REPUBLIC OF CYPRUS

MINISTRY OF AGRICULTURE,
NATURAL RESOURCES AND
ENVIRONMENT

Environment Service

Report under the Decision No 280/2004/EC

Nicosia, January 2007

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1. Introduction

This report has been prepared by the Environment Service of the Ministry of Agriculture, Natural Resources and Environment on behalf of the Republic of Cyprus, as required by the *Decision No 280/2004/EC of the European Parliament and of the Council of 11 February 2004 concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol*.

The European Union is an Annex I signatory to the United Nations Framework Convention on Climate Change (UNFCCC) and an Annex B signatory to its Kyoto Protocol (KP). The KP sets quantified targets for reducing greenhouse gas emissions for those signatories that are included in its Annex B. Cyprus ratified the UNFCCC as a non-Annex I party on 15th October 1997, and on the same basis, subsequently ratified the Kyoto Protocol on 16th July 1999; i.e. Cyprus has no emissions limitation commitments.

Nevertheless, under the Decision No 280/2004/EC Cyprus voluntarily report to the EU the following:

- *Greenhouse gases' emissions Inventory:* for the compilation of a Community greenhouse gas inventory report for the submission to UNFCCC (Article 4).
- *Emissions Projections*: Emissions projections requested under the Article 3(2)(b) of Decision No 280/2004/EC with sectoral detail relevant to FCC/1999/7: Part II: UNFCCC reporting guidelines on national communications, and that required for the reporting of projection indicators specified in Article 9(c) annex III of the Implementing Provision.
- *Policies and Measures*: Specific information on Policies and Measures requested under the Article 3(2)(a) of Decision No 280/2004/EC which also references reporting requirements under Part II: UNFCCC reporting guidelines on national communications.

These shall be presented in 9 Chapters and 2 Annexes:

- Chapter 2: national conditions and trends observed.
- Chapter 3: inventory of emissions for the period 1990-2004; i.e. evolution of emissions of greenhouse gases and other air pollutants, disaggregated by gas and by sector.
- Chapter 4: of policies and measures for the limitation of greenhouse gases emissions and presents the estimated total effect from the combined implementation of these policies and measures.
- Chapter 5: results of emissions projection up to the year 2020, under the scenarios of Business as Usual (present policies and measures), with measures scenario (renewable energy sources and rational energy use schemes) and with additional measures (introduction of natural gas for energy production).
- Chapters 6 – 9 refer to the Impacts and adaptation, financial assistance and technology transfer, Research and systematic observation, and Education, training and public awareness.

- Annex I presents in detail the emissions of greenhouse gases by gas and by sector for the years 1990 to 2004.
- Annex II shows, the potential for emissions reduction by the implementation of policies and measures for 2010, 2015 and 2020, as required by the decision.

2. National Conditions

This chapter provides a short description of the geographical, population and economic profile of Cyprus. Furthermore, it includes information on climate conditions, the economic sectors (agriculture, manufacturing, tertiary sector) active in Cyprus, as well as on the energy system. After the Turkish invasion in 1974, approximately 40% of the island territory is under Turkish occupation. The data presented in this chapter primarily concern the areas under the effective control of the Government of the Republic of Cyprus.

2.1. Geography

Cyprus is located at the north-eastern part of the Mediterranean Sea (33' east of Greenwich and 35' north of the Equator). It is divided in 6 districts: Lefkosia (Nikosia), Lemesos, Larnaca, Pafos, Amochostos (Famagusta) and Kyrenia. Cyprus has an area of 9,251 km^2 of which approximately 18% is covered by forests. These include forests of conifers, such as Calabrian pine, Black pine, Cedar, Cypress and small-scale plantations of Eucalyptus. Cultivated land represents approximately 74% of the total agricultural land, uncultivated land 24%, while the rest 2% is fallow land.

Figure 2.1. Map of Cyprus

2.2. Climate

Cyprus has an intense Mediterranean climate: hot and dry summer from June to September and rainy, rather changeable winter from November to March, separated by short autumn (October) and spring (April and May) seasons, with rapid weather changes. The seasonal difference between mid-summer and mid-winter temperatures is quite large (18 ˚C in the inland areas and about 14 ˚C on the coast). The annual average temperature presents a steady increase and in 1999 the highest temperature of the century was recorded (Figure 2.2).

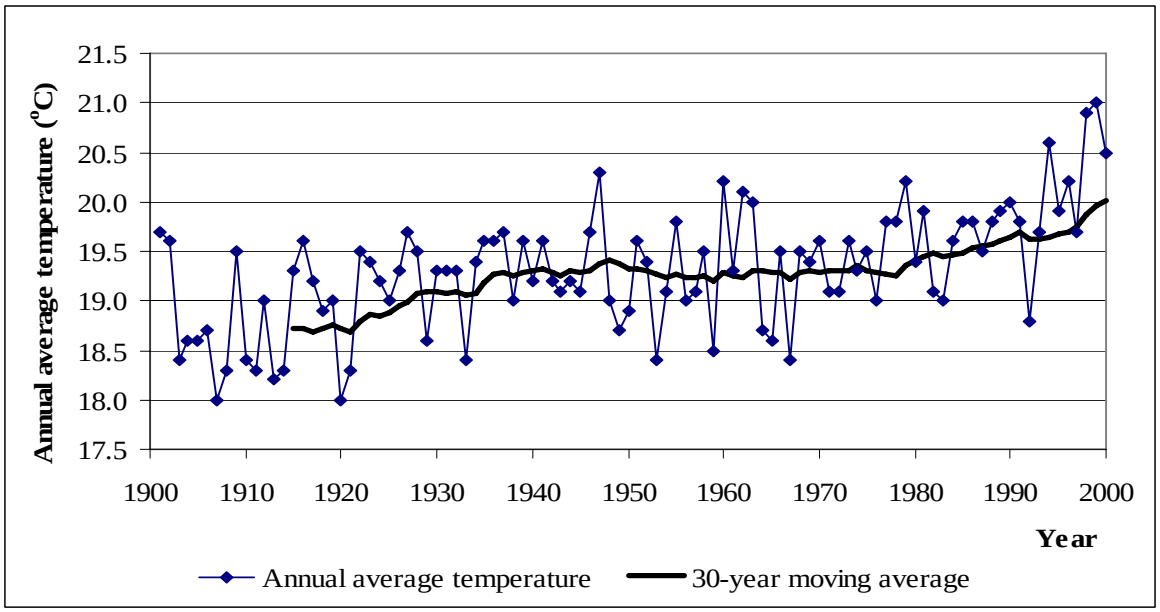

Figure 2.2. Average annual temperatures for 1901 – 2000

The average annual precipitation fluctuates around 500 mm. During the hydro-meteorological year of 2005-2006 however, the annual precipitation was 360.1 mm. Figure 2.3 shows the average annual precipitation (in mm) for a time period of 30 years, as recorded by different measurement stations in Cyprus.

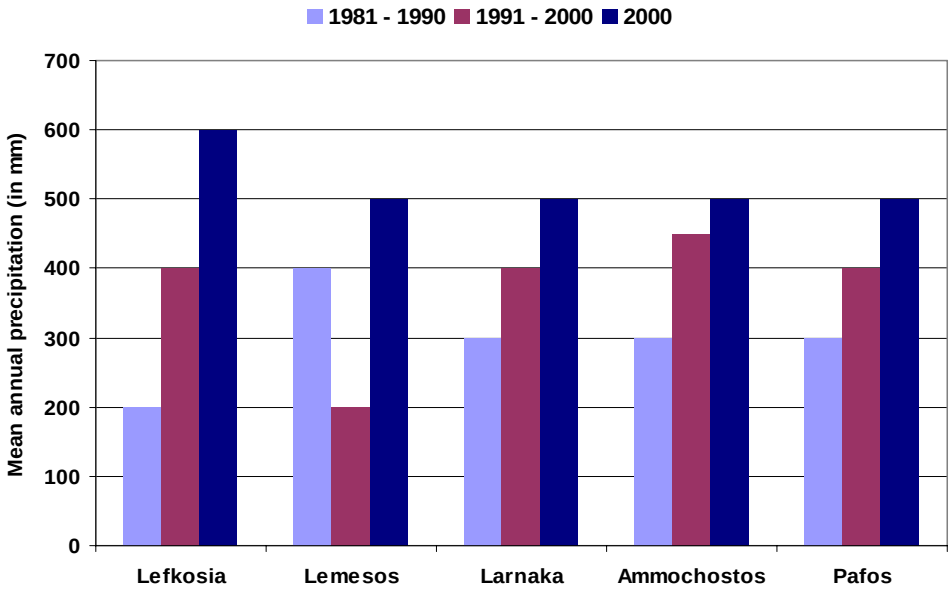

Figure 2.3. Mean annual (1981 - 1990 and 1991 - 2000) and annual (for 2000) precipitation at selected meteorological stations

2.3. Government structure

Under the 1960 Constitution, executive power is given to the President, who is elected for a 5-year term, and is exercised by the Council of Ministers (appointed by the President). The Cypriot Parliament exercises the legislative power of the Republic. An independent judicial body exercises the administration of justice. The main ministries and bodies that are directly or indirectly involved in the effort of reducing greenhouse gases emissions are the following:

- *Ministry of Agriculture, Natural Resources and Environment*: (also responsible regarding forest management and waste management).
- *Ministry of Labour and Social Insurance:* in particular the Department of Labour Inspection, which deals also with issues such as quality of atmospheric environment, emissions from stationary and mobile sources, health and safety in the working environment etc.
- *Ministry of Commerce, Industry and Tourism:* especially the Energy Service, dealing with issues related to inputs/outputs and consumption of liquid fuels, to electricity generation etc.
- *Ministry of Transport*
- *Ministry of the Interior*: especially the Department of Urban Planning and Habitation, while the ministry is also responsible for Local Administration issues.
- *Ministry of Economy:* this ministry comprises the Office for Planning, which has, inter alia, responsibility on issues related to the formulation of economic policy and to the development of long-term economic indicators.
- *Statistical Service:* publishes a significant number of annual and monthly statistical bulletins.

2.4. Population

At the end of 2005, the population of the area under the effective control of the Government of the Republic of Cyprus was estimated at 776,400, corresponding to an increase of 2.3% in comparison to the population at the end of 2004. Regarding the distribution of the population, Lefkosia is the district with the highest number of inhabitants, followed by Lemesos, Larnaca, Pafos and Amochostos.

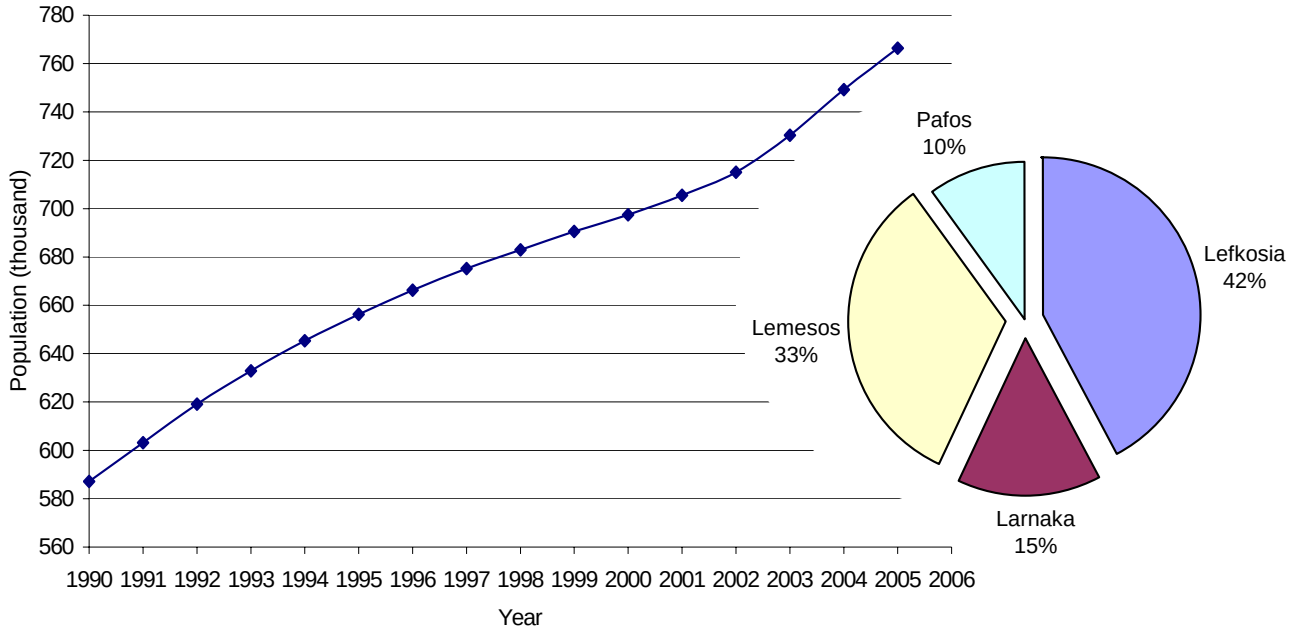

Figure 2.4. (a) Population in the area under the effective control of the Government of the Republic of Cyprus at the end of 2005;
(b) Urbanisation

The development of urbanization has increased the environmental problems related to waste, water and air but also related to land use. In 2004, the proportion of the population of Cyprus that lives in urban areas makes up 69.4% of the total. Lefkosia, the largest city of Cyprus, is inhabited by 219,200 people or 42.2% of the total urban population. The number of households in Cyprus increases, but at smaller rates in comparison to previous years. Moreover, the size of the average household also decreases, as shown in Figure 2.5.

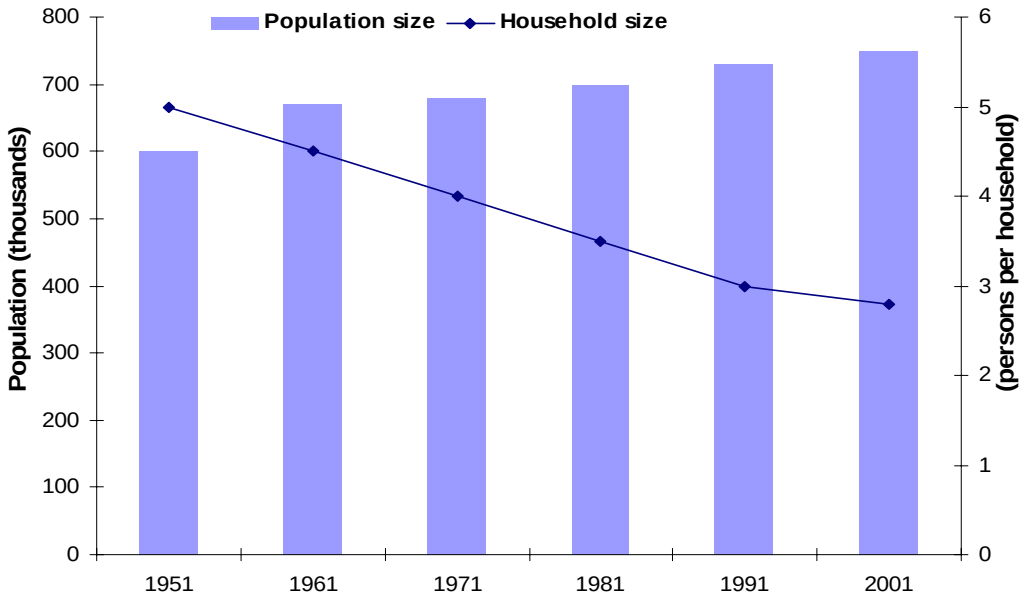

Figure 2.5. Population of Cyprus and average household size

2.5. Economy

During 2004, the Cyprus economy exhibited an accelerated rate of growth, in contrast to the conditions of subdued growth observed during the past two years. The gradual improvement of the overall confidence climate, following the accession of Cyprus to the EU, and the improved external environment of Cyprus, which positively affected the external demand for goods and services, beyond tourism, constituted the main contributing factors towards this development. The significant increase of the oil price in international markets constituted a restraining factor towards further growth of the Cyprus economy.

In summary, the Cyprus economy exhibited conditions of acceleration of economic activity in 2004, mainly due to the strengthening of domestic demand and in particular private consumption demand and investment demand in machinery and transport equipment as well as construction works. The rate of economic growth fluctuated at 3.7% in real terms in 2004, as compared to 1.9% in 2003. The unemployment rate increased marginally to 3.6% in 2004. The rate of inflation decelerated significantly as compared to 2003 and fluctuated at 2.3%. The fiscal deficit recorded a substantial improvement, whereas the current account deficit of the Balance of Payments increased. The overall trend of the Cyprus economy as developed from 1990 to 2004 is shown in Figure 2.6, whereas Figure 2.7 illustrates the gross value added (in constant prices 2000) per economic sector for the period 1990 – 2004.

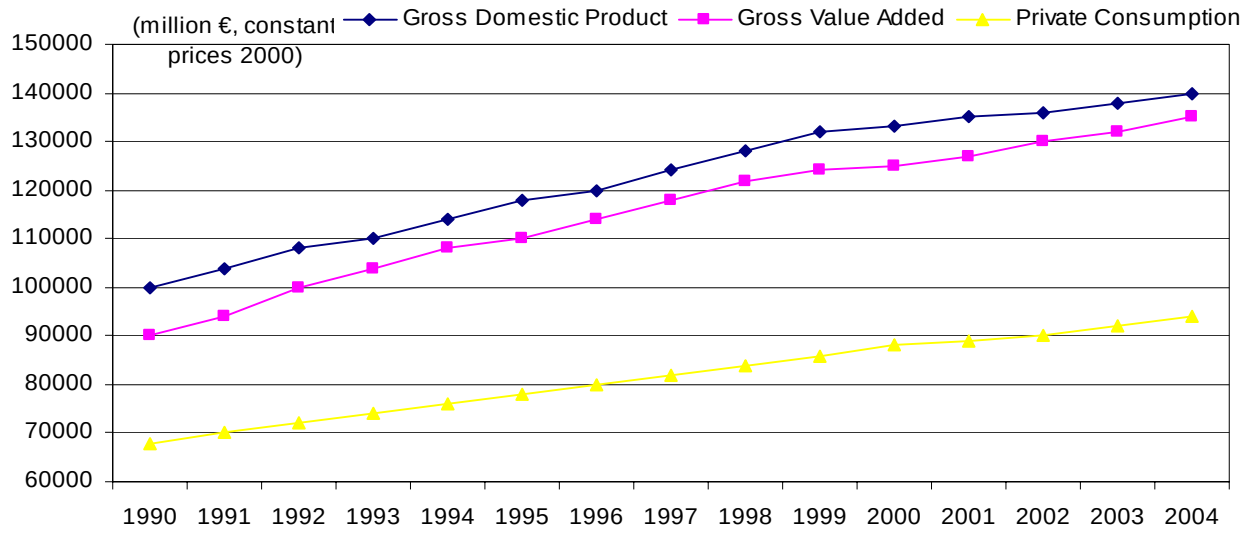

Figure 2.6. Basic macroeconomic indicators of the Cypriot economy for the period 1990 – 2004

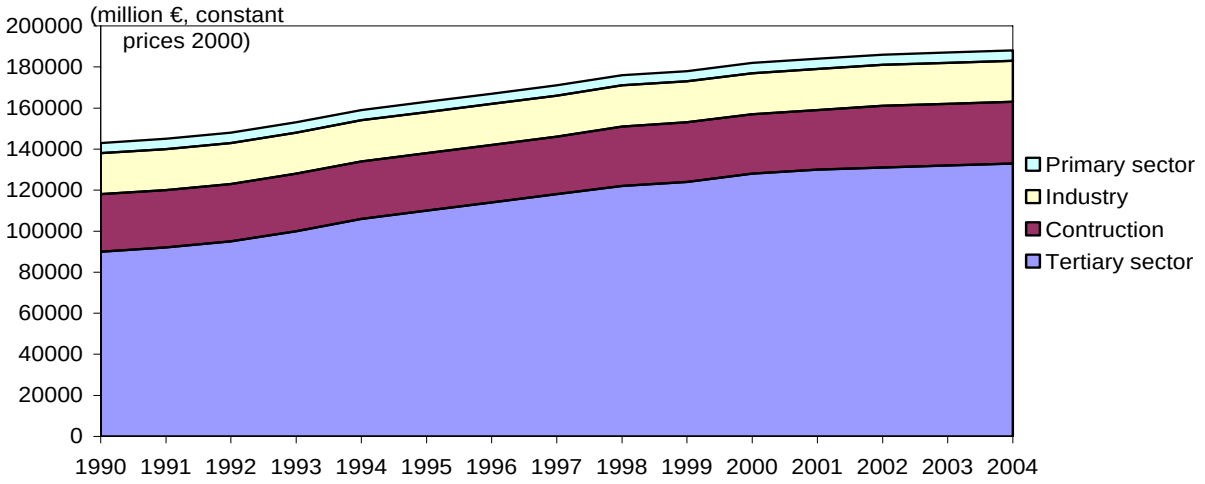

Figure 2.7. Gross value added (in constant prices 2000) per economic sector for the 1990 – 2004

2.5.1. Evolution of GDP

The Cyprus economy continued its expansion through the year 2004 and it is the first time since 2000 that it recorded a higher growth rate in comparison with the previous year. The G.D.P. growth rate is provisionally anticipated to be of the order of 3.7% for 2004, compared to 1.9% in 2003. The main stimulus to growth is provided by the tertiary sector (mainly Transport, Storage and Communication and Financial Intermediation) which is expanding by 4.4% in real terms in 2004, compared to 1.2% in 2003. On the contrary, the secondary sector is exhibiting a real growth of 2.3% compared to 4.0% in 2003 and the primary sector is recording a negative growth rate, from 5.0% in 2003 to -0.5% in 2004. Figure 2.9 illustrates the market prices with respect to 1980 market prices.

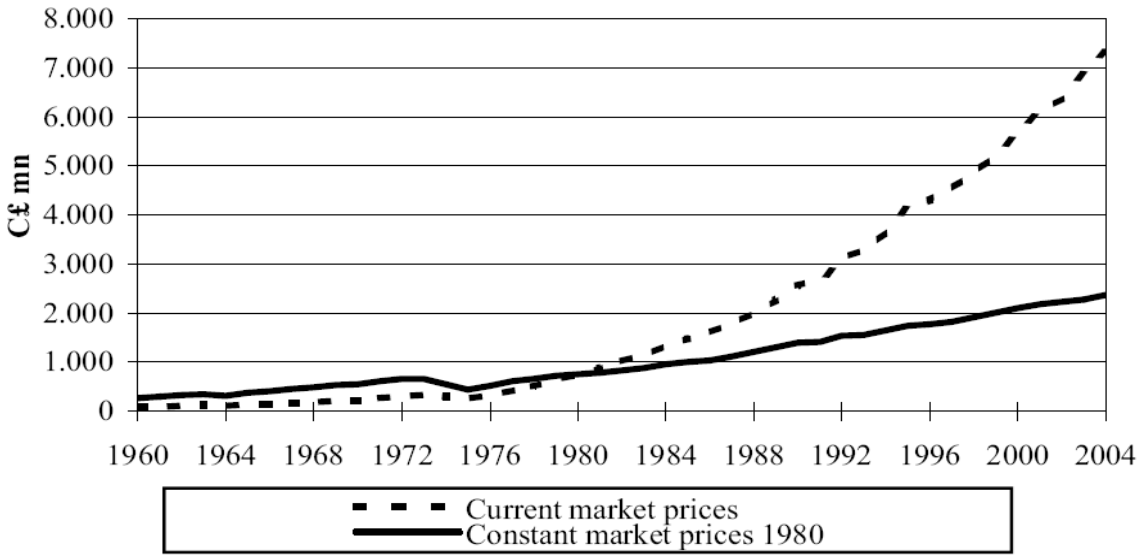

Figure 2.8. Market prices with respect to 1980 market prices

2.5.2. Agriculture

The agricultural sector showed a marginal increase in 2002, compared the previous year, attributed to the favourable weather conditions exhibited. This resulted to an increase of the crop production volume of 11.3%. Figure 2.9 shows the distribution of agricultural land (in thousand hectares) per type of use, whereas Figure 2.10, shows the distribution of agricultural land in irrigated and non-irrigated and fallow land for the period 1990 – 2002.

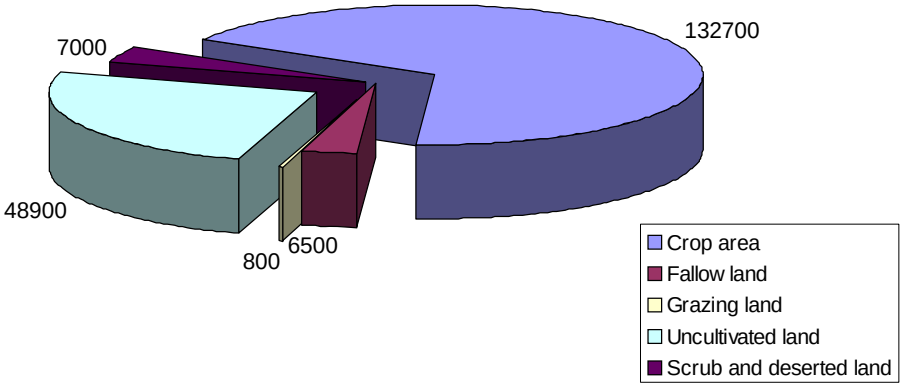

Figure 2.9. Hectares of agricultural land per type of use (2002)

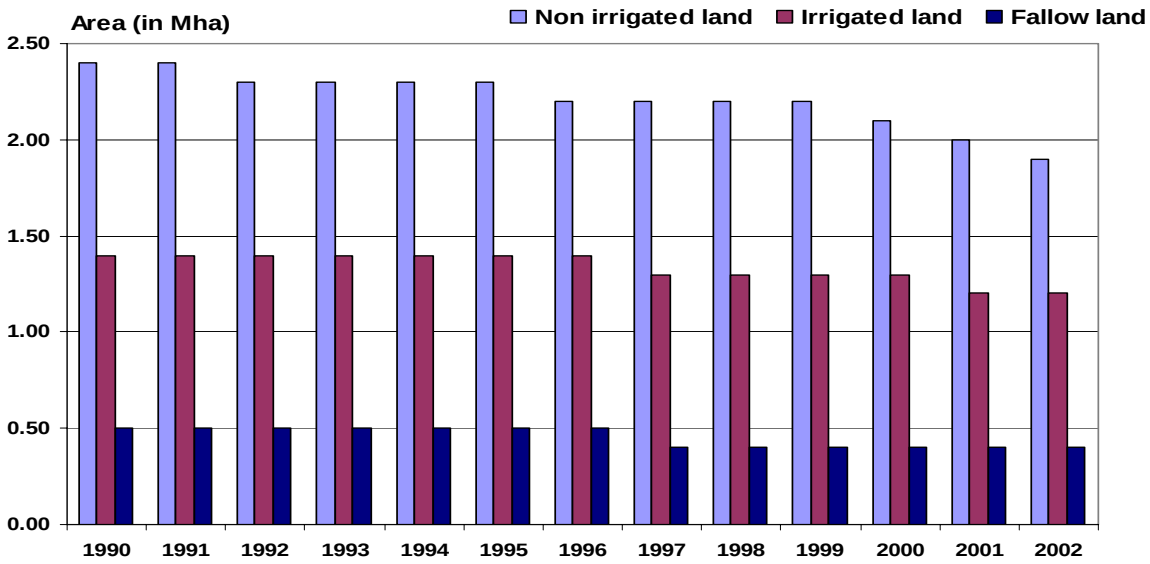

Figure 2.10. Distribution of agricultural land in irrigated and non-irrigated and fallow land (in Mha) for the period 1990 - 2002

With respect to the cultivated area of permanent crops, in 2002 vines cover the larger part of the total with approximately 38%, followed by olive and carobs (27.9%), citrus (14%), nuts (10.7%) and fresh fruit at 9,1%. Regarding temporary crops, cereals cover the highest part of the total (63% approximately), followed by fodder crops (23%) and market gardening (14%). Rain-fed crops exhibited satisfactory yields in 2002 with a significant increase of cereal production, rising from 127 thousand tons in 2001, to 142 thousand tons. Most irrigated crops exhibited steady production levels. An increase in the volume of production was recorded in the case of potatoes and citrus fruits.

The livestock production continued its steady upward trend and increased by 3.2% in 2002 compared to the previous year. Meat production increased by 3.5%; pork, which is the main type of meat consumption, recorded an increase of 2.2% reaching 51,800 tons, while beef production decreased by 2.6% (reduction of 3.800 tons). Sheep and goat meat production increased by 14.5% reaching 12.580 tones while poultry production increased by 3% (reaching 34.800 tones in 2002). Milk production increased by 0.5% to 200.590 tons in 2002. Cow milk, constituting the 70.5% of the total milk production, decreased slightly and dropped to 141.400 tons in 2002. Egg production increased by 10.1% in 2002, reaching 12.320 tons.

2.5.3. Forestry

The gross output of forestry amounted to C£2.1 millions in 2002, compared to C£2.2 millions in 2001. Timber production decreased from approximately 14.361 cubic meters in 2001 to approximately 14.361 cubic meters in 2002, while fuelwood production decreased from 3,300 tons in 2001 to 3,100 tons in 2002. As shown in Figure 2.11 forests only cover 19% of the island.

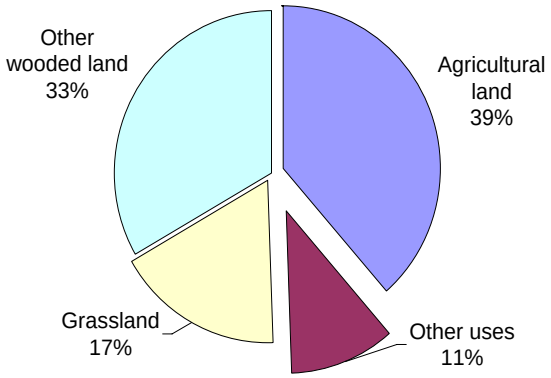

Figure 2.11. Distribution of the area of Cyprus by land cover category

2.5.4. Land Use

Statistical data on land use in Cyprus are currently confined to agricultural land and land under forest. Therefore, the analysis can only be partial and referring only to these two categories of land use. Moreover, a trend break in the data series exists since data on agricultural land after 1974 cover only the area under the effective control of the Government of the Republic of Cyprus (about 63% of the island).

Studying the time series of data for agricultural land, it can be observed that since the early 1980's there a continuous declining trend exists. From 1980 to 2003, agricultural land decreased by 11.9% in total. The trend in arable land, which represents more than half of the agricultural land, has illustrated a similar reduction through the years. From 1980 to 2003, arable land was reduced by 5.5% (Figure 2.12).

The decline is particularly marked for fallow land, permanent meadows and pastures. The decline in agricultural land can be explained by the decline in the share of the agricultural sector in the Gross Domestic Product (GDP). The agricultural sector in 1980 had a share in GDP of the order of 9.7%, while in 2003 its share reached only 3.2% of the GDP. It is worth noting that the shrinking observed in the share of the agricultural sector in the GDP is of a much higher order than the decline of agricultural land in terms of area, which is also indicative of the much faster growth of other sectors of the economy.

Other factors that have contributed to the decrease in agricultural land are residential development, urbanisation and the construction of works, such as roads, buildings, public utility projects etc. In 2003, arable land represents 50.9% of the agricultural land in Cyprus. The largest part of arable land is covered by temporary crops that constitute 47.4% of the agricultural land. Permanent crops are also holding an important place with a share of 20.4% of the total agricultural land. Fallow land follows a declining trend through the years and during 2003 covers 3.5% of the agricultural land. "Other agricultural land" is holding a significant share that reaches 28.4% of the total, while only 0.3% is used as meadows and pastures. In contrast to agricultural land, the land under forests is constantly increasing and stretches over 3.863 km^2 in 2002. Data for 2000 onwards, however, is not comparable with the previous years since the measurements are based on a different definition of land under forest. The new coverage was applied in 1998 and includes, apart from state forests, private forests and other wooded land. For the year 2000, there exists an

estimation concerning built-up and related land. The estimation, which is based on a 1:50,000 map, is 205 km^2 and refers to the whole island.

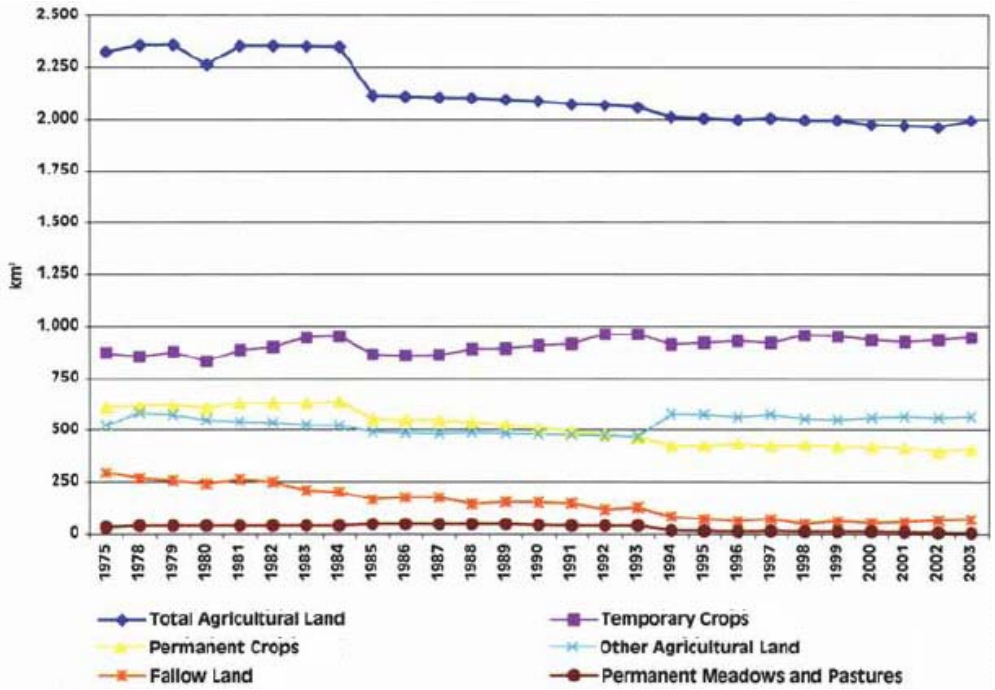

Figure 2.12. Land use (1975 - 2003)

2.5.5. Mining & Quarrying – 2005

The mining and quarrying sector in 2005 increased by 9% compared to the previous year. It is estimated that the value added of the sector in real terms increased from C£22 million in 2004 to C£24 million in 2005, reflecting the increase in the production of sand, gravel and road aggregate which is a result of the expansion in the construction sector.

