Ministry of Natural Resources and Environmental Protection of the Republic of Belarus

Belarus Research Centre ECOLOGY

The Republic of Belarus'

NATIONAL REPORT

ON

DEMONSTRABLE PROGRESS IN

THE IMPLEMENTATION OF

THE KYOTO PROTOCOL

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1. INTRODUCTION

The Republic of Belarus (hereinafter, also **Belarus**), a country with population of around 9.8 million, is located in Central Europe and has an area of 207.6 thousand km^2. As many other countries of the former Soviet Union, Belarus is a transition country that had a significant economic decline in the 1990s as reforms aimed to bring down command economy began to take effect. Market economy mechanisms designed to help to build cost-effective and energy conscious economy and deliberate Government policy aimed at saving resources as the economic crisis grew worse resulted in most of the transition countries, as they were recovering from the crisis and getting their GDP back to the before-the-crisis level, having their greenhouse emissions stabilized at 40-60% of the level before reforms were launched.

Belarus takes global climate change issues very seriously, and its having joined most of the relevant international treaties speaks for itself. Belarus signed the UN Framework Convention on Climate Change (UNFCCC) on 11 June 1992, ratified it on 11 May 2000 and became its full Party on 9 August 2000.

The country deposited its decision to accede to the Kyoto Protocol to UNFCCC on 26 August 2005, and became its full Party on 24 November 2005. According to Decision 32/CMP.1 Belarus has timely submitted a proposal, which was duly circulated to other KP Parties ahead of CMP.2, on including it in Annex B to the Protocol with assigning it 95% to the 1990 (the basis year) level as the emission reduction target. Including Belarus among Annex B countries is a key condition that makes it possible for the country to participate in Kyoto mechanisms, including getting a chance to attract carbon funding from other countries.

As part of its commitments as UNFCCC Annex I Party Belarus has submitted four GHG inventory reports for 1990, 1995, 1999, 2000, 2001, 2002, 2003 and 2004 to the UNFCCC Secretariat. Belarus published its First National Communication covering the period 1990 to 2000 in 2003. Since it acceded to the Kyoto Protocol there have been some solid measures taken in the country to create conditions for it to meet its commitments under the treaty. There has been ongoing work on putting in place legal, institutional and technical frameworks to enable the country to have full and effective participation in the flexibility mechanisms offered by the Kyoto Protocol. Belarus has endorsed its National Climate Change Action Plan, while its National Strategy and Fourth National Communication have been developed and submitted to relevant bodies for approval so far.

This report on demonstrable Kyoto progress under Article 3, paragraph 2, has been prepared in accordance with decisions by the 7^{th} and 8^{th} sessions of the UNFCCC Conference of the Parties (Decision 22/CP.7 and 25/CP.8).

2. DOMESTIC POLICIES AND MEASURES

2.1. Legal and Institutional Frameworks

Since Belarus signed UNFCCC there has been ongoing work on developing legal instruments to control GHG emissions and putting in place a legal and institutional framework for taking climate change prevention measures. The key legal acts setting out Government policy on preventing global climate change in Belarus are as follows:

- Law of Belarus 'On Environmental Protection', of 26.11.1992, Article 56 'Responsibilities of Legal Persons and Entrepreneurs Engaged in Economic or Other Activity Resulting in GHG Emissions into the Atmosphere'; and Article 57 'Controlling Impacts on the Climate.'
- Law of Belarus 'On the Protection of the Atmosphere', of 15.04.1997, Article 43 'Controlling Impacts on the Weather and Climate.'
- Law of Belarus 'On Hydrometeorology', of 10.05.1999, Article 16 'The Competence of the National Hydrometeorology Authority (Climate Inventory).'
- 10.04.2000 Decree by the President of the Republic of Belarus, # 177 'On Ratifying the UN Framework Convention on Climate Change.'
- 12.08.2005 Decree by the President of the Republic of Belarus, # 370 'On the Republic of Belarus' Accession to the Kyoto Protocol to the UN Framework Convention on Climate Change.'
- 30.12.2005 Resolution of the Council of Ministers of the Republic of Belarus, #1582 'On the Implementation of the Provisions of the Kyoto Protocol to the UN Framework Convention on Climate Change.'

