacture and use	61	60	61	62	63
3. Agriculture	579	593	596	596	596
3.A. Enteric fermentation	229	233	247	247	247
3.B. Manure management	198	194	180	180	181
3.D. Agricultural soils	152	166	168	168	168
3.H. Urea application	0.8	0.4	0.4	0.4	0.4
5. Waste	494	521	520	543	585
5.A. Solid Waste Disposal	445	465	369	294	234
5.B. Biological treatment of solid waste	0.01	0.01	0.02	0.03	0.04
5.D. Wastewater treatment and discharge	49	56	151	249	350
TOTAL (excl. LULUCF)	**7974**	**8161**	**8208**	**7615**	**7894**
Change compared to 1990	**40%**	**44%**	**44%**	**34%**	**39%**
Change compared to 2005	**-14%**	**-12%**	**-12%**	**-18%**	**-15%**
Change compared to 2013		**2%**	**3%**	**-5%**	**-1%**

[22]Data was available for 2014 since during the preparation of the report NIR2016 was available internally.

[23] Taibi E., P. Journeay-Kaler, C. Taliotis, M. Howells, M. Welsch, T. Zachariadis, G. Partasides, I. Spyrides, C. Varnava, I. Zavrou, S. Papadouris and C. Rouvas. 2015. Renewable Energy Roadmap for the Republic of Cyprus. international Renewable Energy Agency

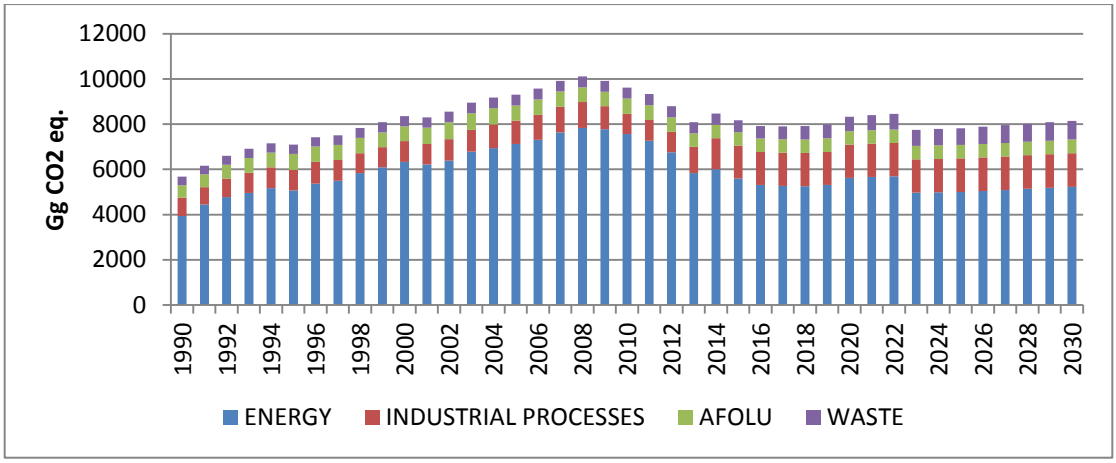

Figure 16. Without measures: Total GHG emissions by sector (Gg CO2 eq.) 1990-2030

Table 13. Without measures: Total GHG emissions by gas 2013-2020

Gg CO2 eq.	2013	2015	2020	2025	2030
CO2	6440	6600	6639	6026	6257
CH4	843	870	873	892	932
N2O	326	338	337	333	333
HFCs & SF6	327	313	319	325	330
TOTAL	**7974**	**8161**	**8208**	**7615**	**7894**

6.3. With measures

The measures included in the "With measures" scenario are listed in Table 14, along with the resulting activity data used for the calculations. Reduction in the emissions is also presented in the table.

All the emission factors and methodologies used are according to the NIR2015. The change in the emissions is presented in Table 15 and Figure 17. The difference in the total emissions between the "Without measures" and the "With measures" scenario are presented in Figure 18.

Emissions based on the "with measures" scenario are projected to increase by 27% in 2030 compared to 1990 and decrease by 22% compared to 2005. In 2030 the difference between the "with additional measures" scenario and the "without measures" scenario (BaU) is -8%.

Table 14. Measures included in the "With measures" scenario and impact on activity data and emissions