The production of sand, gravel and road aggregate, which accounts for the bulk of the sector's output, rose by 4.0% over 2004 and reached from 12,360,000 tonnes in 2004 to 12,850,000 tonnes in 2005 (Figure 2.13). Increase was also recorded in the production of clay, marble, bentonite and umber while the production of havara, building stone and gypsum decreased. Employment in the sector remained at the same level as in the previous year and accounted for about 600 persons.

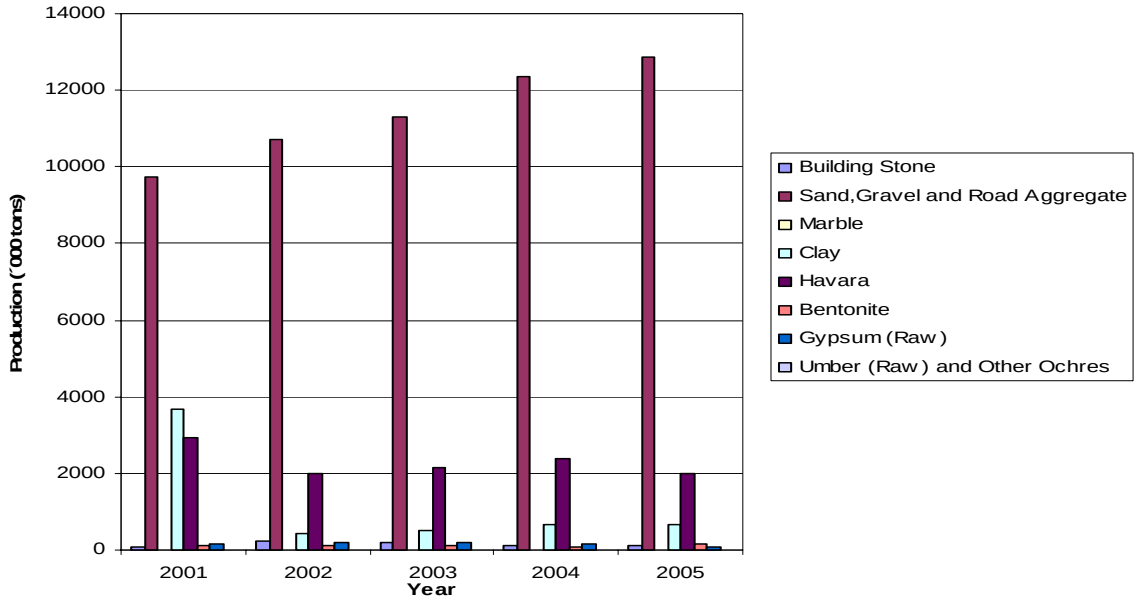

Figure 2.13. Production of minerals and quarrying materials (2001-2005)

2.5.6. Manufacture

In 2005 (Figure 2.14), manufacturing sector presented a small increase, mainly due to an increase in local demand of manufactured goods. Value added of the sector increased by 0.8% in real terms compared to an increase of 0.9% in 2004. Food, beverages and tobacco, which traditionally is the largest group and in 2005 contributed 39.5% to the manufacturing value added, registered an increase of 1.5% in volume of production. The increase of the construction sector enables the group of other non-metallic mineral products to increase and become the second largest group in the manufacturing sector. Its contribution to the value added increased from C£92.1 million in 2004 to C£97.8 million in 2005. The price index of domestically produced manufactured goods rose by 4.2% over 2004, compared to a 6.5% increase in the previous year. This is attributed to an increase of 4.3% in local market prices and 3.7% in export prices.

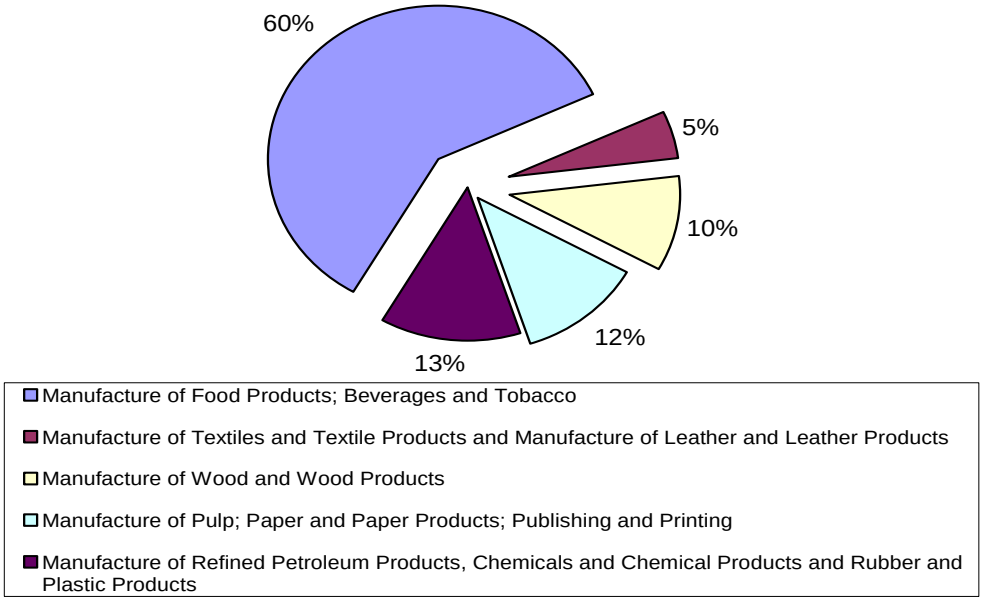

Figure 2.14. Distribution of Value Added in Manufacturing by Industry (2005)

2.5.7. Electricity, Gas and Water Supply

During 2005 there was an increase in the rate of economic growth in this sector, estimated at 5.3%, compared to 3.5% in 2004. Generation, transmission and distribution of electric energy, is by far the most important industry of the sector and in 2005 contributed 80% to the sectoral value added (Figure 2.15). Sales of electricity rose by 5.4% and reached 3,930.7 million kWh in 2005 from 3,729.3 million kWh in 2004. The highest increases were recorded in the construction and health and social work. In the manufacturing sector, the largest increases in the usage of electricity were recorded in chemical and chemical products and metal products industries. Decreases were observed in the clothing and refined petroleum products industries. Consumption of electricity by households rose by 8.9%, for water pumping purposes by 2.9% and for public lighting by 13.9%. Consumption of water in towns is provisionally estimated to have risen by 1.3% to 31.3 million tons, as compared to 30.9 million tons in 2004.

Expenditure on fixed assets in the sector dropped to C£62.1 million from C£95.6 million in 2004. Construction works for the extension and reinforcement of the electricity transmission system and the water supply network accounted for 66.5% of total investment. Machinery and equipment accounted for 32.3% and transport equipment for the remaining 1.2%.

Employment in the sector increased from 1.6 thousand persons in 2004 to 1.7 thousand in 2005, representing less than 0.5% of the total gainfully employed population for the production of the Gross Domestic Product.

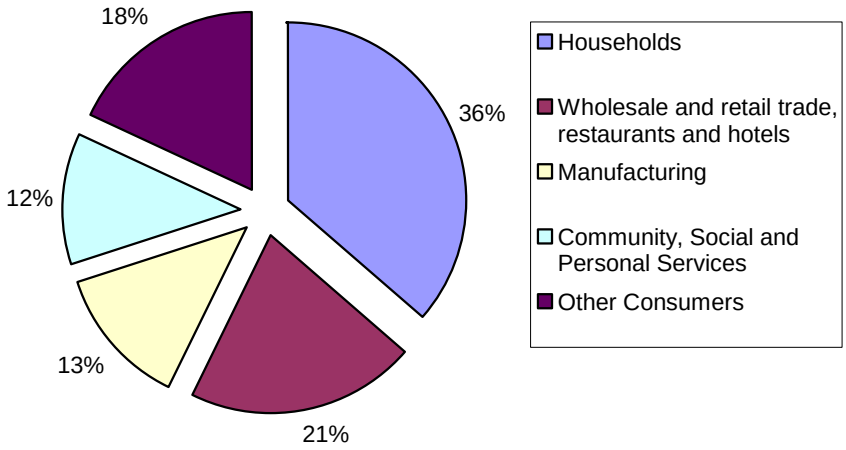

Figure 2.15. Consumption of Electricity by Sector (2005)

2.5.8. Tourism

In 2004 the movement of travellers to and from Cyprus recorded an in-crease compared to the previous year. Total arrivals of travellers (including excursionists) reached 3,381,159 recording an increase of 6.2 per cent and departures totalled 3,385,060 recording an increase of 6.6 per cent compared to 2003. Visitors arriving to Cyprus increased by 2.5 per cent to 2,477,544 persons in 2004 compared to 2,416,253 in 2003 (Figure 2.16).

In 2004, same-day visitors (visitors who did not spend the night in Cyprus) reached 128,532 from 113,006 in 2003. Tourists increased by 2.0 per cent and reached 2,349,012 in 2004. The United Kingdom remained the major source of tourism to the island with a share of 56.7% in the tourist traffic, while Germany came second with 6.9% followed by Greece with 5.7%, Sweden with 3.6%, Russia with 3.6%, Norway with 2.2% and France with 2.0 %.

Revenue from tourism is estimated at £982.3 mil., compared to £1,015.0 mil. in 2003 recording a decrease of 3.2 %. During 2004, 859,454 Cypriots and foreigners residing in Cyprus returned from a trip abroad compared to 737,309 in 2003 recording an increase of 16.6 %. About 42.6 % had visited Greece, 13.0 per cent the United Kingdom, 4.7 per cent Syria, 4.6 per cent Russia, 4.4 per cent Lebanon, 2.7 per cent France, 2.4 per cent Germany and 2.4 per cent Egypt. At the end of 2004 there were in operation 955 collective accommodation establishments with a total capacity of 96,535 beds compared to 951 establishments with 95,185 beds in 2003.

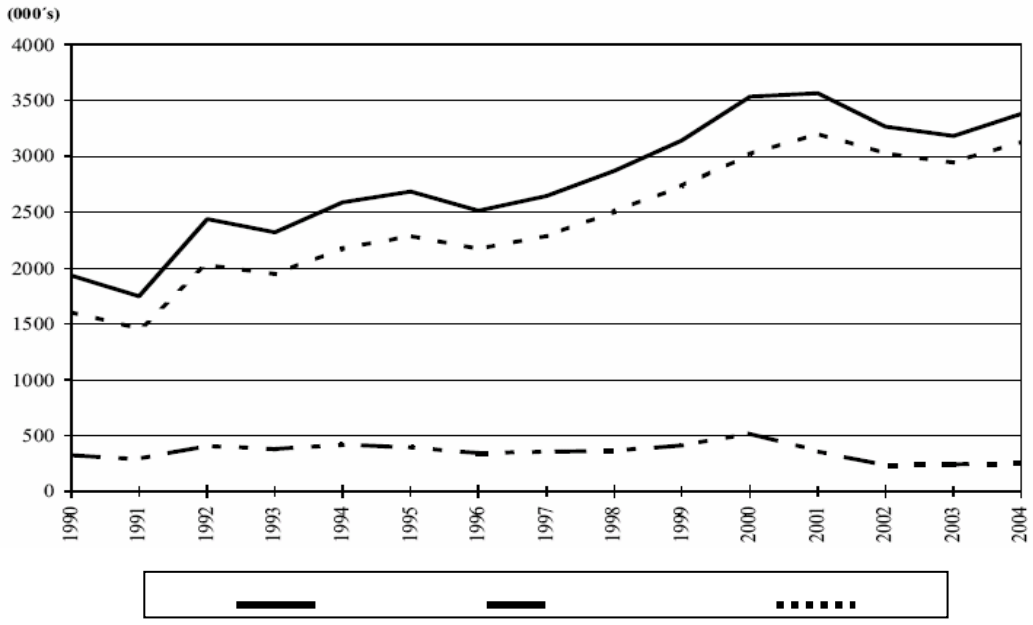

Figure 2.16. Arrivals of travellers by mode of travel, 1990-2004

2.5.9. Trade

Cyprus Economy continued during 2004 its expansion at fairly satisfactory growth rates. Trade activity registered high rates of growth compared with the previous year. The value added of the Trade Sector increased by 15.0% at current market prices and reached C£867.5mn as against C£754.1mn in 2003. The total turnover increased by 9.5% and reached C£5,325.2mn in 2004, while the gross output generated by the trade sector increased by 12.4% to C£1,343.8 mn at current prices. Fixed capital investment at current prices increased by 1.7% to C£93,5mn in 2004. Employment increased by 2.0% to 55.9 thousand persons and accounted for 17.1% of the total gain-fully employed population for the production of G.D.P.

Turnover

The turnover of the trade sector increased by 9.5% and reached C£5,325.2 mn in 2004 as against C£4,863.9 mn in 2003. Turnover in the sale, maintenance and repair of motor vehicles and motorcycles and retail sale of automotive fuel, increased by 22.0% from C£777.5 mn in 2003 to C£948.8 mn in 2004. The biggest sales were recorded in the sale of new motor vehicles (C£385 mn) and in the retail sale of automotive fuel (C£262 mn).

In the wholesale trade and commission trade the turnover increased by 8.4% from C£2,087.1 mn in 2003 to C£2,262.7 mn. The most significant sales were recorded in the wholesale of solid, liquid and gaseous fuels (C£540 mn), to non-specialised wholesale of food, beverages or tobacco (C£204 mn), to wholesale of wood, construction materials and sanitary equipment (C£167 mn) and to wholesale of fruit and vegetables (C£152 mn). In retail trade and repair of personal and household goods, turnover reached C£2,113.7 mn in 2004 compared to C£1,999.3 in 2003 with an increase of 5.7%. The sectors with the biggest sales, were the retail sale in non-specialised stores with food, beverages or tobacco predominating (C£567 mn) followed by the other retail sale in specialised stores (C£373 mn), the other retail sale in non-specialised stores

(supermarkets) (C£254 mn) and the retail sale of furniture, lighting equipment and household articles (C£144 mn).

Employment and labour costs

Employment in the sector increased by 2.0% to 55,934 persons in 2004 from 54,812 persons in 2003 and accounted for 17.1% of the total gainfully employed population. Employment in sale, maintenance and repair of motor vehicles and motorcycles and retail sale of automotive fuel, numbered 8,505, in wholesale trade and commission trade 18,248 persons and in retail trade and repair of personal and household goods 29,181 persons. Working proprietors and family members constituted 14.1% and employees 85.9% of the total employment in 2004. The average labour cost per person engaged in the sector increased by 3.6% to C£9,252 in 2004 from C£8,927 in 2003. In sale maintenance and repair of motor vehicles and motorcycles and retail sale of automotive fuel the labour cost averaged C£9,113, in wholesale trade and commission trade C£11,502 and in retail trade and repair of personal and household goods C£7,885.

Stocks of goods

The total value of goods kept as stock by traders at the end of 2004 reached C£908,7mn as against C£854,6mn at the beginning of the year (both valued at average purchasing prices of 2004). In sale, maintenance and repair of motor vehicles and motorcycles and retail sale of automotive fuel, the value of stocks at the end of 2004 was C£140,5mn, in wholesale trade and commission trade was C£318,2mn and in retail trade and repair of personal and household goods C£450,0mn.

Gross output and costs

The gross output i.e. turnover less the value of goods purchased, of all trading activities amounted to C£1,343.8 mn in 2004 or 25.2% of the turnover (this is also approximately the gross margin on goods traded). Sale's maintenance and repair of motor vehicles and motor cycles and retail sale's of automotive fuel output was C£226.8 mn (23.9% of turnover), wholesale trade's and commission trade's output C£546.1 mn (24.1% of turnover) and retail trade's and repairs´ of personal and household goods output C£570.9 mn (27.0% of turnover). The next table gives a summary of the sector's income and cost structure for 2004.

Fixed investments

Gross fixed capital formation in the sector increased to C£93.5mn in 2004 from C£91.9mn in 2003. Of this, C£33.3mn related to new investments in buildings (shops, warehouses, offices etc.), C£39,1mn constituted expenditure on machinery, furniture and equipment, while the rest C£21.1mn was the value of vehicles purchased by trade firms in 2004.

2.5.10. Transport

The broad Transport, Storage and Communication Sector registered in 2004 an increase of 9.9% on the gross output, at current prices and amounted to £954.9 mn in 2003. The value added of the sector increased to £572.3 mn and its share of G.D.P. was 8.4% at current market prices.

The sector's investments on fixed assets during 2004 totalled £92.0 mn. Of the total capital expenditure, £20.8 mn related to buildings and other construction works, £63.6 mn to machinery and £7.6 mn to transport means. Employment in the sector increased by 1.5% to 21,964 persons in 2005 and accounted for 6.8% of the total gainfully employed population.

Land Transport

The gross output of the land transport sub-sector reached £83.7 mn in 2004 compared to £81.1 mn in 2003 (Figure 2.17). Freight transportation (lorries) had the biggest share in the sub-sector with £43.7 mn, urban taxi transport with £12.5 mn, buses "on-contract" and tourist-buses £10.7 mn and urban bus transport with £7.7 mn.

The air emissions from the transport sector in Cyprus are regulated in full accordance with current EU legislation. Concerning the quality of fuels it should be noted that the sulphur content of the diesel fuel was reduced in 2004 from 1% to 0.035%. The sulphur content was further reduced to 0.005% in 2005 and in 2009 will be pushed down to 0.001%. As far as the quality of petrol is concerned it should be noted that the sulphur content was reduced in 2004 from 1% to 0.015%. In 2005, the sulphur content of petrol was further reduced to 0.005% and will reach in 2009 the amount of 0.001%.

It should be noted that according to the projections of the Ministry of Transport the ratio of inhabitants per passenger car will reach in 2007 the figure of 2, which is considered to be the saturation point, compared with 2.4 in 2000.

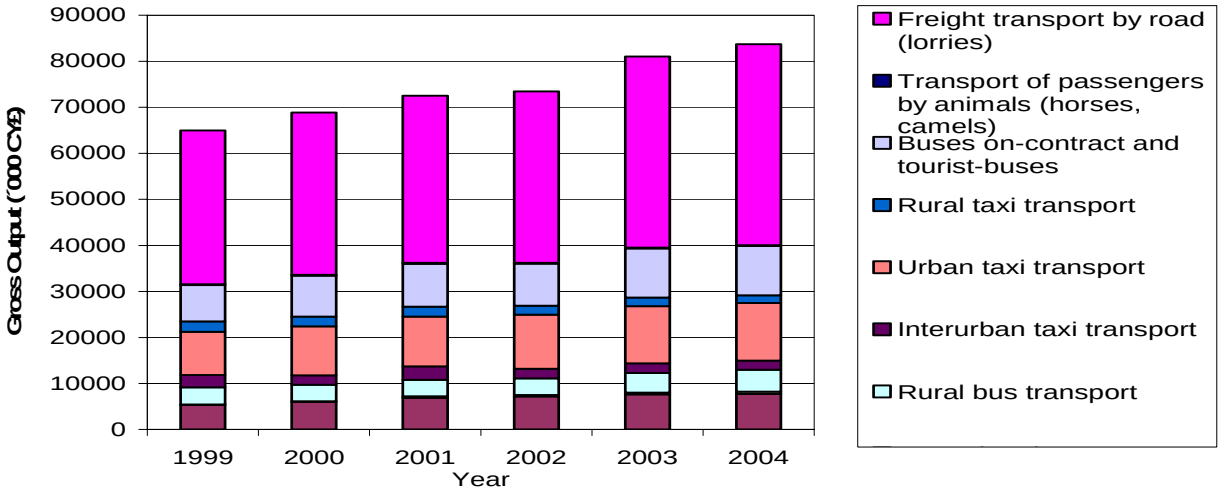

Figure 2.17. Gross output by Land Transport activity (1999-2004)

The value added of the land transport sub-sector at current market prices decreased by 6.8% and reached £45.5 mn in 2005 from £48.8 mn in 2003. Employment in the land transport sub-sector totalled 4,700 persons. Motor vehicles newly registered during 2004, decreased by 9.9% to 48,712 from 54,037 in 2003. Private saloon cars decreased by 12.5% to 36.805 from 42.068 in 2004. Vehicles of all types and categories on the Register of the Land Transport Department at the end of 2004 summed 644,403 compared to

600,942 at the end of 2003. The total value of motor vehicles and transport equipment imported in 2005 reached £361.1 mn from £424.2 mn in 2003.

Water transport

During 2004, 4,649 vessels arrived at the various ports of Cyprus. Of these 3,612 or 77.7% arrived at Limassol port, 820 or 17.6% called at Larnaca port and 217 at other ports (Figure 2.18). At the end of 2004, 1,802 ships were on the Cyprus Register with a total of 21,094,415 gross registered tonnage. The gross output of water transport activities increased by 33.0% over 2003 and amounted to £149.1 mn in 2004. This is mainly attributed to the increase of the passenger mobility, concerning especially cruises. The value added of the sub-sector at current market prices increased by 45.2% to £88.7 mn in 2004 compared to £61.1 mn in 2003.

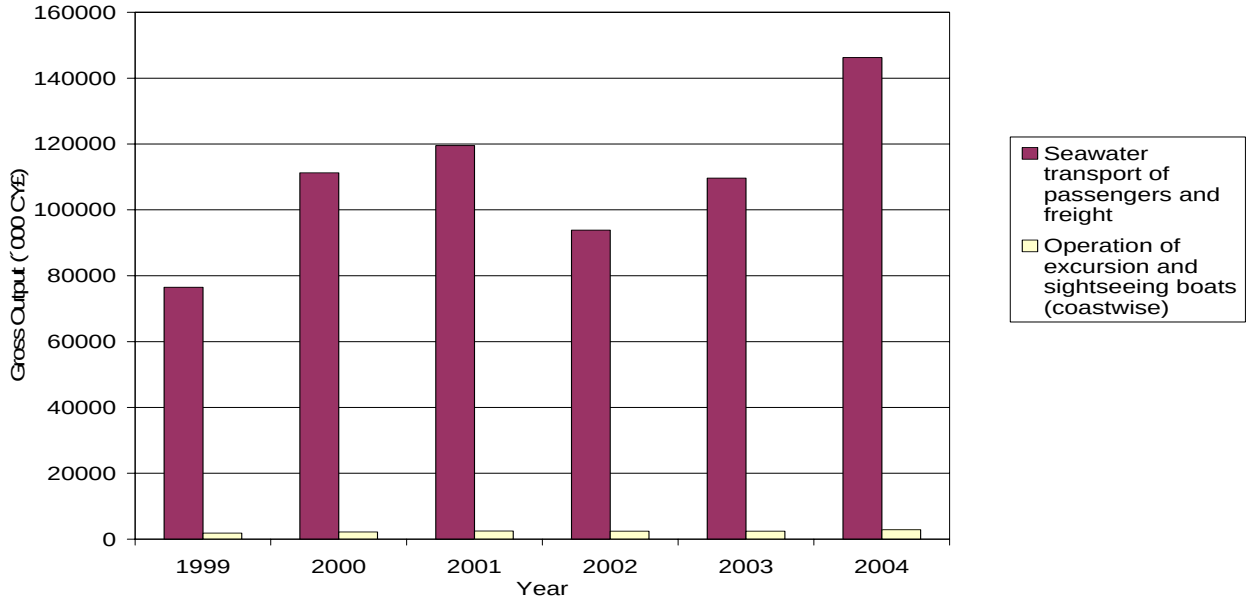

Figure 2.18. Gross output by Water Transport activity (1999-2004)

Air Transport

Civil aircraft landings increased during 2005 and totalled 30,664 compared to 30,146 in 2004 (Figure 2.19). Passenger arrivals through airports increased to 3,390,563 in 2004 compared to 3,210,658 in 2003. The gross output of the air transport sub-sector increased by 1.6% in 2004. The output of air carriers (Cyprus Airways, Eurocypria and Helios) reached at £222.4 mn in terms of gross output as against £218.9 mn in 2003. The value added of air transport activities at current market prices decreased to £53.7 mn in 2004 as against to £61.9 mn in the previous year i.e. it decreased by 13.2%.

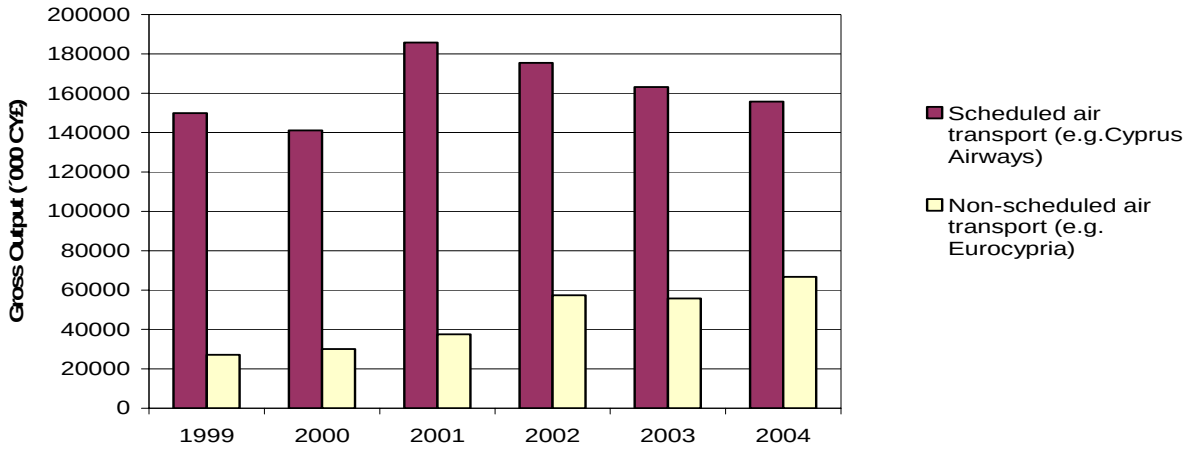

Figure 2.19. Gross output by Air Transport activity (1999-2004)

2.5.11. Construction

The construction sector in 2004 continued to register an upwards trend, recording a positive rate of growth in its value added in real terms. In 2004 the real growth was 5.8% compared to 7.1% in 2003 (Figure 2.20) and 5.5% in 2002. This is attributed mostly to the significant increase in the construction of residential buildings. Gross output at current market prices increased by 14.3% and reached £1,074.5 million compared to £939.9 million in 2003. Value added at current market prices rose to £578.2 million from £506-5 million recording an increase of 14-2%. The contribution of the construction sector to GDP at current market prices increased to 7-9%.

During 2004 the share of new construction in housing was 56.5% of the total output, and non-residential buildings 21.7%, while civil engineering projects (mainly funded by the public sector) accounted for 21.8%. The corresponding figures for 2003 were 52.8% for housing, 24.2% for non-residential buildings and 23.0% for civil engineering projects. The value of new construction at current market prices comprised 89.8% of the total gross output in the construction industry in 2004. Repairs and maintenance accounted for the remaining 10.2%. At current market prices the value of new construction increased by 15.9% from £832.2 million in 2003 to £964.5 million in 2004. In real terms, it increased by 7.2%.

The distribution of the value of new construction in 2004 by main economic sector was as follows: Housing 56.5%, services 11.7%, transport 10.2%, hotels and restaurants 4.3%, wholesale and retail trade 3.8%, electricity, gas and water 4.7%, agriculture 2.8%, manufacturing 2.3% and other activities 3.7%. Employment in the sector increased from 29,518 persons in 2003 to 29,970 in 2004 and accounted for 9.3% of the gainfully employed population for the production of G.D.P. The number of persons registered as unemployed increased from 685 persons in 2003 to 780 in 2004.

Gross fixed capital formation in the sector at current prices increased from £24.3 million in 2003 to £26.4 million in 2004. Construction machinery accounted for 37.3% of investment and transport equipment for 26.9%.

Labour costs during 2004 continued to rise, registering an increase of 4.0% compared to 5.8% in 2003 and 5.0% in 2002. The overall price index of construction materials increased by 8.2%, compared to 4.6% in 2003. The change in the price index is due to the increases that have been recorded in the prices of round bars of iron (29%), drain pipes (27%), bituminous mixtures (22%), premix (19%), gravel and sand aggregate (14%), building bricks (13%) and crushed gravel (13%). Decreases were recorded in the prices of air conditioning appliances (9%), paints, enamels and varnishes (4%) and sanitary ware (1%).

For houses, the cost of construction per square metre (excluding the value of land) increased from £370.3 in 2003 to £389.1 in 2004. For apartment blocks, the cost per square metre rose to £362.6 from £344.9. Investment in housing at current market prices increased to £545.1 million from £457.4 million in 2003 (Figure 2.20). In real terms there was an increase of 16.2%. Of the newly built dwellings 91.2% were financed by the private sector, 2.3% by the public sector and the remaining 6.5% were jointly financed, compared to 88.0%, 3.6% and 8.4% respectively in 2003.

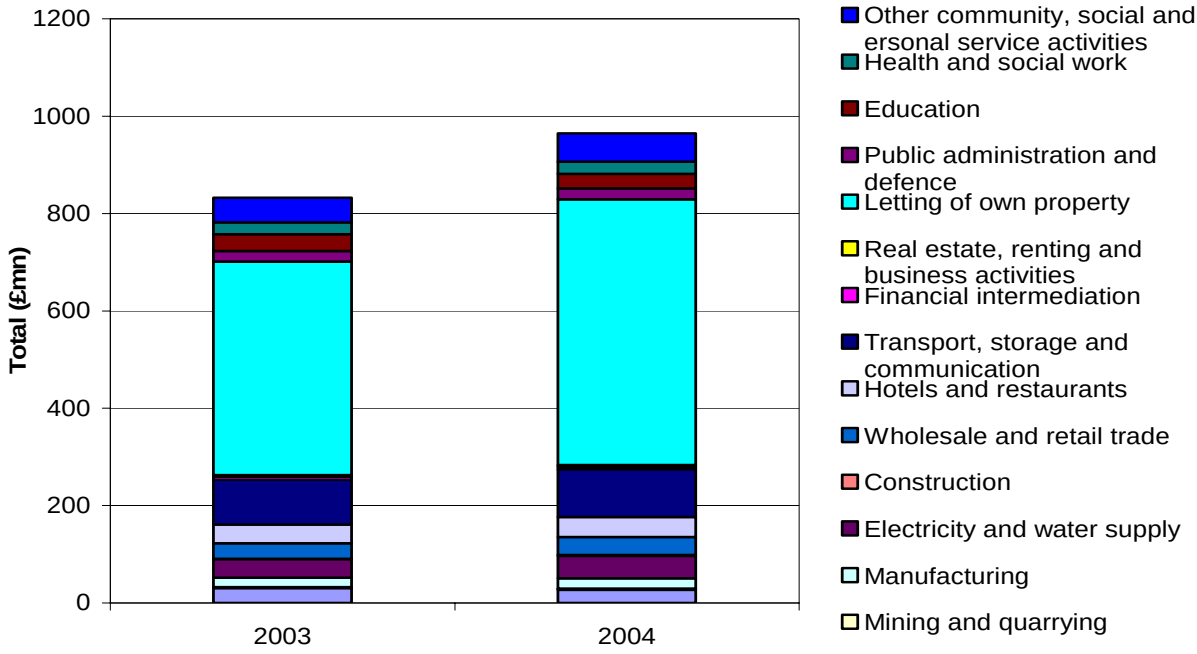

Figure 2.20. Output flow of new construction by category and economic activity (2003-2004)

2.6. The energy system of Cyprus

2.6.1. Electricity production

The energy system of Cyprus depends almost entirely on the imported fuels; 97% of Cyprus' primary energy supply needs originate from imported crude oil and final oil products. The transport sector consumes almost all the Gasoline and Kerosene imported, and 50% of diesel. Diesel is also used by all demand sectors. LPG is used in the domestic and services sectors, whereas coal and fuel oil are used only by industry. The principal fuel for electricity generation is heavy fuel oil. Concerning coal, there are no mining activities in Cyprus, but some small quantities are imported for cement production; no import restrictions are applied. In

general, solid fuels are not important for Cyprus. No gas is used for energy production in Cyprus, but studies have been carried out for the examination of import scenarios for the harmonisation with the requirements of the European Union.

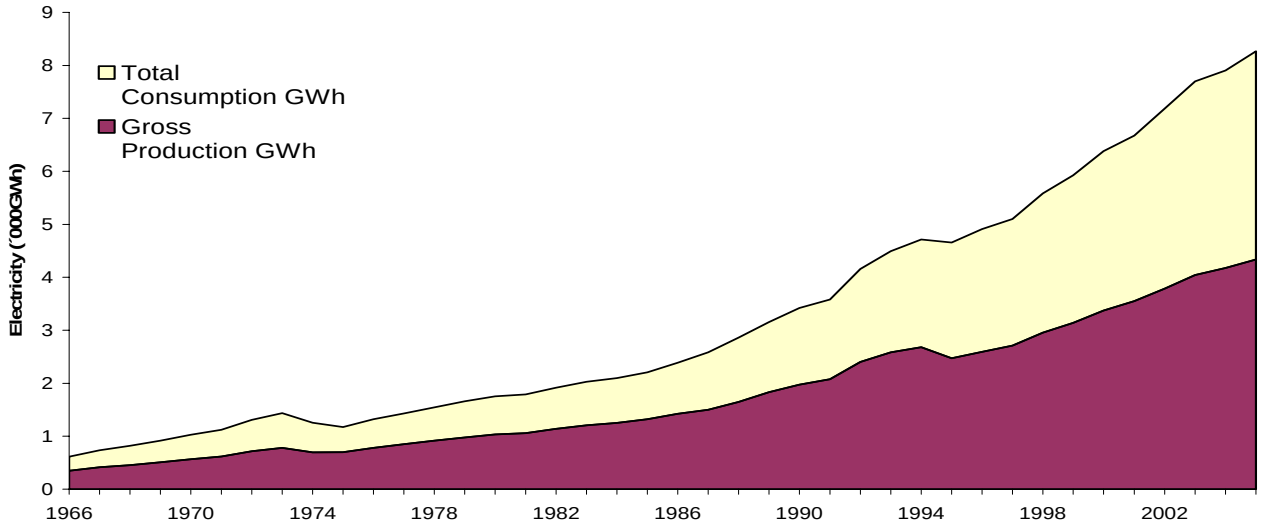

Figure 2.21. Total electricity production and consumption (1966-2005)

Wind energy has not been developed yet, but areas of interest have been identified. Similarly, biomass is not used as energy sources but has been examined as part of municipal solid waste management schemes. Some hydroelectric projects are present in certain areas of the island but only at pilot scale level. However, due to the water shortages faced during the last years, it appears to be a sector that will not develop significantly in Cyprus. According to the Electricity Authority of Cyprus (EAC), which is the only electricity generator and distributor in Cyprus, the total electricity consumption in 2005 was 3,741.8 GWh, of which the main consumers are the commercial sector (1,518,582 MWh) and the domestic sector (1,324,774 MWh) (Figures 2.21 and 2.22).

