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PROMITHEAS – 4

Republic of Estonia

Mapping national procedures, sources, available data and information

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The following document has been read and approved by all the members of the PROMITHEAS – 4 Scientific Committee.
It was also disseminated for comments, through BSEC – PERMIS and BSEC – BC, to all relevant governmental and business authorities and partners before its finalization.
Partners from the beneficiary countries* of the consortium were encouraged to contact direct national authorities, agencies, institutions and market stakeholder for comments before the finalization of this report (Annex 1).

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Acknowledgements

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1. General information

1.1 Government structure (GS)

Estonia, as stated in the Constitution (RT, 1992), is the independent and sovereign democratic republic wherein the supreme power of the state is vested in the people. The people exercise their supreme power of the state on the elections of the Parliement (Riigikogu) through citizens who have the right to vote (Estonian citiziens who has attained 18 years old). Elections are organised every four years.

The President of the Republic acting as the head of the state and the Government of the Republic exercising the executive power. The president of the of Republic Estonia, according the §79 of the Constitution (RT, 1992) of the Republic, shall be elected by the Riigikogu by the secret ballot. The powers of the President of the Republic as the Head of State are established in §78 of the Constitution (RT, 1992) and more specifically in the President of the Republic Working Procedures Act and other specific laws (www.president.ee).

The Parliament has 101 members. The Board of the Parliement (Riigikogu) organises the work of the Riigikogu pursuant to the Riigikogu Rules of Procedure Act and the Riigikogu Internal Rules Act (RT I, 2003). Parliament elects the President and two Vice-Presidents of Parliament (from its members).

Legislation (law-making) is the main task of the Parliament. The main work with the drafts of the legal acts is done in the committees which also have the right to initiate laws. There are two more functions of the Parliament: review of the activity of the executive power and representation. The Parliament also has the right to present statements, declarations and appeals to the people of Estonia, other states and international organisations (www.riigikogu.ee).

The Government is lead by Prime Minister. The ministers are divided into those who run ministries (the so-called portfolio ministers) and those who do not run ministries (the so-called ministers without portfolios). In Estonia are 11 Ministries, however ministers number is 12, because of a regional affairs minister under the Ministry of the Interior who does not have portfolio.

Government coalition consists of the Estonian Reform Party and Union of Pro Patria and Res Publica Union.

The next level of government in Estonia is the local level. Pursuant to the Constitution, the municipalities enjoy autonomy from the central government. The state is divided into 15 counties, which, however, do not constitute a separate level of regional government but act as representatives of the central government in the respective regions.

The Government Communication Unit informs the public of the sessions of the Government and the resolutions that have been adopted. As a rule, journalists put questions to the members of the Government at the press briefings held after each session. Transcripts of press conferences are published by the Government Communication Unit (in Estonian) (http://www.valitsus.ee/en/government/prime-minister-and-ministers).

1.2 Mapping national procedures (NP)

1.2.1 Key categories according to IPCC

Key categories are the categories of emissions, which have a significant influence on the total inventory in terms of the absolute level of emissions. The key categories are those that represent together 80% of inventory level or trend. According to the study done in Estonia in 2007 *(Mandel, 2009)* there are no big differences between results of level and trend assessment of key sources analysis. So for the last national inventory in 2009 the only level assessment was chosen.

1.2.2 Methodology for retrieving key-category data

The point sources information is available from the permits of pollution. Each facility submits data on emissions of polluting substances, data about the burnt fuel, used solvents, liquid fuels distribution and so on. Data is represented on each source of pollution and on the facility as a whole. The owner of point sources can input their calculated/measured annual emissions directly to the system or use web-interface air emission data system for the point sources (OSIS) calculation model, which uses legally regulated estimation methodologies.

CollectER tool is used for calculation of emissions from diffuse sources (EEIC, 2010).

COPERT IV (COPERT, 2010) tool methodology and emission factors are used for the calculation of emission from road transport. Total emissions are calculated on basis of the combination of firm technical data (e.g. emission factors) and activities data (e.g. number of vehicles, annual mileage per vehicle, average trip, speed fuel consumption, monthly temperatures).

1.2.3 Responsible authorities and contact persons

In Estonia, there are two principal ministries responsible for the climate and energy policy – the Ministry of the Environment and the Ministry of Economic Affairs and Communications. The Ministry of the Interior is in charge of the risk analyses of emergency situations, and relevant response plans. The Ministry of the Environment (MoE) is primarily responsible for the implementation of UNFCCC, (RT II, 2002) Protocol and relevant legal acts of the European Community. The Ministry of the Environment elaborates Estonia's climate policy by preparing environmental action plans and strategies, and drafts the legislation required for the implementation of UN,

EC and Estonia's climate policy. The Ministry of the Environment also supervises the preparation of annual GHG inventories, National Communications, implementation of joint implementation projects and the European Union emission allowance trading scheme (ETS). In addition, the Ministry of the Environment coordinates the preparation of national allocation plans for Estonia. The Ministry has a special administrative unit at the Estonian Environmental Information Centre (EEIC), for practical implementation of climate policy. The EEIC is responsible for collecting, analysing, storing, reporting and publishing of environment-related information and data.

Contact person in 2010 was:

Mrs. Natalija Kohv

Estonian Environment Information Centre

Mustamäe tee 33, 10616 Tallinn, Estonia

E-mail: Natalja.Kohv@keskkonnainfo.ee

1.2.4 Procedures to address climate-change issues

The Ministry of Economic Affairs (MoEA) established a special Credit and Export Guarantee Fund KredEx in 2001 with the aim to improve *inter alia* giving loans to enable people to build or renovate their homes and promote energy efficiency in Estonia.

In addition to the abovementioned two ministries, the Ministry of the Interior, Ministry of Agriculture, Ministry of Education and Research as well the Ministry of Social Affairs and the Ministry of Foreign Affairs are involved in different aspects of the climate issue at the state level. Regulation of crisis management and rescue work is, in principal, the task of the Ministry of the Interior who is also responsible for the risk analyses of emergency situations (including storms, floods and extreme weather conditions) and drafting relevant response plans.

If one ministry has a leading role in a certain climate related strategy or development plan, other involved ministries participate in the working groups for the development of such strategies.

In recent years, also local governments have become more active in integrating climate aspects into spatial planning and transport management. Also, participation in different projects that have an impact on reducing GHG emissions has increased. Several local governments that are prone to be affected by floods have developed detailed adaptation and action plans as to how to deal with storms and floods.

1.3 Population (P)

1.3.1 Country's demographic characteristics

The population of Estonia was 1 340 194 in 2011 January. The last population census was in 2000; therefore the data used in this report are taken from the official web page of Estonian Statistics (http://pub.stat.ee/px-web.2001/I_Databas/Population/01Population_indicators_and_composition/02Main_demographic_indicators/02Main_demographic_indicators.asp). On the threshold of the 21st century, in Estonia like in Europe, the main trend in population processes is expressed in the ageing of the population. The fertility rate was decreasing and below 1.3 in 1998, however, it begins to rise reaching 1.64 in 2010. Fertility timing is fallen in Estonia. Forecasted life expectancy until 2050 is increasing. However, it differs for women and men: women leave almost 10 years longer than men. The next table represents the rate of increase in Estonian population.

In 2009, the population density was in 30.9 persons per sq km and the decline in this indicator has also stopped over the last 5 years. For a long time, Estonia was characterised by quite a stable proportion of population in small settlements with a population of less than 2,000, but from the end of 1980's, the decrease of popularion in remote areas are observed and population of near-urbanised areas are becoming to grow (http://pub.stat.ee/px-web.2001/I_Databas/Population/01Population_indicators_and_composition/04Population_figure_and_composition/04Population_figure_and_composition.asp).

Year of birth	Life births	Deaths	Rate of natural increase
2001	12 632	18 516	-4,31
2002	13 001	18 355	-3,94
2003	13 036	18 152	-3,78
2004	13 992	17 685	-2,74
2005	14 350	17 316	-2,20
2006	14 877	17 316	-1,82
2007	15 775	17 409	-1,22
2008	16 028	16 675	-0,48
2009	15 763	16 081	-0,24
2010	15 825	15 790	0,03

Source:http://pub.stat.ee/pxweb.2001/Dialog/varval.asp?ma=PO030&ti=BIRTHS%2C+DEATHS+AND+NATURAL+INCREASE&path=../I_Databas/Population/01Population_indicators_and_composition/02Main_demographic_indicators/&lang=1

Table 1.3.1: The rate of natural increase of Estonia population.