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
ENERGY																
Total electricity production (GWh)	4505	4155	4255	4365	4580	4750	4980	5105	5275	5445	5880	5927	5974	6022	6069	6116
Electricity production from RES (GWh)	389	699	719	735	755	828	922	983	1043	1104	1165	1246	1327	1407	1488	1569
Electricity production from conventional fuels (GWh)	4116	3456	3536	3630	3825	3922	4058	4122	4232	4341	4715	4681	4648	4614	4581	4547
Electricity production from conventional fuels (TJ)	30490	25601	26193	26890	28334	29919	30060	30534	31349	32156	32572	34678	34429	34180	33931	35209
Gas	0	0	13097	26890	28334	29919	30060	30534	31349	32156	32482	34678	34429	34180	33931	35199
HFO	26236	26352	13232	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	4254	4273	2146	0	0	0	0	0	0	0	0	0	0	0	0	0
Reduction in emissions (Gg CO2 eq.)	260	-26	422	851	831	1071	1105	1119	361	343	351	282	350	419	487	470
TRANSPORT																
B1. Reduction in fuel consumption for transport from the promotion of public transport	**1.9%**	**2.4%**	**2.9%**	**3.4%**	**3.9%**	**4.4%**	**4.4%**	**4.4%**	**4.4%**	**4.4%**	**4.4%**	**4.4%**	**4.4%**	**4.4%**	**4.4%**	**4.4%**
Reduction in consumption from B1 (TJ)	474	598	719	837	955	1072	1070	1070	1068	1063	1058	1054	1049	1045	1041	1036
Fuel consumption (TJ)	24482	24301	24060	23779	23532	23301	23251	23243	23198	23101	22998	22893	22789	22696	22607	22518
Gasoline	14717	14550	14305	14022	13800	13606	13544	13531	13478	13386	13294	13205	13123	13052	12988	12928
Diesel	9473	9461	9465	9465	9439	9402	9413	9418	9426	9418	9405	9387	9364	9341	9315	9284
Biofuels	292	291	291	292	293	293	294	294	295	297	298	300	302	304	305	306
Reduction in CO2 emissions from B1 (Gg)	0.0	0.0	8.4	17.4	26.4	35.4	35.3	35.2	35.1	34.9	34.7	34.5	34.4	34.2	34.0	33.9
B2. Reduction in CO2 emissions from road transport from promotion of low CO2 vehicles	**2%**	**2.6%**	**3.2%**	**3.8%**	**4.4%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**
Reduction in CO2 emissions from B2 (Gg)	35.5	46.1	56.5	66.6	76.8	86.8	86.7	86.6	86.5	86.1	85.7	85.4	85.0	84.6	84.3	84.0
AGRICULTURE																
C1. Reduction of emissions from manure management from the promotion of AD for animal waste	**6.0%**	**6.5%**	**7.0%**	**7.5%**	**8.0%**	**8.5%**	**8.5%**	**8.5%**	**8.5%**	**8.5%**	**8.5%**	**8.5%**	**8.5%**	**8.5%**	**8.5%**	**8.5%**
Reduction in emissions from C1 (Gg CO2 eq.)	11.6	12.4	13.2	13.9	14.7	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
WASTE																
D1. Reduction of emissions from controlled waste management sites from biogas recovery	**10%**	**22%**	**34%**	**46%**	**58%**	**70%**	**70%**	**70%**	**70%**	**70%**	**70%**	**70%**	**70%**	**70%**	**70%**	**70%**
Reduction in emissions from D1 (Gg CO2 eq.)	26	59	93	128	166	205	210	215	220	226	231	237	243	249	255	262
D2. Reduction of emissions from wastewater treatment from the promotion of AD for sewage sludge	**6.0%**	**6.0%**	**6.5%**	**7.0%**	**7.5%**	**8.0%**	**8.5%**	**8.5%**	**8.5%**	**8.5%**	**8.5%**	**8.5%**	**8.5%**	**8.5%**	**8.5%**	**8.5%**
Reduction in emissions from D2 (Gg CO2 eq.)	8.00	8.80	9.67	10.43	10.90	11.63	11.70	11.78	11.74	11.68	11.52	10.99	10.56	10.51	9.12	8.36
Domestic (Gg CO2 eq.)	7.93	8.72	9.58	10.34	10.80	11.53	11.59	11.67	11.64	11.58	11.41	10.89	10.35	10.30	8.88	8.11
Industrial (Gg CO2 eq.)	0.07	0.08	0.09	0.09	0.10	0.11	0.10	0.10	0.10	0.11	0.11	0.10	0.21	0.20	0.24	0.24
D3. Reduction of organics to landfill to ≤95 kt by 2020																
BAA kt	293	243	194	144	95	95	95	95	95	95	95	95	95	95	95	95
Gg waste to disposal sites																
paper, paper pulp and products	94.4	78.5	62.5	46.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
food waste	170.6	141.8	113.0	84.2	55.4	55.4	55.4	55.4	55.4	55.4	55.4	55.4	55.4	55.4	55.4	55.4
non-food /garden	27.6	23.0	18.3	13.6	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Reduction in emissions from D3 (Gg CO2 eq.)	0.0	0.0	1.2	6.0	13.8	24.1	36.8	48.1	58.0	66.6	73.9	79.9	84.8	88.4	90.9	92.3
D4. Separate organics collection	**0%**	**3%**	**5%**	**8%**	**10%**	**12%**	**15%**	**15%**	**15%**	**15%**	**15%**	**15%**	**15%**	**15%**	**15%**	**15%**
BAA separately collected (Gg)	0	9	14	22	26	30	37	35	34	32	31	29	28	26	24	23
remaining BAA (Gg)	293	276	264	249	236	223	208	200	192	184	175	166	157	148	138	128
Gg waste to disposal sites																
paper, paper pulp and products	94.4	89.1	85.3	80.3	76.2	72.0	67.1	64.6	62.0	59.3	56.5	53.7	50.7	47.7	44.6	41.4
food waste	170.6	161.0	154.1	145.2	137.7	130.1	121.3	116.8	112.1	107.2	102.2	97.0	91.7	86.2	80.6	74.8
non-food /garden	27.6	26.1	24.9	23.5	22.3	21.1	19.6	18.9	18.1	17.4	16.5	15.7	14.8	14.0	13.1	12.1
Reduction in emissions from D4 (Gg CO2 eq.)	0.0	0.0	0.0	0.0	1.1	2.8	4.7	7.2	9.5	11.5	13.3	14.9	16.3	17.6	18.7	19.5
2F Product Uses as Substitutes for Ozone Depleting Substances																
E1. F-gases recovery	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**1%**	**2%**	**3%**	**4%**	**5%**	**6%**	**7%**	**8%**	**9%**	**10%**
Reduction in emissions from E1 (Gg CO2 eq.)	0	0	0	0	0	0	3.3	6.6	9.9	13.2	16.6	20.0	23.4	26.8	30.2	33.7

Table 15. Changes in the projected emissions from the implementation of the "With measures" scenario

	2013	2015	2020	2025	2030
1. Energy	**5744**	**5304**	**4433**	**4531**	**4644**
1.A.1.a. Public electricity and heat production	2839	2398	1688	1832	1986
1.A.2. Manufacturing industries and construction	470	612	564	554	545
1.A.3. Transport	1936	1849	1739	1704	1672
1.A.3.a. Domestic aviation	36	39	67	53	56
1.A.3.b. Road transportation	1898	1809	1670	1649	1615
1.A.3.d. Domestic navigation	2	1	2	2	1
1.A.4. Other sectors	499	445	442	441	441
1.A.4.a. Commercial/Institutional	90	78	77	77	76
1.A.4.b. Residential	339	305	303	301	301
1.A.4.c. Agriculture/Forestry/Fishing	70	63	62	63	63
2. Industrial processes	**1157**	**1464**	**1473**	**1464**	**1454**
2.A. Mineral Industry	765	1080	1081	1083	1084
2.A. of which cement production	752	1068	1068	1068	1068
2.A. of which other non-cement production	13	12	13	14	15
2.D. Non-energy products from fuels and solvent use	4	4	4	4	4
2.F. Product uses as substitutes for ODS(2)	327	320	326	315	304
2.G. Other product manufacture and use	61	60	61	62	63
3. Agriculture	**579**	**581**	**580**	**580**	**581**
3.A. Enteric fermentation	229	233	247	247	247
3.B. Manure management	198	182	165	165	165
3.D. Agricultural soils	152	166	168	168	168
3.H. Urea application	0.8	0.4	0.4	0.4	0.4
5. Waste	**494**	**487**	**422**	**499**	**554**
5.A. Solid Waste Disposal	445	439	283	261	212
5.B. Biological treatment of solid waste	0.01	0.01	0.02	0.03	0.04
5.D. Wastewater treatment and discharge	49	48	139	237	342
TOTAL (excl. LULUCF)	**7974**	**7836**	**6908**	**7074**	**7233**
Change compared to 1990	**40%**	**38%**	**22%**	**24%**	**27%**
Change compared to 2005	**-14%**	**-16%**	**-26%**	**-24%**	**-22%**
Change compared to 2013		**-2%**	**-13%**	**-11%**	**-9%**
Change compared to BaU projections		**-4%**	**-16%**	**-7%**	**-8%**