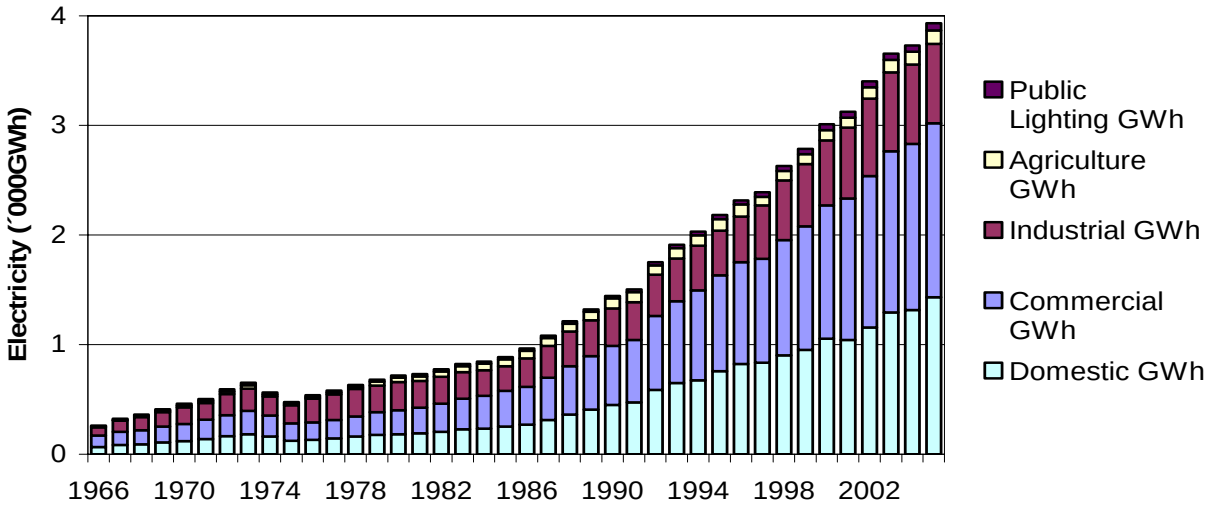

Figure 2.22. Total electricity consumption by category (1966-2005)

2.7. Waste

2.7.1. Solid wastes

The management of solid waste is a necessity for Cyprus, since environmental protection and public health must be secured and, moreover, the environmental policy of the European Union in this field must be adopted. Within this framework, the setting up of a mechanism for the continuous production of data on the generation and management of waste is a prerequisite.

Generation, collection and treatment of municipal waste

The increase in the population, the higher standard of living and the continuously rising numbers of tourists visiting the island had as a consequence the increase of the quantity of waste generated in Cyprus. From 1996 to 2003 there was a growth of the order of 22.9% in the amounts of municipal waste generated. In 2003, the total amount of municipal waste generated was 517,630 tons, recording an increase of 3.5% compared to 2002.

Of particular interest is examining the per capita generation of municipal waste, recording an increase of the order of 12.7% during the 1996-2003 period. In 2003, the per capita municipal waste generation reached 718 kg, one of the highest figures in Europe. The good management of the amounts of municipal waste generated is society's answer to the huge pressure on the environment. The choice of treatment techniques has considerable influence on the environment, though induced pollution may cause disturbances to the surroundings. One of the major problems results from the quantities of final waste subsequently generated.

In Cyprus, the main method of treating municipal waste is their disposal in landfills. Almost the whole amount of waste generated is placed in landfills after been collected by (mainly) the municipalities (Figure 2.3). Recycling, as a way of waste treatment, is still in a very early stage, with a very small proportion of waste destined for recycling, within the country or abroad. In 2003, in Cyprus, 90% of the municipal waste generated was collected by or on behalf of municipalities, by the traditional collection method (door to door collection of household waste). The remaining 10% was collected by the private sector, as separate collection of waste fractions. This specific amount of waste includes the small quantity that is recycled in the country, as well as the quantities that are exported for recycling purposes.

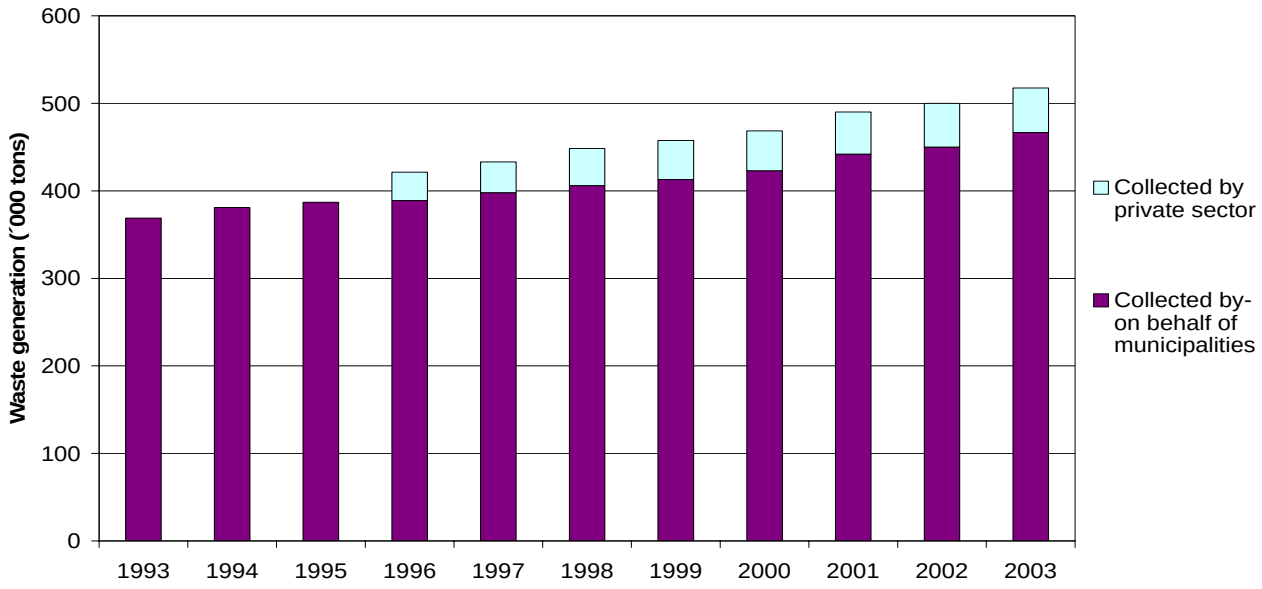

Figure 2.23. Collection of municipal waste (1993-2003)

Composition of municipal waste

The composition of municipal waste reflects household consumption patterns, closely linked to income and urbanization levels and to the overlapping in towns of services, shops and small enterprises whose waste is often mixed with that of households. The composition of municipal waste however does not exhibit noteworthy changes over the years. On average, for the period 1996 to 2003, the contribution of organic material varied around 37.7%, paper, paperboard and paper products at 27.1%, plastics at 11.2% and textiles at 6.1%. Over this period, a fall is observed in the share of organic material and a rise in the share of metals.

Municipal waste consists mainly of organic material and paper, with 38% and 27% respectively in 2003. Plastics and metals, even though having lower shares, are not negligible. In 2003, plastics represent 11% and metals 10% of the total. Textiles constitute 6% of the total, whereas 7% of the total of municipal waste corresponds to the category other waste, which also includes bulky objects (Figure 2.24).

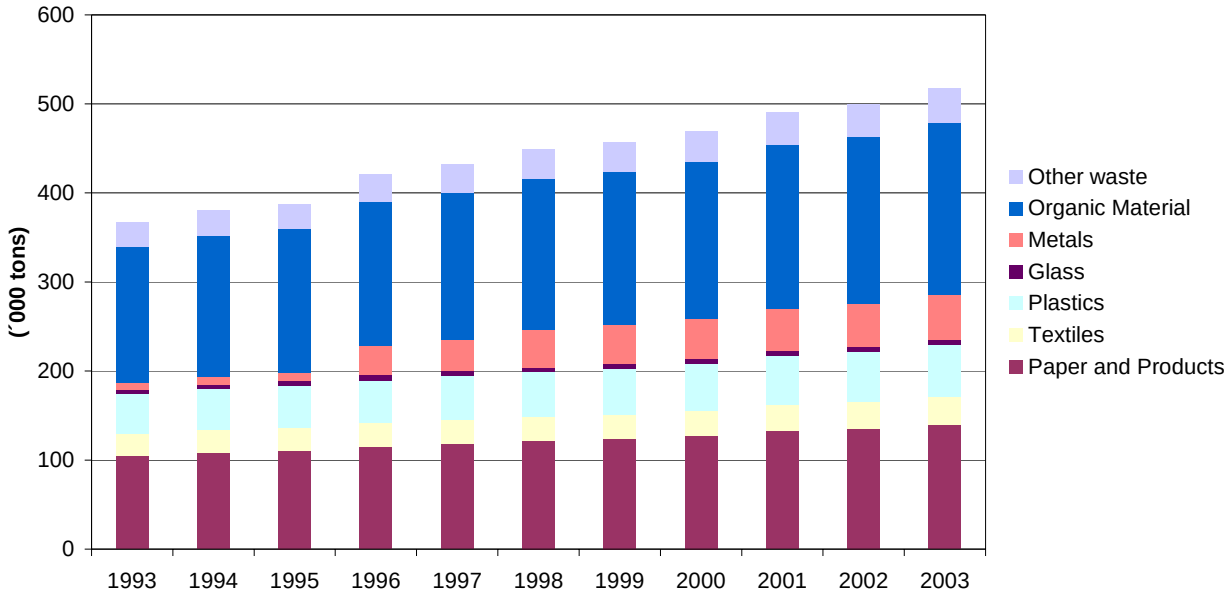

Figure 2.24. Composition of municipal waste (1993-2003)

Generation of waste by manufacturing industries

Waste may be generated by activities such as the extraction of metal ores, agriculture, forestry and manufacturing industries during the processing of raw materials into intermediate and final products. Waste may also be produced from other human activities like construction (including demolition), energy production, water distribution, wastewater treatment, and from the consumption of final products by households.

In Cyprus, data is available on the generation of waste by large industrial enterprises, which, however, are limited and referring to 1985. Data are derived from an ad-hoc survey carried out by the Department of Labour Inspection, which covered 12.4% of the enterprises in the manufacturing sector representing 32.5% of total employment in the sector. Most of the polluting enterprises were covered. However, results were not blown up so as to ascertain the total waste generated in the sector. The total amount of waste generated from manufacturing industries in Cyprus in 1985 was 84,080 tonnes. The contribution of food, beverages and tobacco industries is very significant and amounts to 62% of the total waste generated. Moreover, manufacture of non-metallic mineral products generates 25% of the total.

Generation of Hazardous waste

The production of hazardous waste refers to the categories of waste streams to be controlled under the Basel Convention. The Convention aims at introducing a system for controlling the export, import and disposal of hazardous wastes, so as to reduce the volume of such exchanges and protect human health and the environment. It defines 18 selected streams of hazardous waste according to a specific

nomenclature. Each country may add to the list other wastes listed as hazardous in its national legislation. The Convention came into force for the E.U. on 7 February 1994.

The Environment Service, which functions under the Ministry of Agriculture, Natural Resources and Environment, is the competent authority for the granting of permissions for the import and export of hazardous waste in Cyprus. The total amounts of hazardous waste are estimations. The Basel Convention nomenclature is being adopted. In 1997, the total amount of hazardous waste generated was estimated at around 52 thousand tonnes. In 2001, this amount reached 83,920 tonnes. The largest part (37,500 tonnes) was derived from the production and use of inks, dyes, pigments, paints, lacquers and varnish. Also, the amount of waste from the surface treatment of metals and plastics was 3,000 tonnes. Clinical wastes amounted to 450 tonnes.

The amounts of exports of hazardous waste are derived from the administrative records of the Environment Service on the granting of permissions for exporting hazardous waste. In 2003, the amount exported reached 2,060 tonnes, compared to 2,480 tonnes in 2001 and 5,510 tonnes in 1997.

2.7.2. Wastewater

The waste water produced by the various activities consuming water is a major source of pollution of the environment. Part of the waste water is collected in sewerage networks and then is either treated or directly rejected into the natural environment. Waste water treatment covers a group of processes, the aim of which is to render the effluents produced by the treatment of the sewage in conformity with the environmental standards in force or with other applicable quality standards. There are several types of treatment: primary, secondary and tertiary treatment.

Since the mid-1980's, the policy of the government of Cyprus has been to upgrade sanitary facilities, as the existing infrastructure in many areas could no longer meet sanitation needs. The problem has been addressed first within the urban and tourist areas and, to a lesser extent, within the rural areas. Presently, only part of the urban population and of the tourist areas are provided with centralized sewerage systems and biological treatment plants and there exists an ongoing construction programme for further expansion. It is estimated that about 35% of the national resident population is connected to the sewerage network. This waste water is undergoing tertiary treatment. The remaining 65% of the population has private treatment facilities, such as septic tanks.

3. Greenhouse gas inventory information

3.1. Overview

This section presents emissions estimates for the period 1990-2004 for carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) -greenhouse gases- as well as for other gases, contributing indirectly to the greenhouse effect, such as carbon monoxide (CO), oxides of nitrogen (NO_x), non-methane volatile organic compounds (NMVOCs) and sulfur dioxide (SO_2). Other greenhouse gases, such as HFCs, PFCs and SF_6 are not produced in Cyprus, while the emissions of these gases at the final consumption level have not been estimated yet due to lack of relevant data.

An overview of GHG emissions for the time period 1990-2004 is presented in Table 3.1. The detailed CRF trend tables are presented in Annex I. According to IPCC guidelines, carbon dioxide emissions from international marine and air transport have not been included in national totals and are reported separately in Table 3.2. Furthermore, carbon dioxide emissions from the use of biomass as a fuel have not been included in national totals. The long-term sum GHG emissions are presented in Table 3.3.

3.1.1. Considerations

- geographical speciation
- due to lack of data, emissions of HFCs, PFCs and SF6 have not been estimated from the consumption of products containing them (i.c. air-conditioning, refrigerators, insulators, etc)
- emissions from international air and sea transportation are not included in the national inventory, but listed separately (Table 3.2).
- The team by which the inventory was performed changed in 1999.

3.1.2. Emissions

The data collected for 1990 – 2004, has shown that from 1990 to 2004 the emissions of carbon dioxide have increased by 79.5%. With reference the emissions of 1990, methane and nitrous oxide emissions have also increased by 34.7% and 63.6% respectively.Comparing the emissions of 2004 with 2003 however, CO_2 has increased by 4.2%, N_2O by 3.5%, while the rest of the compounds have reduced: CO by 44.2%, CH_4 by 3.5%, NO_x by 15.8%, NMVOCs by 14.5% and SO_2 by 0.2%. The actual amounts emitted for each as and the comparison between years is shown in Table 3.1.

Table 3.1. Total GHG and other gases emissions (in kt) for the period (a) 1990-1998; (b) 1999-2004

(a)

GAS	1990	1991	1992	1993	1994	1995	1996	1997	1998
CO_2	4640.2	4737.9	5265.2	5556.2	5575.9	5575.7	5866.0	5933.5	6387.2
CH_4	33.9	34.4	36.2	37.2	37.7	38.6	38.7	38.7	38.8
N_2O	2.2	2.2	2.5	2.7	2.7	2.6	2.8	2.8	3.0
NO_x	14.5	14.7	16.5	17.0	18.4	17.7	18.9	19.4	19.7
CO	88.2	86.4	92.9	93.6	96.1	97.3	96.6	95.5	93.3
NMVOCs	11.8	14.2	15.3	15.4	15.4	15.7	15.4	15.2	15.4
SO_2	36.6	35.4	40.8	42.4	46.2	43.8	46.3	47.8	50.7
HFCs	NE	NE	NE	NE	NE	NE	NE	NE	NE
PFCs	NE	NE	NE	NE	NE	NE	NE	NE	NE
SF6	NE	NE	NE	NE	NE	NE	NE	NE	NE

(b)

GAS	1999	2000	2001	2002	2003	2004	1990-04	03-04
CO_2	7236.6	7517.8	7422.3	7771.7	7996.0	8329.4	79.5 %	4.2 %
CH_4	41.3	42.1	44.3	45.9	47.3	45.6	34.7 %	-3.6 %
N_2O	3.1	3.2	3.1	3.4	3.5	3.6	63.6 %	3.5 %
NO_x	20.7	21.6	21.4	22.2	20.9	18.4	-26.7 %	-12.0 %
CO	92.0	87.8	87.2	83.8	84.0	45.8	-48.0 %	-45.4 %
NMVOCs	16.1	16.0	15.8	16.0	15.8	13.5	14.5 %	-14.5 %
SO_2	53.9	52.5	49.9	50.7	45.4	45.4	24.0 %	0.0 %
HFCs	NE	NE	NE	NE	NE	NE		
PFCs	NE	NE	NE	NE	NE	NE		
SF6	NE	NE	NE	NE	NE	NE		

Even though the emissions caused by the international transportation should not be included in the inventories of the countries (Table 3.2), it is worth noting the reduction that occurs in emissions, especially between 2003 and 2004.

Table 3.2. GHG and other gases emissions from international transport for the period (a) 1990 - 1998; (b) 1999-2004

(a)

GAS	1990	1991	1992	1993	1994	1995	1996	1997	1998
CO_2	933.55	752.10	962.34	886.39	939.21	1034.46	1062.33	1079.08	1115.35
CH_4	0.08	0.07	0.08	0.07	0.07	0.09	0.10	0.10	0.10
N_2O	0.02	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03
NO_x	7.71	6.61	7.74	6.84	7.73	8.61	9.87	10.43	10.80
CO	2.86	2.38	2.93	2.83	3.03	3.27	3.34	3.46	3.52
NMVOCs	0.98	0.8	1.01	0.96	1.01	1.1	1.11	1.13	1.16
SO_2	3.05	2.96	3.12	2.82	3.74	4.13	5.01	5.54	5.22

(b)

GAS	1999	2000	2001	2002	2003	2004	1990-04	03-04
CO_2	1339.82	1476.85	1668.86	1412.63	1461.11	1094.7	17.3 %	- 25.1 %
CH_4	0.11	0.12	0.14	0.12	0.12	0.12	0%	0%
N_2O	0.04	0.04	0.05	0.04	0.04	0.04	0%	0%
NO_x	NE	NE	NE	NE	NE	NE	NA	NA
CO	NE	NE	NE	NE	NE	NE	NA	NA
NMVOCs	NE	NE	NE	NE	NE	NE	NA	NA
SO_2	NE	NE	NE	NE	NE	NE	NA	NA

Table 3.3 and Figure 3.1 show the GHG emissions in CO_2 equivalence, allowing comparison to be made on the amounts emitted.

Table 3.3. GHG emissions (CO_2, CH_4, N_2O) in kt CO_2 eq using 1990 emissions as basis for comparison for (a) 1990 – 1998 and (b) 1999 - 2004

(a)

GAS	1990	1991	1992	1993	1994	1995	1996	1997	1998
CO_2	4617.7	4688.6	5204.2	5500.4	5503.8	5499.8	5779.4	5830.0	6267.4
CH_4	711.3	722.9	760.7	781.5	792.1	811.3	812.5	813.0	814.2
N_2O	681.6	693.4	783.5	828.6	840.5	820.4	864.9	876.4	934.6
SUM	6010.6	6104.9	6748.4	7110.4	7136.4	7131.5	7456.8	7519.4	8016.2
(1990=100)	100.0	101.6	112.3	118.3	118.7	118.6	124.1	125.1	133.4

(b)

GAS	1999	2000	2001	2002	2003	2004
CO_2	7116.8	7400.6	7302.6	7652.0	7876.2	8209.6
CH_4	866.8	884.1	930.4	963.6	993.2	958.0
N_2O	962.4	987.1	969.6	1039.8	1076.1	1113.5
SUM	8946.0	9271.8	9202.5	9655.4	9945.5	10281.1
(1990=100)	148.8	154.3	153.1	160.6	165.5	171.0

Base year GHG emissions (1990) were estimated at 6010.6 kt CO_2 eq. Given that LULUCF was a net sink of GHG emissions in 1990 (and for the rest of the reporting period) the relevant emissions / removals are not considered in estimating base year emissions for Cyprus.

The total emissions of the three greenhouse gases (CO_2, CH_4 and N_2O) during the period 1990-2004 increased by 71 % (Figure 3.1). Total emissions do not include absorption/emissions of CO_2 from land use change and forestry, nor emissions from the use of the other three greenhouse gases (HFCs, PFCs and SF_6). The emissions of the latter were not estimated due to the lack of sufficient data. It should also be noted that there is no production of these three gases in Cyprus. Total emissions by activity area are presented in Figure 3.2.

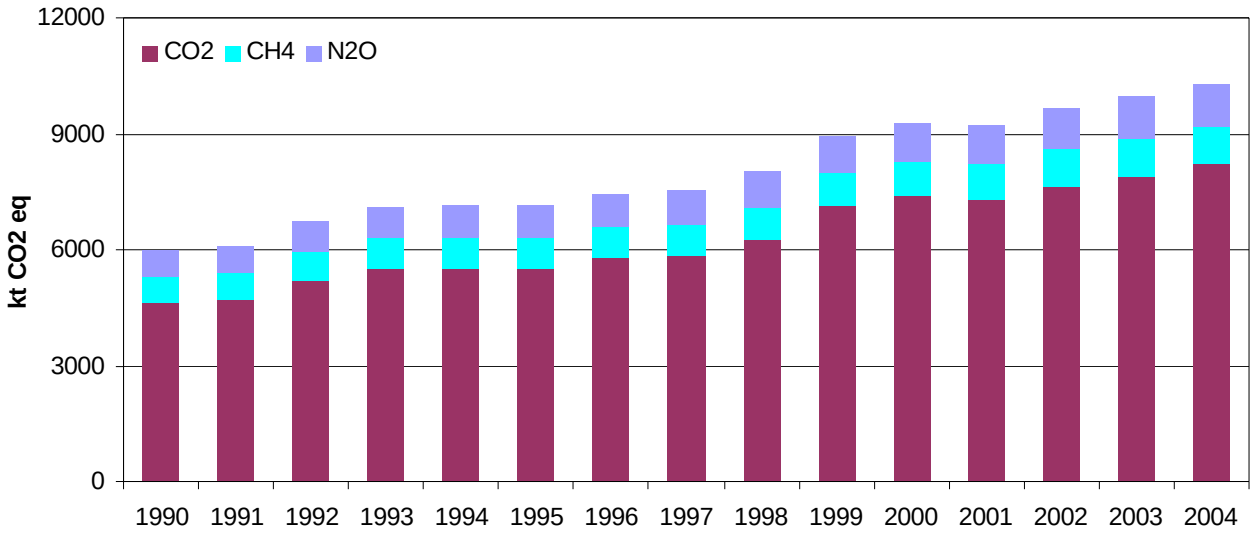

Figure 3.1. Greenhouse gases emissions (in kt of CO_2 equivalent) for the period 1990-2004

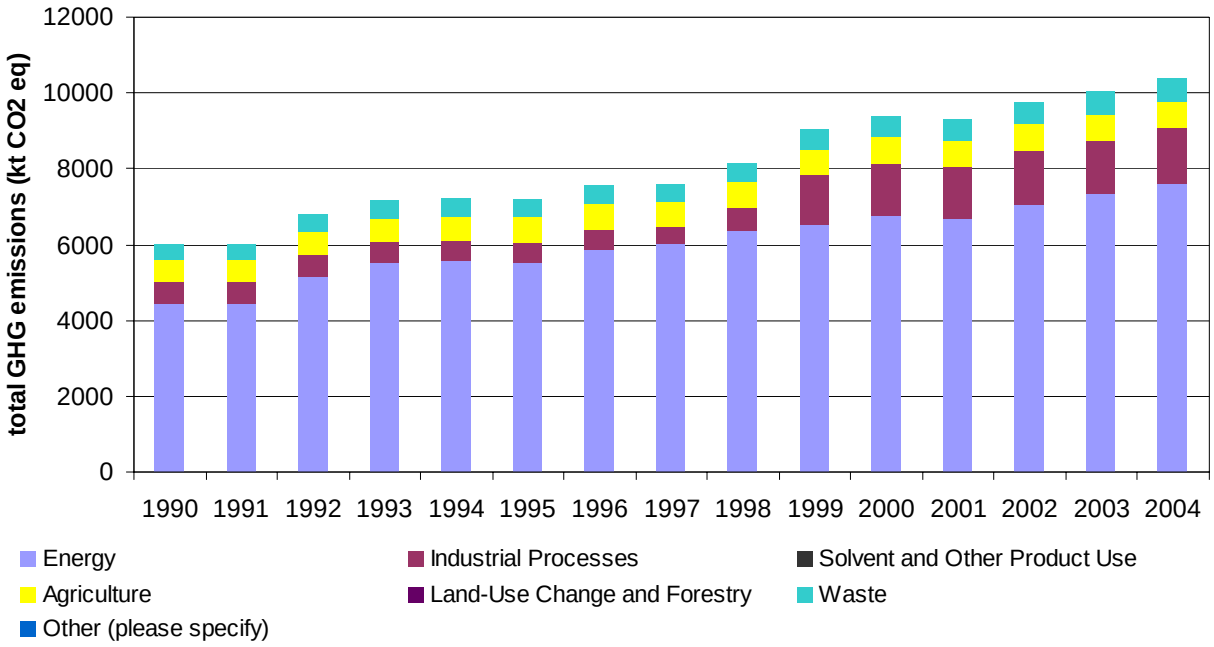

Figure 3.2. Greenhouse gases emissions (in kt of CO_2 equivalent) by activity area for the period 1990-2004

GHG emissions trends (excluding LULUCF) are mainly driven by economic development (Figure 3.3). As expected, emissions and energy consumption follow the same pattern, since that energy is the main source of GHG emissions. The GHG emissions are directly linked to the GDP and population increase and this is clearly illustrated in the figure 3.3 below. Concerning the contribution of the sectors, the activities related to energy are the primary source of GHG emissions (74% in CO_2 equivalents for 2004). These mainly consist of CO_2 and N_2O emissions from fossil fuel combustion (89.9% and 9.9% respectively for 2004), and a small

percentage of methane (0.2%) mainly originating from combustion, production, storage and distribution of fossil fuels.

Other sectors such as agriculture industrial activities, wastes and use of solvents contribute to the remaining 26% of the emissions. Agricultural emissions mainly consist of methane from animal stockbreeding, while nitrous oxide is also emitted from animal waste management and agricultural land. Methane emissions from municipal solid waste come from the solid waste management and the municipal wastewater treatment. Concerning the industrial activities, CO_2 emissions originate form the production of cement and lime.

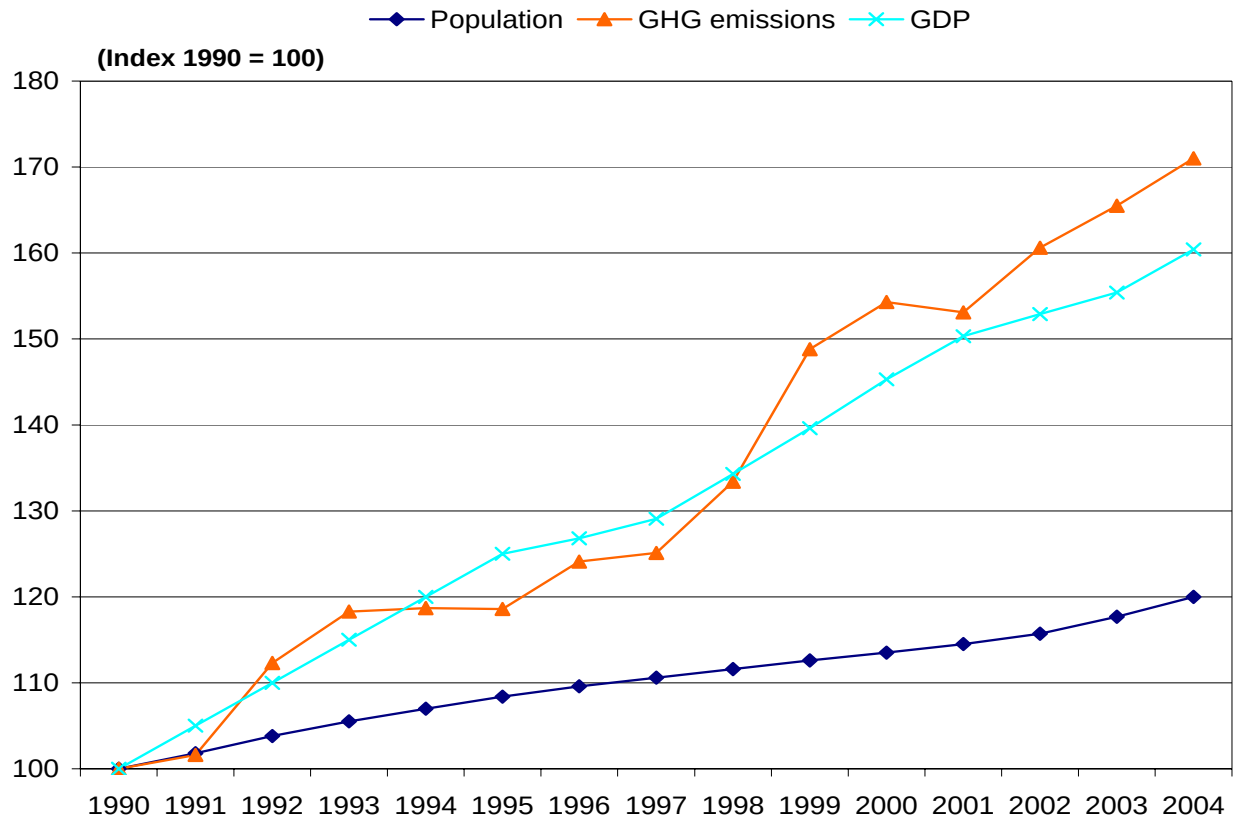

Figure 3.3. Factors underlying GHG emissions trends

The overall trends in cumulative gas productions according to the emissions for 1990 to 2004 are shown in Figure 3.4. As it can be seen from the figure, overall, CO, NMVOCs, NO_x, CH_4 and SO_2 are decreasing and N_2O, CO_2 are increasing.

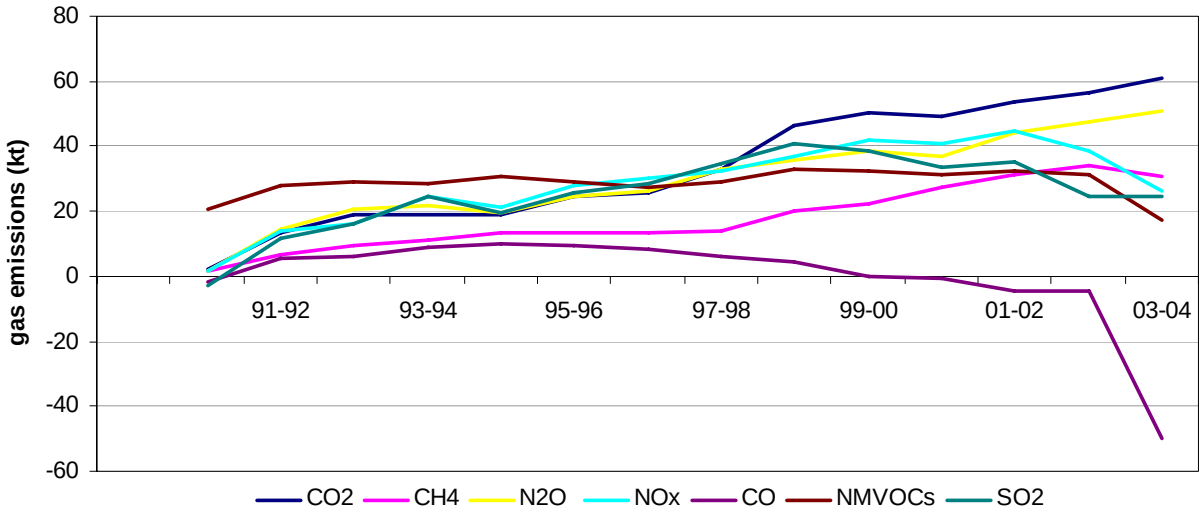

Figure 3.4. Cumulative changes in gas emissions of carbon dioxide, methane, nitrous oxide, nitrogen oxides, carbon monoxide, non – methane volatile organic compounds and sulphur dioxide for years 1990 to 2004

3.2. Methodology

3.2.1. Carbon Dioxide (CO_2)

For the estimation of carbon emitted to the atmosphere from the combustion of mineral fuels, the reference approach proposed by the IPCC and the sectoral approach - based on the methodology of the CORINAIR programme - were used. The statistical data used was derived from the Statistical Service of the Ministry of Economy, the Ministry of Commerce, Industry and Tourism, as well as from various studies elaborated in Cyprus on behalf of public services.

3.2.2. Other gases

The sectoral approach of the CORINAIR programme was used, together with statistical data provided by the Statistical Service of the Ministry of Economy, as well as by other Ministries and public authorities. For the selection of emission factors, apart from the revised guidelines of the IPCC ("*Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*", 1997) and those of CORINAIR ("*Emission Inventory Guidebook*", 1999), other sources were examined, such as:

- EPA AP-42 ("*Compilation of Air Pollutant Emission Factors AP-42*", 1995)
- EPA-FIRE ("*FIRE: Factor Information Retrieval System. Version 6.23*", 1999)
- EU/DG XVII ("*NOx, SO_2, CH_4 and N_2O emissions on the basis of the four long term energy scenarios of DG XVII*", 1996).

3.2.3. Global Warming Potential (GWP)

Emissions from anthropogenic activities affect the concentration and dispersion of greenhouse gases in the atmosphere. Such changes cause modifications to the energy balance (and radiation) on the earth's surface and on the lower layer of the atmosphere, changing either the reflection or the absorption of infrared radiation. A simple index for the impact that the various greenhouse gases have on greenhouse effect is the G.W.P. (Global Warming Potential) index. This index is defined as the total cumulative (for a certain time period) impact, which is generated from the mass unit of each gas emitted today, with respect to the impact generated by a respective amount of a reference gas. The values of the G.W.P. for the major greenhouse gases, as proposed by IPCC are presented in Table 3.4.

Table 3.4. Global Warming Potential (in equivalent tons of CO_2 emissions per ton of gas) of greenhouse gases (time horizon: 100 years).