1.3.2 Development indicators

To characterize the country's social and economic situation the Human Development Index (HDI) can be used. Its calculation is based on three relatively easy-to-find indicators, like life expectancy at birth, which indicates a population's health and longevity and it is 73.7 years (www.stat.ee).

The second indicator is educational attainment, which is indicated, on the one hand, by adult literacy, and on the other hand, mean years of schooling (of adult years). Adult literacy rate (% aged 15 above) is 99.8% (census 2000) and the mean years of schooling is 12 years.

Standard of living, which is measured by GDP per capita at purchasing power parity in US dollars. In 2010 it was (PPP) $19,000 (http://www.stat.ee/main-indicators).

Unemployment rate can be used also as the development indicator and in 2010 it was 17.5%. Distribution of family income (Gini index) in 2009 was 31.4 (www.stat.ee).

1.4 Geographic profile (GP)

1.4.1 Geomorphologic characteristics

As a part of the East European Plain, Estonian territory is a flat, where uplands and plateau-like areas alternate with lowlands, depressions and valleys. These land forms, alongside with the coastal cliffs in northern and western Estonia, are the larger features of Estonian topography (http://www.state.gov/r/pa/ei/bgn/5377.htm#profile).

The bases of the uplands of Estonia are usually 75–100 m above sea level (a.s.l.). The highest point in Estonia is Suur Munamägi Hill (318 m above sea level).

1.4.2 Ecosystems

There are Estonian six commonly used ecosystem types in Estonia: forests, raised bogs, mires and fens, grasslands, inland waters, coastal and marine ecosystems.

1.4.3 LULUCF

Large share of the food consumed in Estonia is grown and produced locally. Compared to the mid-1990s, the share of agriculture in the Estonian economy has decreased and the competitiveness of the Estonian agricultural sector is below average for the EU.

In this century, agricultural census data indicates that the total area of agricultural land has remained fairly stable. At the same time, the area of unused agricultural land has constantly decreased. While in 2001, unused agricultural land made up 73,961 hectares – 8.5% of all agricultural land – this figure had dropped more than two times by 2007, to 3.5% (EEIC, 2010).

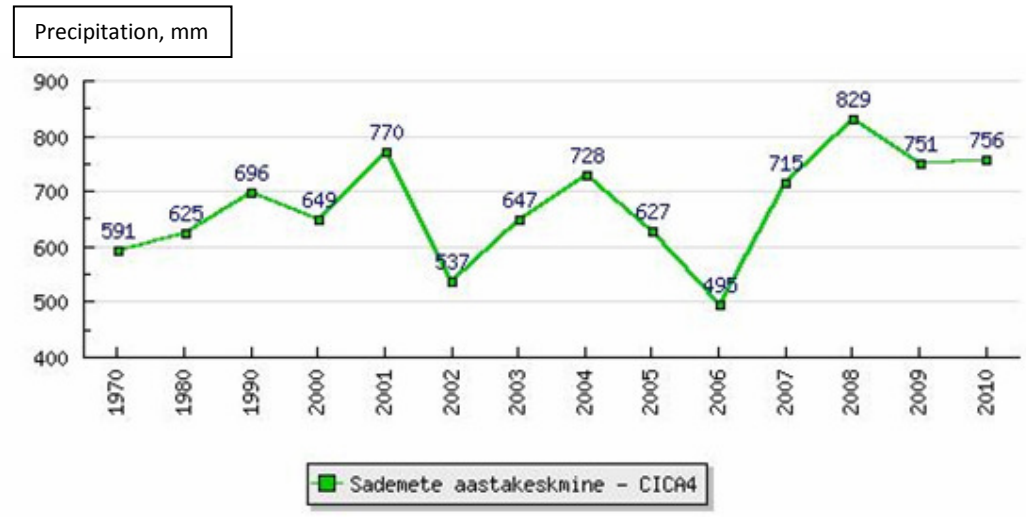
Forest land accounts for 50.6% of Estonia's land area. Forest area and growing stock has increased primarily due to afforestation of land no longer used for agriculture. In addition, forest area and growing stock data have increased due to changes in the methods used to inventory forests in 1999.

According to the 2007 measurement data from the National Forest Inventory, protected forests in Estonia make up 690,000 hectares. Strictly protected forests (conservation forests) amounted to 180,000 hectares; protection forests, 498,000 hectares (EEIC, 2010).

1.5 Climatic profile

1.5.1 Precipitation

The average precipitation is 700 mm, ranging from 520 mm on some islands to almost 780 mm in the uplands.

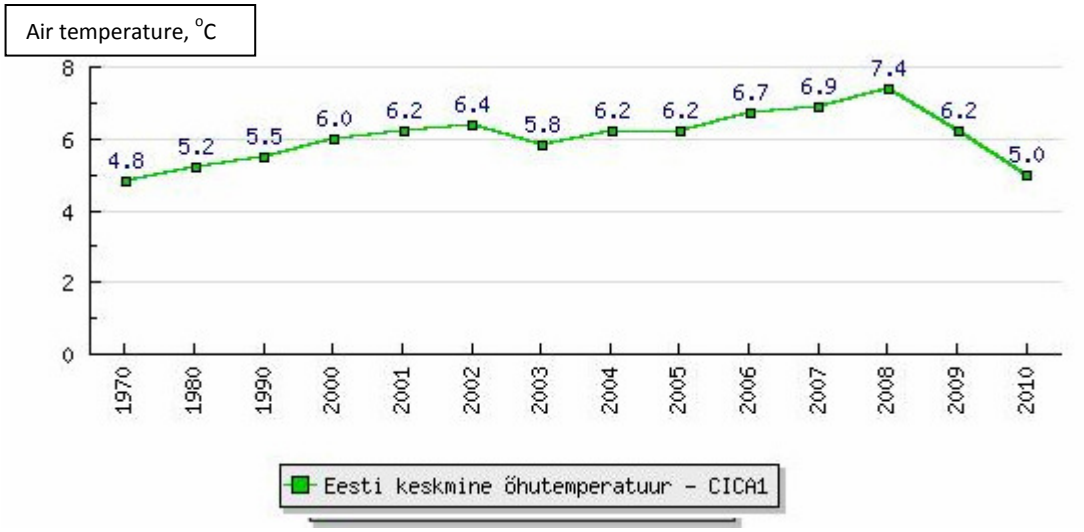


Source: ***www.keskkonnainfo.ee*** .

Figure 1.5.1.1: Annual precipitation (mm) per decades from 1970 and per year from 2000.

1.5.2 Temperature

Average temperatures range from +16.3°C on the Baltic islands to +18.1°C in mainland in July, the warmest month, and from −3.5°C on the Baltic islands to −7.6°C in mainland in February, the coldest month. The average annual temperature in Estonia is 5.2°C.



Source: www.keskkonnainfo.ee

Figure 1.5.1.2: Average annual air temperature, °C, per decades from 1970 and per year from 2000.

1.5.3 Other

Estonia belongs to Atlantic continental region of the temperate zone, which is characterized by rather warm summers and comparely mild winters.

The annual average wind speed in the inland parts of Estonia is less than 4 m/s. On the coasts of the open seas it is more than 6 m/s.

The snow cover is established earliest in the Haanja, Pandivere and Otepää Heights usually at the beginning of December and stays there up to the end of March. On Saaremaa and Hiiumaa islands, the permanent snow cover predominantly forms in the middle of January. In some years, permanent snow cover does not form at all, but in the last decade the snow cover reached up to 80 cm in some regions.

1.6 Economic profile

1.6.1 Income per capita

In 2010 the average monthly gross wages and salaries were 792 euro: http://www.stat.ee/main-indicators).

1.6.2 Primary sector (agriculture)

Agriculture is important sector of activity and a source of income for Estonians all throughout its history. The main agricultural products are: grain, potatoes, vegetables, livestock and dairy products and fish. Agriculture constitutes 2.5% of the total GDP in 2010 (www.stat.ee). Rural working population is decreasing and only 2.8% are occupied in agriculture. Agricultural holdings specialise in three types of production: 45% of the farms engage in crop production, 21% in dairy farming, and 31% in mixed production (crop and livestock production). Grain production is the main activity in

large farms and agricultural enterprises. Potatoes are grown in Estonia mainly on small farms and private residences. Estonia fully covers its potato demand.