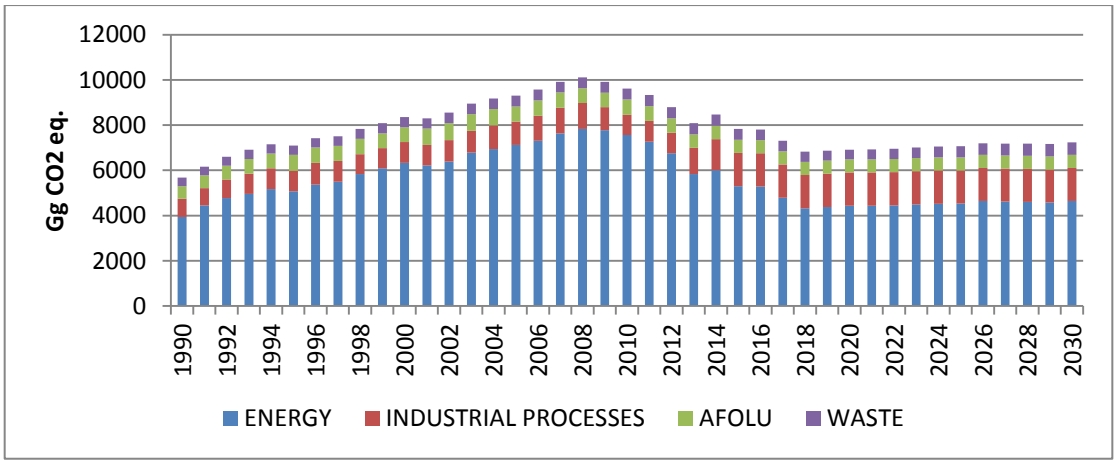

Figure 17. With measures: Total GHG emissions by sector (Gg CO2 eq.) 1990-2030

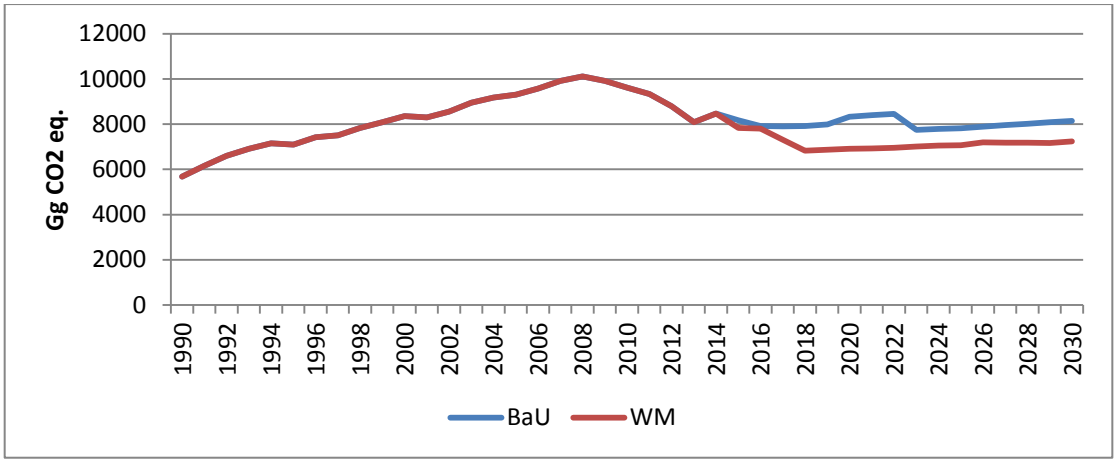

Figure 18. With measures: Total GHG emissions compared to BaU (Gg CO2 eq.) 1990-2030

Table 16. With measures: Total GHG emissions by gas 2013-2020

Gg CO2 eq.	2013	2015	2020	2025	2030
CO2	6440	6271	5405	5505	5620
CH4	843	831	768	841	894
N2O	326	377	374	375	376
HFCs & SF6	327	320	326	315	304
TOTAL	**7974**	**7836**	**6908**	**7074**	**7233**

6.3.1. Sensitivity Analysis

Sensitivity analysis was carried out using the change in the total at 1% change of each measure. The results of the calculations for the "With measures" scenario are presented in Table 17.

Table 17. Change in total of "With Measures" scenario at 1% change of each measure

	2015	2020	2025	2030
1. Energy	0.975%	0.912%	0.868%	0.855%
B1. Reduction in fuel consumption for transport from the promotion of public transport	0.011%	0.020%	0.023%	0.022%
B2. Reduction in CO2 emissions from road transport from promotion of low CO2 vehicles	0%	0.008%	0.010%	0.009%
C1. Reduction of emissions from manure management from the promotion of AD for animal waste	0.004%	0.004%	0.004%	0.004%
D1. Reduction of emissions from controlled waste management sites from biogas recovery	0.008%	0.047%	0.063%	0.069%
D2. Reduction of emissions from wastewater treatment from the promotion of AD for sewage sludge	0.002%	0.003%	0.003%	0.002%
D3. Reduction of organics to landfill to ≤95 kt by 2020	0%	0.006%	0.020%	0.024%
D4. Separate organics collection	0%	0.001%	0.004%	0.005%
E1. F-gases recovery	0%	0%	0.005%	0.009%

6.4. With additional measures

The measures included in the “With additional measures” scenario are listed in Table 18, along with the resulting activity data used for the calculations. Reduction in the emissions is also presented in the table.

All the emission factors and methodologies used are according to the NIR2015. The change in the emissions is presented in Table 19 and Figure 19. The difference in the total emissions between the “Without measures” and the “With additional measures” scenario are presented in Figure 20.

Emissions based on the “with additional measures” scenario are projected to increase by 2% in 2030 compared to 1990 and decrease by 38% compared to 2005. In 2030 the difference between the “with additional measures” scenario and the “without measures” scenario (BaU) is -27%.