GAS		G.W.P.
Carbon dioxide (CO_2)		1
Methane (CH_4)		21
Nitrous oxide (N_2O)		310
HFCs	HFC-23	11700
	HFC-125	2800
	HFC-134a	1300
	HFC-143a	3800
	HFC-152a	140
	HFC-227ea	2900
	HFC-236fa	6300
	HFC-4310mee	1300
PFCs:	CF_4	6500
	C_2F_6	9200
	C_4F_{10}	7000
	C_6F_{14}	7400
SF_6		23900

G.W.P. values for other gases (NO_x, CO, NMVOCs) are not provided by IPCC (nor from any other source for this purpose), because for the time being it is not possible to estimate the indirect impacts of these gases, as there is not an adequate definition of their chemical reactions that take place in the atmosphere.

3.3. Evolution of emissions trends per sector

The results from the calculations made for the GHG emissions by sector are presented in Table 3.5, and the sectoral contribution to the total GHG emissions for 1990 to 2004 in Figure 3.5.

Table 3.5. Total GHG emissions (in Mt CO_2 eq) by sector for the years 1990-2004

	1990	1991	1992	1993	1994	1995
Energy	4452.86	4452.86	5153.95	5502.00	5556.78	5541.75
Industrial Processes	570.52	570.52	566.55	547.85	530.82	514.95
Solvent and Other Product Use	2.29	2.29	2.41	2.45	2.49	2.51
Agriculture	570.62	570.62	621.62	645.22	639.48	663.50
Land-Use Change and Forestry	-18.90	-18.90	-57.52	-52.26	-68.56	-72.33
Waste	433.23	433.23	461.37	465.15	475.44	481.11
Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	6010.62	6010.62	6748.38	7110.41	7136.45	7131.49

	1996	1997	1998	1999	2000	2001
Energy	5865.31	6012.27	6364.20	6498.85	6762.53	6664.58
Industrial Processes	513.48	458.04	604.61	1347.41	1392.49	1375.20
Solvent and Other Product Use	2.54	2.56	2.59	2.59	2.59	2.59
Agriculture	684.58	666.00	671.72	666.86	671.85	695.59
Land-Use Change and Forestry	-83.08	-99.95	-116.22	-116.22	-116.22	-116.22
Waste	473.97	480.48	489.30	546.52	558.58	580.80
Other (please specify)	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	7456.80	7519.40	8016.21	8946.01	9271.82	9202.54

	2002	2003	2004
Energy	7073.37	7338.07	7612.77
Industrial Processes	1386.32	1383.52	1480.16
Solvent and Other Product Use	2.59	2.59	2.59
Agriculture	718.44	721.78	671.72
Land-Use Change and Forestry	-116.22	-116.22	-116.22
Waste	590.84	615.76	630.02
Other (please specify)	0.00	0.00	0.00
TOTAL	9655.35	9945.51	10281.05

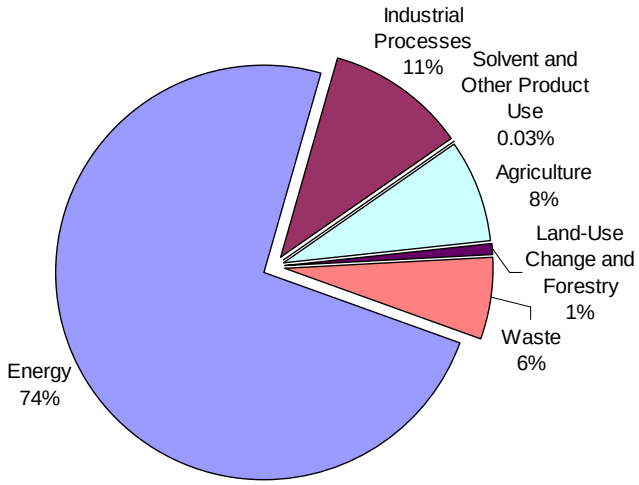

Figure 3.5. Contribution of activity sectors to total GHG emissions during 1990 and 2004

Emissions caused by the sector of Energy for 2004 accounted for 74% of total GHG emissions, corresponding to an increase of 71% in comparison to 1990 levels, and 3.4% in comparison to 2003. The sector with the greatest increase of emissions since 1990 is industry, showing an increase of 159% in comparison to 1990 and 7% in comparison to 2003. A large decrease however, has been achieved by the land use changes and forestry. Moreover, agricultural emissions even though have increased by 17.7% between 1990 and 2004, have reduced by 7% between 2003 and 2004. Table 3.5 shows the contribution of the sectors to the total emissions produced annually.

Table 3.6. Contribution of sectors to the total emissions produced annually for 1990-2004

	Energy	Industrial Processes	Solvent and Other Product Use	Agriculture	Land-Use Change and Forestry	Waste
1990	74.1%	9.5%	0.04%	9.5%	-0.3%	7.2%
1991	74.1%	9.5%	0.04%	9.5%	-0.3%	7.2%
1992	76.4%	8.4%	0.04%	9.2%	-0.9%	6.8%
1993	77.4%	7.7%	0.03%	9.1%	-0.7%	6.5%
1994	77.9%	7.4%	0.03%	9.0%	-1.0%	6.7%
1995	77.7%	7.2%	0.04%	9.3%	-1.0%	6.7%
1996	78.7%	6.9%	0.03%	9.2%	-1.1%	6.4%
1997	80.0%	6.1%	0.03%	8.9%	-1.3%	6.4%
1998	79.4%	7.5%	0.03%	8.4%	-1.4%	6.1%
1999	70.6%	14.6%	0.03%	7.2%	-1.3%	5.9%
2000	73.5%	15.1%	0.03%	7.3%	-1.3%	6.1%
2001	72.4%	14.9%	0.03%	7.6%	-1.3%	6.3%
2002	73.3%	14.4%	0.03%	7.4%	-1.2%	6.1%
2003	73.8%	13.9%	0.03%	7.3%	-1.2%	6.2%
2004	74.0%	14.4%	0.03%	6.5%	-1.1%	6.1%

3.3.1. Energy sector

A percentage of 57.7% of the emissions released by the sector of energy for 2004 are from the energy industries, corresponding to an increase of 11.1% in comparison to the emissions of 1990 and 0.4% in comparison to 2003. Following is the sub-sector of transport with 26.9% in 2004, 25.5 % in 2003 and 21.9% in 1990. Other energy sub-sectors contributing to the GHG emissions are the manufacturing industries and construction with 7.1% in 2004 (in comparison to 7.7% and 17.8% for 2003 and 1990 respectively), and the others category which includes tertiary sector etc., with 8.3% in 2004, 14.1% in 1990 and 9.5% in 2003. Fugitive Emissions from Fuels depends only on the consumption of oil and natural gas. These contribute steadily 0.01% since 1990. The comparison between years for all energy sub-sectors is illustrated in Figure 3.6.

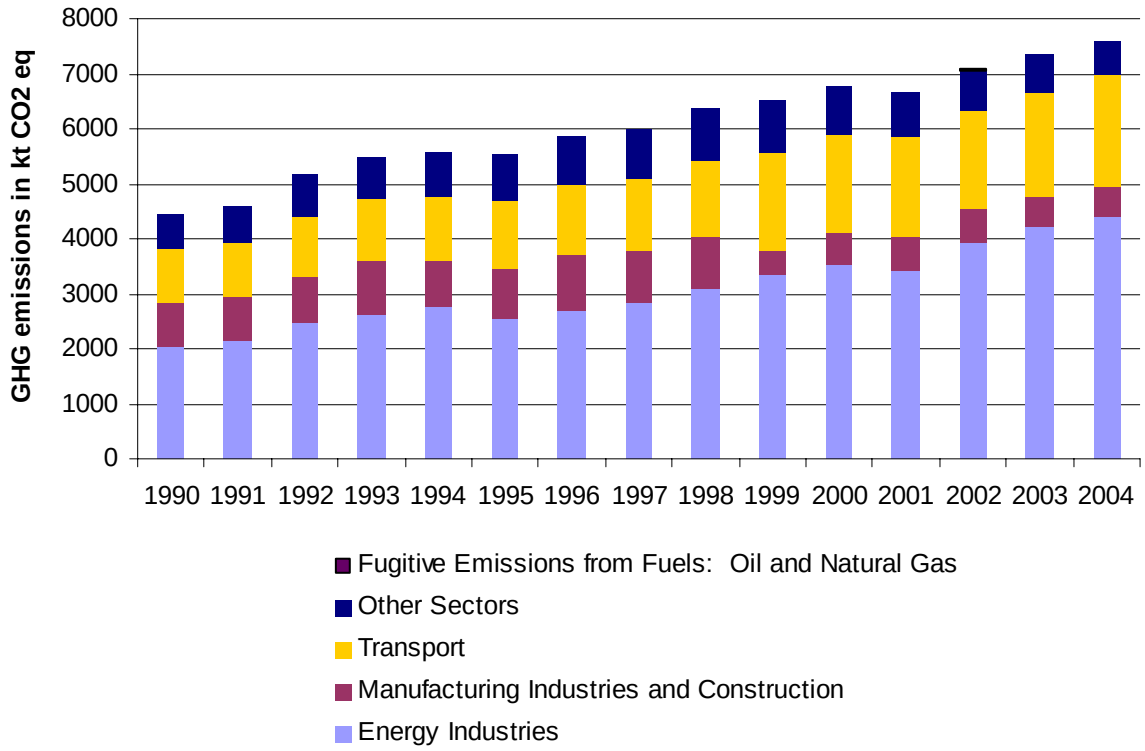

Figure 3.6. Contribution of activity sub-sectors to total GHG emissions to the sector of energy during 1990 and 2004

3.3.2. Industrial processes and construction

The emissions of industrial processes come mainly from the production of mineral products, cement and lime. The contribution to the total GHG emissions in 2004 was 14.4% showing an increase of 159% in comparison to 1990 and 7% compared to 2003. The trend from 1990 to 2004 is displayed in Figure 3.7.

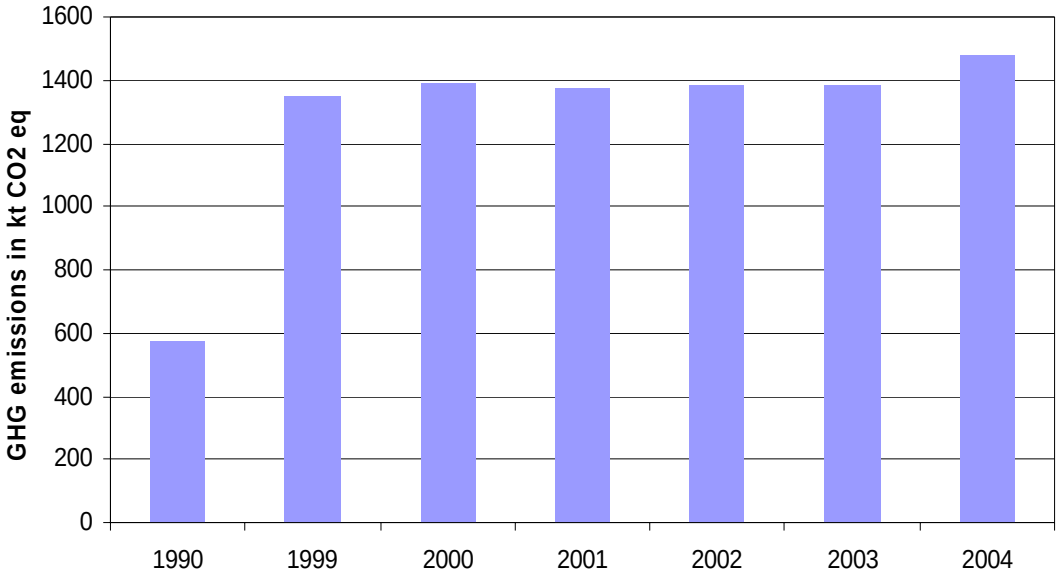

Figure 3.7. Industrial processes and construction GHG emissions during 1990 and 2004

3.3.3. Solvent and other product use

The use of solvents and other products caused an increase of total GHG emissions in CO2 equivalents in the order of 13.1% from 1990 to 2004. The emissions caused by solvents and other product use contribute by 0.03% to the total emissions of 2004 and 2003 in comparison to 0.04% of the emissions in 1990.

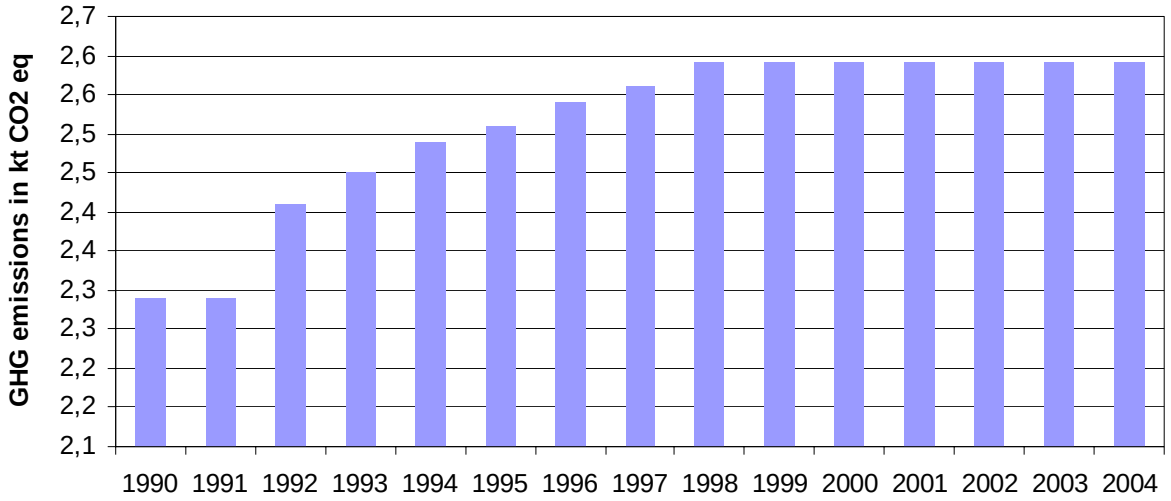

Figure 3.8. Contribution of solvents and other products use to GHG emissions during 1990 and 2004

3.3.4. Agriculture

In 2004, the total GHG emissions from agriculture were produced by the sub-sectors of Enteric Fermentation (25%), Manure Management (35%) and Agricultural Soils (39%). In comparison to 2003, Enteric Fermentation and Manure Management showed a decrease of 16% and 6.6% respectively, while the emissions from Agricultural Soils did not change.

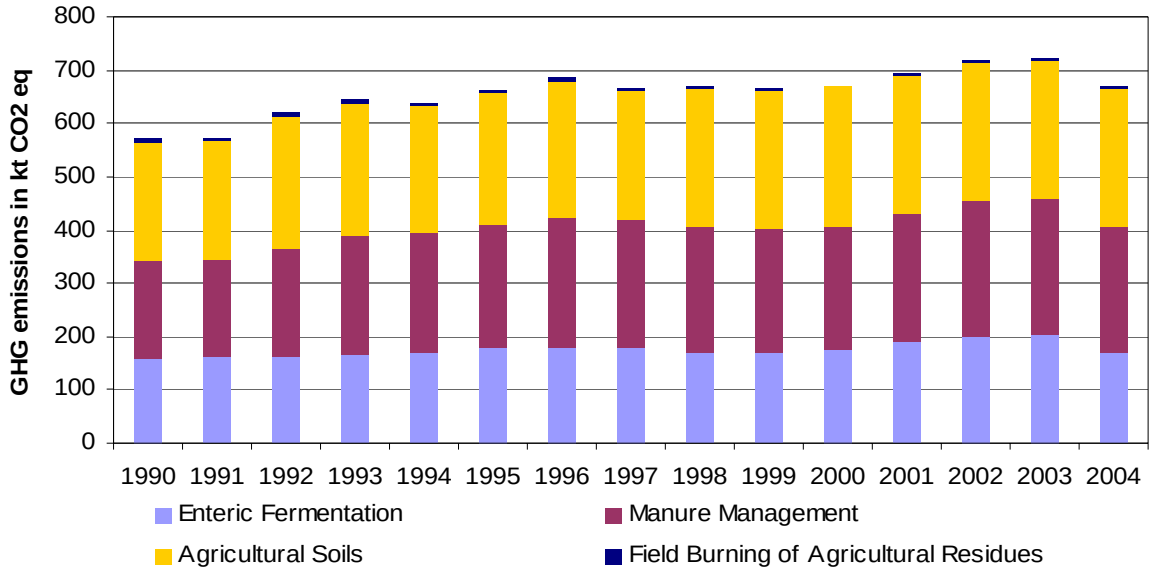

Figure 3.9. Agricultural activities causing GHG emissions and their contribution during 1990 and 2004

In comparison to 1990 base values, the emissions originating from Enteric Fermentation increased by 7%, Manure Management by 31%, Agricultural Soils by 15%, while emissions from Field Burning of Agricultural Residues reduced by 36%.

3.3.5. Land-use change and forestry

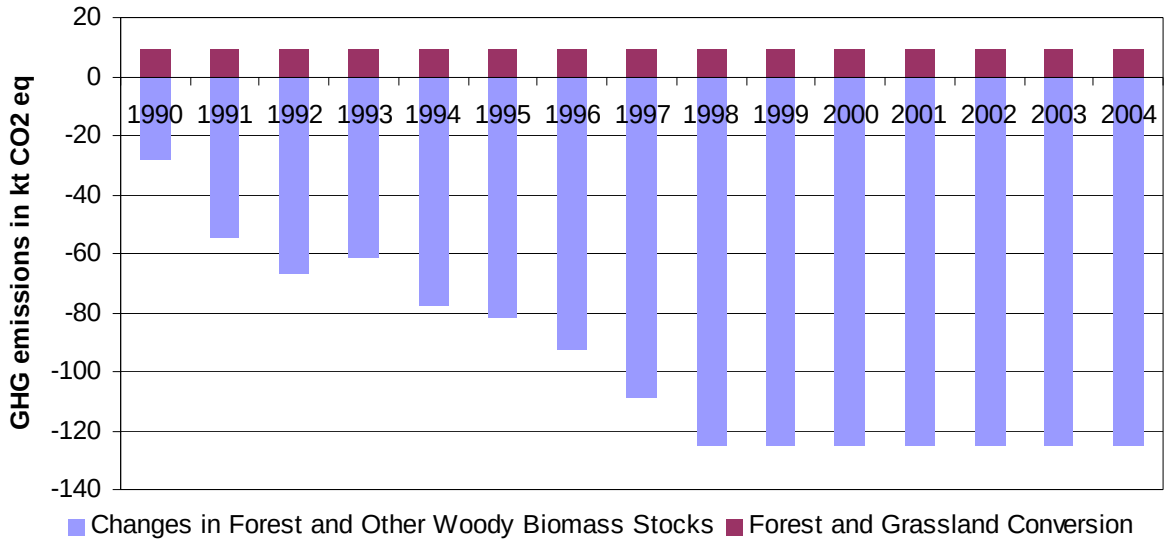

Figure 3.10. Land-use and forestry GHG emissions during 1990 and 2004

The reduction of emissions caused by change of land use increased by 35% between 1990 and 2004. Due to lack of information it is assumed that is constant at 1998 levels.

3.3.6. Waste sector

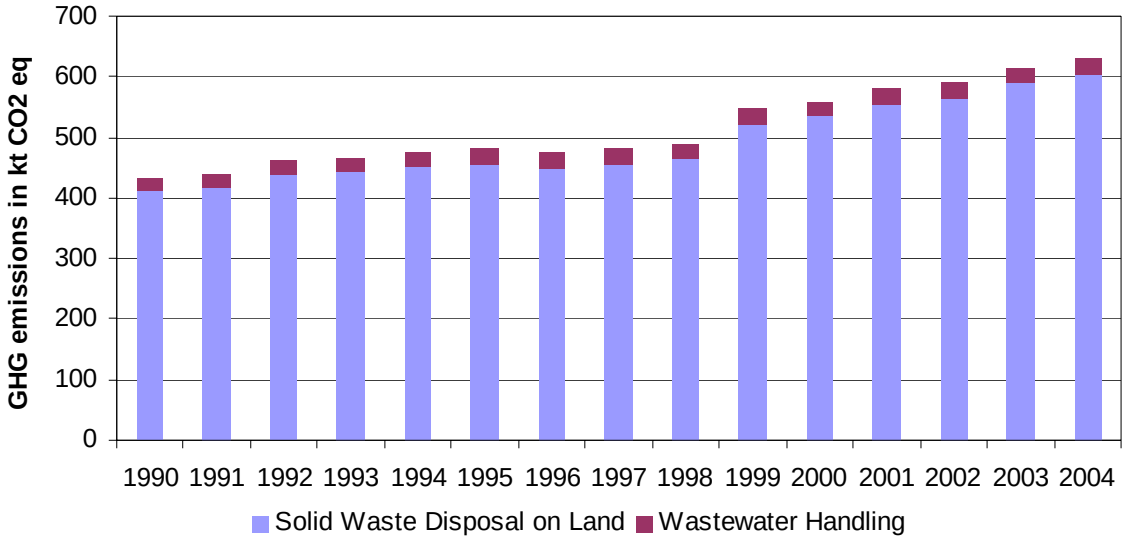

Figure 3.11. Waste sector total GHG emissions during 1990 and 2004

Solid Waste Disposal on Land and Wastewater Handling are the contributors to GHG emissions for the sector of waste, by 96% and 4% respectively for 2004. Comparing 2004 to 2003 there is no change for Wastewater Handling emissions, while Solid Waste Disposal increased by 2.4%. In comparison to 1990 emissions, Solid Waste Disposal on Land increased by 47% and Wastewater Handling by 12.5%.

3.4. Evolution of emissions trends per gas

3.4.1. Carbon dioxide emissions

Carbon dioxide is the most important greenhouse gas in Cyprus, representing 80.1% of total greenhouse gases emissions in 2004. Since 1990, carbon dioxide emissions continuously increase, on the exception of the years 1994 and 1995, when there was a stabilization of emissions due to the significant reduction of electricity supply to the occupied area. (note: the percentage of total electricity production, which is supplied to the occupied area , was reduced from 16.3% in 1990 to 14.7% in 1994, 2.3% in 1995, 0.2% in 1998 and 0% in 2004). In 2004, CO_2 emissions were 8.3 Mt, compared to 4.6 Mt in 1990, presenting a total increase of 79.5% (Figure 3.12).

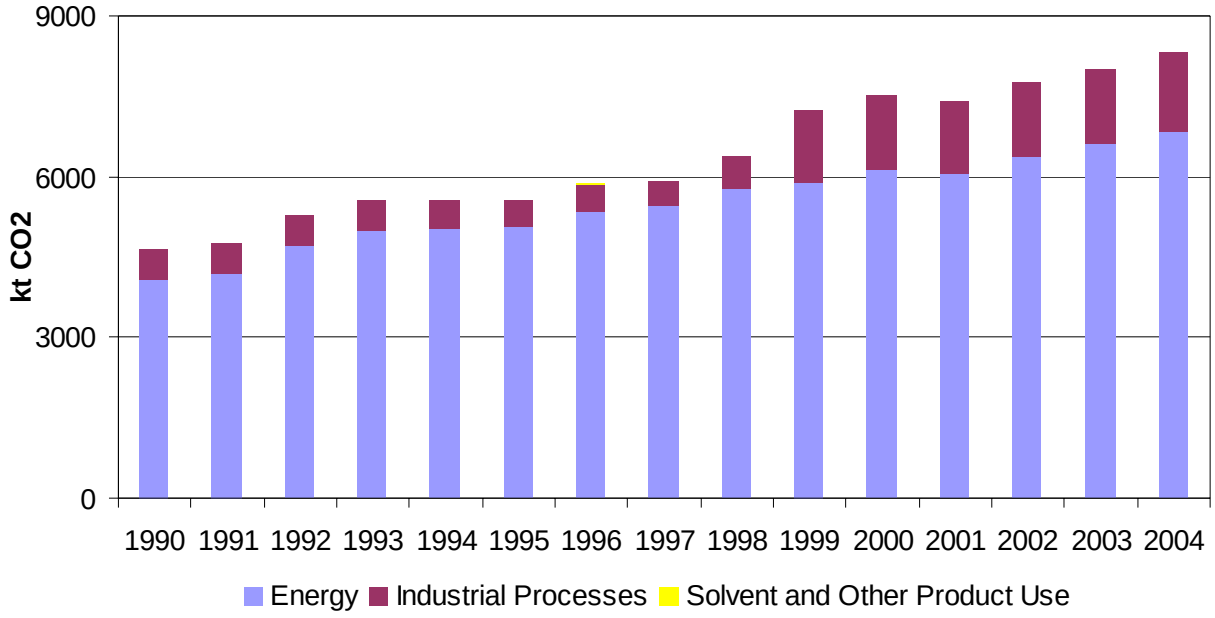

Figure 3.12. CO_2 emissions by activity area produced for the years 1990-2004

The combustion of fossil fuels is responsible for 82% of total CO_2 emissions for 2004, while the remaining 18% is generated from industrial processes (production of cement and lime) and the use of solvents (negligible amount, approximately 0.03% for 2004). Regarding CO_2 emissions from combustion, approximately 54% of the total emissions in 2004 originate from electricity generation, 7.7% from industry and construction, approximately 29% from transport and 9% other sectors which include the residential, commercial, public sector and agriculture, and the refinery. As is can be seen in Table 3.7, the emissions produced in 2003 where broken down in approximately 54% for energy, 27.5% for transport, 10.2% for other sectors and 8.3% for manufacturing industries and construction. Compared to 1990 though, the amount released by industries and construction was more than double (18.9% in comparison to 8.3% for 2004). This can be explained by the change in the structure of the economy faced in Cyprus in the last years that the number of industries operating is reduced substantially due to the high personnel and operational costs.

Table 3.7. % Contribution to CO_2 Emissions from energy sector

CO_2 Emissions from energy sector (%)	1990	2003	2004
1. Energy Industries	42.7	53.9	54.1
2. Manufacturing Industries and Construction	18.9	8.3	7.7
3. Transport	23.5	27.5	29.2
4. Other Sectors	14.8	10.2	9.0

3.4.2. Methane emissions

Methane contributed by 9% in total greenhouse gases emissions in 2004, reaching 957.98 kt of CO_2 equivalent. Methane emissions increased by approximately 34.75% in 2004, compared to 1990 levels (1990: 711.32 kt of CO_2 equivalent), but decreased by 3.5% compared to 2003 emissions. The sector of waste is the larger anthropogenic source of methane emissions and is responsible for approximately 60% of total methane emissions in 2004, compared to 61% in 1990 and 62% in 2003. The agricultural sector is the second most important source of emissions and is responsible for 32% of the total emissions, a portion which is smaller than 2003 (36%) and 1990 (37%) emissions. Figure 3.13 presents methane emissions by activity area for the years 1990-2004.

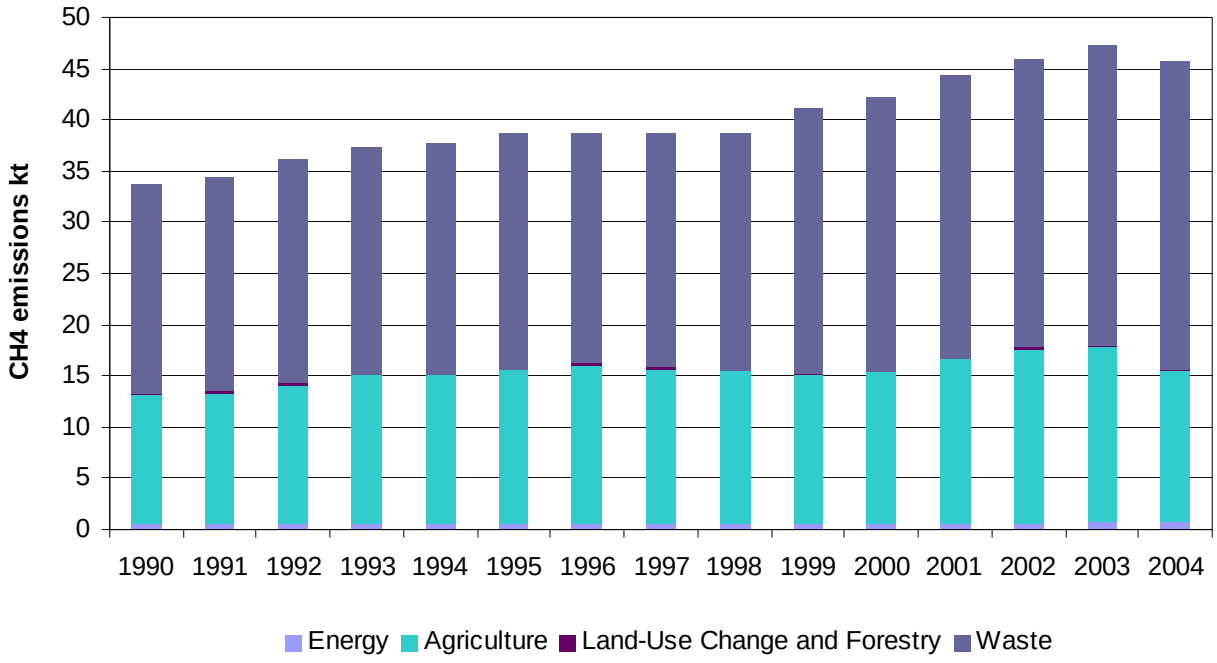

Figure 3.13. Methane emissions by activity area for the years 1990-2004

3.4.3. Nitrous oxide emissions

Nitrous oxide emissions contribute by approximately 11% of the total emissions in 2004, reaching 1113.48 kt of CO_2 equivalent in 2004, presenting an increase by approximately 64.5% compared to 1990 and 4.2% compared to 2003 (1076.1 kt CO_2 equivalent) (Figure 3.14).

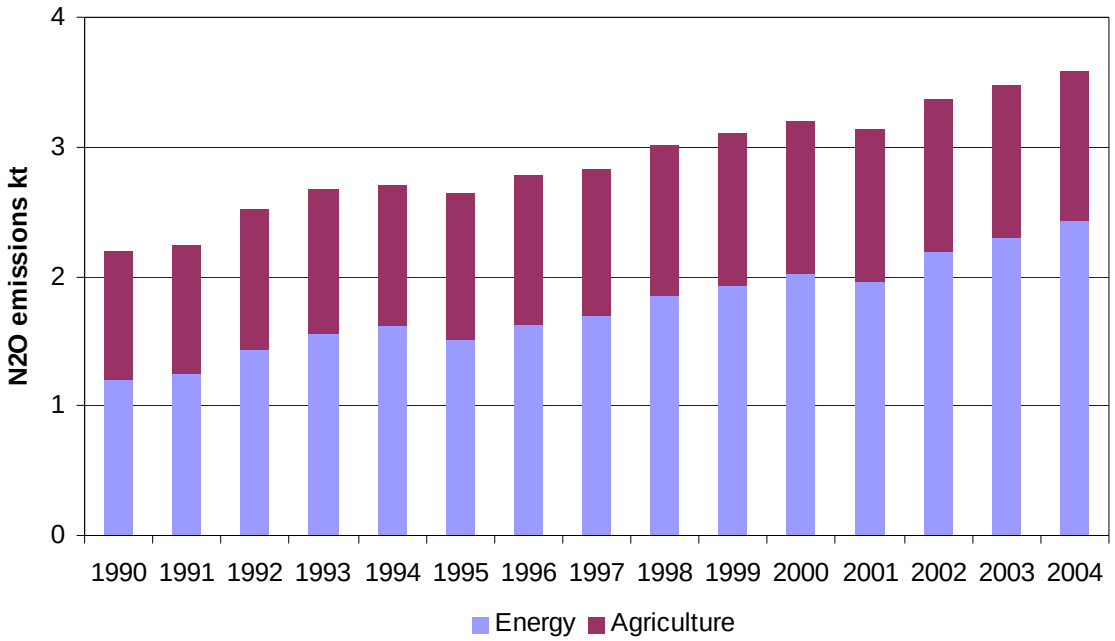

Figure 3.14. Nitrous oxide emissions by activity area for the years 1990-2004.

The energy sector is the major source of nitrous oxide emissions and presents an increase of its contribution from 55% in 1990 to 66% in 2003 and 67% in 2004, while the agricultural sector presents a decrease of its share from 44.9% in 1990, to 34% in 2003 and 33% in 2004.

3.4.4. HFCs, PFCs and SF_6 emissions

HFCs, PFCs and SF_6 are not produced in Cyprus. Regarding emissions from the use of the above gases, these were not estimated due to lack of relevant statistical data.

3.5. Evolution of emissions trends for other gases: NOx, CO, NMVOCs, SO_2

In addition to GHG anthropogenic activities also emit carbon monoxide (CO), nitrogen oxides (NOx) and non-methane volatile organic compounds (NMVOCs), that are commonly referred as 'criteria pollutants', as although they are not included in greenhouse gases, they contribute significantly to the creation of the greenhouse effect. During the period 1990-2004, nitrogen oxides and non-methane volatile organic compounds show an increasing trend, on contrary to carbon monoxide emissions, which decrease from

1992 and onwards due to the introduction of new catalytic gasoline vehicles and diesel vehicles in the vehicles fleet.

3.5.1. Nitrogen oxides (NOx)

As it can be seen in Figure 3.15, the emissions of nitrogen oxides increase by 49% comparing 2004 to 1990 and decrease by 7% in comparison of 2004 to 2003. The emissions from agriculture and land use remain almost constant, while energy production is the factor affecting the large reduction observed.

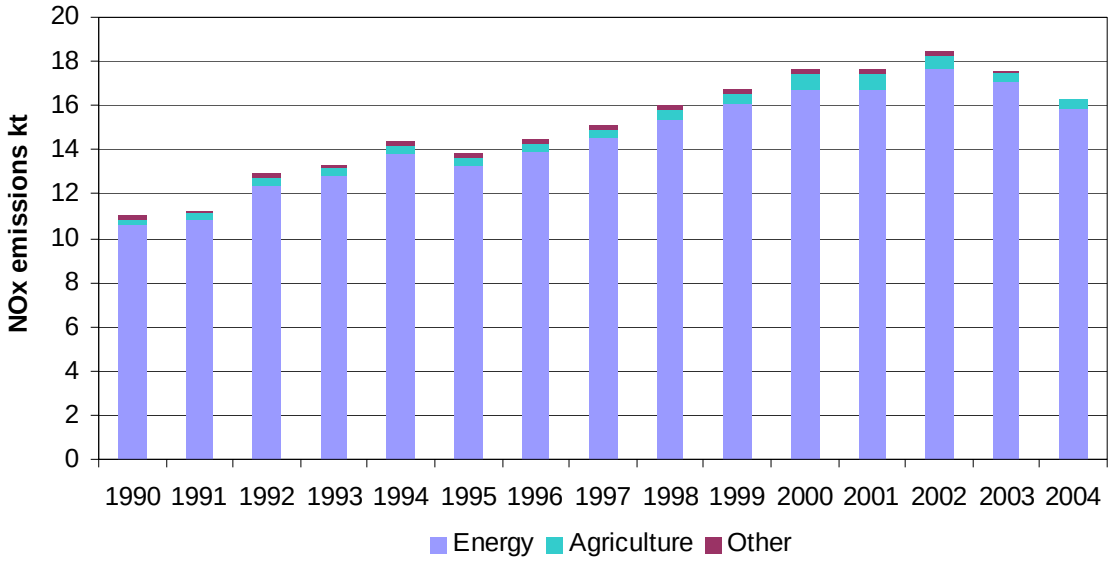

Figure 3.15. Nitrogen oxides emissions by activity area for the 1990-2004.