1.6.3 Secondary sector (mining, manufacture, construction, energy industries)

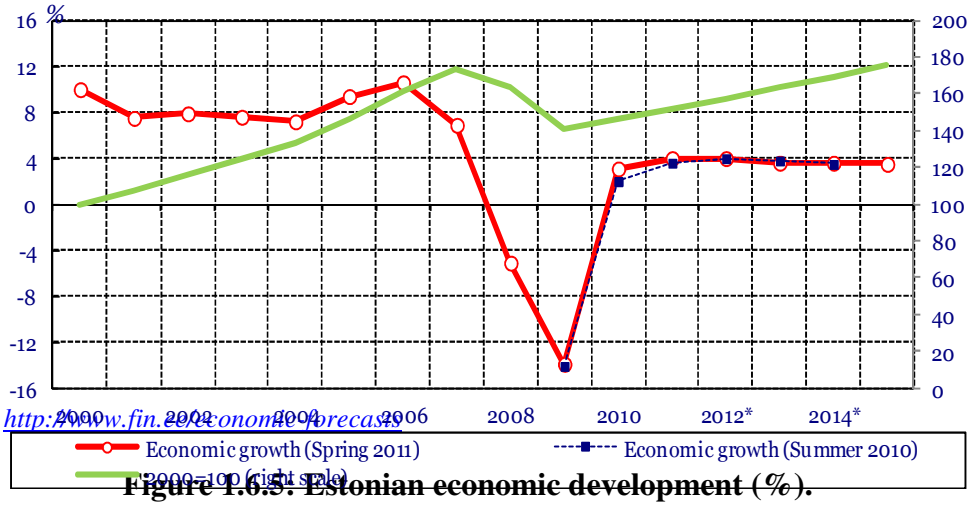
Estonian industries include: oil shale mining, shipbuiding, engineering, electronics, wood and wood products, textiles; information technology, telecommunications. Industry consistutes 28.7% of the total GDP in 2010 (www.stat.ee).

1.6.4 Tertiary sector (trade, tourism, transport, communication)

Services are sectors that constitute 68.8% of the total GDP in 2010 (www.stat.ee).

1.6.5 Future prospects for the country's economy

Estonian economy, as it belongs to the Scandinavian sphere of interest, has a unique position in Europe, because its economy is enfluenced by Russia as well. In 2008, foreign investments have been made to Estonia from the nearby countries by integrating Estonia's economy closely with the Nordic economy. Sweden (39% of all foreign direct investments made to Estonia) and Finland (23.9%) maintain a solid leading position, the percentage of which has remained relatively stable in the recent years. 26% of the Finnish investments have been made to the processing industry. The future of Estonian economy, as euro area member, involved a rise in Estonia's credibility for foreign investors. The businesses no longer need to invest in exchange risk hedging, and travelling is more convenient. Estonia's economy is highly export-oriented. According to the forecast of the Estonian Mistry of Finances, officialy done in April 2011 (http://www.fin.ee/economic-forecasts), export markets are assumed to increase by 6.3% in 2011 and by 6.6% in 2012, as main engine for growth, supporting the increase of economic sentiment and gradual recovery of domestic demand.



Source: http://www.fin.ee/economic-forecasts

Figure 1.6.5: Estonian economic development (%).

In 2012 the contribution to growth should lean more to domestic demand as private consumption and investments are recovering. The same forecast said, that inflation in Estonia increase up to 4% in 2011 from 2.7% in 2010. Estonian GDP being 3.1% in 2010 is also expected to grow up to 4% in 2011 and 2012. GDP forecast is presented in Figure 1.6.5 and Table 1.6.5. In 2013-2015 Estonian economic growth is expected to stabilise round 4% (Figure 1.6.5). Growth is supported in addition to export also by stable increase of domestic demand.

	1998 – 2009	**2010**	**2011 ***	**2012 ***	**2013 ***	**2014 ***	**2015 ***
1. Growth of real GDP	4.5	3.1	4.0	4.0	3.6	3.6	3.4
1a. GDP in real terms (bln EUR)		9.0	9.3	9.7	10.1	10.4	10.8
2. Growth of nominal GDP	10.2	4.6	8.0	7.1	6.9	6.4	6.3
2a. GDP in nominal terms (bln EUR)		14.5	15.7	16.8	17.9	19.1	20.3
2b. GNI in nominal terms (bln EUR)		13.7	14.6	15.6	16.5	17.4	18.4
Components of real GDP							
3. Private consumption expenditure (incl. non-profit organisations)	4.7	-1.9	2.2	4.5	4.4	4.6	4.6
4. Government final consumption expenditure	1.6	-2.1	0.0	1.0	1.0	2.7	3.3
5. Gross fixed capital formation	6.4	-9.1	7.9	8.2	7.7	7.1	6.6
6. Changes in inventories (% of GDP)	1.6	1.3	2.0	2.1	2.2	2.1	2.0
8. Exports of goods and services	5.9	21.7	15.9	5.5	7.1	6.8	6.8
9. Imports of goods and services	5.6	21.0	16.3	6.0	8.0	7.9	8.0
Contributions to real GDP growth [1)]							
10. Domestic demand (without inventories)	4.8	-3.5	2.6	4.0	4.0	4.3	4.4
11. Changes in inventories	-0.2	4.4	0.5	-0.1	-0.1	-0.3	-0.3
12. Ext. balance of goods and services	-0.3	1.6	0.9	0.0	-0.3	-0.5	-0.7
Value added growth							
13. Primary sector	3.0	7.3	2.2	1.9	2.1	2.0	1.8
14. Industry	4.3	19.2	11.0	5.3	4.3	4.1	4.0
15. Construction	5.7	-10.1	5.0	8.6	5.2	4.3	3.8
16. Other services	4.6	1.6	1.6	3.4	3.3	3.3	3.3

1) Contribution to GDP growth indicates the share of a specific field in the economic growth. It is calculated by multiplying the field's growth with its share in GDP. The sum of the fields' share makes up the economic growth (the reason for a little difference is a statistical error – the part of GDP that could not be divided between the fields).

Source: Ministry of Finance of Estonia, Statistics Estonia.

Table 1.6.5: GDP Forecast for 2011–2015 (%).

In 2011 Ministry of Finance expects export of goods and services to increase by 16%. In 2012-2015 export will moderate to 5.5-7% being in line with the developments of our main trading partners (http://www.fin.ee/economic-forecasts).

Import demand for the input for exports remains high and import is forecasted to increase by 16.3% in 2011. As domestic demand recovers, import growth will slightly outpace export growth. Domestic demand grew by 1% in 2010, which somewhat exceeded Summer Forecast's expectations.

Investments (gross fixed capital formation) are expected to grow 8.1% in 2012, which should initially predominantly come from corporate investments to machinery and equipment. Housing investments recovery will be slower. Investments in the coming years will also grow faster than GDP and the structure of investments should become more broad-based. Investment to GDP ratio will start to grow, but will remain lower than in the pre-boom level until the end of the forecast period (http://www.fin.ee/economic-forecasts).

Consumer prices will increase by 4.5% in 2011, by 2.8% in 2012 and by 3.0% in 2013. Inflation in this year is accelerating due to price pressures from external environment. The world market food and fuel prices are high, which have quickly spread over the local retail prices. The food is estimated to give a half of the 2011th annual inflation of 4.5%.

In 2011 the **number of employed** persons is expected to increase compared to 2010 level by 12 thousand people, i.e. by 2.2%. In 2012 employment growth slightly slows down, reaching 1.9%.

In terms of increasing labour demand, unemployment rate decreases to 13.5% in 2011 and to 11.4% in 2012. By the end of forecast horizon, unemployment rate decreases to 8%. The modest growth in **average wages** continues in 2011, amounting to 3.5% (http://www.fin.ee/economic-forecasts.

1.7 Transportation (T)

The Estonian transport network consists of the infrastructure needed for road, rail, water and air traffic. The total length of national roads as at January 1, 2009, was 16,487 kilometers, i.e. 28.4% of the total length of the Estonian road network, which is 58,034 kilometers. 38,489 km were local and private roads accounting for 66.3% of the total road network. 9,922 kilometres of the national roads were paved and 6,565 kilometres were gravel roads. The density of the national roads is 380 km per 1,000 km^2 and the density of the entire registered road network is 1,336 km per 1,000 km^2 of the territory (http://pub.stat.ee/px-web.2001/I_Databas/Economy/34Transport/12Transport_infrastructure/12Transport_infrastructure.asp). The rail transport system in Estonia consists of about 1,200 kilometres of railway lines, of which 919 kilometres are currently in public use and 133 kilometres have been electrified.

Estonia has a very long coastline of 3,794 km as well as a dense port network. Port of Tallinn is one of the biggest ports in the region. There are 48 ports in the State Port Register with a maximum depth of over 17 meters.