Table 18. Measures included in the "With additional measures" scenario and impact on activity data and emissions

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
ENERGY																
Total electricity production (GWh)	4252	4155	4255	4365	4580	4855	4855	4958	5061	5165	5566	5669	5772	5876	5979	6082
Electricity production from RES (GWh)	507	699	719	735	755	776	776	1036	1296	1555	905	1165	1425	1684	1944	2204
Electricity production from conventional fuels (GWh)	3745	3456	3536	3630	3825	4079	4195	4312	4428	4545	4661	4504	4348	4191	4035	3878
Electricity production from conventional fuels (TJ)	34827	32139	32883	33758	35571	37933	39016	40098	41181	42263	43345	41889	40433	38977	37520	36064
Gas	0	0	0	0	14681	15101	15521	15940	16360	16780	16216	15653	15090	14526	13963	15090
HFO	29968	28295	29048	30608	0	0	0	0	0	0	0	0	0	0	0	0
Diesel	4859	4588	4710	4963	4	0	0	0	0	0	0	0	0	0	0	0
Reduction in emissions (Gg CO2 eq.)	-81	-145	-216	-287	-368	1930	1949	1966	1230	1234	1237	1324	1410	1496	1582	1669
TRANSPORT																
B1. Reduction in fuel consumption for transport from the promotion of public transport	**1.9%**	**2.4%**	**2.9%**	**3.4%**	**3.9%**	**4.4%**	**4.52%**	**4.64%**	**4.76%**	**4.88%**	**5.0%**	**6.0%**	**7.0%**	**8.0%**	**9.0%**	**10.0%**
Reduction in consumption from B1 (TJ)	474	598	719	837	955	1072	1099	1128	1155	1179	1203	1437	1669	1899	2128	2355
Fuel consumption (TJ)	24956	24899	24779	24616	24487	24374	24321	24312	24266	24165	24056	23946	23838	23741	23648	23555
Gasoline	15003	14907	14732	14516	14361	14232	14167	14154	14098	14002	13906	13813	13727	13652	13586	13523
Diesel	9656	9693	9747	9798	9822	9835	9847	9851	9859	9852	9838	9819	9795	9771	9743	9711
Biofuels	298	298	300	302	305	307	308	308	309	310	312	314	316	318	319	320
Reduction in CO2 emissions from B1 (Gg)	0.0	0.0	8.4	17.4	26.4	35.4	37.5	39.6	41.7	43.7	45.6	63.4	81.1	98.7	116.1	133.4
B2. Reduction in CO2 emissions from road transport from promotion of low CO2 vehicles	**2%**	**2.6%**	**3.2%**	**3.8%**	**4.4%**	**5.0%**	**6.0%**	**7.0%**	**8.0%**	**9.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**
Reduction in CO2 emissions from B2 (Gg)	36	46	56	67	77	87	104	121	138	155	171	171	170	169	169	168
AGRICULTURE																
C1. Reduction of emissions from manure management from the promotion of AD for animal waste	**6.0%**	**6.5%**	**7.0%**	**7.5%**	**8.0%**	**8.5%**	**9.0%**	**9.5%**	**10.0%**	**10.5%**	**11.0%**	**11.5%**	**12.0%**	**12.5%**	**13.0%**	**13.5%**
Reduction in emissions from C1 (Gg CO2 eq.)	11.6	12.4	13.2	13.9	14.7	15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.7	22.6	23.5	24.4

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
WASTE																
D1. Reduction of emissions from controlled waste management sites from biogas recovery	**10%**	**22%**	**34%**	**46%**	**58%**	**70%**	**70%**	**70%**	**70%**	**70%**	**80%**	**80%**	**80%**	**80%**	**80%**	**80%**
Reduction in emissions from D1 (Gg CO2 eq.)	26	59	93	128	166	205	210	215	220	226	265	271	278	285	292	300
D2. Reduction of emissions from wastewater treatment from the promotion of AD for sewage sludge	**6.0%**	**6.5%**	**7.0%**	**7.5%**	**8.0%**	**8.5%**	**9.0%**	**9.5%**	**10.0%**	**10.5%**	**11.0%**	**11.5%**	**12.0%**	**12.5%**	**13.0%**	**13.5%**
Reduction in emissions from D2 (Gg CO2 eq.)	7.9	8.7	9.6	10.3	10.8	11.5	12.3	13.0	13.7	14.3	14.8	14.7	14.6	15.1	13.6	12.9
Domestic (Gg CO2 eq.)	7.9	8.6	9.5	10.2	10.7	11.4	12.2	12.9	13.6	14.2	14.6	14.6	14.3	14.9	13.2	12.5
Industrial (Gg CO2 eq.)	0.07	0.08	0.09	0.09	0.10	0.11	0.11	0.12	0.12	0.13	0.14	0.14	0.29	0.30	0.36	0.38
D3. Reduction of organics to landfill to ≤95 kt by 2016																
BAA kt	216	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
Gg waste to disposal sites																
paper, paper pulp and products	70	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
food waste	126	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55
non-food /garden	20	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Reduction in emissions from D3 (Gg CO2 eq.)	0	5	20	34	47	60	71	80	89	96	102	106	110	112	114	114
D4. Separate organics collection	**0%**	**3%**	**5%**	**8%**	**10%**	**12%**	**15%**	**15%**	**15%**	**15%**	**15%**	**15%**	**15%**	**15%**	**15%**	**15%**
BAA separately collected (Gg)	293	285	278	271	262	254	245	236	226	216	206	196	185	174	163	151
remaining BAA (Gg)	0	9	14	22	26	30	37	35	34	32	31	29	28	26	24	23
Gg waste to disposal sites	293	276	264	249	236	223	208	200	192	184	175	166	157	148	138	128
paper, paper pulp and products																
food waste	94	89	85	80	76	72	67	65	62	59	57	54	51	48	45	41
non-food /garden	171	161	154	145	138	130	121	117	112	107	102	97	92	86	81	75
Reduction in emissions from D4 (Gg CO2 eq.)	0.0	0.0	0.0	0.0	1.1	2.8	4.7	7.2	9.5	11.5	13.3	14.9	16.3	17.6	18.7	19.5
2F Product Uses as Substitutes for Ozone Depleting Substances																
E1. F-gases recovery	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**1%**	**2%**	**3%**	**4%**	**5%**	**6%**	**7%**	**8%**	**9%**	**10%**
Reduction in emissions from E1 (Gg CO2 eq.)	0	0	0	0	0	0	3.3	6.6	9.9	13.2	16.6	20.0	23.4	26.8	30.2	33.7

Table 19. Changes in the projected emissions from the implementation of the "With measures" scenario