3.5.2. Carbon monoxide (CO)

Emissions of carbon monoxide of 2004 have reduced by 48% since 1990 and 43% in comparison to 2003 (Figure 3.16). This is mainly attributed to the reduction of losses from the energy sector (49% since 1990 and 46% since 2003), which also corresponds to the primary contributor, responsible for 97.6% of the total emissions in comparison to 98.7% in 1990.

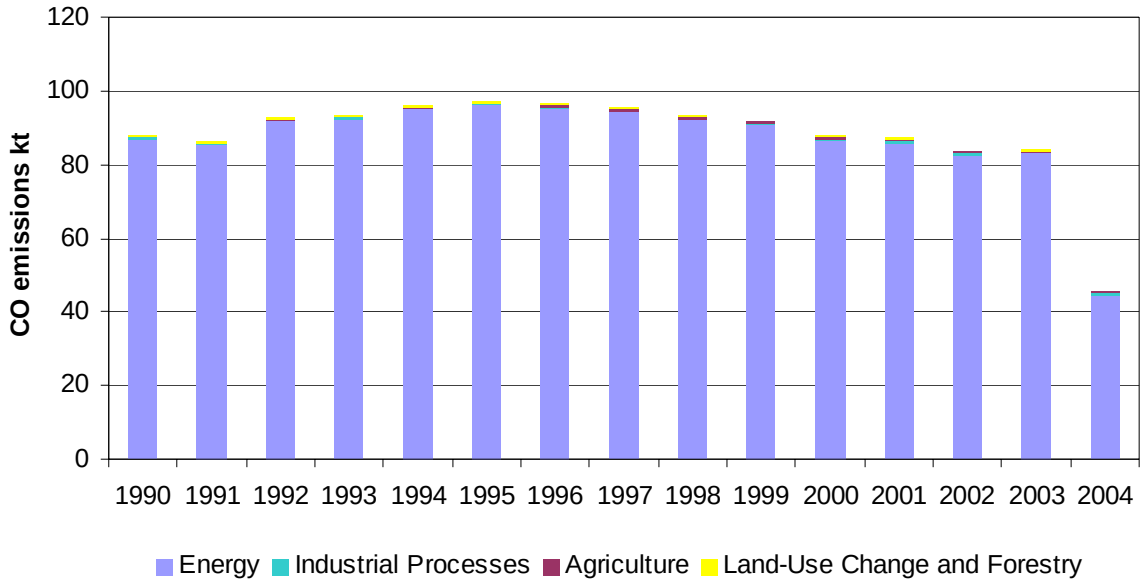

Figure 3.16. Carbon Monoxide emissions by activity area for the 1990-2004.

3.5.3. Non-methane volatile organic compounds (NMVOC)

Emissions of NMVOC in comparison to the emissions of 2004 have increased since 1990 by 13.5%, but decreased by 13.5% in comparison to 2003. In terms of energy production, the emissions have increased by 28% in comparison to 1990 but decreased by 38% in comparison to 2003. For the industrial sector, emissions of 2004 decreased by 72% in comparison to 1990 but increased by 24% in comparison to 2003. Moreover, in terms of, agriculture, the emissions of 2004 are by 56% less than 1990. Figure 3.17 summarises the fluctuations of NMVOC emissions for 1990 to 2004.

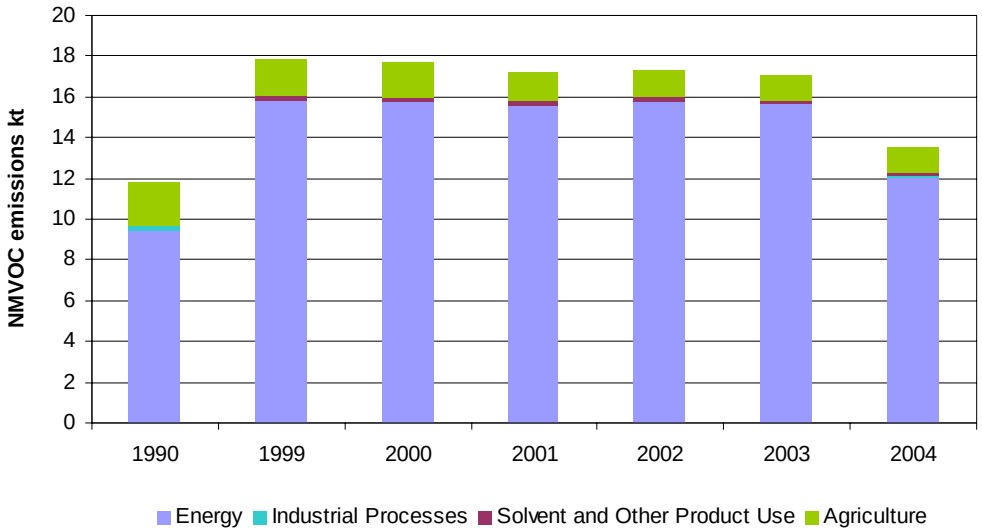

Figure 3.17. Non-methane volatile organic compounds' emissions by activity area (1990-2004)

3.5.4. Sulphur dioxide

SO_2 emissions show in general an increasing trend until 1990, when emissions were significantly reduced due to the introduction in electricity generation of a fuel with low sulphur content, and continue with a decreasing trend. In 2004, total emissions increased by approximately 24% with regard to the emissions in 1990, and decreased by 2.5% in comparison to 2003. Even though the contribution of the energy sector decreases, the contribution of industrial processes and construction appears to be increasing in the later years.

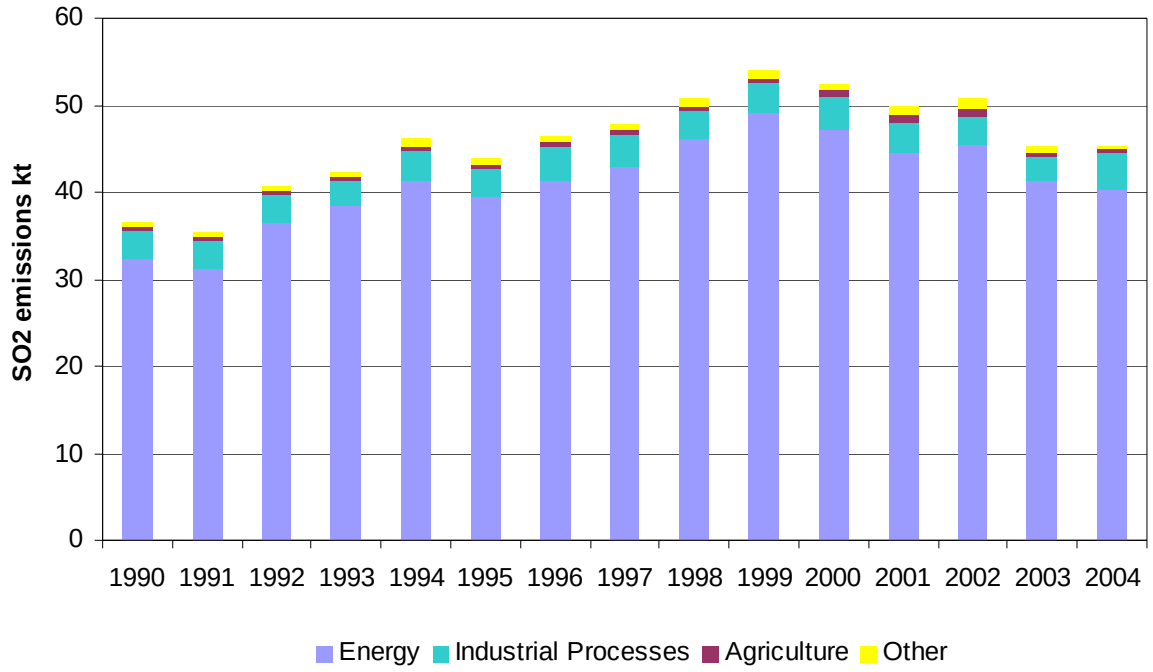

Figure 3.18. Sulphur dioxide emissions by activity area (1990-2004)

4. Policies and measures

4.1. Introduction

Proper planning and implementation of an integrated plan for the reduction of greenhouse gases emissions presupposes the establishment of a quantitative target, which must be accomplished with through the planned actions and interventions. Within the framework of the Kyoto Protocol, legally binding targets for emissions reduction are foreseen (initially for the period 2008 – 2012 compared to 1990) for developed countries.

The European Union, representing the 15 pre-May 2004 Member States, is an Annex I signatory to the United Nations Framework Convention on Climate Change (UNFCCC) and an Annex B signatory to its Kyoto Protocol. The Kyoto Protocol (KP) sets quantified targets for reducing greenhouse gas emissions for those signatories that are included in its Annex B. Cyprus ratified the UNFCCC as a *non-Annex I* party on 15th October 1997, and on the same basis, subsequently ratified the Kyoto Protocol on 16th July 1999.

It follows that Cyprus has no emissions limitation commitments under the KP. Indeed, out of 25 EU Member States, only Cyprus and Malta have no commitments. All the other 23 Member States are individually Annex I Parties to the Convention (Annex B to the Kyoto Protocol), and so have quantified emission limitation commitments. Thus, for the time being, Cyprus and Malta have exceptional status within the EU.

Although Cyprus does not have any individual reduction limitation commitments, the country fully supports the European Commission in leading all 25 Member States towards ambitious reductions in greenhouse gas emissions, together with the EU's leading role in the international action on climate change. Also, as a Member State of the European Union, Cyprus is now bound by the obligations set out in European Union legislation.

The starting point and the duration of the second commitment period have not been discussed yet, while it is obvious that there will be a new burden-sharing agreement of the EU Member-States for this period. Therefore, the formulation of policies and measures for the reduction of greenhouse gases emissions (with a time horizon that covers also the period 2010-2020) is essential for Cyprus.

The measures and policies to be taken depend on (a) the technological and commercial maturity of the available technologies to the directly available for application and use, (b) the immediate and measurable efficiency towards the reduction in GHG emissions, and (c) the specific needs and characteristics of the economy and the society. The main aims of the policies developed are:

- the promotion of renewable energy sources;
- the introduction of natural gas in the Cyprus market and society (buildings, industrial processes mainly in electricity production, transport);

- the promotion of rational use of energy (RUE);
- the promotion of efficient electric equipment;
- the promotion of re-structural changes in agriculture and industry; and
- the promotion of additional actions mainly focusing on the management of all waste streams.

Moreover, the implementation of the EU legislation provisions is considered for the preparation of the policies and measures. Among others:

1994/63/EC	Distribution and Storage of Petrol Directive
1996/61/EC	IPPC Directive
1999/13/EC	Solvents Directive
1999/32/EC	Sulphur content of liquid fuels Directive
2001/77/EC	RES and RUE Directive
2001/80/EC	Large Combustion Plants Directive
2001/81/EC	National Emission Ceilings Directive
2003/87/EC	Emissions Trading Directive
2004/42/EC	New Solvents Directive

4.1.1. Overview

Within this framework and taking into account the developing prospects of the Cyprus economy, the expected evolution of greenhouse gases emissions up to 2020 and the specific characteristics of the Cypriot energy system, the possibility to limit the rate of increase of emissions in 2020 with regard to 1990 is examined.

According to the BaU Scenario (See Chapter 5):

- The projected increase of total greenhouse gases emissions with respect to 1990 (in kt CO2-equiv) is +110.8% in 2010 and +185.7% in 2020.
- The energy sector represents the basic source of total greenhouse gases emissions, with a share that increases from 74% in 1990 to 84.1% in 2010 and 88.1% in 2020. On the contrary, the contribution of the other sectors to total greenhouse gases emissions decreases (5.6% for industrial processes, 3.5% for waste and 5.2% for agriculture in 2020).
- Greenhouse gases emissions from all sectors increase compared to 1990, with CO_2 emissions presenting the higher annual average rate of change (5.7% for the period 1990-2020) as a result of the increased participation of the energy sector to the emissions total, while the respective rate for N_2O is 4.17% and for CH_4 1.35%.

Taking into account the expected significant increase of greenhouse gases emissions up to 2020, particularly from the energy sector, it is clear that the formulation of an integrated plan for the limitation of emissions must focus on the energy sector, as even in the case that emissions from the other sectors remain at 1990 levels, the total increase of emissions would be in the order of +90% in 2010 and +163% in 2020. Summarising, Table 4.1 illustrates the increase in emissions as expected in case of the “business as usual” scenario.

Table 4.1. GHG emissions according to BaU scenario, in comparison to 1990

	2010	2020
Total GHG emissions (kt CO2-equiv)	+110.8%	+185.7%
Energy Sector contribution to emissions	84.1%	88.1%
Industrial Processes contribution to emissions		- 5.6%
Waste contribution to emissions		- 3.5%
Agriculture contribution to emissions		- 5.2%
CO_2 annual rate of increase in GHG emissions (1990 – 2020)	5.7%	
N_2O annual rate of increase in GHG emissions (1990 – 2020)	4.17%	
CH_4 annual rate of increase in GHG emissions (1990 – 2020)	1.35%	

4.2. Possible interventions for emissions reduction

The selection of measures presented below was made by using the following criteria: (a) the technological and commercial maturity of the available technologies, so that their immediate promotion is possible (b) their direct and measurable performance regarding the reduction of CO_2 emissions and (c) the particular structural features of Cypriot economy and society.

4.2.1. Energy

Policy objectives associated with the topic of energy can be distinguished in two sections: energy sources and energy efficiency. The aim is to increase the amount of energy originating from renewable energy sources, thus reducing the amount of carbon dioxide emissions. At the same time, the improvement of the energy efficiency of the systems implemented (renewable or non-renewable) will further decrease the amounts of carbon dioxide released to the atmosphere. A sustainable energy policy does not only depend on the environmentally friendly technology to be used, but also on the efficiency and cost-effectiveness provided by the technology.

The strategic goals set for energy include security of energy supply; promotion the use of Renewable Energy Sources; promotion of efficient use of energy and energy conservation; and decoupling of economic growth from energy use. The applications for the RES and RUE support schemes have shown a noticeable increase from 2004 to 2005 (Table 4.2), which is expected to continue in the following years.

Table 4.2. Applications for the RES and RUE support schemes

	Number of applications submitted			
Category	2004	2005	Increase	2006 (Jan-Jun)
Energy conservation	47	58	23%	14
Thermal insulation	119	684	474%	970
Central solar hot water systems	69	87	26%	17
Household solar hot water systems	440	1697	285%	617

Measures and actions taken (but not yet fully implemented) at national level for the promotion of RES and RUE, include 'SAVEnergy' exhibition, organising public hearings and RES info days, school presentations to promote "energy awareness", introduction of awards for the households with the best record in energy saving and promotion of the creation of a theme park. Additional measures that have been approved include:

- Introduction of simpler and faster procedures for submitting and evaluating applications;
- In order to facilitate applications and speed up the procedures for licenses and applications the Council of Ministers has recently approved the introduction of the "ONE STOP SHOP" for large investments in RES.
- Increase in the subsidy intensity and the maximum amount of grant in many categories of the scheme.
- Broadening the range of eligible applicants for thermal insulation (Construction companies are now eligible applicants)
- Provision of numerous benefits to low-energy vehicle owners like free parking and "charging stations" for electric vehicles.
- Purchasing of clean vehicles for the needs of the civil service.
- Promotion of legislation concerning the use of LPG and compressed natural gas in the transport sector.
- Evaluation of the optimal use of public transport within the local development plans.
- Improvement of driving behaviour by the evaluation of different indices like fuel consumption per vehicle, passenger number per vehicle and load per vehicle.
- A large-scale informative campaign was scheduled, to promote the use of RES and to encourage energy conservation.

As of 2006, a five year programme promoting energy saving has started. The programme is mainly financed from the special fund for energy conservation and the promotion of renewable resources. It includes undertaking of an intensive campaign on energy saving; energy saving through relevant investment expenditure in public buildings; the construction of new buildings of the broader public sector, the relevant provisions on energy saving should be complied with; and public procurement – the energy performance was introduced as a criterion in the purchases of electrical equipment and by the Government. Examples of the measures proposed include:

- placement of photovoltaic cells on the roof of public buildings ;

- use of recycled paper, files, ball pens;
- public lighting and public office lighting, all lamps will be replaced by low energy consumption lamps and all lamps used will be high pressure sodium lamps;
- central heating of public schools from solar energy, and
- six military camps will be prepared to use LPG (liquid petroleum gas) instead of diesel petrol, funded by the Ministry of Defence, and all the new installations will be using LPG.

Energy Sources

The first formulation of Renewable Energy and Energy Conservation Action Plan was completed in 1985 and revised in 1998. This included the first energy support Scheme for the sectors of manufacturing industry, hotels and agriculture. In year 2000, the Applied Energy Centre and the Cyprus Institute of Energy were established. Moreover,

- the Electricity Authority of Cyprus (EAC) agreed to purchase electricity generated from RES;
- the independent authority of Transmission System Operator (TSO) was set;
- procedures have been specified for licensing and interconnection of wind and photovoltaic installations to the national grid;
- an Action Plan (2002-2010) for RES was formulated;
- the legislative framework for the promotion of RES and conservation of energy (2003) was established;
- Cyprus Energy Regulatory Authority (CERA) (2004) was instituted;
- New support schemes have been initiated (2004); and
- New Enhanced Support Schemes for RES and RUE (2006) were created.

The indicative targets set for the following years include:

- An increase of electricity generation from RES, to reach 6% of the total electricity consumption in 2010, 9% in 2015 and 12% in 2020.
- The reduction of GHG emissions caused by RUE in energy consumption to reach 5% by 2010, 7.5% by 2015 and 10% by 2020.

Support measures have been set and applied for RES (wind energy, biomass, and solar collectors) as measures of RES promotion.

Natural Gas

One important issue for Cyprus is the market liberalization, opening up Electricity Authority of Cyprus to competition and promoting wider developments within the Cyprus electricity market. In particular, the following are currently studied:

- Plans to construct an Energy Centre that would allow the import of liquefied natural gas (LNG). The planned Energy Centre (through which liquefied natural gas will be available to the energy sector and more widely) may result in a significant reduction in CO_2 emissions, but these developments are too uncertain to quantify at present.
- Plans by Electricity Authority of Cyprus to construct additional combined cycle gas turbine (CCGT) units to be fuelled by natural gas;
- Plans by other companies to construct generation plants that would compete with Electricity Authority of Cyprus, again using natural gas as a fuel.

The construction of a receiving / re-gasification terminal for the Liquefied Natural Gas (LNG) would make possible the importation of natural gas.

According to the provisions of the relevant Large Combustion Plants (LCP) Directive, Moni and Dhekelia power stations are considered to be existing installations whereas Vasilikos power station is considered to be a new installation. The third unit installed recently (in 2006) at Vasilikos power station uses a Flue Gas Desulphurisation (FGD) Unit in order to comply with the requirements of the Directive 2001/80/EC (LCP Directive). In the near future another unit will also be installed at Vasilikos power station that will comply with the Emission Limit Values (ELVs) for SO_2 and NOx set by the above mentioned Directive. Furthermore BATs will be used.

The national efforts focus on securing the supply of Liquified Natural Gas (LNG) for use in the energy sector by 2010. The successful outcome of this process will contribute significantly to the drastic reduction of GHG emissions and of the main pollutants to the atmosphere, especially of the SO_2 emissions. Based on the Electricity Authority energy plan projections, which takes into account the use of LNG as main fuel, the SO_2 emissions in 2010 and 2020 will be reduced to about 10 Ktn and 12 Ktn, respectively.

This project is planned to begin in 2007 and be completed by 2010.

Biomass

The promotion of utilization of biomass is included in the National Action Plan for the promotion of RES (2002-2010). For the promotion of biomass for heating /cooling and electricity production, Cyprus has introduced the following measures:

1. A Support Scheme for the promotion of RES and Energy Conservation, which includes the provision of grants on the investment for production of biofuels, utilization of biomass for heating/cooling, tele-heating/ tele-cooling and the co-generation from biomass.
2. A new support scheme for electricity generation from biomass has just been approved. The scheme for electricity generation from biomass is more generous and provides operational grant (Feed-in purchase price per KWh) up to 12.38 euro cents per KWh depending upon the technology used and raw biomass.

Energy Efficiency

Main instruments of the energy efficiency governmental policy are the energy pricing, the formulation and implementation of energy efficiency programmes for the various sectors of the economy and the promotion of renewable energy sources.

The Energy Service, of the Ministry of Commerce, Industry and Tourism, operates its own Applied Energy Center, which in close cooperation with the Cyprus Institute of Energy serve as the focal point for all efforts in the field of energy conservation and renewable energy sources.

The Cyprus Institute of Energy was established in 2000 by the Minister of Commerce, Industry and Tourism and its primary objectives are to promote renewable energy sources utilization and energy saving/conservation. It shares the facilities with the Applied Energy Centre and it has the flexibility to cooperate with the private sector. Both the Applied Energy Centre and the Cyprus Institute of Energy play a significant role during the implementation phase of the national grant scheme for the promotion of renewable energy sources.

Both institutes are operating a grant scheme which provides financial support in the form of governmental grants for investments in the field of energy conservation and replacement of electricity and conventional fuels with renewable energy sources.

The new 2004 grant scheme includes two categories: Energy conservation and Renewable energy sources. The Category A: Energy conservation refers to investments which aim at energy conservation as well as the installation of combined heat and power. Energy conservation investments are defined as investments on energy conservation systems which can achieve at least 10% energy saving out of the total energy consumption. The Category B: Renewable Energy Sources (RES) refers to investments which are related to the utilization of wind energy systems, solar thermal and photovoltaic systems, biomass, hydro and desalination systems using RES.

Indicative targets for energy conservation include the reduction of the total energy consumption by 1% per annum. Energy efficiency is enhanced by measures such as introduction of new technologies and promotion of proper maintenance of the systems used in industries. Up to June 2006, 1747 applications of thermal insulations have been approved, corresponding to an investment (on behalf of the Republic of Cyprus) of CYP£1.5 million. The corresponding annual reduction in conventional fuel consumption corresponds to 2800 tonnes (0.035%). According to data of the Energy Service (June 2006), energy saving projects have been granted ranging from 15.5% to 63% reduction in energy consumption (Table 4.3).

Table 4.3. Examples of remarkable energy saving projects for which funding was approved

	Project	Technology	Energy Saving
1	Construction company	Central solar system	63 %
2	Household	Solar space heating	56.4 %
3	Household	Plastic solar	50 %
4	Enterprise	Plastic solar	47.39 %
5	Construction company	Total office heat insulation	44.28 %
6	Hotel	Central solar system	41 %
7	Household	Solar space heating	40 %
8	Hotel	Electricity conservation	16 %
9	Hotel	Central solar system	40 %
10	Industry	Electricity conservation with heat recovery	16 % electricity 25 % thermal
11	Hotel	Energy IT system	17 %
12	Radio station	Solar swimming pool	40 %
13	Hotel	Central solar system	39 %

The basic intervention in Cyprus for the reduction of emissions from the sector of electricity generation is the introduction of natural gas.

MEASURES OVERVIEW

NATURAL GAS

- All power plants to be constructed after 2012 will be using natural gas.
- The 4th unit of Vassiliko power station whose construction has started will be using natural gas.
- Decommissioning of Moni and Dekelia power units (after 2012) and replacement by units using natural gas.

ENERGY EFFICIENCY

- Reduction of losses from the transfer and distribution system.

RENEWABLE ENERGY SOURCES

- Use of renewable energy sources (RES) for electricity generation and, more specifically, installation of wind farms with total capacity at least 150 MW in 2010 and 300 MW in 2020.

4.2.2. Residential and tertiary sector

The energy consumption in the residential and tertiary sector is expected to increase significantly (approximately 3% annually in the residential sector and 4.5% annually in the tertiary sector, for the period 2007 - 2020). The high increase in the tertiary sector is due mainly to the high development of the sector of services, commerce and tourism. Similarly, the contribution of these sectors in CO_2 emissions is significant and exceeds 45% (with the allocation of electricity consumption in end-users).

MEASURES

- Improvement of the thermal behaviour of buildings in the residential sector. This measure implies: (a) formulation and mandatory - after 2007 - implementation of a space heating regulation for all new buildings in the residential sector and (b) roof insulation in buildings constructed before 2007, so that 50% of those buildings in 2010 and 100% of those buildings in 2020 end-up in having such an insulation.
- Improvement of the thermal behaviour of buildings in the tertiary sector. This measure implies formulation and mandatory - after 2007 - implementation of a space heating regulation for all new buildings in the tertiary sector and the insulation of roof/openings in buildings constructed before 2007. The penetration rate of the measure is 60% of buildings in the public sector and 50% of buildings in the sector of services by 2010, while in 2020 the measure will cover all buildings.
- Maintenance of central heating boilers. The maintenance of central heating boilers on an annual basis could lead to an improvement of their performance up to 10%, depending on the boiler's condition before its maintenance. The penetration rate of the measure is 60% (in 2010) and 100% (in 2020) of the existing. boilers of the residential and tertiary sector.
- Replacement of central heating boilers. Replacement of old boilers with new ones with a high-energy performance. The penetration rate of the measure is 25% for 2010 and to 50% for 2020 of the existing central heating boilers in the residential sector, while the penetration rate in the public sector is 50% and 75% respectively.
- Use of high efficiency air conditioning systems. The energy conservation by unit is estimated approximately to 20%. The penetration rate of new, energy-efficient units, is 75% in 2010 and 100% in 2020 of the total installed units in the residential and tertiary sector.
- Use of high efficiency electric appliances. The penetration of energy-efficient electric appliances (note: this measure applies to the residential sector only) is 75% in 2010 and 100% in 2020 of the total appliances.
- Use of energy-efficient lighting bulbs. The penetration rate is 80% (in 2010) and 100% (in 2020) of the conventional lighting bulbs in the residential and tertiary sector.
- Automations in lighting. The conservation of electricity that can be achieved through this measure is on the order of 20% per automation installation, and the penetration rate is 50% (in 2010) and 80% (in 2020) of the total buildings of the tertiary sector.
- Solar collectors for water heating. Use of solar collectors for water heating. The target set is covering 50% of the energy demand for water heating in the tertiary sector from solar collectors in 2010 and 75% in 2020.
- Roof-top photovoltaic systems connected to the electricity grid. Installation of roof-top systems with total capacity of 3 MW (in 2020).

4.2.3. Industry

MEASURES

- Promotion of co-generation. It is estimated that 50 MW of co-generation systems with steam generators will be installed in 2010 and 100 MW in 2020.
- Promotion of natural gas for thermal uses. It is estimated that natural gas will replace 100 ktoe of crude oil in 2010 and 150 ktoe of crude oil in 2020.
- Promotion of solar energy. Substitution of crude oil and diesel by solar collectors for production of steam of low temperatures (covering 50% of the relevant thermal needs) and mean temperatures (covering 20% of the relevant thermal needs) can lead to a thermal profit up to 24 ktoe.
- Various energy conservation measures. Moderate energy conservation interventions aiming at the reduction of losses from the steam production system and the exploitation of the rejected heat from furnaces. Interventions for the improvement of performance of the space heating and lighting installations.

4.2.4. Transport

As mentioned previously, the transport sector accounts for a significant percentage of the total energy consumption. The only public transport system in Cyprus is the bus system, which was characterised "not well developed". As of November 2004, the following measures were adopted for the encouragement of the sustainable use of energy:

- A significant reduction of the excise duty for small and middle class volume engine vehicles;
- A 15% discount for the purpose of the excise duty for cars with CO_2 emissions of 150 g/km or less and, at the same time, a 10% penalty on cars with CO_2 emissions of 200 g/km or more;
- Excise duty and registration fees on electric cars were abolished, whereas dual propulsion cars (hybrids) are now subject to half the registration and circulation fee;
- An incentive for scrapping of vehicles older than 15 years, was introduced;
- The discount in the form of a lower circulation license that benefited older cars was abolished;
- Finally, a provision was introduced for a small fee, paid for each saloon and light commercial vehicle before being cleared by the Customs (one cent per cc of engine – e.g. for a 1600 cc car EURO 27 is paid). The total amount so collected is earmarked for the development and enhancement of public transport, and is considered as an innovative measure to Cyprus budgetary practice.

Hybrid vehicles, Dual propulsion / Fuel flexible vehicles, Electric vehicles, Low CO_2 emission vehicles (≤120g/Km CO_2) are already in the market and streets of Cyprus, with the owners receiving economical support by the Ministry of Commerce, Industry and Tourism. This was initiated in beginning of 2006, through a five year programme promoting energy saving. The programme that is mainly financed from the special fund for energy conservation and the promotion of renewable resources includes:

- The provision of a subsidy on the excise duty of hybrid cars;
- Promotion of the use of biofuels through the imposition of a zero excise duty on biofuels;
- Expansion of the use of the school bus;
- Public procurement – The energy performance will be introduced as a criterion in the purchases of electrical equipment and motor vehicles by the Government

Biofuels for transport

In the framework of the EU strategy for biofuels and the review of the Directive 2003/30/EC, the Minister of Commerce, Industry & Tourism is also considering the possibility to set "biofuel obligations" under which every litre of diesel sold by the oil marketing companies will contain a given proportion of biodiesel (e.g. 3% (V/V)). Four companies have already applied for financial support of biofuel production. The estimated production of those companies is 8,238 m^3 (7,513 tones) biodiesel per year from oil seeds, which corresponds to 1.16% of the transport fuels. Excise tax exception of biofuels for transport.

The potential of biofuels from the domestic biomass is limited. There is however, the possibility of the production of certain quantities of bio-fuels from imported raw materials and especially from seed oils.

Transport Policy

The main aims for the transport policy are (1) to reduce the use of the private vehicles with the simultaneous increase of the means for public transport; and (2) the reduction of the traffic in the towns for improvement of the urban environment. For the implementation of theses aims, a complete policy on transport is needed and cooperation of all the public and local authorities, stakeholders and private sector for the accomplishment of the strategic goals. The main measures to be taken for the accomplishment of the strategic goals are:

(a) motivation for the recovery or replacement of old vehicles;

(b) development of economically viable means of urban public transport, providing easy access to all (maximum distance from a bus stop to be at approximately 300 metres, access to accurate information etc.);

(c) reduction of the operational cost of public transport with reduction in delays and the routes´ duration;

(d) creation of bus lanes;

(e) renewal or the flied and modernisation of the means of public transport (modern, comfortable vehicles with low or no exhaust emissions);

(f) development of means promoting and prioritising public transport;

(g) construction of parking places outside urban areas, and connection of these with city centres with public transport (Park & Ride Facilities);

(h) developed and improve the urban pedestrians and cyclists routes;

The application of the additional specific measures below will reduce the traffic and increase the public transport in the capital of Cyprus, Nicosia:

- extension of the school buses pilot routes;
- construction of a modern central bus station;
- public transport priority measures and Park and Ride facilities;
- development of new bus routes, placement of new bus stops, development of facilities for public transport and the citizen;
- development and improvement of the areas for parking places.

The projected increase of energy consumption in transport is significant (+80% in 2020 with respect to 2000). Consequently, there is also a significant increase of greenhouse gases emissions. It is expected that emissions will increase with an annual average rate in the order of 3% for the period 2000 – 2020 (from 1466 ktn in 2000 to 2658 ktn in 2020). The major pollutants emitted, regarding the greenhouse effect, are CO_2 and N_2O and their contribution is expected to increase because of the penetration of catalytic vehicles.

MEASURES

Measures concerning vehicles:

- Maintenance of cars and trucks. The estimation of energy conservation and the implied emissions reduction is based on the consideration that for 50% of private vehicles and for 70% of trucks there is a possibility of small improvements of their performance through the implementation of this measure.
- Promotion of small cars in urban transport. The increase of the share of small cars in urban transport by 20% is expected to lead to a thermal profit up to 17 ktoe.
- Fuel switching from diesel to LPG in taxis. The measure concerns the conversion of diesel engines in taxis into engines that can use LPG. This conversion does not present technical difficulties, but attention must be paid regarding sitting of replenishment stations and related security issues. The penetration rate is set to 30% of the relevant passenger-kms after 2012 and 40% in 2020.

Measures concerning the management of transport:

- Promotion of public transport. It is estimated that the contribution of public transport into the total transport work by 30% in 2010 and by 50% in 2020 can lead to an energy profit up to 76.5 ktoe.
- Development of non-urban public transport. The improvement and further development of the existing network can lead to a thermal profit up to 23 ktoe, (in case that the relevant transport work is doubled).
- Improvements in road signalling. The measure can lead to energy conservation in the order of 0.8 - 3.5% in the signalling nodes that will be implemented. It is estimated that a full implementation of the measure after 2010 can lead to an energy profit up to 11 ktoe.

Measures concerning the use of alternative fuels:

Use of natural gas in urban public transport. The introduction of 150 buses in to 2012 using natural gas and 150 additional buses up to 2020.

4.2.5. Agriculture and Forestation

The agricultural sector is the main contributor to ammonia emissions in Cyprus. Existing installations for the intensive rearing of poultry or pigs are obliged to apply all the appropriate preventive measures against pollution (Best Available Techniques – BATs).

The main pollutant emitted from the agricultural sector in relation to the NEC Directive is ammonia. The agricultural sector is responsible for more than 90% of ammonia emissions in Europe. If farmyard manure is handled in the wrong way, more than half the ammonia content can escape into the air before the manure is spread into the soil. It is very important that the manure is spread at the right time and in the right weather conditions and that it is injected in the soil or quickly ploughed down. In general, measures applied to cut ammonia emissions are alternative livestock feeding strategies, low – emission manure spreading and storage, low – emission animal housing systems and measures connected to the use of mineral fertilizers, including their restriction.