Estonia has 12 airports with paved runways. In 2008, about 1.9 million passengers were served in Estonian airports. It is 6% more than in 2007 and also more than ever. Over 1.8 million passengers were served in Tallinn Airport in 2009.

The freight turnover (total types of transport) was more than 25000 thousand tonne-kilometres (Figure 1.7.1). The increase in freight turnover was mainly influenced by the sea and raiway transport in 2010, where it increased by 62% and 12% respectively. The freight turnover of road transport enterprises decreased by 5%. International transport covered 85% of the total freight turnover and increased by a tenth during 2010.

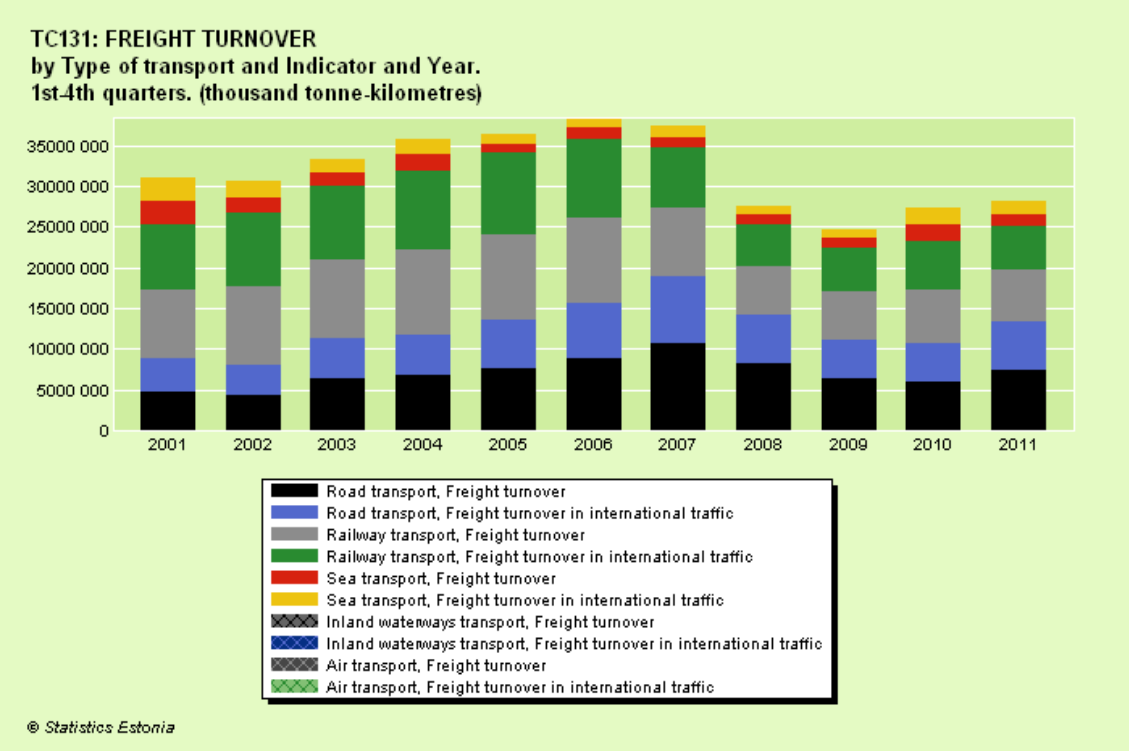


Figure 1.7.1: The freight turnover of Estonian transport 2001–2011.

1.7.1 Road transport

Road transport includes all transportation on the roads in Estonia: passenger cars, light duty vehicles, heavy duty trucks, buses, motorcycles and mopeds. The source category does not cover farm and forest tractors because they are included in other sectors as off-roads (agricultural and industrial machinery etc.). Road transport sector includes emissions from fuel combustion, road abrasion, tyre and brake wear and NMVOC emissions from gasoline evaporation. Road transportation is the most

important emission source in transport sector covering over 93.8% of sector´s emissions. Road transport contributed to the emissions of nitrogen oxides, non-methane volatile compounds and carbon monoxide 63.9%, 72.8% and 83.2% respectively in 2009.

1.7.2 Shipping

Domestic navigation includes the most important domestic water transport in Estonia: merchant ships, passenger and technical ships and other inland vessels.

National navigation in Estonia is also small emission source in transport sector. The share of navigation transport into total transport emissions in 2009 were: NOx – 2.0%, NMVOC – 1.3%, CO – 0.5%.

1.7.3 Railways

Railway transportation in Estonia is a small emission source in transport sector. Railway transport is operated by steam and diesel locomotives.

All non-electric locomotives in Estonia use diesel oil or coal in Estonia. Since 2002 there is no coal burning locomotives in operation.

Compared to other countries, the rail transport of passengers in Estonia is used seldom also the rail network density (in meters per km^2) is one of the smallest in Europe.

The rail transport is used mostly for transport of goods. The total contribution to the emissions of nitrogen oxides, non-methane volatile compounds and carbon monoxide were 12.3%, 3.6% and 1.3% respectively in transport sector in 2009.

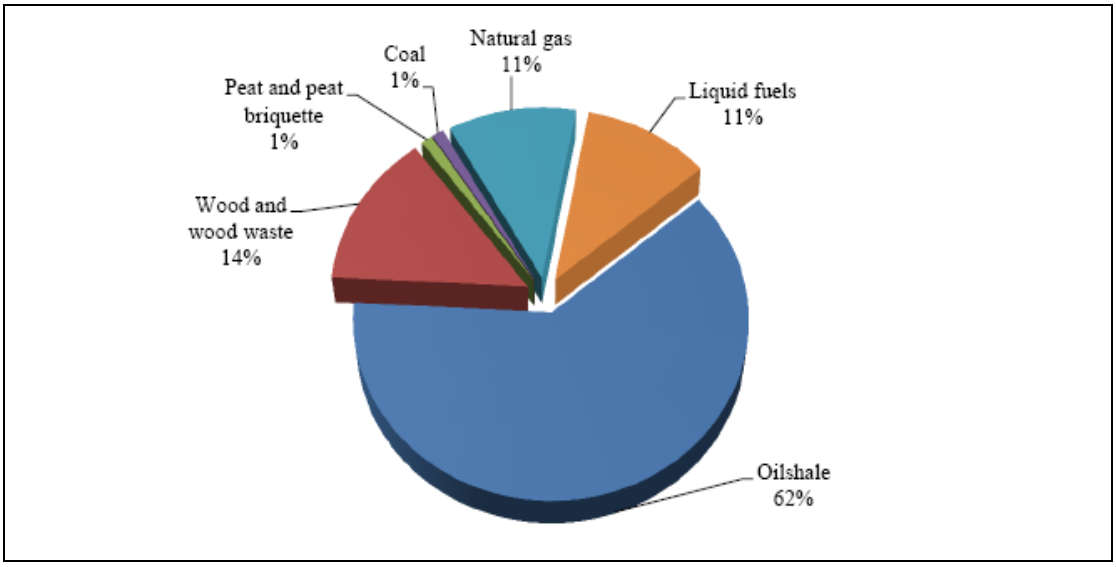
1.7.4 Air transport

Aviation sector has very minor share into total emissions. The total contribution of aircraft LTO emissions to the emissions of nitrogen oxides, non-methane volatile compounds and carbon monoxide were 0.5%, 0.2% and 0.5%, respectively, in transport sector in 2009. Other pollutants have even smaller share.

1.8 Energy

1.8.1 Energy supply

Estonia has very few conventional resources. However, it has important reserves of oil shales: 4 Gt (2010), therefore accounting for approximately 70% of the world's oil shale production. Estonia has also large areas of peat land - peat reserves are approximated at 2 Gt. 54% of the country are covered by forests, and thus Estonia also has important reserves of wood. Figure 1.8.1 shows the structure of primary energy supply in 2009.