	2013	2015	2020	2025	2030
1. Energy	**5744**	**5645**	**3573**	**3549**	**3262**
1.A.1.a. Public electricity and heat production	2839	2739	828	946	787
1.A.2. Manufacturing industries and construction	470	612	564	554	545
1.A.3. Transport	1936	1849	1739	1607	1489
1.A.3.a. Domestic aviation	36	39	67	53	56
1.A.3.b. Road transportation	1898	1809	1670	1552	1432
1.A.3.d. Domestic navigation	2	1	2	2	1
1.A.4. Other sectors	499	445	442	441	441
1.A.4.a. Commercial/Institutional	90	78	77	77	76
1.A.4.b. Residential	339	305	303	301	301
1.A.4.c. Agriculture/Forestry/Fishing	70	63	62	63	63
2. Industrial processes	**1157**	**1464**	**1473**	**1464**	**1454**
2.A. Mineral Industry	765	1080	1081	1083	1084
2.A. of which cement production	752	1068	1068	1068	1068
2.A. of which other non-cement production	13	12	13	14	15
2.D. Non-energy products from fuels and solvent use	4	4	4	4	4
2.F. Product uses as substitutes for ODS(2)	327	320	326	315	304
2.G. Other product manufacture and use	61	60	61	62	63
3. Agriculture	**579**	**581**	**580**	**576**	**572**
3.A. Enteric fermentation	229	233	247	247	247
3.B. Manure management	198	182	165	161	156
3.D. Agricultural soils	152	166	168	168	168
3.H. Urea application	0.8	0.4	0.4	0.4	0.4
5. Waste	**494**	**487**	**421**	**461**	**511**
5.A. Solid Waste Disposal	445	439	281	227	174
5.B. Biological treatment of solid waste	0.01	0.01	0.02	0.03	0.04
5.D. Wastewater treatment and discharge	49	48	139	234	337
TOTAL (excl. LULUCF)	**7974**	**8177**	**6047**	**6049**	**5800**
Change compared to 1990	**40%**	**44%**	**6%**	**6%**	**2%**
Change compared to 2005	**-14%**	**-12%**	**-35%**	**-35%**	**-38%**
Change compared to 2013		**3%**	**-24%**	**-24%**	**-27%**
Change compared to BaU projections		**0%**	**-26%**	**-21%**	**-27%**
Change compared to WM projections		**4%**	**-12%**	**-14%**	**-20%**

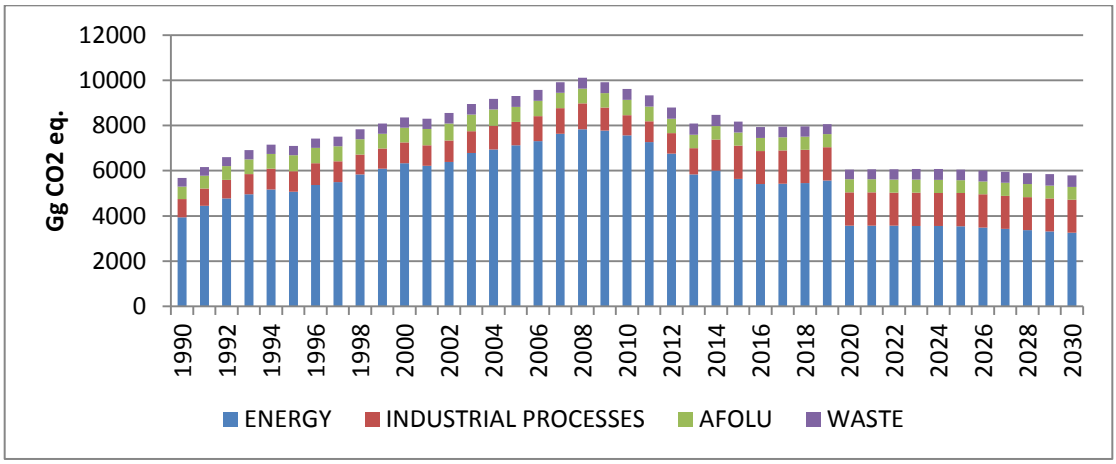

Figure 19. With additional measures: Total GHG emissions by sector (Gg CO2 eq.) 1990-2030

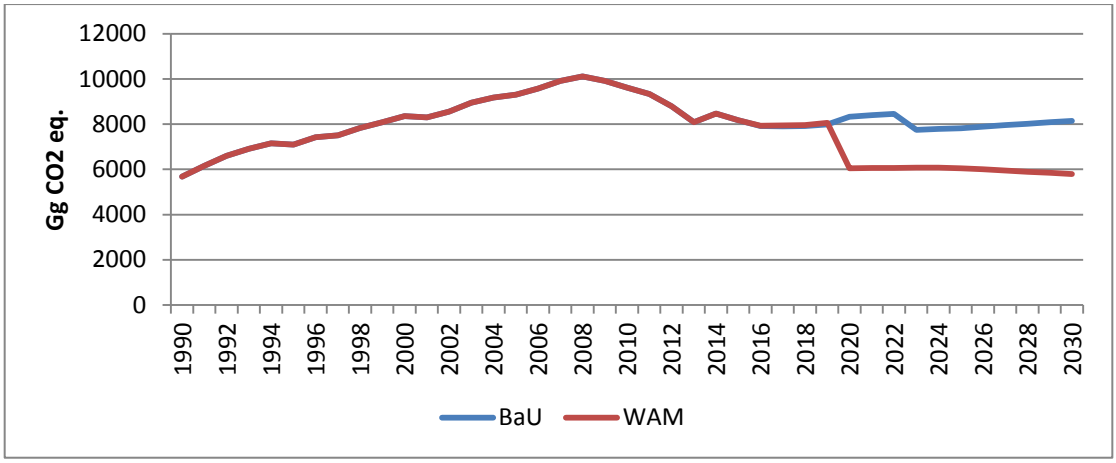

Figure 20. With additional measures: Total GHG emissions compared to BaU (Gg CO2 eq.) 1990-2030

Table 20. With additional measures: Total GHG emissions by gas 2013-2020

Gg CO2 eq.	2013	2015	2020	2025	2030
CO2	6440	6611	4551	4528	4251
CH4	843	831	764	799	842
N2O	326	378	371	371	365
HFCs & SF6	327	320	326	315	304
TOTAL	**7974**	**8177**	**6047**	**6049**	**5800**

6.3.1. Sensitivity Analysis

Sensitivity analysis was carried out using the change in the total at 1% change of each measure. The results of the calculations for the "With measures" scenario are presented in Table 21.

Table 21. Change in total of "With Additional Measures" scenario at 1% change of each measure

	2015	2020	2025	2030
1. Energy	0.972%	0.920%	0.862%	0.847%
B1. Reduction in fuel consumption for transport from the promotion of public transport	0%	0.007%	0.010%	0.025%
B2. Reduction in CO2 emissions from road transport from promotion of low CO2 vehicles	0.012%	0.017%	0.036%	0.032%
C1. Reduction of emissions from manure management from the promotion of AD for animal waste	0.004%	0.003%	0.004%	0.005%
D1. Reduction of emissions from controlled waste management sites from biogas recovery	0.009%	0.039%	0.056%	0.057%
D2. Reduction of emissions from wastewater treatment from the promotion of AD for sewage sludge	0.003%	0.002%	0.003%	0.002%
D3. Reduction of organics to landfill to ≤95 kt by 2020	0%	0.011%	0.022%	0.022%
D4. Separate organics collection	0%	0.001%	0.003%	0.004%
E1. F-gases recovery	0%	0%	0.004%	0.006%

7. Provision of public financial support, technological and capacity-building support to developing country parties

Climate finance plays a key role as a means to reaching the agreed goal of limiting the global average temperature increase to below 2 °C above pre-industrial levels, achieving transformational change to low GHG emission economies and supporting climate resilient sustainable development. The EU and its Member States are the largest providers of Official Development Assistance (ODA) to developing countries, accounting for €58.2 billion in 2014 and allocated €7.34 billion to fast start finance over 2010-2012. Cyprus contributed €1.2 million to fast start finance during the period 2010-2012.