The last resolution, # 1582, has adopted an Action Plan for the Implementation of the Provisions of the Kyoto Protocol to the UN Framework Convention on Climate Change for 2005-2012. Pursuant to it, and in line with established procedure, a number of norm-setting legal acts have been prepared, submitted for approval and approved by the Council of Ministers of the Republic of Belarus, as follows:

- 04.05.2006 Resolution of the Council of Ministers of the Republic of Belarus, # 585 'On Approving the Provision on the National Greenhouse Gases Inventory System.' This document sets out procedures for organizing and operating the national GHG inventory system established in line with Belarus' commitments under Article 5 of the Kyoto Protocol. The inventory system includes a number of facilities and measures aimed at taking inventory of GHG emissions generated in Belarus using the guidelines developed by the Intergovernmental Panel for Climate Change (IPCC) and endorsed by Decisions 2/CP.3, and 4/CP.1. Key objectives of the GHG

inventory system include setting up an information system to keep stock of emissions by sources and removals by sinks of GHG gases; managing the state GHG cadastre, and a data base designed to facilitate the development of programmes and measures aimed at reducing emissions and enhancing sinks and reservoirs of GHG gases.

- 10.04.2006 Resolution of the Council of Ministers of the Republic of Belarus, # 485 'On Approving the Provision on the Procedure of Maintaining the State Cadastre of Anthropogenic Emissions by Sources and Removals by Sinks of Greenhouse Gases.' This document sets out procedures for managing the state cadastre of anthropogenic emissions by sources and removals by sinks of greenhouse gases. The GHG cadastre is aimed to allow Belarus to meet its commitments regarding yearly reporting pursuant to relevant provisions of the UN Framework Convention on Climate Change and/or the Kyoto Protocol, prepare National Communications for submission to the UN Conference of the Parties, as well as for reviewing trends and making projections of future GHG emissions and removals. The management of the state GHG cadastre is a responsibility of the Ministry of Natural Resources and Environmental Protection of Belarus, which is entitled by the force of this Resolution to use data provided by other bodies of authority, appointed by this Resolution. Guidance in managing the cadastre is generally derived from the IPCC guidelines approved by Decisions 2/CP.3, 4/CP.1 and 18/CP.8

According to the above mentioned Action Plan the following documents were approved:

- 05.09.2006 Resolution of the Council of Ministers of the Republic of Belarus # 1145 'On the Establishment of the State Commission on Climate Change.' The document sets out the composition, objectives and powers of the Commission that is established to coordinate action on preventing climate change and ensure that the country meets its international commitments. In particular, the Commission, on behalf of the Government, considers and endorses measures under the Kyoto Protocol flexibility mechanisms (emission trading, joint implementation and clean development), GHG inventories and national GHG reports, as well as takes other action in line with the Kyoto Protocol procedures. The Commission is chaired by a Deputy Prime Minister.
- 05.09.2006 Resolution of the Council of Ministers of the Republic of Belarus # 1144 'On Approving the Provision on the Procedure of Submission, Review and Monitoring of Joint Implementation Projects.'
- 26.08.2006 Resolution of the Council of Ministers of the Republic of Belarus # 1077 'Resolution on the National Carbon Units Registry of the Republic of Belarus.'
- Resolution on the procedure for attracting investment and spending available funds under the Kyoto Protocol.

Pursuant to the Decrees issued by the President of the Republic of Belarus, # 177 (10.04.2000) and # 370 (12.08.2005), the Ministry of Natural Resources and Environmental Protection of Belarus (the Ministry) is charged with implementing Government policy on climate change.

By its Order # 417 of 29.12.2005, the Ministry assigned the RUP Belarus Research Centre ECOLOGY to be the National GHG Inventory and Cadastre Centre. According to draft Statute of the Centre, its key objectives include conducting inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol on substances that deplete the ozone layer, managing the state GHG cadastre, developing and taking part in implementing measures aimed at the reduction of emissions and enhancement of GHG sinks and reservoirs.