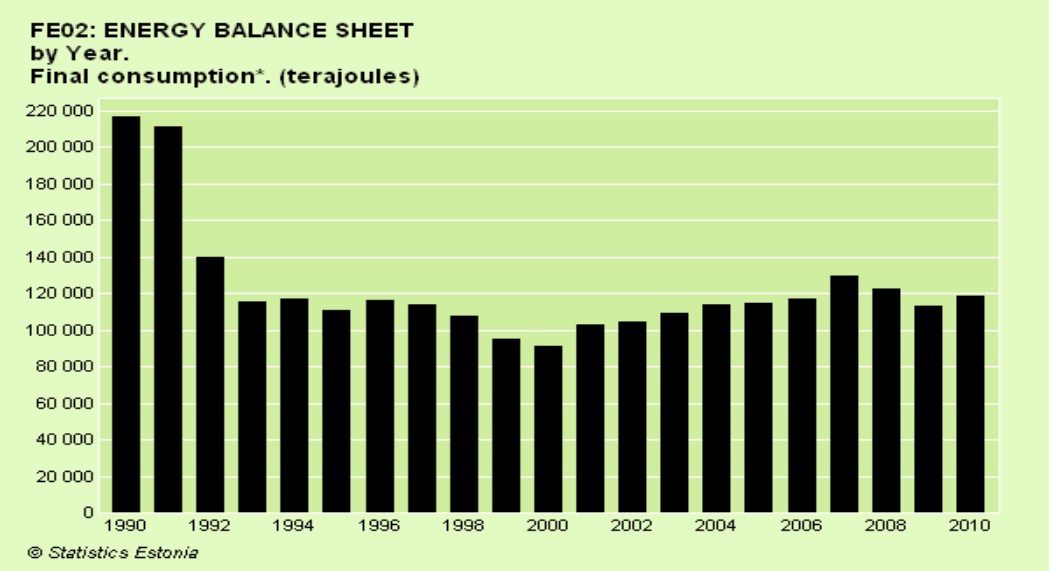


Source: *www.stat.ee*

Figure 1.8.1: Structure of primary energy supply in Estonia 2009.

1.8.2 Energy consumption

Total energy consumption per capita is 4 toe/cap and ranks among the hightest in Eastern Europe, close to that of Austria and Slovenia and almost double that in Lativa, mainly due to oil shale combustion in thermal power plants with low efficiency. Final energy consumption is showen in Figure 1.8.2. Total electricity consumption in Estonia amounted to 7.8 terawatt-hours in 2011, an amount 2 percent smaller than in the year before (http://elering.ee/electricity-consumption-grows-2-year-on-year).



Source: *http://pub.stat.ee/px-web.2001/Dialog/varval.asp?ma=FE02&ti=ENERGY+BALANCE+SHEET&path=../I_Databas/Economy/07Energy/02Energy_consumption_and_production/01Annual_statistics/&lang=1*

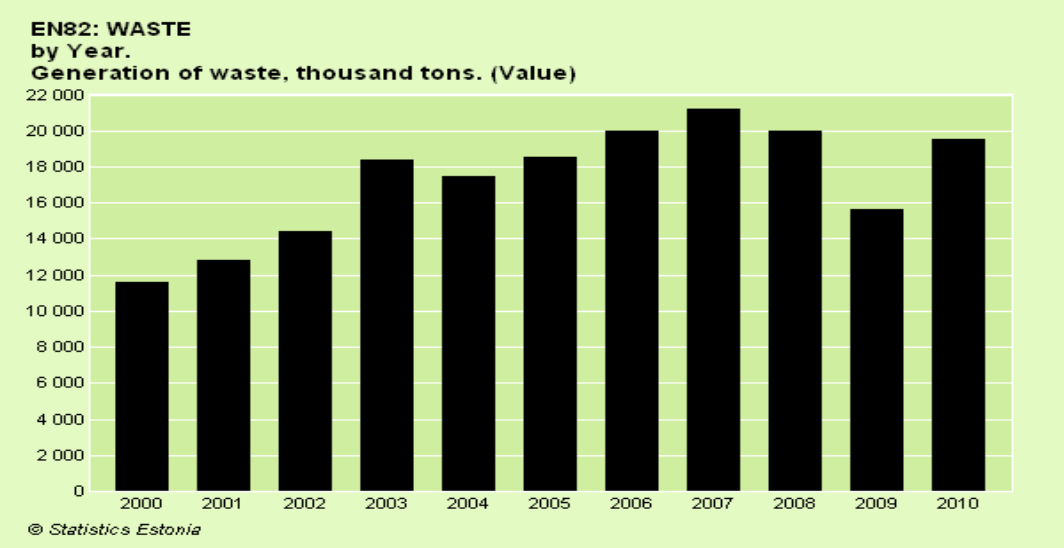
Figure 1.8.2: Final energy consumption - total.

1.9 Waste disposal

In 2008, the new National Waste Management Plan was approved by the Government of the Republic. According this Plan the main guiding principles of the waste management in Estonia up to 2013 were deveploped. Waste recovery has increased over the last years, total recovery rate in the country was over 40% in 2010. Nearly 100% of wood processing waste is recovered. A considerable part of oil shale mining waste, construction and demolition waste (including excavated soil), waste generated in agriculture and dairy industry, metal waste, sewage sludge, garden and park waste is recovered as well.

1.9.1 Solid waste disposal

During the reorganisation of waste management, the number of landfills in non-conformity with environmental requirements was decreased (with 6 non-hazardous waste disposal sites left after 16 July 2009); waste (including packaging waste) recovery rates were increased, separate collection of household waste and the deposit refund system for beverage containers were implemented.



Source: http://pub.stat.ee/px-web.2001/Dialog/varval.asp?ma=EN82&ti=WASTE&path=../I_Databas/Environment/01Environmental_pressure/04General_data/&lang=1

Figure 1.9.1.1: Generation of waste.

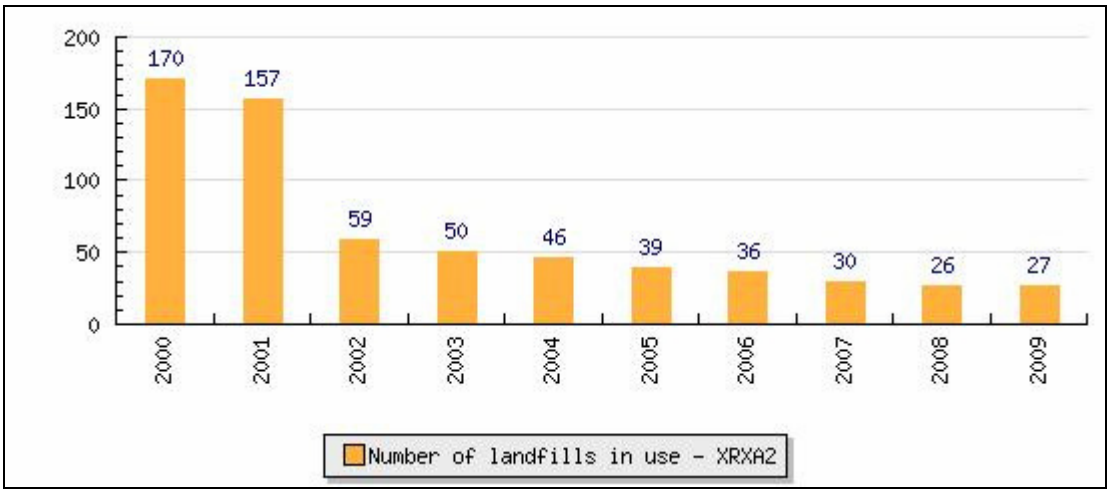
Recycling of wastes is increasing (table 1.9.1).

EN82: WASTE by Indicator and Year											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Waste recycling rate, %	..	14	18	23	25	30	37	32	29	28	37

Source: http://pub.stat.ee/px-web.2001/Dialog/varval.asp?ma=EN82&ti=WASTE&path=../I_Databas/Environment/01Environmental_pressure/04General_data/&lang=1

Table 1.9.1: Waste recycling rate, in %.

The number of landfills in use is decreased since 2000 to 2009 (Figure 1.9.1.2).