Furthermore, in 2014, the EU collectively committed €14.5 billion to help developing countries tackling climate change. The total support provided by the EU to developing country Parties to the UNFCCC in 2013 and 2014 amounted to USD 2 178 million (€ 1 641 million). Cyprus did not provide any financial support to developing countries in 2013 and 2014.

Annex I: "Without measures" scenario - activity data

	2015	2016	2017	2018	2019	2020
GDP-Nominal (€mn)	17415	17795	18302	18961	19688	20390
GDP - Real (€mn)	15145	15368	15677	16026	16368	16668
Population	847008	850773	854393.7	857815	860977.4	863891.5
Energy						
Total electricity production (GWh)	4252	4155	4255	4365	4580	5509
Electricity production from RES (GWh)	507	699	719	735	755	895
Electricity production from conventional fuels (TJ)	29087	26075	25937	25907	26580	12405
Gas	4716	4228	4206	4201	4310	23901
HFO	0	0	0	0	0	0
Diesel	0	0	0	0	0	0
Energy demand (TJ)	53875	55371	56343	58162	59842	60398
Air transport - domestic	540	625	689	796	893	929
Jet kerosene (total domestic & international)	10618	12290	13550	15671	17571	18287
road transport	9656	9693	9747	9798	9822	9834
Gasoline	15003	14907	14732	14516	14361	14232
Diesel	9656	9693	9747	9798	9822	9835
Biofuels	298	298	300	302	305	307
cement industry	6335	6241	6083	5942	5852	5812
Gas oil	43	43	43	43	43	43
RFO	243	245	249	253	256	257
Liquefied Petroleum Gas	47	47	47	47	47	47
Other solid fuels	96	94	91	88	86	85
Biomass	278	281	288	294	299	301
Pet-coke	5236	5133	4960	4802	4700	4655
Industrial waste (non-renewable)	392	397	406	415	421	424
other industries	1666	1670	1673	1677	1681	1682
Gas oil	563	565	567	570	573	576
RFO	696	700	702	704	705	704
Liquefied Petroleum Gas	234	232	232	231	231	231
Other kerosene	87	86	86	86	86	86
Solid biofuels	86	86	86	86	86	86
households	4573	4559	4554	4555	4553	4547
Gas oil	2439	2427	2420	2418	2415	2410
Liquefied Petroleum Gas	1463	1461	1462	1465	1465	1464
Biomass	278	278	278	279	279	279
Other kerosene	393	393	393	394	394	394
services	1322	1320	1318	1319	1320	1319
Gas oil	558	556	555	555	555	555
Light Fuel Oil	3124	3121	3117	3114	3112	3110
Liquefied Petroleum Gas	520	518	517	517	517	516
Biomass	204	205	205	206	207	207
agriculture	1320	1313	1310	1308	1307	1307
Gas oil	809.0197	802.3067	799.3151	798.3862	797.7153	796.9341
Liquefied Petroleum Gas	47.32756	47.32905	47.38174	47.46999	47.53513	47.56345
Biomass	463.693	463.5428	463.1797	462.6411	462.2307	462.0369
Industry						
Cement production (t)	2000000	2000000	2000000	2000000	2000000	2000000
Ceramics production (t)	100000	140000	250000	450000	520000	561600
Lime production (t)	3181	3502	3824	4145	4466	4787
Lubricant use (t)	7	7	7	7	7	7
Agriculture						
Dairy cattle	0%	1%	2%	3%	4%	5%
Other cattle	0%	1%	2%	3%	4%	5%
Sheep	0%	2%	4%	6%	8%	10%
Goats	0%	2%	4%	6%	8%	10%

	2015	2016	2017	2018	2019	2020
Horses	0%	0%	0%	0%	0%	0%
Mules & Asses	0%	0%	0%	0%	0%	0%
Swine	0%	-2%	-4%	-6%	-8%	-10%
Poultry	0%	-1%	-3%	-4%	-6%	-10%
Daily milk production (kg)	17.18	17.18	17.18	17.18	17.18	17.18
% cows pregnant	72.24	72.24	72.24	72.24	72.24	72.24
Total Fertilisers N (t)	0%	0%	0%	0%	0%	0%
Agricultural production	0%	0%	0%	0%	0%	0%
Wheat	0%	0%	0%	0%	0%	0%
Barley	0%	0%	0%	0%	0%	0%
Oats	0%	0%	0%	0%	0%	0%
Beans & pulses (legumes)	0%	0%	0%	0%	0%	0%
Potatoes (tubers)	0%	0%	0%	0%	0%	0%
Cultivated area	0%	0%	0%	0%	0%	0%
Wheat	0%	0%	0%	0%	0%	0%
Barley	0%	0%	0%	0%	0%	0%
Oats	0%	0%	0%	0%	0%	0%
Beans & pulses (legumes)	0%	0%	0%	0%	0%	0%
Potatoes (tubers)	0%	0%	0%	0%	0%	0%
Manure management - anaerobic digestion						
dairy cattle	8%	10%	13%	15%	18%	20%
other cattle	8%	10%	13%	15%	18%	20%
market swine	63%	57%	50%	43%	37%	30%
breeding swine	63%	57%	50%	43%	37%	30%
poultry	12%	13%	15%	17%	18%	20%
sheep	0%	0%	1%	1%	1%	1%
goats	0%	0%	1%	1%	1%	1%
horses	0%	0%	1%	1%	1%	1%
mules & asses	0%	0%	1%	1%	1%	1%
Urea applied to soil	555	555	555	555	555	555
Waste						
MSW production (kt)	546.28	553.3	563.79	573.07	581.43	589.52
MSW production per capita (kg/cap)	625.75	630.92	640.1	647.95	654.87	661.65
Waste to disposal sites (%)	64.0%	61.5%	59.0%	56.4%	53.9%	51.4%
MSW production to disposal sites per capita (kg/cap)	400	388	377	366	353	340
Waste to managed (%)	32.2%	32.2%	59.3%	97.0%	97.0%	97.0%
Waste to unmanaged (%)	67.8%	67.8%	40.7%	3.0%	3.0%	3.0%
Composition of waste to disposal site						
paper, paper pulp and products	27.0%	27.0%	27.0%	27.0%	27.0%	27.0%
textiles & fabrics	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%
wood	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%
food waste	48.8%	48.8%	48.8%	48.8%	48.8%	48.8%
non-food /garden	7.9%	7.9%	7.9%	7.9%	7.9%	7.9%
other	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%
Waste composted (kt)	59.00	66.40	74.42	82.52	90.70	99.04
Protein, kg/person/yr	28.81	28.81	28.81	28.81	28.81	28.81
well operated centralised, aerobic treatment	83%	89%	89%	89%	89%	89%
Industrial production						
alcohol	654	654	654	654	654	654
beer	32895	32895	32895	32895	32895	32895
soft drinks	25981	25981	25981	25981	25981	25981
dairy products	100890	100890	100890	100890	100890	100890
meat & poultry	83554	83554	83554	83554	83554	83554
refinery	0	0	0	0	0	0
soaps & detergents	6487	6487	6487	6487	6487	6487
vegetable oils	12161	12161	12161	12161	12161	12161
vegetables, fruits & juices	54512	54512	54512	54512	54512	54512
wine	11531	11531	11531	11531	11531	11531