According to Integrated Pollution Prevention and Control Directive (IPPC, 96/61/EC) all existing installations for the intensive rearing of poultry or pigs with more than: 40,000 places for poultry, 2,000 places for production pigs (> 30 Kg) or 750 places for sows, have to apply by October 2007 all the appropriate preventive measures against pollution and in particular through application of the Best Available Techniques (BATs). The application by October 2007 of the Best Available Techniques in existing IPPC pig and poultry farms will significantly minimize ammonia and methane emissions to the atmosphere of Cyprus.

All the owners of the IPPC farm installations have been informed of the provisions of the IPPC Directive and of the need to minimize their emissions through the use of Best Available Techniques. Furthermore the Department of Labour Inspection together with all other Departments and Associations involved, have developed a National Best Available Technique Document for pig farms based on the information included in the relevant BREF Document issued by the European IPPC Bureau in Seville, Spain. A similar National BREF Document is currently being prepared for IPPC poultry farms. In particular, the above two Documents refer to feeding methods, housing of animals, storage of manure and slurry as well as ways of spreading them on land.

The measures proposed for the agricultural policy among others promote forestation, biological cultivations, and changes in land use. This shall be accomplished by:

- professional training of the farmers;
- consultation services for the farmers: especially where technical support is required, consulting can prove vital for guiding the farmers to the right decisions;
- modernisation of the methods utilised by farmers, especially for environmental upgrade;

- financial support for waste management from agricultural activities: especially for farming, where large amounts of gasses are emitted from the improper management of wastes;
- creation and modernisation of agricultural production units, through which funding promotes the investment in new equipment and know-how; thus increasing the efficiency of the process, reducing the greenhouse gases emissions;

Part of biomass exploitation in the energy sector, is the promotion of methane recovery from the wastes produced from intensive animal breeding. Through the guidelines prepared for the farmers, the environment service promotes anaerobic digestion and therefore methane production, collection and use. This will not only reduce the methane emissions to the atmosphere, but will exploit the methane released by the animal wastes through anaerobic digestion. Methane will be recovered and used onsite for energy production.

In Cyprus, 80 animal breeding units fall within the IPPC Directive; 40 piggeries and 40 poultry farms. As the directive requires, attention should be paid on the energy spend onsite, the way wastes are collected for minimisation of emissions. Moreover, the farms should be surrounded with trees for reduction in visual and nuisance problems; i.e. forestation is encouraged and in some cases is an obligation of the owner or management.

4.2.6. Waste

Under the National Lisbon Program for the Republic of Cyprus a Waste Management Strategy was adopted by the Council of Ministers in April 2004. The strategy covers all waste streams and the requisite environmental infrastructure; the tendering of a major initiative to establish packaging waste management; appropriate pricing; and awareness-raising to reduce waste production. The implementation of the Waste Management Strategy is to be completed by 2009. Concerning the Urban Wastewater Treatment, Cyprus was granted a transitional period, until 2012, to meet all requirements of the Directive 91/271/EEC, on Urban Wastewater, i.e. to serve all communities with a population of more than 2000 inhabitants, with sewerage networks and sewage treatment.

Solid wastes

Not properly managed biological degradation of wastes can contribute to the greenhouse effect. Thus any uncontrolled waste streams that can be biodegraded, can produce greenhouse gases (GHG). The aims set by Cyprus in 2004 were:

- reduction of waste quantities produced;
- reuse of materials;
- recycle/ recovery of materials;
- energy recovery from materials originating from wastes; and
- proper landfilling of the output of the treatment.

Part of the Strategic Plan for the Management of Solid and Hazardous Waste, is the restoration of the existing semi-controlled landfills. The emissions expected to be prohibited from the biogas recovery after restoration of the units are shown in Table 4.4. the composition of the biogas produced is assumed to be in 50:50 ratio with carbon dioxide, and the maximum recovery of biogas is 75%.

Table 4.4. Total Biogas Recovery based on mean annual production from the restored landfills in Cyprus

Landfill	By year	Total Biogas Recovery based on mean annual production (m^3/hr)
Abdelero	2040	1134
Agia Marinouda	2036	11425
Agia Napa	2033	4059
Atsas	2033	2887
Frenaros	2031	2377
Kotsiatis	2035	57513
Marathouda	2042	17337
Navkias	2065	24409
Paralimni	2044	2533
Tersefanou	2033	10152
Xylofagou	2053	2082
Vati		1980

The two new landfills of Nicosia and Limassol that have been designed but not yet constructed (operation expected in 2009) are estimated to produce the maximum biogas volume of 1,868 and 2,800 m^3/h respectively.

Liquid wastes

Liquid wastes produced by municipalities are currently served by sewerage collection system at 70% of the island. Cyprus was granted a transitional period until 2012, to meet all requirements set by Directive 91/271/EEC on Urban Wastewater. Based on a feasibility study performed, the Government of Cyprus plans to construct the required sewerage networks and sewage treatment plants to serve rural communities of population greater than 2000. Moreover, the sewerage networks are being expanded at all major municipalities.

Liquid wastes originating from Nicosia and Larnaca from areas that are not covered by the sewerage network (municipal), once collected are taken for treatment to the treatment unit of Vathia Gonia.

MEASURES

- Recycling. Recycling of paper and reuse of the materials collected in the printing industry.

- Methane recovery. Collection of methane generated from managed disposal sites and conversion into CO_2 through combustion in flares. The penetration rate is 25% of methane generated from these sites in 2010 and 50% in 2020.

Apart from the above-mentioned policies and measures, the set of policies and measures for greenhouse gases emissions reduction is accomplished with a number of measures, for which the reduction potential cannot be easily quantified and/or their contribution is not expected to affect significantly the national totals of emissions. However, these measures must be promoted together with the measures presented in the previous paragraphs (and which form the core of the national plan for the reduction of greenhouse gases emissions), as they act in a complementary way for the implementation of several basic policies and measures or/and create new areas for possible interventions with a significant reduction potential in the future. Measures of this type are:

- Bio-climatic design of buildings
- Mandatory installation of energy consumption gauges in all consumers (households, enterprises of the tertiary sector)
- Voluntary agreements with commercial stores and suppliers of energy equipment for buildings in order to promote equipment with a high rate of energy efficiency.
- Introduction of a credit card, providing favorable terms for the purchase of energy equipment using renewables, energy-efficient appliances etc.
- Proper management of electricity demand with the aim to reduce the peak-load demand.
- Automations in air-conditioning installations (e.g. hotels, public buildings).
- Road lighting: Replacement of Hg bulbs by Na bulbs, together with proper operation adjustments.
- Voluntary agreements with industrial sectors or/and individual companies, as well as with energy-intensive industries of the tertiary sector for the reduction of energy consumption.
- Implementation of least-cost planning in electricity generation
- Combined use of passenger cars
- Promotion of motorcycles
- Combined use of transport means in the case of freight transport
- Creation of parking places, properly combined with the network of urban public transport
- Promotion of electric/hybrid vehicles
- Use of natural gas in garbage trucks
- Special taxation policy for vehicles using natural gas and LPG, as well as for electric/hybrid vehicles
- Tram network in large urban centers
- Readjustment of the existing pricing policy

Finally, the effective implementation of the national plan for the reduction of greenhouse gases emissions requires also activities in the area of education, training and public awareness.

4.3. Promotion of Greenhouse friendly Technologies

An important factor to be also considered for all activity sectors and through all policies and measures is knowledge and awareness. Time is and should be dedicated, to inform the public and especially young people on the impact their lifestyle and habits could have on the environment, and specifically greenhouse effect.

Cyprus contribution to Environmental technologies action plan, mainly concentrates on activities to encourage the diffusion of environmental technologies and environmental products, rather than their development. Among the research and dissemination of new technologies in Cyprus are the:

1. Cooperation with Harvard University: Harvard School of Public Health (HSPH) and the Government of Cyprus have established an international research, education, and technology initiative for the environment and public health, to address key environmental issues in Cyprus and the wider region.
2. Thematic Park for Renewable Energy Sources and Energy Saving: The Ministry of Commerce, Industry and Tourism, is proceeding with the establishment of a thematic park on Renewable Energy Sources (RES) and Energy Saving (ES). The park will be used to exhibit current RES and ES technologies as well as conventional energy producing methods.
3. Research Promotion Foundation: Between 2003 and 2005, the Foundation funded a number of research projects relating to environmental technologies, such as: System for the monitoring of particulate air pollution in almost real-time; modelling and analysis of traffic and impact of dedicated bus lanes; investigation into the utilization of energy crops in Cyprus; evaluation of methods for the treatment of wastes in Cyprus with special emphasis on the production of green coal; photoelectric Oxidation and stabilization of organic pollutants in water utilizing solar energy; efficiency improvement of photovoltaic elements with the use of luminous radiation spectral narrowing arrays; pilot study for the production, purification and storage of hydrogen with the utilization of renewable energy sources such as solar and wind energy.

5. Projection of GHG emissions

Four scenarios have been considered for the projection of GHG emission: (1) business as usual (BaU), i.e. no changes are made to the way energy is produced and managed in Cyprus; (2) the scenario that renewable energy sources and rational energy use schemes are introduced for the production and management of energy; (3) the addition of natural gas in the energy production, replacing other fuels used so far and (4) the addition of the other measures eliminating GHG emissions. Figure 5.1 summarises the projections of GHG emissions for the above four different scenarios.

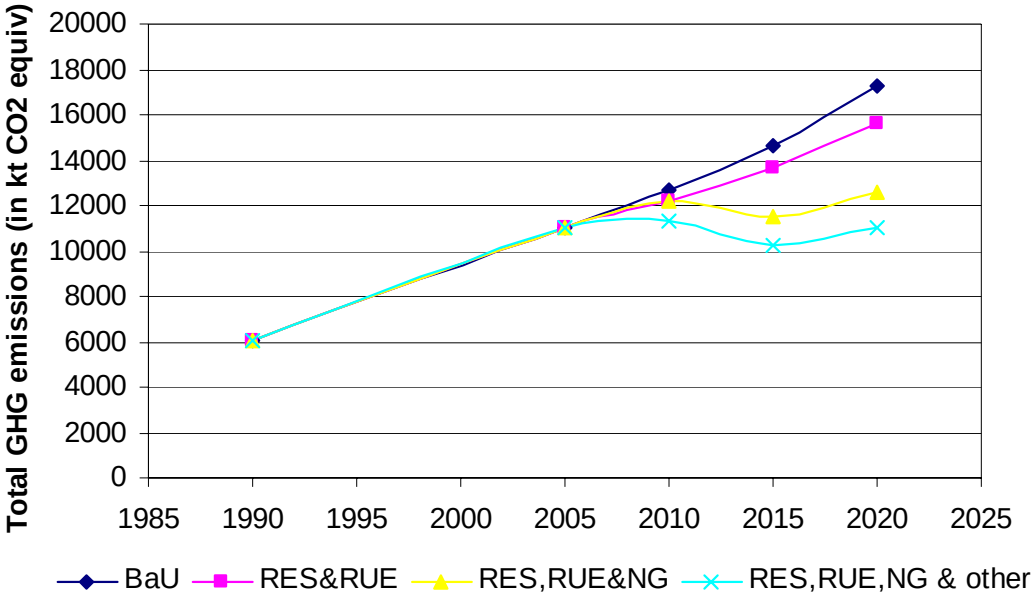

Figure 5.1. The impact of introduction of all measures on the GHG emissions in CO_2 equivalents

5.1. Scenario 1: BaU

5.1.1. Assumptions

The assumptions used for the calculations and projections performed for the scenarios of "Business as Usual" are Demographic characteristics, Weather conditions and Macroeconomic rates.

[1] Demographic characteristics

It is estimated that the increasing trend of population, which was registered during the decade 1990-2000 (approximately 1.6% annually), will continue but with lower rates (approximately 1% annually for the period 2000-2010 and 0.6% for the period 2010-2020). During the same time period, the average size of households (number of persons per household) decreases by approximately 0.7% annually, leading (together with the evolution of population) to an increase of the number of households. The evolution of

population and number of households represents a crucial defining parameter of energy needs in the residential and tertiary sector, as well as in the transport sector.

Furthermore, a crucial parameter affecting the energy consumption in the tertiary sector is also the total area of buildings used in the sector of services, which depends on the population's density, the prosperity rate, the size the sector of services etc. The total area of buildings in the tertiary sector was estimated by using appropriate area indices per employee. It was assumed that this index (square meters per employee) would increase with an average rate of 0.2% until 2010 and 0.1% until 2020.

[2] Weather conditions

It was assumed that weather conditions remain unchanged, as they were in 1995. An assumption that climate conditions will be closer to the historical average would ignore the increase of the annual average temperature and would lead to a sudden, non-justifiable increase of energy demand for space heating after the year 2000. However, it is pointed out that if future weather conditions get closer to the historical average, then the energy consumption (primary and final) will be different from the projected one. On the basis of these assumptions, it was estimated that the number of degree-days for heating in Cyprus for 1995 mounted to 1050, while the operation of air-conditioning units expands over a time period of 5 months annually.

[3] Macroeconomic rates

BaU is based on the assumption that the intensive rate of economy growth in Cyprus will continue. Thus, for the whole decade 2000-2010, it is assumed that the average annual rate of GDP growth will be 4%, while it decreases slightly towards the end of the period examined by, 3.5% for the years 2010-2015 and 3% for the years 2015-2020.

The basic assumptions that are used for all three scenarios described next are summarised in Table 5.1.

Table 5.1. Summary of parameters and assumptions for emissions projections in the energy sector

Parameters	1990	2000	2005	2010	2015	2020
Increase of GDP	4.5%	4.5%	4.5%	4%	3.5%	3%
Added value INDUSTRY/year	+2.65%	+2.65%	+2.65%	+2.65%	+1.45%	+1.45%
Added value SERVICES/year	+5%	+5%	+5%	+5%	+5%	+5%
Added value AGRICULTURAL SECTOR/year	+2.45%	+2.45%	+2.45%	+2.45%	+2%	+2%
Annual increase of population	1.6%	1.6%	1%	1%	0.6%	0.6%
Persons/household/year	-0.7%	-0.7%	-0.7%	-0.7%	-0.7%	-0.7%
Area /employee/year	+0.2%	+0.2%	+0.2%	+0.2%	+0.1%	+0.1%
Annual degree-days for space heating		1050	1050	1050	1050	1050
Operation of air-conditioning units (months)	5	5	5	5	5	5

[4] Other assumptions

Considering that Cyprus does not have a specific quantitative target for emissions reduction within the framework of the Kyoto Protocol for the 1st commitment period, it was assumed that in the BaU Scenario no specific measures for the limitation of greenhouse gases would be taken. In addition, it is assumed that all decisions regarding investments on energy technologies and equipment in the various economic sectors will be made by considering a 6% interest rate.

Finally, the agreement between EU and car manufacturing industries (ACEA, KAMA, JAMA) for the decrease of fuel consumption in new cars (aiming to achieve an average carbon dioxide emission factor of 140 g/km in 2008).

5.1.2. Methodology

ENERGY SECTORS

For the projection of emissions from the energy sector, the ENPEP (Energy and Power Evaluation Program) model was used. ENPEP was developed by the Argonne National Laboratory (ANL, USA) and comprises several distinctive models, which have as target the full analysis/simulation of the energy/electricity system, with parallel quantification of its environmental and social consequences.

The ENPEP model, through the use of its basic module BALANCE achieves the following:

- Simulation of energy flows in an energy system, from the level of energy supply (crude oil imports, carbon mining etc.), through the conversion into other energy forms (liquid fuels, electricity), and up to the final energy demand (hot water in the residential sector, steam in industrial processes etc.).
- Projection of future energy balances on the basis of a non-linear algorithm for the simulation of the energy system, considering different decision-makers.
- Projection of the shares of alternative technologies in the energy market (e.g. electricity generation technologies) on the basis of the cost of these technologies, as well as of the fuels that they use.
- Estimation of the cost and the environmental burdens, which are associated with the projected development of the energy system under consideration.

NON-ENERGY SECTORS

Projection of greenhouse gases emissions in the non-energy sector is not based on the use of a computational simulation tool, such as in the energy sector, but it depends on the projection of activity data for each source and on the definition of the suitable emission factor.

The equation used for emissions projection has the following general form:

$$Em_t^g = A_t \cdot EF_t^g$$
$$A_t = A_0 \cdot (1 + r(x_i))^t$$
$$EF_t^g = EF_0^g \cdot (1 + f(m,T)) \quad (1)$$

where:

t, 0	:	Indices referring to a future point in time and to the base year respectively
g	:	Index referring to greenhouse gases
Em_t^g	:	Emissions of g-gas at time point t
At	:	Activity at time point t
EF_t^g	:	Emission coefficient of g-gas at time point t
xi	:	Defining parameters of activity development
r(xi)	:	Rate of activity change, estimated on the basis of the defining parameters
$f(m,T)$	:	Rate of change of emission factor, which depends on the technological evolutions (parameter T) and the adoption of policies and measures (parameter m)

Industrial processes

Projections of CO2 emissions from cement and lime production are based on the estimation of the respective production levels up to 2020. The defining parameter for the development of cement and lime production was considered to be the added value (AV) of the sector of construction. In specific, the 3-years moving average is used, so that the time lag in the relevant change of the two elements is taken into account.

It is estimated that AV will increase with an average annual rate of growth of 2.3% for the period 2005 until 2010 and 1% until 2015. Finally, for the period 2015-2020, it is estimated that AV will decrease with an average annual rate of 1%.

The CO2 emission factor for cement and lime production remains stable and equal to the one of the period 2000-2005, as the introduction of measures for the reduction of emissions is not foreseen in BaU.

Solvents and coherent products use

Sources examined in this sector are the use of paints and metal degreasing / dry cleaning. Activity levels are defined from the evolution of population, while no change is foreseen for the emission factor (1 kg NMVOC/capita for paints and 0.25 kg NMVOC/capita for metal degreasing / dry cleaning)

Agriculture

Emissions are projected on the basis of the number of animals, the production of agricultural products and the amount of nitrogen in synthetic fertilizers. In specific:

- The projection of the number of animals is based on the analysis of the available time series. Per category, the rates are higher until 2010, while from this point and onward the number of animals remains practically stable (the change of the number of animals per category for the period 2010-2020 is less than 1%).
- The production of agricultural products depends on the agricultural land and the productivity of cultivated lands. On the basis of data available, crop areas decrease with an average rate of 0.3% for the period 1990-2005. Adopting a linear trend model, projected areas decrease by 20% in 2020. Productivity of agricultural areas presents significant fluctuations and this is the reason why the average of the period 1990-2005 was used.
- The amount of nitrogen in synthetic fertilizers is defined on the basis of the total crop area and the share of cereals in the total crop area. Overall, the required nitrogen decreases by 5% until 2010 and by 10% until 2020 compared to 1990.

Wastes

For solid wastes, the activity levels are defined on the basis of population (permanent and tourists) while in the case of liquid waste the industrial production is also required.

- Population. The consideration of tourists for the estimation of the equivalent population is performed through the number of overnight staying. The projection of overnight staying is based on a linear trend model, which leads to a doubling of the number of overnight staying in 2020 with respect to 2005. This result is in accordance with the estimations for the evolution of AV in the hotels/restaurants sector.
- Industrial production. The projection of industrial production is based on the analysis of the relevant time series. The average rate of increase for the industrial production of the examined sectors fluctuates up to 3.5% until 2010, while for the period 2010-2020 the average rate fluctuates up to 1.5%. It should be pointed out that the refinery does not operate from 2010 and onwards.

In the case of solid waste management, the following assumptions have been made:

- The composition of wastes is the average of the period 1990-2005.
- The amount of recycled materials increases from approximately 3% in 2005 to 20% in 2010 and to 40% in 2020
- The amount of wastes deposited in managed landfills increases gradually, so that in 2010 the total amount of wastes is deposited in managed landfills. Furthermore, it was assumed that there will be no collection of methane generated for combustion in flares or for energy recovery.

5.1.3. Emissions

The emissions calculated on the basis of sector and gas. Table 5.2 summarises the results of the sectors energy, agriculture, industry, tertiary, wastes, contributing the most to the GHG emissions.

Table 5.2. Emissions of GHG per sector in kt CO_2 equivalents, based on the BaU scenario, projected for 2010, 2015 and 2020

Sector	1990	2010	2015	2020
Energy	4452.9	10689.8	12539.7	15175.4
Industry	570.6	646.5	686.1	665.7
Solvents	2.3	3.0	3.0	3.0
Agriculture	570.6	739.0	741.1	741.1
Wastes	433.2	632.1	657.3	638.4
TOTAL	6029.6	12710.4	14627.2	17223.6
Comparison to 1990		110.8%	142.6%	185.7%

The figures above are also illustrated in the form of a diagram (Figure 5.2). As it can be seen, the emissions caused by industry, agriculture and wastes are almost stable at approximately 2000 kt CO2 eq, while the overall increase is produced entirely by the sector of energy.

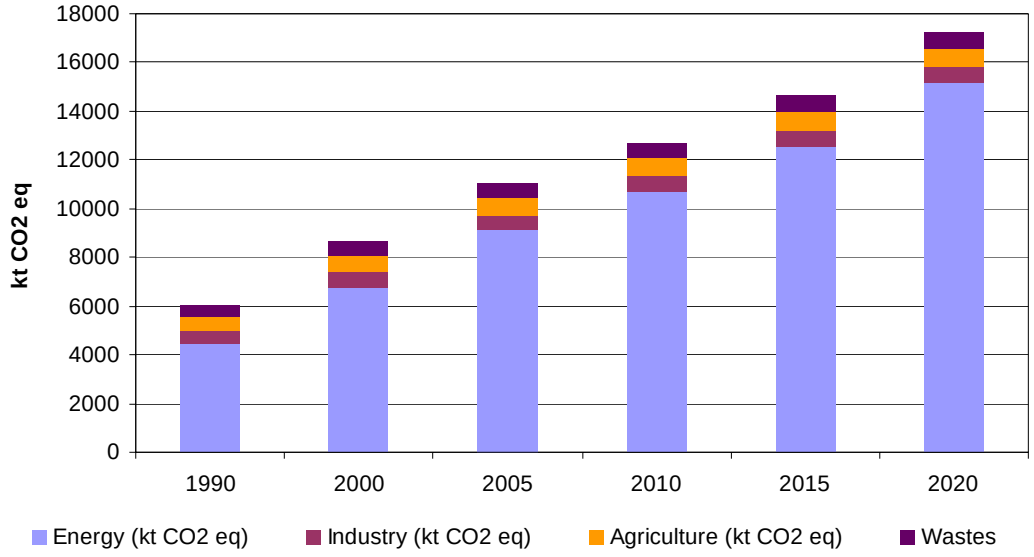

Figure 5.2. Contribution of sectors to emissions of GHG in kt CO_2 equivalents

Table 5.3. Emissions of GHG per gas and sector in kt CO_2 equivalents, based on the BaU scenario, projected for 2010, 2015 and 2020

Agriculture	1990	2010	2015	2020
CO2	0.0	0.0	0.0	0.0
CH4	265.4	336.0	338.1	338.1
N2O	305.3	403.0	403.0	403.0
TOTAL	570.6	739.0	741.1	741.1
Comparison to 1990		29.5%	29.9%	29.9%

Wastes	1990	2010	2015	2020
CO2	0.0	0.0	0.0	0.0
CH4	433.2	632.1	657.3	638.4
N2O	0.0	0.0	0.0	0.0
TOTAL	433.2	632.1	657.3	638.4
Comparison to 1990		45.9%	51.7%	47.4%

Industry	1990	2010	2015	2020
CO2	570.5	646.5	686.1	665.7
CH4	0.0	0.0	0.0	0.0
N2O	0.0	0.0	0.0	0.0
TOTAL	570.5	646.5	686.1	665.7
Comparison to 1990		13.3%	20.3%	16.7%

Energy	1990	2010	2015	2020
CO2	4067.4	9755.8	11444.1	13849.5
CH4	10.3	22.4	26.3	31.8
N2O	375.2	910.3	1067.8	1292.2
TOTAL	4452.9	10689.78	12539.72	15175.44
Comparison to 1990		140.1%	181.6%	240.8%

The energy sector in Cyprus is divided into the sub-sectors of Energy Industries, Manufacturing Industries and Construction, Transport, Agriculture, Tertiary Sector and Residential. The Table 5.4, the emissions released per sub-sector are shown.

Table 5.4. Emissions of GHG per gas and energy sub-sector in kt CO_2 equivalents, based on the BaU scenario, projected for 2010, 2015 and 2020

Energy Industries	1990	2010	2015	2020
CO2	1664.0	4289.4	5137.0	6004.6
CH4	0.0	1.0	1.0	1.0
N2O	313.0	806.4	965.8	1128.9
TOTAL	1977.0	5096.8	6103.7	7134.4
Comparison to 1990		157.8%	208.7%	260.9%

Transport	1990	2010	2015	2020
CO2	957.0	1956.0	2232.0	2547.0
CH4	6.7	11.0	13.0	1.0
N2O	12.4	66.0	81.0	908.0
TOTAL	976.2	2033.0	2326.0	3456.0
Comparison to 1990		108.3%	138.3%	254.0%

Agriculture	1990	2010	2015	2020
CO2	218.0	511.0	576.0	642.0
CH4	0.0	1.0	2.0	2.0
N2O	25.0	61.0	69.0	77.0
TOTAL	243.0	573.0	647.0	721.0
Comparison to 1990		135.8%	166.3%	196.7%

Tertiary	1990	2010	2015	2020
CO2	182.0	485.0	574.0	671.0
CH4	0.0	0.0	0.0	0.0
N2O	0.0	1.0	1.0	1.0
TOTAL	182.0	486.0	575.0	672.0
Comparison to 1990		167.0%	215.9%	269.2%

Residential	1990	2010	2015	2020
CO2	202.0	519.0	620.0	719.0
CH4	2.0	2.0	2.0	2.0
N2O	0.0	2.0	2.0	2.0
TOTAL	204.0	523.0	624.0	723.0

Comparison to 1990		156.4%	205.9%	254.4%

Industry	1990	2010	2015	2020
CO2	770.2	1927.0	2213.0	2414.0
CH4	0.8	5.0	4.0	5.0
N2O	21.8	46.0	47.0	50.0
TOTAL	792.8	1978.0	2264.0	2469.0
Comparison to 1990		149.5%	185.6%	211.4%

The comparison between the energy sub-sectors is illustrated in Table 5.5 and Figure 5.3.

Table 5.5. Emissions of GHG per energy sub-sector in kt CO_2 equivalents, based on the BaU scenario, projected for 2010, 2015 and 2020

ENERGY SUB-SECTORS	1990	2010	2015	2020
Energy Industries	2053.6	5096.8	6103.7	7134.4
Manufacturing Industries and Construction	792.8	1978.0	2264.0	2469.0
Transport	976.2	2033.0	2326.0	3456.0
Agriculture	243.0	573.0	647.0	721.0
Tertiary Sector	182.0	486.0	575.0	672.0
Residential	204.0	523.0	624.0	723.0
TOTAL	4451.6	10689.8	12539.7	15175.4
Comparison to 1990		140.1%	181.7%	240.9%

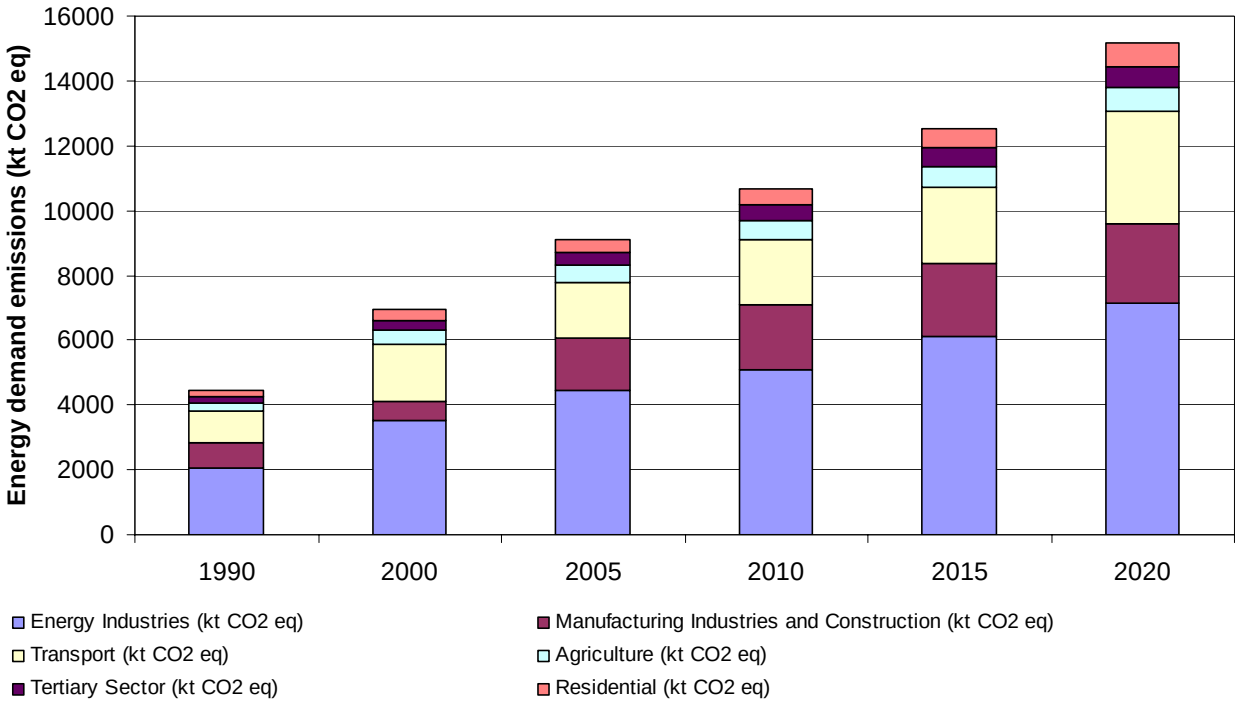

Figure 5.3. Contribution of GHG emissions of in kt CO_2 equivalents for 2000, 2005, 2010, 2015 and 2020 in comparison to 1990, for the energy sub-sectors

5.2. Scenario 2: Introduction of Renewable Energy Sources (RES) and Rational Use of Energy (RUE)

5.2.1. Assumptions

In addition to the assumptions stated for the BaU scenario, Scenario 2 assumes that:

- An increase of electricity generation from RES, to reach 6% of the total electricity consumption in 2010, 9% in 2015 and 12% in 2020.
- The reduction of GHG emissions caused by RUE in energy consumption to reach 5% by 2010, 7.5% by 2015 and 10% by 2020.

5.2.2. Emissions

The impact of introduction of RES and RUE mainly has an impact on the sector of energy. The rest of the sectors are affected but not to the extent the sector of energy is affected. Table 5.6 and Figure 5.4 shows the impact RES and RUE will have on the total emissions.

Table 5.6. Impact of introduction of RES and REU on GHG emissions for total emissions in kt CO_2 equivalents for 2010, 2015 and 2020 in comparison to 1990

02>>>>> RES & RUE	1990	2010	2015	2020
RUE		-254.8	-457.8	-713.4
RES		-305.8	-549.3	-856.1
TOTAL CO_2 EMISSIONS	6010.6	12149.7	13620.1	15654.1

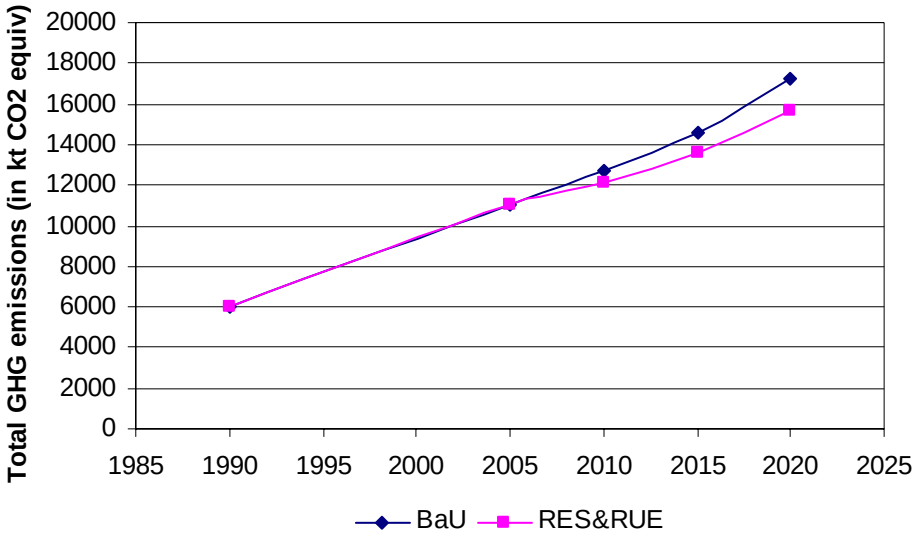

Figure 5.4. Impact of introduction of RES and RUE on GHG emissions for total emissions in kt CO_2 equivalents for 2010, 2015 and 2020 in comparison to 1990

5.3. Scenario 3: Introduction of Renewable Energy Sources (RES), Rational Use of Energy (RUE) and Natural Gas

5.3.1. Assumptions

In addition to the use of RES and RUE after 2008, at the power generating stations

- The use of Diesel is minimised
- Natural Gas is introduced in 2011 covering all the new energy demand and replacing HFO units.