Source: www.keskkonnainfo.ee

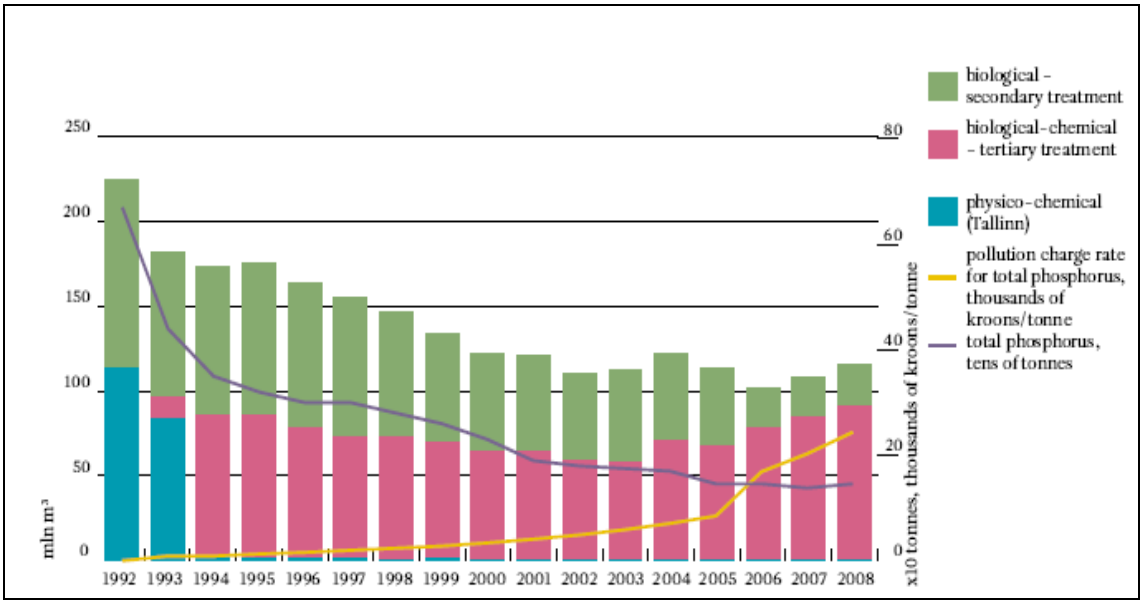
Figure 1.9.1.2:Number of landfills in use from 2000 to 2009.

1.9.2 Wastewater treatment

Waste water treatment is characterized by increased efficacy and the adoption of more contemporary treatment methods.

Wastewater treatment has improved significantly in the last 16 years. In 2008, 99% of all wastewater that required treatment was treated (EEIC, 2009). Even though secondary treatment removes an average of 85-95% of organic pollution, most of the nutrients remain and this no longer satisfies today's requirements. For this reason, the share of tertiary treatment – i.e. biological-chemical alias phosphorus and nitrogen removal has risen markedly. In 2008, a total of 4/5 of the wastewater from the population and manufacturing companies underwent tertiary treatment (Figure 1.9.2.).

The total amount of wastewater generated in 2010 was 1.8 billion m^3, from which 1.5 billion m^3 was used as cooling water for the production of energy and therefore no water treatment was needed. 359.5 million $m^3$of the total amount of wastewater generated needed to be handled, the quantity of wastewater, which was actually treated, using mostly aerobic treatment, was about 358.1 million m^3. The decrease has taken place in the amounts of wastewater treated in Estonia in 1990-2010, which is likely caused by the quantities of used water decrease due to the consequence of saving (water meters in households, water saving in technological processes) and due to the a large number of closed industries.



Source: www.keskkonnainfo.ee

Figure 1.9.2: Wastewater treatment: physical-chemical and secondary and tertiary treatment.

2 The national GHG inventory

2.1 Developing a national GHG-inventory system

2.1.1 Governmental authorities responsible for collecting GHG data

The Ministry of the Environment (MoE) is responsible for climate policy and submission of greenhouse gas inventory and reports [NIR, 2010]. The Estonian Environmental Information Centre (EEIC) under the MoE is responsible for collecting, analysing, storing, reporting and publishing of the environment-related information and data.

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2.1.2 Supporting institutions

The Institute of Ecology (IE) at Tallinn University (TLU) was responsible for the inventories under contract to the Ministry of the Environment in Estonia until summer 2006.

For 2008, 2009 and 2010 inventories are produced in collaboration between MoE, EEIC, Tallinn University of Technology (TUT) and Estonian Environmental Research Centre (EERC). TUT experts are responsible for Energy, Waste, Agriculture, Land Use, Land-Use Change and Forestry (LULUCF), and EERC – for Industrial Processes.

In preparation of the inventory and in compiling of the basic data the EEIC cooperates not only with MoE, but also with Ministry of Economic Affairs and Communications, Ministry of Agriculture and Statistics Estonia.

2.1.3 Measurement methodology and data sources

The national database contains data for point and diffuses sources of emissions. The emission inventory for the period of 1990-1999 is based on data about the large point sources and area sources.

Since 2000 to 2004 the CollectER (point and area sources data base) and software was used to gather data (both – point and area). For point sources information gathering the EEIC created a new web-interface air emission data system for the point sources (OSIS) in 2004. Operators of point sources can directly fill in their annual air pollution reports.

The point sources information system contains data that is reported by the facilities having permit of pollution. Data is represented on each source of pollution and on the facility as a whole. Point sources owner can directly input their calculated/ measured annual emissions to the system or use OSIS calculation models, which uses legally regulated estimation methodologies. There is possibility to use for estimation of emissions other methods, however, it should be done in co-ordination with MoE (regulated by Air Protection Act). When the report in the system it should be confirmed by the local department of environment. In the end, EEIC is shecking data, aftrewhat the information is ready for various reports.

Calculation of emissions from diffuse sources is done by using of CollectER tool.

For the calculation of emission from road transport EEIC is using COPERT IV tool methodology and emission factors. Total emissions are calculated on basis of the combination of firm technical data (e.g. emission factors) and activities data (e.g. number of vehicles, annual mileage per vehicle, average trip, speed fuel consumption, monthly temperatures). Vehicles data (passenger cars, light and duty vehicles, buses, motorcycles) and annual mileage per vehicle EEIC is obtained from the Estonian Motor Vehicle Registration Centre. Meteodata is provided by the Estonian Meteorological and Hydrological Institute (EMHI). Data about fuel consumption by the Statistical Office of Estonia.

National emission inventory data stored in the CollectER annual inventory databases is used for reporting (www.keskkonnainfo.ee).

2.1.4 Activity data

Activity data is obtained mainly from the Statistical Office of Estonia (SOE) (www.stat.ee). However, in addition from different sectors from other sources, which are listed below.

Energy related data – from the annual statistical bulletin „*Energy Balance*" and from AS Estonian Energy (state energy company). The data received from the SOE cover all fuels used sectors such as Energy and Manufacturing Industries, Transport, Agriculture, Residential and Commercial/Institutional. Additionally TUT asks every year by special inquiry data on aviation bunkering and quantities of some industrial products which are not published (like production of pulp and paper, food and drink, etc) but are needed for implementation of GHG Inventory.

Industrial data – from SOE and in case of F-gases from national and international companies, associations, public institutions etc. Data on clinker production (raw material for cement production) is received directly from the cement factory AS Kunda Nordic Cement. In chemical industry sector only CO_2 emissions from ammonia production are calculated; data is received from the ammonia factory AS Nitrofert.

Agriculture sector data – from Estonian Animal Recording Centre (http://www.jkkeskus.ee/english): fat content of milk and number of cows, which give birth) and from Scientific publications (a model of gross intake by pigs.

Waste sector – from EEIC's yearbook, from EERC http://www.klab.ee/en/services/environment/environmental-chemistry/) and from yearbook „Energy Balance" of SOE.

2.1.5 Conformity with data exchange standards

All data used in exchange satisfy the standard requirements.

The Ambient Air Protection Act regulates data collection and reporting. Methods for the calculation of emissions are laid down in several regulations of MoE. The Air Pollution Database consist data of point sources (for 2009 about 1650) and diffuse sources. Generally structure and emission calculation from the small point sources and area sources are based on EMEP/CORINAIR (EEA, 2007b) methodology.

All tables are prepared in accordance with the UNFCCC reporting Guidelines on Annual Inventories. The Common Reporting format (CRF) tables are produced with the CRF Reporter software (version 3.4.3). The methodology used in calculations of emissions is harmonized with the Guidelines for National Greenhouse Gas Inventories (*IPCC, 2006*) and those of Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories published by the Intergovernmental Panel of Climate Change (*IPCC, 2000*). Thus, all data and tables are meet the requirements of standards.

2.2 Systematic observations

2.2.1 Meteorological measurements

Meteorological data are available from EMHI, from Meteorological monitoring stations (MMS). The number of automated stations is 22, measurement programme types of measured elements and MMS location can be find from the EMHI webpage (www.emhi.ee) and in addition measured data can be obtained from EEIC (www.keskkonnainfo.ee).

2.2.2 Oceanic observations

EMHI is the responsible institution for the sea water level and rest oceanographic measurements on the Baltic Sea coastal area. Information of all necessary data is available on EMHI webpage (see p. 2.3.1).

2.2.3 Terrestrial observations

Soil and forest monitoring programmes permit to receive information about conditions of those ecosystems. The data is available from EEIC (www.keskkonnainfo.ee).