	2021	2022	2023	2024	2025	2026
GDP-Nominal (€mn)	21308	22266	23268	24315	25410	26553
GDP - Real (€mn)	17084	17511	17949	18398	18858	19329
Population	866694	869564	872461	875376	878281	881212
Energy						
Total electricity production (GWh)	5677	5844	6012	6179	6347	6481
Electricity production from RES (GWh)	895	895	895	895	895	895
Electricity production from conventional fuels (TJ)	12595	12778	0	0	0	0
Gas	24268	24620	0	0	0	0
HFO	0	0	0	0	0	0
Diesel	0	0	0	0	0	0
Energy demand (TJ)	59782	58236	57142	56431	56089	55999
Air transport - domestic	902	825	773	744	734	736
Jet kerosene (total domestic & international)	17748	16231	15217	14642	14434	14478
road transport	9846	9851	9859	9851	9838	9819
Gasoline	14167	14154	14098	14002	13906	13813
Diesel	9847	9851	9859	9852	9838	9819
Biofuels	308	308	309	310	312	314
cement industry	5799	5788	5765	5732	5704	5679
Gas oil	43	43	43	43	43	43
RFO	257	257	257	258	259	259
Liquefied Petroleum Gas	47	47	47	47	47	47
Other solid fuels	85	85	84	84	83	83
Biomass	301	301	301	302	304	305
Pet-coke	4642	4632	4607	4571	4540	4513
Industrial waste (non-renewable)	424	424	425	426	428	430
other industries	1682	1680	1678	1677	1677	1677
Gas oil	577	578	578	579	581	582
RFO	702	700	697	694	692	690
Liquefied Petroleum Gas	231	231	231	231	232	232
Other kerosene	86	86	86	86	86	86
Solid biofuels	86	86	86	86	86	86
households	4538	4532	4526	4525	4526	4527
Gas oil	2404	2400	2395	2394	2395	2395
Liquefied Petroleum Gas	1462	1461	1459	1459	1459	1459
Biomass	279	279	279	280	280	280
Other kerosene	393	393	392	392	392	392
services	1318	1315	1314	1313	1312	1312
Gas oil	554	553	552	552	551	551
Light Fuel Oil	3108	3106	3104	3102	3101	3099
Liquefied Petroleum Gas	516	515	514	513	513	513
Biomass	208	207	207	208	208	208
agriculture	1308	1311	1313	1316	1319	1321
Gas oil	798.908	801.752	803.445	806.224	808.977	810.586
Liquefied Petroleum Gas	47.6018	47.641	47.6713	47.7024	47.731	47.7539
Biomass	461.873	461.764	461.724	461.768	461.912	462.172
Industry						
Cement production (t)	2000000	2000000	2000000	2000000	2000000	2000000
Ceramics production (t)	606528	655050	707454	764051	825175	891189
Lime production (t)	5109	5430	5751	6072	6394	6715
Lubricant use (t)	7	7	7	7	7	7
Agriculture						
Dairy cattle	5%	5%	5%	5%	5%	5%
Other cattle	5%	5%	5%	5%	5%	5%
Sheep	10%	10%	10%	10%	10%	10%
Goats	10%	10%	10%	10%	10%	10%
Horses	0%	0%	0%	0%	0%	0%
Mules & Asses	0%	0%	0%	0%	0%	0%
Swine	-10%	-10%	-10%	-10%	-10%	-10%
Poultry	-10%	-10%	-10%	-10%	-10%	-10%
Daily milk production (kg)	17.18	17.18	17.18	17.18	17.18	17.18
% cows pregnant	72.24	72.24	72.24	72.24	72.24	72.24

	2021	2022	2023	2024	2025	2026
Total Fertilisers N (t)	0%	0%	0%	0%	0%	0%
Agricultural production	0%	0%	0%	0%	0%	0%
Wheat	0%	0%	0%	0%	0%	0%
Barley	0%	0%	0%	0%	0%	0%
Oats	0%	0%	0%	0%	0%	0%
Beans & pulses (legumes)	0%	0%	0%	0%	0%	0%
Potatoes (tubers)	0%	0%	0%	0%	0%	0%
Cultivated area	0%	0%	0%	0%	0%	0%
Wheat	0%	0%	0%	0%	0%	0%
Barley	0%	0%	0%	0%	0%	0%
Oats	0%	0%	0%	0%	0%	0%
Beans & pulses (legumes)	0%	0%	0%	0%	0%	0%
Potatoes (tubers)	0%	0%	0%	0%	0%	0%
Manure management - anaerobic digestion						
dairy cattle	21%	21%	22%	22%	23%	23%
other cattle	21%	21%	22%	22%	23%	23%
market swine	32%	34%	36%	38%	40%	42%
breeding swine	32%	34%	36%	38%	40%	42%
poultry	21%	22%	23%	24%	25%	26%
sheep	1%	1%	1%	1%	2%	2%
goats	1%	1%	1%	1%	2%	2%
horses	1%	1%	1%	1%	2%	2%
mules & asses	1%	1%	1%	1%	2%	2%
Urea applied to soil	555	555	555	555	555	555
Waste						
MSW production (kt)	598.37	607.2	616.31	625.52	634.91	644.69
MSW production per capita (kg/cap)	669.41	677.09	684.95	692.88	700.95	709.38
Waste to disposal sites (%)	48.9%	46.4%	43.8%	41.3%	38.8%	36.3%
MSW production to disposal sites per capita (kg/cap)	327	314	300	286	272	257
Waste to managed (%)	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%
Waste to unmanaged (%)	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Composition of waste to disposal site						
paper, paper pulp and products	27.0%	27.0%	27.0%	27.0%	27.0%	27.0%
textiles & fabrics	11.0%	11.0%	11.0%	11.0%	11.0%	11.0%
wood	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%
food waste	48.8%	48.8%	48.8%	48.8%	48.8%	48.8%
non-food /garden	7.9%	7.9%	7.9%	7.9%	7.9%	7.9%
other	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%
Waste composted (kt)	107.71	116.58	125.73	135.11	144.76	154.73
Industrial production						
alcohol	654	654	654	654	654	654
beer	32895	32895	32895	32895	32895	32895
soft drinks	25981	25981	25981	25981	25981	25981
dairy products	100890	100890	100890	100890	100890	100890
meat & poultry	83554	83554	83554	83554	83554	83554
refinery	0	0	0	0	0	0
soaps & detergents	6487	6487	6487	6487	6487	6487
vegetable oils	12161	12161	12161	12161	12161	12161
vegetables, fruits & juices	54512	54512	54512	54512	54512	54512
wine	11531	11531	11531	11531	11531	11531