5.3.2. Emissions

Table 5.7. Impact of introduction of RES, RUE and natural gas on GHG emissions for total emissions in kt CO_2 equivalents for 2010, 2015 and 2020 in comparison to 1990

03>>>>> RES, RUE & Natural Gas	1990	2010	2015	2020
RUE		-254.8	-457.8	-713.4
RES		-305.8	-549.3	-856.1
LNG (Mt)			-2147.5	-3048.8
TOTAL CO_2 EMISSIONS	6010.6	12149.7	11472.6	12605.3

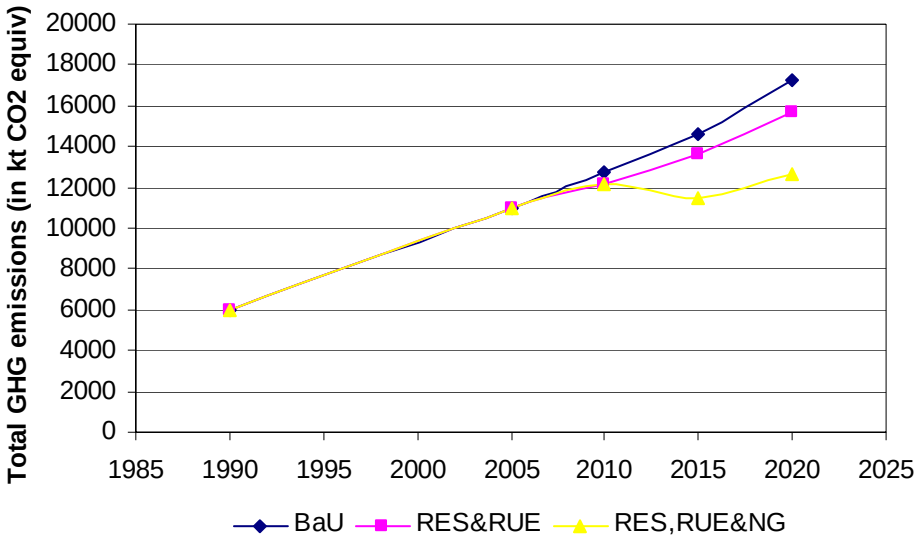

Figure 5.5. Impact of introduction of RES, RUE and natural gas on GHG emissions for total emissions in kt CO_2 equivalents for 2010, 2015 and 2020 in comparison to 1990

5.4. Scenario 4: Introduction of RES, RUE, Natural Gas and other measures in tertiary sector

5.4.1. Assumptions

In addition to the use of RES, RUE after 2008 and natural gas this scenario considers the reductions in emissions caused by the tertiary sector:

- Improvement of the thermal behaviour of buildings in the residential sector causing energy conservation; (up-to 2,338 toe conservation in 2020)
- Maintenance of central heating boilers (up to 44,664 toe conservation in 2020);
- Replacement of central heating boilers (up to 3,218 toe conservation in 2020);
- Use of high efficiency air conditioning systems (up to 38,180 toe conservation in 2020);
- Use of high efficiency electric appliances (up to 6,476 toe conservation in 2020);
- Use of energy-efficiency lighting bulbs (up to 34,934 toe conservation in 2020);
- Automations in lighting (up to 6,892 toe conservation in 2020);
- Solar collectors for water heating (up to 11,595 toe conservation in 2020);
- Roof-top photovoltaic systems connected to grid (up to 452 toe conservation in 2020).

5.4.2. Emissions

Table 5.8. Impact of introduction of RES, RUE, natural gas and reductions in the total emissions in kt CO_2 equivalents for 2010, 2015 and 2020 in comparison to 1990

04>>>>> RES, RUE, NG & Tertiary sector	**1990**	**2010**	**2015**	**2020**
RUE		-254.8	-457.8	-713.4
RES		-305.8	-549.3	-856.1
LNG (Mt)			-2147.5	-3048.8
Tertiary Sector		-824.0	-1188.5	-1553.0
TOTAL CO_2 EMISSIONS	6010.6	11325.7	10284.1	11052.3

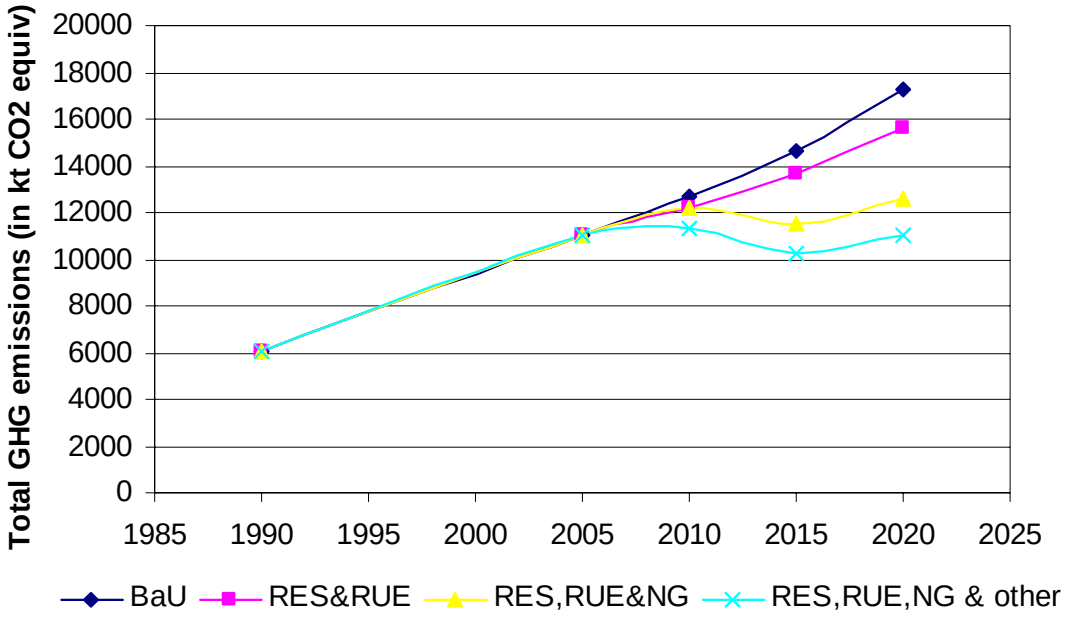

Figure 5.6. Impact of introduction of RES, RUE, natural gas and reductions in the emissions of the tertiary sector on GHG emissions for total emissions in kt CO_2 equivalents for 2010, 2015 and 2020 in comparison to 1990

5.5. Summary

Figure 5.7 and Table 5.9 summarise the results of the policies and measures in the reduction of GHG emissions under the four different Scenarios. Also, Figure 5.7 illustrates that all Scenarios (apart from BAU) will result in a significant decoupling of GHG emissions from GDP.

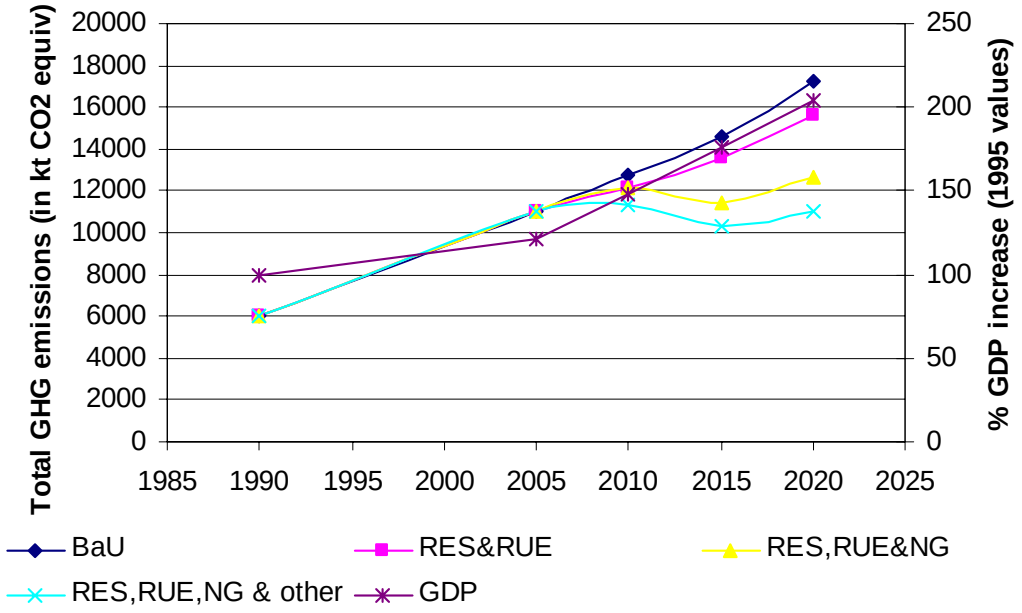

Figure 5.7. Impact of introduction of RES, RUE, natural gas and reductions in the emissions of the tertiary sector on GHG emissions for total emissions in kt CO2 equivalents for 2010, 2015 and 2020 in comparison to 1990, in comparison to the % GDP increase

Table 5.9. Impact of introduction of RES, RUE, natural gas and reductions in the total emissions in kt CO_2 equivalents for 2010, 2015 and 2020 in comparison to 1990

	1990	**2005**	**2010**	**2015**	**2020**
BaU (kt CO2 equiv)	6011	11013	12710	14627	17224
BaU (% increase from 1990 values)		*83%*	*111%*	*143%*	*187%*
RES&RUE (kt CO2 equiv)	6011	11013	12150	13620	15654
RES&RUE (% increase from 1990 values)		*83%*	*102%*	*127%*	*160%*
RES,RUE&NG (kt CO2 equiv)	6011	11013	12150	11473	12605
RES,RUE&NG (% increase from 1990 values)		*83%*	*102%*	*91%*	*110%*
RES,RUE,NG & other (kt CO2 equiv)	6011	11013	11326	10284	11052
RES,RUE,NG & other (% increase from 1990 values)		*83%*	*88%*	*71%*	*84%*
GDP (%)	100	122	148	176	204

6. Impacts and adaptation

To date, a study on climate change in Cyprus, the potential impacts from such changes and the appropriate adaptation measures has not been carried out. However, the measurements of temperature (see Figure 2.2, Chapter 2) show that there is an increase of the average annual temperature in Cyprus, especially after the eighties. The Cypriot economy, depending largely on tourism - which is developed across the coast of the island - can be significantly affected by a potential change in climate. Furthermore, it should be noted that the increase of temperature is closely connected to the consumption of electricity by air-conditioning units and thus a further increase of the temperature during summer will lead to a consequent increase of electricity demand and the associated emissions from this sector. It should be emphasized that carbon dioxide emissions from electricity generation increased significantly during the last decade and are expected to continue to increase substantially in the future.

It should be also noted that Cyprus faces severe water shortage problems, while in many areas uncontrolled water pumping has led to sea intrusion into groundwater aquifers and to the deterioration of water quality that is pumped. A further decrease of precipitation, combined with a lack of measures for a proper water management, will worsen this situation and will adversely affect the local economy and the quality of life.

Thus, it is clear that the estimation of impacts and the development of appropriate adaptation measures are necessary in order to limit to the maximum possible extent the negative impacts on the environment, the economy and the quality of life from a potential climate change.

7. Financial assistance and technology transfer

Cyprus occupies a strategic location in the Eastern Mediterranean Sea and has already developed a significant collaboration with neighbouring countries in the field of commerce and education. This fact, together with the intention of the Cypriot government to implement policies and measures for the reduction of greenhouse gases emissions, is expected to support technology transfer towards the neighbouring developing countries.

8. Research and systematic observation

To date, in Cyprus a network for the research and systematic observation on climate change has not been developed. There are stations for the measurement of temperature, precipitation, as well as for conventional air pollutants (SO2, NOx, particulate matter). The existing network for the monitoring of air quality will be accomplished with additional stations and thus, within the framework of this expansion, the network could also integrate some stations for research and systematic observation regarding climate change.

9. Education, training and public awareness

Education and training of the administration staff and the staff of other bodies, involved directly or indirectly in the determination and implementation of mitigation measures, is necessary for an effective and successful implementation of the national plan for the reduction of greenhouse gases emissions. Towards this direction, the Cypriot government organized workshops and training seminars on the above-mentioned issues.

In December 2001, the Ministry of Agriculture, Natural Resources and Environment, in collaboration with the National Observatory of Athens (Greece), organized a training seminar addressed to the employees at the various administration departments. This seminar was part of the process regarding the formulation of the national plan for the reduction of greenhouse gases emissions. During this seminar, which was of a rather technical character, participants were informed on the requirements set by the UN Convention and the Kyoto Protocol regarding annual inventories of greenhouse gases emissions, National Communications to the UNFCCC, the development of emissions projections, National Systems for the estimation of emissions etc. Furthermore, participants were trained on the use of computational tools for the development of annual emission inventories, the development of projections and the assessment of policies and measures for the limitation of emissions.

This seminar was followed by a workshop, organized also by the Ministry of Agriculture, Natural Resources and Environment and the National Observatory of Athens. The objective of the workshop was to inform the administration staff on the recent decisions during COP-7 in Marrakech, the characteristics of the Kyoto Protocol flexible mechanisms, the requirements set by the UN Convention and the Kyoto Protocol regarding annual inventories, National Communications etc., as well as to stimulate a general discussion regarding the national plan for the reduction of carbon dioxide emissions in Cyprus.

In order to further promote the effective implementation of the National Plan, an integrated campaign aiming at public awareness on climate change and the possible activities for the reduction of greenhouse gases emissions is planned, as the active participation of the public is necessary for the achievement of the targets specified in the National Plan.

Relevant Publications

A. Emissions Inventory

EMEP/CORINAIR, "Atmospheric Emission Inventory Guidebook", Prepared by the EMEP Task Force on Emission Inventories, September 1999

EU-DG XVII-A2, "NOx, SO2, CH4 and N2O emissions on the basis of the four long term energy scenarios of DG XVII", 1996

IPCC, "Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories", 2000

UNEP/WMO/OECD/IEA, "Revised 1996 Guidelines for National Greenhouse Gas Inventories: Reference Manual", 1997

U.S. Environmental Protection Agency [EPA], "Compilation of Air Pollutant Emission Factors AP-42", 5th Edition, Volume I: Stationary Point and Area Sources", 1995

World Health Organization [WHO], "Assessment of Sources of Air, Water and Land Pollution – Part One: Rapid Inventory Techniques in Environmental Pollution", Environmental Technology Series, Geneva, 1993

B. Projections – Policies and Measures

Argonne National Laboratory, "Description of ENPEP/BALANCE Model", Technical Report, 2000

CIA/HED – Republic of Cyprus, "Recycling of Municipal Solid Waste in the Main Urban and Tourist Centres of Cyprus", Supplementary Report, May 1999

Electricity Authority of Cyprus, "Development Plan 1999 – 2008", March 1999

EXERGIA – Ministry of Commerce, Industry and Tourism, "Preparation of an Action Plan for Improving Energy Efficiency of the Energy Sector of the Island of Cyprus", 1st Technical Report within the framework of Synergy Programme, 1997

Office for Planning, "Strategic Development Plan 1999 – 2003", 1999

U.S. Environmental Protection Agency [EPA], "Emissions Projection", Report prepared for Projections Committee, Emissions Inventory Improvement Programme, 1999

C. Statistical Publications

Ministry of Finance, Department of Statistics and Research, “Transport Statistics”, “Agricultural Statistics”, “Industrial Statistics”, “Statistical Abstract”

Electricity Authority of Cyprus, Operational Characteristics of the electricity generation system

Annex I: 1990–2004 Inventory

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS CYPRUS
(Sheet 1 of 1) 1990

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 (1)	CH4	N2O	HFCs	PFCs	SF6	Total
	CO2 equivalent (Gg)						
Total (Net Emissions) (1)	**4,617.74**	**711.32**	**681.56**	**0.00**	**0.00**	**0.00**	**6,010.62**
1. Energy	**4,067.37**	**10.31**	**375.18**				**4,452.86**
A. Fuel Combustion (Sectoral Approach)	4,067.37	9.81	375.18				4,452.36
1. Energy Industries	1,736.97	0.42	316.20				2,053.59
2. Manufacturing Industries and Construction	770.23	0.78	21.78				792.79
3. Transport	957.05	6.72	12.40				976.17
4. Other Sectors	603.12	1.89	24.80				629.81
5. Other	0.00	0.00	0.00				0.00
B. Fugitive Emissions from Fuels	0.00	0.50	0.00				0.50
1. Solid Fuels	0.00	0.00	0.00				0.00
2. Oil and Natural Gas	0.00	0.50	0.00				0.50
2. Industrial Processes	**570.52**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**570.52**
A. Mineral Products	570.52	0.00	0.00				570.52
B. Chemical Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production	0.00	0.00	0.00		0.00	0.00	0.00
D. Other Production	NO						0.00
E. Production of Halocarbons and SF6				0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF6				0.00	0.00	0.00	0.00
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Solvent and Other Product Use	**2.29**		**0.00**				**2.29**
4. Agriculture	**0.00**	**265.36**	**305.26**				**570.62**
A. Enteric Fermentation		158.55					158.55
B. Manure Management		102.48	78.11				180.59
C. Rice Cultivation		0.00					0.00
D. Agricultural Soils(2)		0.00	225.59				225.59
E. Prescribed Burning of Savannas		0.00	0.00				0.00
F. Field Burning of Agricultural Residues		4.33	1.56				5.89
G. Other		0.00	0.00				0.00
5. Land-Use Change and Forestry(1)	**-22.44**	**2.41**	**1.13**				**-18.90**
6. Waste	**0.00**	**433.23**	**0.00**				433.23
A. Solid Waste Disposal on Land	0.00	411.39					411.39
B. Wastewater Handling		21.84	0.00				21.84
C. Waste Incineration	0.00	0.00	0.00				0.00
D. Other	0.00	0.00	0.00				0.00
7. Other (please specify)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
							0.00
Memo Items:							
International Bunkers	**933.55**	**1.68**	**6.20**				**941.43**
Aviation	744.81	1.26	6.20				752.27
Marine	188.74	0.42	0.00				189.16
Multilateral Operations	**0.00**	**0.00**	**0.00**				**0.00**
CO2 Emissions from Biomass	**32.11**						**32.11**

(1) For CO2 emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).
(2) See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 emissions	CO2 removals	Net CO2 emissions / removals	CH4	N2O	Total emissions
Land-Use Change and Forestry	CO2 equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	97.16	-125.22	-28.06			-28.06
B. Forest and Grassland Conversion	5.62		5.62	2.41	1.13	9.16
C. Abandonment of Managed Lands	0.00	0.00	0.00			0.00
D. CO2 Emissions and Removals from Soil	0.00	0.00	0.00			0.00
E. Other	0.00	0.00	0.00	0.00	0.00	0.00
Total CO2 Equivalent Emissions from Land-Use Change and Forestry	102.78	-125.22	-22.44	2.41	1.13	-18.90

Total CO2 Equivalent Emissions without Land-Use Change and Forestry (a)	6,029.52
Total CO2 Equivalent Emissions with Land-Use Change and Forestry (a)	6,010.62

(a) The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS CYPRUS
(Sheet 1 of 1) 1991

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 (1)	CH4	N2O	HFCs	PFCs	SF6	Total
	CO2 equivalent (Gg)						
Total (Net Emissions) (1)	**4,688.64**	**722.90**	**693.37**	**0.00**	**0.00**	**0.00**	**6,104.90**
1. Energy	**4,165.03**	**10.42**	**388.92**				**4,564.36**
A. Fuel Combustion (Sectoral Approach)	4,165.03	9.81	388.92				4,563.76
1. Energy Industries	1,804.34	0.42	328.60				2,133.36
2. Manufacturing Industries and Construction	798.33	0.78	23.12				822.23
3. Transport	955.26	6.72	12.40				974.38
4. Other Sectors	607.09	1.89	24.80				633.78
5. Other	0.00	0.00	0.00				0.00
B. Fugitive Emissions from Fuels	0.00	0.60	0.00				0.60
1. Solid Fuels	0.00	0.00	0.00				0.00
2. Oil and Natural Gas	0.00	0.60	0.00				0.60
2. Industrial Processes	**570.35**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**570.35**
A. Mineral Products	570.35	0.00	0.00				570.35
B. Chemical Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production	0.00	0.00	0.00		0.00	0.00	0.00
D. Other Production	NO						0.00
E. Production of Halocarbons and SF6				0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF6				0.00	0.00	0.00	0.00
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Solvent and Other Product Use	**2.35**		**0.00**				**2.35**
4. Agriculture	**0.00**	**270.12**	**303.32**				**573.45**
A. Enteric Fermentation		160.86					160.86
B. Manure Management		106.26	79.24				185.50
C. Rice Cultivation		0.00					0.00
D. Agricultural Soils(2)		0.00	223.00				223.00
E. Prescribed Burning of Savannas		0.00	0.00				0.00
F. Field Burning of Agricultural Residues		3.00	1.08				4.09
G. Other		0.00	0.00				0.00
5. Land-Use Change and Forestry(1)	**-49.09**	**2.41**	**1.13**				**-45.55**
6. Waste	**0.00**	**439.95**	**0.00**				439.95
A. Solid Waste Disposal on Land	0.00	417.48					417.48
B. Wastewater Handling		22.47	0.00				22.47
C. Waste Incineration	0.00	0.00	0.00				0.00
D. Other	0.00	0.00	0.00				0.00
7. Other (please specify)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
							0.00
Memo Items:							
International Bunkers	**752.10**	**1.47**	**3.10**				**756.67**
Aviation	575.58	1.05	3.10				579.73
Marine	176.52	0.42	0.00				176.94
Multilateral Operations	**0.00**	**0.00**	**0.00**				**0.00**
CO2 Emissions from Biomass	**32.11**						**32.11**

(1) For CO2 emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).
(2) See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 emissions	CO2 removals	Net CO2 emissions / removals	CH4	N2O	Total emissions
Land-Use Change and Forestry	CO2 equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	75.83	-130.54	-54.71			-54.71
B. Forest and Grassland Conversion	5.62		5.62	2.41	1.13	9.16
C. Abandonment of Managed Lands	0.00	0.00	0.00			0.00
D. CO2 Emissions and Removals from Soil	0.00	0.00	0.00			0.00
E. Other	0.00	0.00	0.00	0.00	0.00	0.00
Total CO2 Equivalent Emissions from Land-Use Change and Forestry	81.45	-130.54	-49.09	2.41	1.13	-45.55

Total CO2 Equivalent Emissions without Land-Use Change and Forestry (a)	6,150.46
Total CO2 Equivalent Emissions with Land-Use Change and Forestry (a)	6,104.90

(a) The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS CYPRUS
(Sheet 1 of 1) 1992

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 (1)	CH4	N2O	HFCs	PFCs	SF6	Total
	CO2 equivalent (Gg)						
Total (Net Emissions) (1)	**5,204.18**	**760.73**	**783.48**	**0.00**	**0.00**	**0.00**	**6,748.38**
1. Energy	**4,696.28**	**11.17**	**446.50**				**5,153.95**
A. Fuel Combustion (Sectoral Approach)	4,696.28	10.60	446.50				5,153.37
1. Energy Industries	2,088.13	0.42	378.20				2,466.75
2. Manufacturing Industries and Construction	828.98	0.94	24.90				854.81
3. Transport	1,067.67	7.35	12.40				1,087.42
4. Other Sectors	711.50	1.89	31.00				744.39
5. Other	0.00	0.00	0.00				0.00
B. Fugitive Emissions from Fuels	0.00	0.57	0.00				0.57
1. Solid Fuels	0.00	0.00	0.00				0.00
2. Oil and Natural Gas	0.00	0.57	0.00				0.57
2. Industrial Processes	**566.55**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**566.55**
A. Mineral Products	566.55	0.00	0.00				566.55
B. Chemical Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production	0.00	0.00	0.00		0.00	0.00	0.00
D. Other Production	NO						0.00
E. Production of Halocarbons and SF6				0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF6				0.00	0.00	0.00	0.00
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Solvent and Other Product Use	**2.41**		**0.00**				**2.41**
4. Agriculture	**0.00**	**285.77**	**335.85**				**621.62**
A. Enteric Fermentation		161.91					161.91
B. Manure Management		117.39	87.07				204.46
C. Rice Cultivation		0.00					0.00
D. Agricultural Soils(2)		0.00	246.45				246.45
E. Prescribed Burning of Savannas		0.00	0.00				0.00
F. Field Burning of Agricultural Residues		6.47	2.34				8.81
G. Other		0.00	0.00				0.00
5. Land-Use Change and Forestry(1)	**-61.06**	**2.41**	**1.13**				**-57.52**
6. Waste	**0.00**	**461.37**	**0.00**				461.37
A. Solid Waste Disposal on Land	0.00	438.06					438.06
B. Wastewater Handling		23.31	0.00				23.31
C. Waste Incineration	0.00	0.00	0.00				0.00
D. Other	0.00	0.00	0.00				0.00
7. Other (please specify)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
							0.00
Memo Items:							
International Bunkers	**962.34**	**1.68**	**6.20**				**970.22**
Aviation	779.75	1.26	6.20				787.21
Marine	182.59	0.42	0.00				183.01
Multilateral Operations	**0.00**	**0.00**	**0.00**				**0.00**
CO2 Emissions from Biomass	**32.11**						**32.11**

(1) For CO2 emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).
(2) See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 emissions	CO2 removals	Net CO2 emissions / removals	CH4	N2O	Total emissions
Land-Use Change and Forestry	CO2 equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	69.50	-136.18	-66.68			-66.68
B. Forest and Grassland Conversion	5.62		5.62	2.41	1.13	9.16
C. Abandonment of Managed Lands	0.00	0.00	0.00			0.00
D. CO2 Emissions and Removals from Soil	0.00	0.00	0.00			0.00
E. Other	0.00	0.00	0.00	0.00	0.00	0.00
Total CO2 Equivalent Emissions from Land-Use Change and Forestry	75.12	-136.18	-61.06	2.41	1.13	-57.52

Total CO2 Equivalent Emissions without Land-Use Change and Forestry (a)	6,805.90
Total CO2 Equivalent Emissions with Land-Use Change and Forestry (a)	6,748.38

(a) The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS CYPRUS
(Sheet 1 of 1) 1993

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 (1)	CH4	N2O	HFCs	PFCs	SF6	Total
	CO2 equivalent (Gg)						
Total (Net Emissions) (1)	**5,500.36**	**781.46**	**828.60**	**0.00**	**0.00**	**0.00**	**7,110.41**
1. Energy	**5,005.85**	**11.11**	**485.04**				**5,502.00**
A. Fuel Combustion (Sectoral Approach)	5,005.85	10.49	485.04				5,501.38
1. Energy Industries	2,229.69	0.42	406.10				2,636.21
2. Manufacturing Industries and Construction	924.52	1.04	29.34				954.91
3. Transport	1,109.98	7.14	15.50				1,132.62
4. Other Sectors	741.66	1.89	34.10				777.65
5. Other	0.00	0.00	0.00				0.00
B. Fugitive Emissions from Fuels	0.00	0.62	0.00				0.62
1. Solid Fuels	0.00	0.00	0.00				0.00
2. Oil and Natural Gas	0.00	0.62	0.00				0.62
2. Industrial Processes	**547.85**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**547.85**
A. Mineral Products	547.85	0.00	0.00				547.85
B. Chemical Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production	0.00	0.00	0.00		0.00	0.00	0.00
D. Other Production	NO						0.00
E. Production of Halocarbons and SF6				0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF6				0.00	0.00	0.00	0.00
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Solvent and Other Product Use	**2.45**		**0.00**				**2.45**
4. Agriculture	**0.00**	**302.78**	**342.43**				**645.22**
A. Enteric Fermentation		168.00					168.00
B. Manure Management		127.68	96.18				223.86
C. Rice Cultivation		0.00					0.00
D. Agricultural Soils(2)		0.00	243.69				243.69
E. Prescribed Burning of Savannas		0.00	0.00				0.00
F. Field Burning of Agricultural Residues		7.10	2.57				9.67
G. Other		0.00	0.00				0.00
5. Land-Use Change and Forestry(1)	**-55.80**	**2.41**	**1.13**				**-52.26**
6. Waste	**0.00**	**465.15**	**0.00**				465.15
A. Solid Waste Disposal on Land	0.00	441.63					441.63
B. Wastewater Handling		23.52	0.00				23.52
C. Waste Incineration	0.00	0.00	0.00				0.00
D. Other	0.00	0.00	0.00				0.00
7. Other (please specify)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
							0.00
Memo Items:							
International Bunkers	**886.39**	**1.47**	**6.20**				**894.06**
Aviation	730.69	1.26	6.20				738.15
Marine	155.70	0.21	0.00				155.91
Multilateral Operations	**0.00**	**0.00**	**0.00**				**0.00**
CO2 Emissions from Biomass	**32.11**						**32.11**

(1) For CO2 emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).
(2) See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 emissions	CO2 removals	Net CO2 emissions / removals	CH4	N2O	Total emissions
Land-Use Change and Forestry	CO2 equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	80.77	-142.19	-61.42			-61.42
B. Forest and Grassland Conversion	5.62		5.62	2.41	1.13	9.16
C. Abandonment of Managed Lands	0.00	0.00	0.00			0.00
D. CO2 Emissions and Removals from Soil	0.00	0.00	0.00			0.00
E. Other	0.00	0.00	0.00	0.00	0.00	0.00
Total CO2 Equivalent Emissions from Land-Use Change and Forestry	86.39	-142.19	-55.80	2.41	1.13	-52.26

Total CO2 Equivalent Emissions without Land-Use Change and Forestry (a)	7,162.67
Total CO2 Equivalent Emissions with Land-Use Change and Forestry (a)	7,110.41

(a) The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS CYPRUS
(Sheet 1 of 1) 1994

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 (1)	CH4	N2O	HFCs	PFCs	SF6	Total
	CO2 equivalent (Gg)						
Total (Net Emissions) (1)	**5,503.85**	**792.05**	**840.54**	**0.00**	**0.00**	**0.00**	**7,136.45**
1. Energy	**5,042.64**	**11.32**	**502.82**				**5,556.78**
A. Fuel Combustion (Sectoral Approach)	5,042.64	10.61	502.82				5,556.07
1. Energy Industries	2,334.98	0.42	424.70				2,760.10
2. Manufacturing Industries and Construction	820.07	0.95	25.42				846.44
3. Transport	1,140.16	7.14	18.60				1,165.90
4. Other Sectors	747.43	2.10	34.10				783.63
5. Other	0.00	0.00	0.00				0.00
B. Fugitive Emissions from Fuels	0.00	0.71	0.00				0.71
1. Solid Fuels	0.00	0.00	0.00				0.00
2. Oil and Natural Gas	0.00	0.71	0.00				0.71
2. Industrial Processes	**530.82**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**530.82**
A. Mineral Products	530.82	0.00	0.00				530.82
B. Chemical Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production	0.00	0.00	0.00		0.00	0.00	0.00
D. Other Production	NO						0.00
E. Production of Halocarbons and SF6				0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF6				0.00	0.00	0.00	0.00
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Solvent and Other Product Use	**2.49**		**0.00**				**2.49**
4. Agriculture	**0.00**	**302.88**	**336.60**				**639.48**
A. Enteric Fermentation		171.15					171.15
B. Manure Management		126.21	94.67				220.88
C. Rice Cultivation		0.00					0.00
D. Agricultural Soils(2)		0.00	239.93				239.93
E. Prescribed Burning of Savannas		0.00	0.00				0.00
F. Field Burning of Agricultural Residues		5.52	2.00				7.52
G. Other		0.00	0.00				0.00
5. Land-Use Change and Forestry(1)	**-72.10**	**2.41**	**1.13**				**-68.56**
6. Waste	**0.00**	**475.44**	**0.00**				475.44
A. Solid Waste Disposal on Land	0.00	451.50					451.50
B. Wastewater Handling		23.94	0.00				23.94
C. Waste Incineration	0.00	0.00	0.00				0.00
D. Other	0.00	0.00	0.00				0.00
7. Other (please specify)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
							0.00
Memo Items:							
International Bunkers	**939.21**	**1.47**	**6.20**				**946.88**
Aviation	748.34	1.26	6.20				755.80
Marine	190.87	0.21	0.00				191.08
Multilateral Operations	**0.00**	**0.00**	**0.00**				**0.00**
CO2 Emissions from Biomass	**32.11**						**32.11**

(1) For CO2 emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).
(2) See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 emissions	CO2 removals	Net CO2 emissions / removals	CH4	N2O	Total emissions
Land-Use Change and Forestry	CO2 equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	70.89	-148.61	-77.72			-77.72
B. Forest and Grassland Conversion	5.62		5.62	2.41	1.13	9.16
C. Abandonment of Managed Lands	0.00	0.00	0.00			0.00
D. CO2 Emissions and Removals from Soil	0.00	0.00	0.00			0.00
E. Other	0.00	0.00	0.00	0.00	0.00	0.00
Total CO2 Equivalent Emissions from Land-Use Change and Forestry	76.51	-148.61	-72.10	2.41	1.13	-68.56

Total CO2 Equivalent Emissions without Land-Use Change and Forestry (a)	7,205.01
Total CO2 Equivalent Emissions with Land-Use Change and Forestry (a)	7,136.45

(a) The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS CYPRUS
(Sheet 1 of 1) 1995

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 (1)	CH4	N2O	HFCs	PFCs	SF6	Total
	CO2 equivalent (Gg)						
Total (Net Emissions) (1)	**5,499.79**	**811.32**	**820.38**	**0.00**	**0.00**	**0.00**	**7,131.49**
1. Energy	**5,058.19**	**11.77**	**471.79**				**5,541.75**
A. Fuel Combustion (Sectoral Approach)	5,058.19	11.12	471.79				5,541.10
1. Energy Industries	2,153.44	0.42	387.50				2,541.36
2. Manufacturing Industries and Construction	894.20	1.04	28.49				923.73
3. Transport	1,206.05	7.56	18.60				1,232.21
4. Other Sectors	804.50	2.10	37.20				843.80
5. Other	0.00	0.00	0.00				0.00
B. Fugitive Emissions from Fuels	0.00	0.65	0.00				0.65
1. Solid Fuels	0.00	0.00	0.00				0.00
2. Oil and Natural Gas	0.00	0.65	0.00				0.65
2. Industrial Processes	**514.95**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**514.95**
A. Mineral Products	514.95	0.00	0.00				514.95
B. Chemical Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production	0.00	0.00	0.00		0.00	0.00	0.00
D. Other Production	NO						0.00
E. Production of Halocarbons and SF6				0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF6				0.00	0.00	0.00	0.00
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Solvent and Other Product Use	**2.51**		**0.00**				**2.51**
4. Agriculture	**0.00**	**316.03**	**347.47**				**663.50**
A. Enteric Fermentation		177.87					177.87
B. Manure Management		132.72	99.39				232.11
C. Rice Cultivation		0.00					0.00
D. Agricultural Soils(2)		0.00	246.12				246.12
E. Prescribed Burning of Savannas		0.00	0.00				0.00
F. Field Burning of Agricultural Residues		5.44	1.96				7.40
G. Other		0.00	0.00				0.00
5. Land-Use Change and Forestry(1)	**-75.87**	**2.41**	**1.13**				**-72.33**
6. Waste	**0.00**	**481.11**	**0.00**				481.11
A. Solid Waste Disposal on Land	0.00	456.96					456.96
B. Wastewater Handling		24.15	0.00				24.15
C. Waste Incineration	0.00	0.00	0.00				0.00
D. Other	0.00	0.00	0.00				0.00
7. Other (please specify)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
							0.00
Memo Items:							
International Bunkers	**1,034.46**	**1.89**	**6.20**				**1,042.55**
Aviation	820.33	1.47	6.20				828.00
Marine	214.13	0.42	0.00				214.55
Multilateral Operations	**0.00**	**0.00**	**0.00**				**0.00**
CO2 Emissions from Biomass	**32.11**						**32.11**