2.2.4 Air-quality monitoring

Number of air quality monitoring stations is 91. Measured parameters and all supplement information are available on EEIC home page (www.keskkonnainfo.ee).

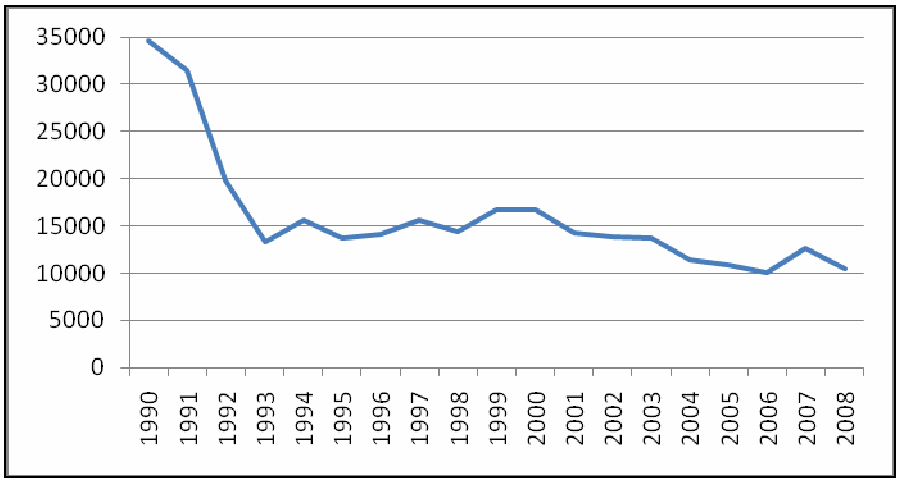
3 Reporting

3.1 GHG emissions per sector

According to the UNFCCC reporting guidelines on annual inventories (FCCC/SBSTA/2004/8) the greenhouse gas emissions and removals are divided into the following sectors: Energy, Industrial processes, Solvent and other product use, Agriculture, Land use, Land use change and Forestry (LULUCF) and Waste. All necessary information is available from the National Inventory Report. In case of Estonia, the last reports are prepared for the inventory period 1990-2008 and 1990-2009. The last period report is informative as it reguires Convention on Long-Range Transboundary Air Pollution (NIIR, 2011).

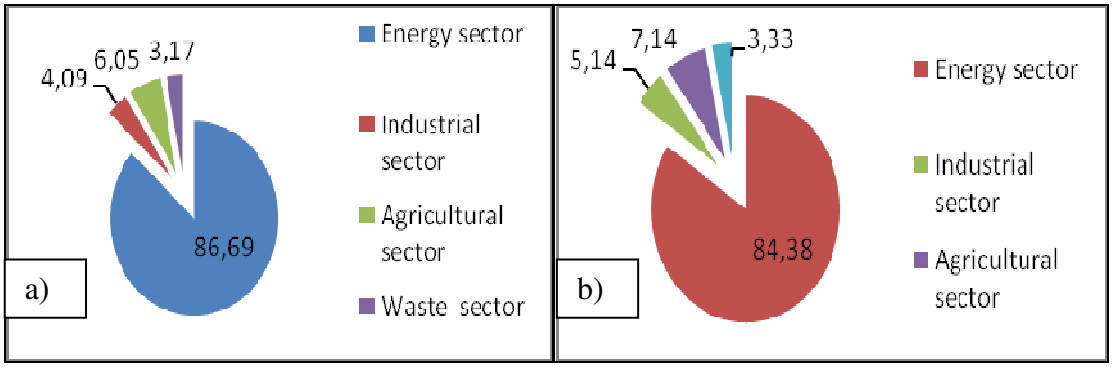
The total GHG emissisons have decresed by about 50% from 1990 to 2009 from 35,000 Gg to 10, 000 Gg, without LULUCF). These changes are presented (in CO_2-eq) in Figure 3.1.1.

Energy sector is the main source of GHG emissions in Estonia (excl. LULUCF). This sector contributed 86.7 % (
.1.2.a) of the total emissions in 2007 and 84.38% in 2008 (
.1.2.b). About 97% of emissions originated from fuel combustion and ca 3% were contributed by fugitive emissions. CO_2 emissions from the energy sector have decreased and varied mainly in relation to the economic trend, the energy supply structure and climate conditions.



Source: Statistics Estonia (www.stat.ee)

Figure 3.1.1: Total emissions, thousands CO_2 equivalent tonnes in Estonia for the period 1990-2008.



Source: Statistics Estonia (www.stat.ee).

Figure 3.1.2: Total emisssions (%) from different sectors in Estonia in 2007 (a) and in 2008 (b).

Industrial sector emissions are divided into the following categories: Mineral Products, Chemical Industry and Consumption of Halocarbons and SF6. Under Mineral Products are emissions from Cement Production and Lime and Glass Production; under Chemical Industry - emissions from Ammonia Productions. The category Consumption of Halocarbons and SF6 covers the emissions of F-gases from refrigeration and air conditioning, foam blowing, aerosols and electrical equipment.

As it demonstrates Figure 3.1.2.b, the industrial sector emisssions contribute 5.14% in 2008, totalling 1,040.88 Gg CO_2 equivalents (www.stat.ee). The Cement, Ammonia and Lime Production are the sectors that contribute the most GHG emisssions. Emissions from the industry sectors fluctuated during the period 1990-2008, with the lowest emissions in 1992 and 1993 during the decreasing of economy of the country, and 2002 and 2003 because of the decrease in ammonia production (the only existing ammonia factory was being reconstructed). For the last years, emisssions of GHG from the industrial sectors are increasing probably due to increase of Cement production.

Agriculture sector contributed 1,447.07 Gg CO_2 equivalent in 2008 (7.14%, Fig. 3.1.2.b). The main source of emissions are the Enteric Fermentation of livestock and Direct Emissions from Agricultural Soils. As it stated in NIR (2010), the emissions from agriculture sectordeclined 52.6% compared to the base year, mostly due to the decreasing livestock population and the quantities of synthetic fertilizers and manure applied to agricultural fields

Estonia ´s emissions from the **LULUCF sector** are divided into the following categories: Forest Land, Cropland, Grassland and Wetlands. In 2008 the LULUCF sector acted as a CO_2 sink, totalling 9,729.83 Gg CO_2 equivalent. The main sink of CO_2 in Estonia is Forest land. Reported net CO_2 removals in the LULUCF sector increased by 54.9% between 1990 and 2008. The sharp decreases in 1999 and 2000 are explained by the sharp increase in the forest felling in these years. Land use has changed in recent decades.

Solid Waste Disposal on Land contributed the most to the total emissions for the **Waste sector** in 2008, totalling 674.82 Gg CO_2 equivalent (www.stat.ee). The total emissions in CO_2 equivalent from the Waste sector decreased by 0.76% compared to the 1990.

In 2010 the recalculations of emission to the inventory were done for the time period from 1990 to 2008. The reason is explained in the NIIR (2011) in table 0.1, but mainly due to improvment of methods of emission's estimation, like correction of emission factors for some new emissions, or useof new methodology. The next reason was the use of New*„EMEP/EEA air pollutant emission inventory guidebook 2009.* The recalculated emissions are available in NIIR (2011) in Summary and in chapter 10.

Because of New guidebook in 2009, the key categories list was updated by new antropogenic emissions and emissions from new categories of activities. For all these changes new calculations were done.

Updated new activities are:

- 2.A.6 Road paving with asphalt (1990-2009)
- 2.A.7.b Construction and demolition (2000-2009)
- 2.D.2 Food and drink (1990-2008, were added some SNAP for this activity)
- 3.A.1 Decorative coating application (1990-2006)
- 3.B.2 Dry cleaning (1990-2006)
- 3.D.1 Printing (1990-2006)
- 3.D.3 Other product use (1990-2006).

The list of anthropogenic emissions of main pollutants from 2010 includes: SOx, NOx, NMVOC, NH3 and CO, particulate matter (TSP, PM10, PM2.5), heavy metals (Pb, Cd, Hg, As, Cr, Cu, Ni, Zn,), and persistent organic pollutants (dioxins, PCB, HCB, PAHs).

3.2 GHG emissions per type

The estimation of GHGs emisssions coveres the following gases:

carbon dioxide (CO_2),

methane (CH_4),

nitrous oxide (N_2O) and

fluorinated gases - hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6).

In addition, emissions for nitrogen oxides (NOx), carbon monoxide (CO), non-methane volatile organic compounds (NMVOCs) and sulphur dioxide (SO_2) are also included in the national inventory report (NIIR, 2011).