	2027	2028	2029	2030		
GDP-Nominal (€mn)	27748	28997	30302	31665		
GDP - Real (€mn)	19813	20308	20816	21336		
Population	884152	887102	890089	893160		
Energy						
Total electricity production (GWh)	6616	6750	6885	7019		
Electricity production from RES (GWh)	895	895	895	895		
Electricity production from conventional fuels (TJ)	0	0	0	0		
Gas	0	0	0	0		
HFO	0	0	0	0		
Diesel	0	0	0	0		
Energy demand (TJ)	56061	56114	56178	56257		
Air transport - domestic	746	754	763	773		
Jet kerosene (total domestic & international)	14672	14844.1	15021.6	15212.9		
road transport	9795	9770	9743	9711		
Gasoline	13727	13652	13586	13523		
Diesel	9795	9771	9743	9711		
Biofuels	316	318	319	320		
cement industry	5657	5638.02	5621	5605.87		
Gas oil	43	43	43	43		
RFO	260	260	261	261		
Liquefied Petroleum Gas	47	47	47	47		
Other solid fuels	82	82	81	81		
Biomass	306	306	307	308		
Pet-coke	4488	4467	4448	4431		
Industrial waste (non-renewable)	431	432	433	434		
other industries	1676	1675	1674	1673		
Gas oil	583	584	584	585		
RFO	688	686	684	681		
Liquefied Petroleum Gas	232	233	233	234		
Other kerosene	86	86	86	87		
Solid biofuels	86	86	87	87		
households	4526	4526	4525	4524		
Gas oil	2395	2394	2394	2393		
Liquefied Petroleum Gas	1459	1458	1458	1457		
Biomass	281	281	282	282		
Other kerosene	392	392	392	392		
services	1312	1311	1311	1310		
Gas oil	551	551	551	550		
Light Fuel Oil	3098	3097	3096	3094		
Liquefied Petroleum Gas	512	512	512	511		
Biomass	208	209	209	209		
agriculture	1322	1322	1323	1322		
Gas oil	811.304	811.366	810.788	809.45		
Liquefied Petroleum Gas	47.772	47.786	47.7962	47.8026		
Biomass	462.586	463.19	464.047	465.234		
Industry						
Cement production (t)	2000000	2000000	2000000	2000000		
Ceramics production (t)	962484	1039482	1122641	1212452		
Lime production (t)	7036	7357	7679	8000		
Lubricant use (t)	7	7	7	7		
Agriculture						
Dairy cattle	5%	5%	5%	5%		
Other cattle	5%	5%	5%	5%		
Sheep	10%	10%	10%	10%		
Goats	10%	10%	10%	10%		
Horses	0%	0%	0%	0%		
Mules & Asses	0%	0%	0%	0%		
Swine	-10%	-10%	-10%	-10%		
Poultry	-10%	-10%	-10%	-10%		
Daily milk production (kg)	17.18	17.18	17.18	17.18		
% cows pregnant	72.24	72.24	72.24	72.24		

	2027	2028	2029	2030		
Total Fertilisers N (t)	0%	0%	0%	0%		
Agricultural production	0%	0%	0%	0%		
Wheat	0%	0%	0%	0%		
Barley	0%	0%	0%	0%		
Oats	0%	0%	0%	0%		
Beans & pulses (legumes)	0%	0%	0%	0%		
Potatoes (tubers)	0%	0%	0%	0%		
Cultivated area	0%	0%	0%	0%		
Wheat	0%	0%	0%	0%		
Barley	0%	0%	0%	0%		
Oats	0%	0%	0%	0%		
Beans & pulses (legumes)	0%	0%	0%	0%		
Potatoes (tubers)	0%	0%	0%	0%		
Manure management - anaerobic digestion						
dairy cattle	24%	24%	25%	25%		
other cattle	24%	24%	25%	25%		
market swine	44%	46%	48%	50%		
breeding swine	44%	46%	48%	50%		
poultry	27%	28%	29%	30%		
sheep	2%	2%	2%	2%		
goats	2%	2%	2%	2%		
horses	2%	2%	2%	2%		
mules & asses	2%	2%	2%	2%		
Urea applied to soil	555	555	555	555		
Waste						
MSW production (kt)	654.77	665.46	676.68	688.54		
MSW production per capita (kg/cap)	718.07	727.38	737.18	747.55		
Waste to disposal sites (%)	33.8%	31.2%	28.7%	26.2%		
MSW production to disposal sites per capita (kg/cap)	242	227	212	196		
Waste to managed (%)	97.0%	97.0%	97.0%	97.0%		
Waste to unmanaged (%)	3.0%	3.0%	3.0%	3.0%		
Composition of waste to disposal site						
paper, paper pulp and products	27.0%	27.0%	27.0%	27.0%		
textiles & fabrics	11.0%	11.0%	11.0%	11.0%		
wood	3.1%	3.1%	3.1%	3.1%		
food waste	48.8%	48.8%	48.8%	48.8%		
non-food /garden	7.9%	7.9%	7.9%	7.9%		
other	2.2%	2.2%	2.2%	2.2%		
Waste composted (kt)	165.00	175.68	186.76	198.30		
Industrial production						
alcohol	654	654	654	654		
beer	32895	32895	32895	32895		
soft drinks	25981	25981	25981	25981		
dairy products	100890	100890	100890	100890		
meat & poultry	83554	83554	83554	83554		
refinery	0	0	0	0		
soaps & detergents	6487	6487	6487	6487		
vegetable oils	12161	12161	12161	12161		
vegetables, fruits & juices	54512	54512	54512	54512		
wine	11531	11531	11531	11531		