(1) For CO2 emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).
(2) See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 emissions	CO2 removals	Net CO2 emissions / removals	CH4	N2O	Total emissions
Land-Use Change and Forestry	CO2 equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	74.02	-155.51	-81.49			-81.49
B. Forest and Grassland Conversion	5.62		5.62	2.41	1.13	9.16
C. Abandonment of Managed Lands	0.00	0.00	0.00			0.00
D. CO2 Emissions and Removals from Soil	0.00	0.00	0.00			0.00
E. Other	0.00	0.00	0.00	0.00	0.00	0.00
Total CO2 Equivalent Emissions from Land-Use Change and Forestry	79.64	-155.51	-75.87	2.41	1.13	-72.33

Total CO2 Equivalent Emissions without Land-Use Change and Forestry (a)	7,203.82
Total CO2 Equivalent Emissions with Land-Use Change and Forestry (a)	7,131.49

(a) The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS CYPRUS
(Sheet 1 of 1) 1996

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 (1)	CH4	N2O	HFCs	PFCs	SF6	Total
	CO2 equivalent (Gg)						
Total (Net Emissions) (1)	**5,779.41**	**812.51**	**864.88**	**0.00**	**0.00**	**0.00**	**7,456.80**
1. Energy	**5,350.01**	**11.94**	**503.37**				**5,865.31**
A. Fuel Combustion (Sectoral Approach)	5,350.01	11.34	503.37				5,864.71
1. Energy Industries	2,268.41	0.42	412.30				2,681.13
2. Manufacturing Industries and Construction	1,003.41	1.26	32.17				1,036.84
3. Transport	1,242.81	7.56	21.70				1,272.07
4. Other Sectors	835.38	2.10	37.20				874.68
5. Other	0.00	0.00	0.00				0.00
B. Fugitive Emissions from Fuels	0.00	0.60	0.00				0.60
1. Solid Fuels	0.00	0.00	0.00				0.00
2. Oil and Natural Gas	0.00	0.60	0.00				0.60
2. Industrial Processes	**513.48**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**513.48**
A. Mineral Products	513.48	0.00	0.00				513.48
B. Chemical Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production	0.00	0.00	0.00		0.00	0.00	0.00
D. Other Production	NO						0.00
E. Production of Halocarbons and SF6				0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF6				0.00	0.00	0.00	0.00
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Solvent and Other Product Use	**2.54**		**0.00**				**2.54**
4. Agriculture	**0.00**	**324.19**	**360.39**				**684.58**
A. Enteric Fermentation		180.60					180.60
B. Manure Management		138.18	103.27				241.45
C. Rice Cultivation		0.00					0.00
D. Agricultural Soils(2)		0.00	255.17				255.17
E. Prescribed Burning of Savannas		0.00	0.00				0.00
F. Field Burning of Agricultural Residues		5.41	1.95				7.36
G. Other		0.00	0.00				0.00
5. Land-Use Change and Forestry(1)	**-86.62**	**2.41**	**1.13**				**-83.08**
6. Waste	**0.00**	**473.97**	**0.00**				473.97
A. Solid Waste Disposal on Land	0.00	449.82					449.82
B. Wastewater Handling		24.15	0.00				24.15
C. Waste Incineration	0.00	0.00	0.00				0.00
D. Other	0.00	0.00	0.00				0.00
7. Other (please specify)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
							0.00
Memo Items:							
International Bunkers	**1,062.33**	**2.10**	**9.30**				**1,073.73**
Aviation	786.21	1.47	6.20				793.88
Marine	276.12	0.63	3.10				279.85
Multilateral Operations	**0.00**	**0.00**	**0.00**				**0.00**
CO2 Emissions from Biomass	**32.11**						**32.11**

(1) For CO2 emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).
(2) See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 emissions	CO2 removals	Net CO2 emissions / removals	CH4	N2O	Total emissions
Land-Use Change and Forestry	CO2 equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	70.74	-162.97	-92.24			-92.24
B. Forest and Grassland Conversion	5.62		5.62	2.41	1.13	9.16
C. Abandonment of Managed Lands	0.00	0.00	0.00			0.00
D. CO2 Emissions and Removals from Soil	0.00	0.00	0.00			0.00
E. Other	0.00	0.00	0.00	0.00	0.00	0.00
Total CO2 Equivalent Emissions from Land-Use Change and Forestry	76.36	-162.97	-86.62	2.41	1.13	-83.08

Total CO2 Equivalent Emissions without Land-Use Change and Forestry (a)	7,539.88
Total CO2 Equivalent Emissions with Land-Use Change and Forestry (a)	7,456.80

[a] The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS CYPRUS
(Sheet 1 of 1) 1997

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 (1)	CH4	N2O	HFCs	PFCs	SF6	Total
	CO2 equivalent (Gg)						
Total (Net Emissions) (1)	**5,829.99**	**813.03**	**876.38**	**0.00**	**0.00**	**0.00**	**7,519.40**
1. Energy	**5,472.87**	**12.27**	**527.13**				**6,012.27**
A. Fuel Combustion (Sectoral Approach)	5,472.87	11.44	527.13				6,011.45
1. Energy Industries	2,399.89	0.42	434.00				2,834.31
2. Manufacturing Industries and Construction	903.41	0.94	28.03				932.38
3. Transport	1,293.80	7.98	24.80				1,326.58
4. Other Sectors	875.78	2.10	40.30				918.18
5. Other	0.00	0.00	0.00				0.00
B. Fugitive Emissions from Fuels	0.00	0.82	0.00				0.82
1. Solid Fuels	0.00	0.00	0.00				0.00
2. Oil and Natural Gas	0.00	0.82	0.00				0.82
2. Industrial Processes	**458.04**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**458.04**
A. Mineral Products	458.04	0.00	0.00				458.04
B. Chemical Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production	0.00	0.00	0.00		0.00	0.00	0.00
D. Other Production	NO						0.00
E. Production of Halocarbons and SF6				0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF6				0.00	0.00	0.00	0.00
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Solvent and Other Product Use	**2.56**		**0.00**				**2.56**
4. Agriculture	**0.00**	**317.87**	**348.13**				**666.00**
A. Enteric Fermentation		178.29					178.29
B. Manure Management		137.55	101.43				238.98
C. Rice Cultivation		0.00					0.00
D. Agricultural Soils(2)		0.00	245.99				245.99
E. Prescribed Burning of Savannas		0.00	0.00				0.00
F. Field Burning of Agricultural Residues		2.03	0.71				2.74
G. Other		0.00	0.00				0.00
5. Land-Use Change and Forestry(1)	**-103.49**	**2.41**	**1.13**				**-99.95**
6. Waste	**0.00**	**480.48**	**0.00**				480.48
A. Solid Waste Disposal on Land	0.00	456.12					456.12
B. Wastewater Handling		24.36	0.00				24.36
C. Waste Incineration	0.00	0.00	0.00				0.00
D. Other	0.00	0.00	0.00				0.00
7. Other (please specify)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
							0.00
Memo Items:							
International Bunkers	**1,079.08**	**2.10**	**9.30**				**1,090.48**
Aviation	774.64	1.47	6.20				782.31
Marine	304.44	0.63	3.10				308.17
Multilateral Operations	**0.00**	**0.00**	**0.00**				**0.00**
CO2 Emissions from Biomass	**32.11**						**32.11**

(1) For CO2 emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).
(2) See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 emissions	CO2 removals	Net CO2 emissions / removals	CH4	N2O	Total emissions
Land-Use Change and Forestry	CO2 equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	61.99	-171.10	-109.11			-109.11
B. Forest and Grassland Conversion	5.62		5.62	2.41	1.13	9.16
C. Abandonment of Managed Lands	0.00	0.00	0.00			0.00
D. CO2 Emissions and Removals from Soil	0.00	0.00	0.00			0.00
E. Other	0.00	0.00	0.00	0.00	0.00	0.00
Total CO2 Equivalent Emissions from Land-Use Change and Forestry	67.61	-171.10	-103.49	2.41	1.13	-99.95

Total CO2 Equivalent Emissions without Land-Use Change and Forestry (a)	7,619.35
Total CO2 Equivalent Emissions with Land-Use Change and Forestry (a)	7,519.40

(a) The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS CYPRUS
(Sheet 1 of 1) 1998

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 (1)	CH4	N2O	HFCs	PFCs	SF6	Total
	CO2 equivalent (Gg)						
Total (Net Emissions) (1)	**6,267.39**	**814.22**	**934.60**	**0.00**	**0.00**	**0.00**	**8,016.21**
1. Energy	**5,779.95**	**12.06**	**572.19**				**6,364.20**
A. Fuel Combustion (Sectoral Approach)	5,779.95	11.21	572.19				6,363.35
1. Energy Industries	2,631.58	0.42	474.30				3,106.30
2. Manufacturing Industries and Construction	886.29	0.92	26.59				913.80
3. Transport	1,350.04	7.77	27.90				1,385.71
4. Other Sectors	912.04	2.10	43.40				957.54
5. Other	0.00	0.00	0.00				0.00
B. Fugitive Emissions from Fuels	0.00	0.86	0.00				0.86
1. Solid Fuels	0.00	0.00	0.00				0.00
2. Oil and Natural Gas	0.00	0.86	0.00				0.86
2. Industrial Processes	**604.61**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**604.61**
A. Mineral Products	604.61	0.00	0.00				604.61
B. Chemical Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production	0.00	0.00	0.00		0.00	0.00	0.00
D. Other Production	NO						0.00
E. Production of Halocarbons and SF6				0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF6				0.00	0.00	0.00	0.00
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Solvent and Other Product Use	**2.59**		**0.00**				**2.59**
4. Agriculture	**0.00**	**310.44**	**361.28**				**671.72**
A. Enteric Fermentation		170.10					170.10
B. Manure Management		137.55	99.68				237.23
C. Rice Cultivation		0.00					0.00
D. Agricultural Soils(2)		0.00	260.61				260.61
E. Prescribed Burning of Savannas		0.00	0.00				0.00
F. Field Burning of Agricultural Residues		2.79	0.99				3.78
G. Other		0.00	0.00				0.00
5. Land-Use Change and Forestry(1)	**-119.76**	**2.41**	**1.13**				**-116.22**
6. Waste	**0.00**	**489.30**	**0.00**				489.30
A. Solid Waste Disposal on Land	0.00	464.73					464.73
B. Wastewater Handling		24.57	0.00				24.57
C. Waste Incineration	0.00	0.00	0.00				0.00
D. Other	0.00	0.00	0.00				0.00
7. Other (please specify)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
							0.00
Memo Items:							
International Bunkers	**1,115.35**	**2.10**	**9.30**				**1,126.75**
Aviation	799.79	1.47	6.20				807.46
Marine	315.56	0.63	3.10				319.29
Multilateral Operations	**0.00**	**0.00**	**0.00**				**0.00**
CO2 Emissions from Biomass	**32.11**						**32.11**

(1) For CO2 emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).
(2) See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 emissions	CO2 removals	Net CO2 emissions / removals	CH4	N2O	Total emissions
Land-Use Change and Forestry	CO2 equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	54.62	-180.00	-125.38			-125.38
B. Forest and Grassland Conversion	5.62		5.62	2.41	1.13	9.16
C. Abandonment of Managed Lands	0.00	0.00	0.00			0.00
D. CO2 Emissions and Removals from Soil	0.00	0.00	0.00			0.00
E. Other	0.00	0.00	0.00	0.00	0.00	0.00
Total CO2 Equivalent Emissions from Land-Use Change and Forestry	60.24	-180.00	-119.76	2.41	1.13	-116.22

Total CO2 Equivalent Emissions without Land-Use Change and Forestry (a)	8,132.43
Total CO2 Equivalent Emissions with Land-Use Change and Forestry (a)	8,016.21

(a) The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS CYPRUS
(Sheet 1 of 1) 1999

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 (1)	CH4	N2O	HFCs	PFCs	SF6	Total
	CO2 equivalent (Gg)						
Total (Net Emissions) (1)	**7,116.82**	**866.79**	**962.40**	**0.00**	**0.00**	**0.00**	**8,946.01**
1. Energy	**5,886.58**	**12.28**	**600.00**				**6,498.85**
A. Fuel Combustion (Sectoral Approach)	5,886.58	11.42	600.00				6,498.00
1. Energy Industries	2,844.91	0.45	511.96				3,357.32
2. Manufacturing Industries and Construction	421.33	0.47	11.92				433.71
3. Transport	1,738.76	8.44	36.11				1,783.31
4. Other Sectors	881.57	2.07	40.02				923.66
5. Other	0.00	0.00	0.00				0.00
B. Fugitive Emissions from Fuels	0.00	0.86	0.00				0.86
1. Solid Fuels	0.00	0.00	0.00				0.00
2. Oil and Natural Gas	0.00	0.86	0.00				0.86
2. Industrial Processes	**1,347.41**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1,347.41**
A. Mineral Products	1,347.41	0.00	0.00				1,347.41
B. Chemical Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production	0.00	0.00	0.00		0.00	0.00	0.00
D. Other Production	NO						0.00
E. Production of Halocarbons and SF6				0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF6				0.00	0.00	0.00	0.00
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Solvent and Other Product Use	**2.59**		**0.00**				**2.59**
4. Agriculture	**0.00**	**305.57**	**361.28**				**666.86**
A. Enteric Fermentation		169.16					169.16
B. Manure Management		133.62	99.68				233.30
C. Rice Cultivation		0.00					0.00
D. Agricultural Soils(2)		0.00	260.61				260.61
E. Prescribed Burning of Savannas		0.00	0.00				0.00
F. Field Burning of Agricultural Residues		2.79	0.99				3.78
G. Other		0.00	0.00				0.00
5. Land-Use Change and Forestry(1)	**-119.76**	**2.41**	**1.13**				**-116.22**
6. Waste	**0.00**	**546.52**	**0.00**				546.52
A. Solid Waste Disposal on Land	0.00	521.95					521.95
B. Wastewater Handling		24.57	0.00				24.57
C. Waste Incineration	0.00	0.00	0.00				0.00
D. Other	0.00	0.00	0.00				0.00
7. Other (please specify)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
							0.00
Memo Items:							
International Bunkers	**1,307.71**	**2.25**	**11.73**				**1,321.70**
Aviation	829.27	1.53	6.43				837.23
Marine	478.44	0.73	5.31				484.47
Multilateral Operations	**0.00**	**0.00**	**0.00**				**0.00**
CO2 Emissions from Biomass	**32.11**						**32.11**

(1) For CO2 emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).
(2) See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 emissions	CO2 removals	Net CO2 emissions / removals	CH4	N2O	Total emissions
Land-Use Change and Forestry	CO2 equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	54.62	-180.00	-125.38			-125.38
B. Forest and Grassland Conversion	5.62		5.62	2.41	1.13	9.16
C. Abandonment of Managed Lands	0.00	0.00	0.00			0.00
D. CO2 Emissions and Removals from Soil	0.00	0.00	0.00			0.00
E. Other	0.00	0.00	0.00	0.00	0.00	0.00
Total CO2 Equivalent Emissions from Land-Use Change and Forestry	60.24	-180.00	-119.76	2.41	1.13	-116.22

Total CO2 Equivalent Emissions without Land-Use Change and Forestry (a)	9,062.23
Total CO2 Equivalent Emissions with Land-Use Change and Forestry (a)	8,946.01

(a) The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS CYPRUS
(Sheet 1 of 1) 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 (1)	CH4	N2O	HFCs	PFCs	SF6	Total
	CO2 equivalent (Gg)						
Total (Net Emissions) (1)	**7,400.62**	**884.07**	**987.13**	**0.00**	**0.00**	**0.00**	**9,271.82**
1. Energy	**6,125.30**	**12.50**	**624.72**				**6,762.53**
A. Fuel Combustion (Sectoral Approach)	6,125.30	11.65	624.72				6,761.68
1. Energy Industries	2,974.62	0.47	536.31				3,511.40
2. Manufacturing Industries and Construction	573.90	0.64	16.54				591.08
3. Transport	1,730.77	8.51	35.93				1,775.21
4. Other Sectors	846.02	2.03	35.95				883.99
5. Other	0.00	0.00	0.00				0.00
B. Fugitive Emissions from Fuels	0.00	0.86	0.00				0.86
1. Solid Fuels	0.00	0.00	0.00				0.00
2. Oil and Natural Gas	0.00	0.86	0.00				0.86
2. Industrial Processes	**1,392.49**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1,392.49**
A. Mineral Products	1,392.49	0.00	0.00				1,392.49
B. Chemical Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production	0.00	0.00	0.00		0.00	0.00	0.00
D. Other Production	NO						0.00
E. Production of Halocarbons and SF6				0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF6				0.00	0.00	0.00	0.00
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Solvent and Other Product Use	**2.59**		**0.00**				**2.59**
4. Agriculture	**0.00**	**310.57**	**361.28**				**671.85**
A. Enteric Fermentation		174.87					174.87
B. Manure Management		132.91	99.68				232.59
C. Rice Cultivation		0.00					0.00
D. Agricultural Soils(2)		0.00	260.61				260.61
E. Prescribed Burning of Savannas		0.00	0.00				0.00
F. Field Burning of Agricultural Residues		2.79	0.99				3.78
G. Other		0.00	0.00				0.00
5. Land-Use Change and Forestry(1)	**-119.76**	**2.41**	**1.13**				**-116.22**
6. Waste	**0.00**	**558.58**	**0.00**				558.58
A. Solid Waste Disposal on Land	0.00	534.01					534.01
B. Wastewater Handling		24.57	0.00				24.57
C. Waste Incineration	0.00	0.00	0.00				0.00
D. Other	0.00	0.00	0.00				0.00
7. Other (please specify)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
							0.00
Memo Items:							
International Bunkers	**1,444.74**	**2.50**	**13.07**				**1,460.31**
Aviation	907.25	1.67	7.03				915.95
Marine	537.49	0.83	6.04				544.36
Multilateral Operations	**0.00**	**0.00**	**0.00**				**0.00**
CO2 Emissions from Biomass	**32.11**						**32.11**

(1) For CO2 emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).
(2) See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 emissions	CO2 removals	Net CO2 emissions / removals	CH4	N2O	Total emissions
Land-Use Change and Forestry	CO2 equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	54.62	-180.00	-125.38			-125.38
B. Forest and Grassland Conversion	5.62		5.62	2.41	1.13	9.16
C. Abandonment of Managed Lands	0.00	0.00	0.00			0.00
D. CO2 Emissions and Removals from Soil	0.00	0.00	0.00			0.00
E. Other	0.00	0.00	0.00	0.00	0.00	0.00
Total CO2 Equivalent Emissions from Land-Use Change and Forestry	60.24	-180.00	-119.76	2.41	1.13	-116.22

Total CO2 Equivalent Emissions without Land-Use Change and Forestry (a)	9,388.04
Total CO2 Equivalent Emissions with Land-Use Change and Forestry (a)	9,271.82

(a) The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS CYPRUS
(Sheet 1 of 1) 2001

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 (1)	CH4	N2O	HFCs	PFCs	SF6	Total
	CO2 equivalent (Gg)						
Total (Net Emissions) (1)	**7,302.55**	**930.42**	**969.57**	**0.00**	**0.00**	**0.00**	**9,202.54**
1. Energy	**6,044.52**	**12.90**	**607.16**				**6,664.58**
A. Fuel Combustion (Sectoral Approach)	6,044.52	12.04	607.16				6,663.72
1. Energy Industries	2,907.77	0.46	523.76				3,431.99
2. Manufacturing Industries and Construction	598.83	0.66	17.04				616.54
3. Transport	1,743.37	8.94	36.14				1,788.45
4. Other Sectors	794.54	1.97	30.22				826.74
5. Other	0.00	0.00	0.00				0.00
B. Fugitive Emissions from Fuels	0.00	0.86	0.00				0.86
1. Solid Fuels	0.00	0.00	0.00				0.00
2. Oil and Natural Gas	0.00	0.86	0.00				0.86
2. Industrial Processes	**1,375.20**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1,375.20**
A. Mineral Products	1,375.20	0.00	0.00				1,375.20
B. Chemical Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production	0.00	0.00	0.00		0.00	0.00	0.00
D. Other Production	NO						0.00
E. Production of Halocarbons and SF6				0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF6				0.00	0.00	0.00	0.00
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Solvent and Other Product Use	**2.59**		**0.00**				**2.59**
4. Agriculture	**0.00**	**334.30**	**361.28**				**695.59**
A. Enteric Fermentation		189.65					189.65
B. Manure Management		141.86	99.68				241.54
C. Rice Cultivation		0.00					0.00
D. Agricultural Soils(2)		0.00	260.61				260.61
E. Prescribed Burning of Savannas		0.00	0.00				0.00
F. Field Burning of Agricultural Residues		2.79	0.99				3.78
G. Other		0.00	0.00				0.00
5. Land-Use Change and Forestry(1)	**-119.76**	**2.41**	**1.13**				**-116.22**
6. Waste	**0.00**	**580.80**	**0.00**				580.80
A. Solid Waste Disposal on Land	0.00	556.23					556.23
B. Wastewater Handling		24.57	0.00				24.57
C. Waste Incineration	0.00	0.00	0.00				0.00
D. Other	0.00	0.00	0.00				0.00
7. Other (please specify)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
							0.00
Memo Items:							
International Bunkers	**1,582.52**	**2.79**	**14.78**				**1,600.09**
Aviation	990.31	1.82	7.67				999.81
Marine	592.21	0.97	7.10				600.28
Multilateral Operations	**0.00**	**0.00**	**0.00**				**0.00**
CO2 Emissions from Biomass	**32.11**						**32.11**

(1) For CO2 emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).
(2) See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 emissions	CO2 removals	Net CO2 emissions / removals	CH4	N2O	Total emissions
Land-Use Change and Forestry	CO2 equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	54.62	-180.00	-125.38			-125.38
B. Forest and Grassland Conversion	5.62		5.62	2.41	1.13	9.16
C. Abandonment of Managed Lands	0.00	0.00	0.00			0.00
D. CO2 Emissions and Removals from Soil	0.00	0.00	0.00			0.00
E. Other	0.00	0.00	0.00	0.00	0.00	0.00
Total CO2 Equivalent Emissions from Land-Use Change and Forestry	60.24	-180.00	-119.76	2.41	1.13	-116.22

Total CO2 Equivalent Emissions without Land-Use Change and Forestry (a)	9,318.76
Total CO2 Equivalent Emissions with Land-Use Change and Forestry (a)	9,202.54

(a) The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS CYPRUS
(Sheet 1 of 1) 2002

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 (1)	CH4	N2O	HFCs	PFCs	SF6	Total
	CO2 equivalent (Gg)						
Total (Net Emissions) (1)	**7,651.98**	**963.59**	**1,039.78**	**0.00**	**0.00**	**0.00**	**9,655.35**
1. Energy	**6,382.82**	**13.17**	**677.38**				**7,073.37**
A. Fuel Combustion (Sectoral Approach)	6,382.82	12.32	677.38				7,072.52
1. Energy Industries	3,335.11	0.53	602.64				3,938.28
2. Manufacturing Industries and Construction	576.41	0.60	15.18				592.19
3. Transport	1,735.60	9.27	35.94				1,780.81
4. Other Sectors	735.70	1.91	23.62				761.23
5. Other	0.00	0.00	0.00				0.00
B. Fugitive Emissions from Fuels	0.00	0.86	0.00				0.86
1. Solid Fuels	0.00	0.00	0.00				0.00
2. Oil and Natural Gas	0.00	0.86	0.00				0.86
2. Industrial Processes	**1,386.32**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1,386.32**
A. Mineral Products	1,386.32	0.00	0.00				1,386.32
B. Chemical Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production	0.00	0.00	0.00		0.00	0.00	0.00
D. Other Production	NO						0.00
E. Production of Halocarbons and SF6				0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF6				0.00	0.00	0.00	0.00
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Solvent and Other Product Use	**2.59**		**0.00**				**2.59**
4. Agriculture	**0.00**	**357.16**	**361.28**				**718.44**
A. Enteric Fermentation		200.59					200.59
B. Manure Management		153.78	99.68				253.46
C. Rice Cultivation		0.00					0.00
D. Agricultural Soils(2)		0.00	260.61				260.61
E. Prescribed Burning of Savannas		0.00	0.00				0.00
F. Field Burning of Agricultural Residues		2.79	0.99				3.78
G. Other		0.00	0.00				0.00
5. Land-Use Change and Forestry(1)	**-119.76**	**2.41**	**1.13**				**-116.22**
6. Waste	**0.00**	**590.84**	**0.00**				590.84
A. Solid Waste Disposal on Land	0.00	566.27					566.27
B. Wastewater Handling		24.57	0.00				24.57
C. Waste Incineration	0.00	0.00	0.00				0.00
D. Other	0.00	0.00	0.00				0.00
7. Other (please specify)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
							0.00
Memo Items:							
International Bunkers	**1,380.52**	**2.46**	**12.56**				**1,395.54**
Aviation	953.77	1.75	7.39				962.91
Marine	426.75	0.71	5.17				432.63
Multilateral Operations	**0.00**	**0.00**	**0.00**				**0.00**
CO2 Emissions from Biomass	**32.11**						**32.11**

(1) For CO2 emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).
(2) See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 emissions	CO2 removals	Net CO2 emissions / removals	CH4	N2O	Total emissions
Land-Use Change and Forestry	CO2 equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	54.62	-180.00	-125.38			-125.38
B. Forest and Grassland Conversion	5.62		5.62	2.41	1.13	9.16
C. Abandonment of Managed Lands	0.00	0.00	0.00			0.00
D. CO2 Emissions and Removals from Soil	0.00	0.00	0.00			0.00
E. Other	0.00	0.00	0.00	0.00	0.00	0.00
Total CO2 Equivalent Emissions from Land-Use Change and Forestry	60.24	-180.00	-119.76	2.41	1.13	-116.22

Total CO2 Equivalent Emissions without Land-Use Change and Forestry (a)	9,771.57
Total CO2 Equivalent Emissions with Land-Use Change and Forestry (a)	9,655.35

(a) The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS CYPRUS
(Sheet 1 of 1) 2003

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 (1)	CH4	N2O	HFCs	PFCs	SF6	Total
	CO2 equivalent (Gg)						
Total (Net Emissions) (1)	**7,876.22**	**993.18**	**1,076.10**	**0.00**	**0.00**	**0.00**	**9,945.51**
1. Energy	**6,609.87**	**14.51**	**713.69**				**7,338.07**
A. Fuel Combustion (Sectoral Approach)	6,609.87	13.66	713.69				7,337.22
1. Energy Industries	3,561.76	0.57	644.34				4,206.67
2. Manufacturing Industries and Construction	551.12	0.59	14.77				566.48
3. Transport	1,820.14	10.66	37.57				1,868.37
4. Other Sectors	676.84	1.85	17.01				695.70
5. Other	0.00	0.00	0.00				0.00
B. Fugitive Emissions from Fuels	0.00	0.86	0.00				0.86
1. Solid Fuels	0.00	0.00	0.00				0.00
2. Oil and Natural Gas	0.00	0.86	0.00				0.86
2. Industrial Processes	**1,383.52**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1,383.52**
A. Mineral Products	1,383.52	0.00	0.00				1,383.52
B. Chemical Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production	0.00	0.00	0.00		0.00	0.00	0.00
D. Other Production	NO						0.00
E. Production of Halocarbons and SF6				0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF6				0.00	0.00	0.00	0.00
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Solvent and Other Product Use	**2.59**		**0.00**				**2.59**
4. Agriculture	**0.00**	**360.50**	**361.28**				**721.78**
A. Enteric Fermentation		203.32					203.32
B. Manure Management		154.38	99.68				254.06
C. Rice Cultivation		0.00					0.00
D. Agricultural Soils(2)		0.00	260.61				260.61
E. Prescribed Burning of Savannas		0.00	0.00				0.00
F. Field Burning of Agricultural Residues		2.79	0.99				3.78
G. Other		0.00	0.00				0.00
5. Land-Use Change and Forestry(1)	**-119.76**	**2.41**	**1.13**				**-116.22**
6. Waste	**0.00**	**615.76**	**0.00**				615.76
A. Solid Waste Disposal on Land	0.00	591.19					591.19
B. Wastewater Handling		24.57	0.00				24.57
C. Waste Incineration	0.00	0.00	0.00				0.00
D. Other	0.00	0.00	0.00				0.00
7. Other (please specify)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
							0.00
Memo Items:							
International Bunkers	**1,429.00**	**2.52**	**12.42**				**1,443.93**
Aviation	1,046.92	1.93	8.11				1,056.96
Marine	382.08	0.59	4.30				386.97
Multilateral Operations	**0.00**	**0.00**	**0.00**				**0.00**
CO2 Emissions from Biomass	**32.11**						**32.11**

(1) For CO2 emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).
(2) See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 emissions	CO2 removals	Net CO2 emissions / removals	CH4	N2O	Total emissions
Land-Use Change and Forestry	CO2 equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	54.62	-180.00	-125.38			-125.38
B. Forest and Grassland Conversion	5.62		5.62	2.41	1.13	9.16
C. Abandonment of Managed Lands	0.00	0.00	0.00			0.00
D. CO2 Emissions and Removals from Soil	0.00	0.00	0.00			0.00
E. Other	0.00	0.00	0.00	0.00	0.00	0.00
Total CO2 Equivalent Emissions from Land-Use Change and Forestry	60.24	-180.00	-119.76	2.41	1.13	-116.22

Total CO2 Equivalent Emissions without Land-Use Change and Forestry (a)	10,061.72
Total CO2 Equivalent Emissions with Land-Use Change and Forestry (a)	9,945.51

(a) The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

SUMMARY 2 SUMMARY REPORT FOR CO2 EQUIVALENT EMISSIONS CYPRUS
(Sheet 1 of 1) 2004

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 (1)	CH4	N2O	HFCs	PFCs	SF6	Total
	CO2 equivalent (Gg)						
Total (Net Emissions) (1)	**8,209.60**	**957.98**	**1,113.48**	**0.00**	**0.00**	**0.00**	**10,281.05**
1. Energy	**6,846.60**	**15.10**	**751.07**				**7,612.77**
A. Fuel Combustion (Sectoral Approach)	6,846.60	14.25	751.07				7,611.92
1. Energy Industries	3,706.54	0.60	684.57				4,391.71
2. Manufacturing Industries and Construction	524.66	0.58	14.82				540.07
3. Transport	1,997.37	11.28	41.28				2,049.92
4. Other Sectors	618.03	1.79	10.40				630.21
5. Other	0.00	0.00	0.00				0.00
B. Fugitive Emissions from Fuels	0.00	0.86	0.00				0.86
1. Solid Fuels	0.00	0.00	0.00				0.00
2. Oil and Natural Gas	0.00	0.86	0.00				0.86
2. Industrial Processes	**1,480.16**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1,480.16**
A. Mineral Products	1,480.16	0.00	0.00				1,480.16
B. Chemical Industry	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C. Metal Production	0.00	0.00	0.00		0.00	0.00	0.00
D. Other Production	NO						0.00
E. Production of Halocarbons and SF6				0.00	0.00	0.00	0.00
F. Consumption of Halocarbons and SF6				0.00	0.00	0.00	0.00
G. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3. Solvent and Other Product Use	**2.59**		**0.00**				**2.59**
4. Agriculture	**0.00**	**310.44**	**361.28**				**671.72**
A. Enteric Fermentation		170.10					170.10
B. Manure Management		137.55	99.68				237.23
C. Rice Cultivation		0.00					0.00
D. Agricultural Soils(2)		0.00	260.61				260.61
E. Prescribed Burning of Savannas		0.00	0.00				0.00
F. Field Burning of Agricultural Residues		2.79	0.99				3.78
G. Other		0.00	0.00				0.00
5. Land-Use Change and Forestry(1)	**-119.76**	**2.41**	**1.13**				**-116.22**
6. Waste	**0.00**	**630.02**	**0.00**				630.02
A. Solid Waste Disposal on Land	0.00	605.45					605.45
B. Wastewater Handling		24.57	0.00				24.57
C. Waste Incineration	0.00	0.00	0.00				0.00
D. Other	0.00	0.00	0.00				0.00
7. Other (please specify)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
							0.00
Memo Items:							
International Bunkers	**1,094.68**	**1.90**	**8.54**				**1,105.12**
Aviation	930.50	1.71	7.21				939.42
Marine	164.18	0.19	1.33				165.70
Multilateral Operations	**0.00**	**0.00**	**0.00**				**0.00**
CO2 Emissions from Biomass	**32.11**						**32.11**

(1) For CO2 emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).
(2) See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO2 emissions	CO2 removals	Net CO2 emissions / removals	CH4	N2O	Total emissions
Land-Use Change and Forestry	CO2 equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	54.62	-180.00	-125.38			-125.38
B. Forest and Grassland Conversion	5.62		5.62	2.41	1.13	9.16
C. Abandonment of Managed Lands	0.00	0.00	0.00			0.00
D. CO2 Emissions and Removals from Soil	0.00	0.00	0.00			0.00
E. Other	0.00	0.00	0.00	0.00	0.00	0.00
Total CO2 Equivalent Emissions from Land-Use Change and Forestry	60.24	-180.00	-119.76	2.41	1.13	-116.22

Total CO2 Equivalent Emissions without Land-Use Change and Forestry (a)	10,397.27
Total CO2 Equivalent Emissions with Land-Use Change and Forestry (a)	10,281.05

(a) The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

Annex II: Projections

		1990	2005	2010	2015	2020
Scenario 1: BaU						
	Total GHG emissions (kt CO2 equiv)	6010.6	11013.5	12710.4	14627.2	17223.6
Scenario 2: RES&RUE						
	RUE impact on emissions (kt CO2 equiv)			-254.839	-457.779	-713.444
	RES impact on emissions (kt CO2 equiv)			-305.807	-549.335	-856.133
	OVERALL IMPACT (kt CO2 equiv)	**6010.6**	**11013.5**	**12149.7**	**13620.1**	**15654.1**
Scenario 3: RES,RUE&NG						
	RES & RUE impact on emissions (kt CO2 equiv)			-560.646	-1007.11	-1569.58
	NG impact on emissions (kt CO2 equiv)				-2147.5	-3048.79
	OVERALL IMPACT (kt CO2 equiv)	**6010.6**	**11013.5**	**12149.7**	**11472.6**	**12605.3**
Scenario 4: RES,RUE,NG & other						
	RES, RUE & NG impact on emissions (kt CO2 equiv)			-560.646	-3154.61	-4618.37
	Other measures (kt CO2 equiv)			-824.0	-1188.5	-1553.0
	OVERALL IMPACT (kt CO2 equiv)	**6010.6**	**11013.5**	**11325.7**	**10284.1**	**11052.3**