Estonia´s base year for calculating the emissions of CO_2, CH_4 and N_2O is 1990, the base year for the emissions of fluorinated gases is 1995.

The most important GHG in Estonia in 2008 (www.stat.ee) was carbon dioxide (CO_2), contributing 85.83% of the total GHG emissions (excl. LULUCF) expressed in CO_2 equivalent. The next GHG was methane (CH_4) and nitrous oxide (N_2O), contributing 7.96% and 5.56%, respectively. Fluorinated gases (the so-called „Fgases“) account for about 0.66% of the total emissions. As it stated in the last National Inventory Report (NIR, 2010), the GHG trends are decreased: CO_2 decreased by 51.89% from 36,135.69 Gg in 1990 to 17,383.08 Gg in 2008, especially CO_2 emissions from Energy sub-sector Public Electricity and Heat Production, which is the major source of CO_2 in Estonia.

Emissions of methane (CH4) decreased by 40.82% from 2723.55 Gg CO_2 equivalent in 1990 to 1611.73 Gg CO_2 equivalent in 2008, especially from Energy sub-sector Fugitive Emissions from Fuels, which is the major source of CH4 in Estonia.

Emissions of N_2O decreased by 43.29% from 1984.20 Gg CO_2 equivalent in 1990 to 1125.32 Gg CO_2 equivalent in 2008, especially N_2O emissions from Agriculture sub-sector Agricultural Soils, which is the major source of N_2O in Estonia.

Emissions of the F-gases (HFCs, PFCs and SF_6) increased from 28,9 Gg CO_2 equivalent in 1995 to 133.47 Gg CO_2 equivalent in 2008, especially HFC emissions from refrigeration and air- conditioning equipment, which is the major source of halocarbons in Estonia (NIR, 2010).

3.3 Information publicly available

Information is publicly accessible through the user interface of the registry web page (https://khgregister.envir.ee) and at Climate web: http://www.keskkonnainfo.ee/index.php?lan=EE&sid=582&tid=525&l3=339&l2=323&l1=320.

The Decision 280/2004/EC of the European Parliament and of the Council requires EU Member States to provide information on the legal entities authorized to participate in the mechanism under Articles 6, 12 and 17 of the (RT II, 2002) Protocol in the NIR. According to the Estonian national legislation (The Ambient Air Protection Act, §117, RT 2004, 43, 298) the Ministry of the Environment as competent authority is authorized to trade with AAUs, RMUs, ERUs and CERs. Installations falling under the scope of the Directive 2003/87/EC are authorized to use

ERUs and CERs for compliance according to the percentage set out in National Allocation Plan for 2008-2012. This information is available at Climate web:

http://www.keskkonnainfo.ee/index.php?lan=EE&sid=582&tid=525&l3=339&l2=323&l1=320.

Installation and permit details (available on the Estonian NR interface – Under "Public Reports": https://khgregister.envir.ee/).

Information about verified emissions, surrenders and compliance status of installations (On Estonian Environment Information Centre Climate web page, in estonian language: http://www.keskkonnainfo.ee/index.php?lan=EE&sid=352&tid=332&l2=326&l1=320.

Other public information is available in Estonian Environment Information Centre Climate web page (in Estonian and in English):

http://www.keskkonnainfo.ee/index.php?lan=EE&sid=582&tid=525&l3=339&l2=323&l1=320.

Allocated allowances vs. verified emissions (On Estonian Environment Information Centre, Climate web page (in Estonian): http://www.keskkonnainfo.ee/index.php?lan=EE&sid=352&tid=332&l2=326&l1=320.

4 Verification

4.1 Methods for QA/QC analyses

The quality control (QC) procedures used in Estonia's GHG inventory comply with the IPCC Good Practice Guidance (IPCC, 2000). General inventory QC checks are carried out and individual source category checklists are produced. Also assessment of completeness is evaluated.

During the Twinning Light project "Improving the quality of Estonia's National Greenhouse Gas Inventory" with Finland in 2009 Estonia updated its QA/QC plan. The Estonia's QA/QC plan consists of six parts:

- stakeholder engagement (stakeholders = e.g. suppliers of data, reviewers, recipients, other inventory compiling institutes),
- data collection,
- data manipulation,
- inventory compilation,
- consolidating the inventory estimates (e.g. into a single national database),
- reporting.

All institutions involved in the inventory process (MoE, EEIC; TUT and EERC) are responsible for implementing **quality control (QC)** procedures to meet the data quality objectives. The sectoral experts send their xml files to the compiler (EEIC) who puts all the sectors together and completes the CRF tables. During that time the numbers are cross-checked in the CRF reporter to make sure that no mistakes were made during the importing process. Also the CRF completeness check is carried out to make sure that all the necessary data is filled. When EEIC has completed the CRF tables, then all data is checked by an independent expert from Tallinn University of Technology (TUT). When it is necesarry, the adjustments can be carried out as a result.

After the CRF tables are finalized, the experts start preparing the sectoral chapters of the National Inventory report (NIR). These parts are also sent to EEIC who adds the introduction part and puts the draft NIR together. The compiler makes sure that the structure of the report follows the IPCC guidelines. All figures on emissions and removals in tables and text are checked to make sure that they are consistent with those reported in the CRF. It is also checked that all methodological changes, recalculations, trends in emission and removals are well explained.

When the draft NIR is completed it is sent to the MoE. The Climate and Radiation Department looks over the inventory report and makes sure that the submitted data is

officially valid and the report is well structured. When there are no contradictions the report is introduced for coordination to the Forestry, Waste and Water Department, Deputy Secretary General on Environmental Management and Deputy Secretary General on International Co-operation. Then if the report is approved by the Secretary General it can be sent to the EC and UNFCCC.

The inventory meetings with participants from all institutes participating in the inventory preparation are held four times a year. When it is necesarry, the bilateral quality meetings between the quality coordinator (EEIC) and the expert organizations are also held.

MoE and EEIC, in collaboration with the expert organizations responsible for the inventory calculation sectors, set yearly quality objectives for the whole inventory at the inventory planning stage and designs the QC procedures needed for achieving these objectives.

The setting of quality objectives is based on the inventory principles presented in the UNFCCC Guidelines and in the EUs decision on a Mechanism for Monitoring Community greenhouse gas emissions, that is, transparency, consistency, comparability, completeness, accuracy and timeliness. In addition, the principle of continuous improvement is included (NIIR, 2011).

The objective of **quality assurance (QA)** implementation is to involve reviewers (experienced and less experienced) that can conduct an unbiased review of the inventory and who may have a different technical perspective. Preferably these reviewers would be independent experts from other agencies or national experts or groups not closely connected with the national inventory compilation. In some years independent experts from TUT were involved in the review.

The public also has the opportunity to evaluate the review. The draft NIR is uploaded to the EEIC website www.keskkonnainfo.ee where all interested parties can comment on it. The public reviews may be researchers and practitioners in non-governmental organizations, industry and academia, as well as the general public. The comments received during these processes are reviewed and, as appropriate, incorporated into the NIR.

UNFCCC reviewsm is also a part of QA implementation. Experts from other countries are examining the data and methods that Estonia is using. These experts is checking the documentation, archiving system and national system. They conclude whether Estonia's overall performance is in accordance with the guidelines. The review report indicates the specific areas where the inventory is in need of improvements.

Estonian QA/QC plan is currently under development (March, 2011).

4.2 Data verification indices

Verification activities are usualy done for each sector separately. The QC/QA plan for different sectors includes the QC activities described in the IPCC GPG (*IPCC, 2000*).

Activity data are checked annually for updating. Emission factors are compared with IPCC default and with emission factors of other countries.

As it mentioned in 4.1, the Estonian QA/QC plan is currently under development (March, 2011), so verification criterion will be evaluated in near future.

The same situation is with uncertunty assesment, it is under currently development in Estonia.

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APPENDIX

Acronyms and abbreviations

^{0}C = Celsius degrees

CORINAIR = European Emissions Inventory Guidebook developed by European Environment Agency

CRF= Common Reporting Format

GHG = greenhouse gas

EEIC = Estonian Environmental Information Centre

EMHI = Estonian Meteorological and Hydrological Institute

HDI = Human Development Index

IPCC = Inter-governmental Panel on Climate Change

LULUCF = Land use, land-use change, forestry

MoEA = Ministry of Economic Affairs

MoE = Ministry of Environment

NIR = National Inventory report

NMVOC = non-methane volatile organic compounds

QA = quality assurance

QC = quality control

SOE or SE = Statistical Office of Estonia

TUT = Tallinn University of Technology