Within the Ministry itself, its Inspectorate on the Protection of Atmospheric Air, Ozone and Climate has created Department of State Control over Impacts on Climate. The Department's key objectives are as follows:

- Implement state policy on climate change;
- Improve legal and institutional frameworks to combat climate change and use mechanisms under international climate-related treaties;
- Perform the functions of the JI Secretariat;
- Perform the functions of the Secretariat to the State Commission on Climate Change;
- Perform other functions relating to the implementation of state policy on climate change.

2.2. National Strategy on Climate Change

The national strategy on climate change is designed to reflect Government policy that Belarus has undertaken to implement to fulfill its commitments under the UN Framework Convention on Climate Change and the Kyoto Protocol. The first draft of the national strategy was included in the First National Communication (2003). The draft was based on a number of conceptual documents adopted by the Government by the time, in particular the Concept of the National Strategy for Sustainable Socio-Economic Development of Belarus until 2020 and the National Action Plan for the Rational Use and Protection of Natural Resources and Environmental Protection in Belarus for 2001-2005 (Resolution of the Council of Ministers of the Republic of Belarus #12 of 21.06.2001).

In line with the Resolution of the Council of Ministers of the Republic of Belarus 'On the Implementation of the Provisions of the Kyoto Protocol to the UN Framework Convention on Climate Change' (# 1582 of 30.12.2005), the Belarus National Strategy was finally adopted by the Council of Ministers of the Republic of Belarus in its Resolution # 1155 of 07.09.2006 'On Approving the Strategy for

Reducing Emissions and Enhancing Removals by Sinks of Greenhouse Gases in the Republic of Belarus for 2007 – 2012.'

Reviewing trends and projections of GHG emissions (see Part 3 below) suggests that Belarus is likely to fulfill its commitment to reduce GHG emissions by 5% to its base year (1990) as made in its application for inclusion on the list of the Annex B countries under the Kyoto Protocol. However, aware of its share of responsibility for global climate change and taking into account its commitments in subsequent commitment periods, as well as the provisions for a commitment period reserve as set out in UNFCCC/CP/2001/13/add.2, para. 6-10, the Government is planning to take appropriate measures to bring down emissions to acceptable minimum and enhance removals of greenhouse gases as the country's economy continues to grow. According to the Action Plan for the Implementation of the Provisions of the Kyoto Protocol to the UN Framework Convention on Climate Change for 2005-2012, the strategy must provide for, *inter alia*, developing measures to reduce emissions and enhance removals of greenhouse gases and including such measures in sector programmes for rational use of nature and environmental protection for 2006-2010 and afterwards, with giving particular attention to reducing greenhouse gas emissions in 2008-2012.

As GDP energy intensity is still relatively high in Belarus, it is planned that most of the reductions will be achieved through upgrading outdated industrial and power production sites. In some sectors of the economy, where costs to bring emissions down may be especially high, there will be policy in place to introduce new technology by attracting investments through the JI mechanism and international emission trading.

Since about 65% of CO_2 emissions (global warming potential) is contributed by power production sites and high power consumption industries, as suggested by the First National Communication and the most recent GHG inventories, the paramount objective is to reduce rates at which fossil fuels are consumed and have fuel and energy resources (FER) used by far more efficiently. To this end, reducing emissions in Belarus is yet quite inexpensive when compared to developed countries. Thus this line of action remains to be a priority in short-term policy on climate change in Belarus.

In particular, quite a few Government programmes have been implemented successfully, with one of their objectives being to increase energy efficiency and conservation in the country, thus reducing GHG emissions. For example, the National Energy Conservation Programme for 2001-2005, endorsed by the Council of Ministers' Resolution #56 of 16.01.2001, includes achieving the planned GDP growth as one of its tasks, without increasing the consumption of FERs, i.e. reducing GDP energy efficiency in 2005 by 15.1-18.7% against 2000, with a GDP growth of 118-123% over the same period. It was estimated that possible savings of FERs owing to reduced GDP energy intensity in 2005 would be 6.1 - 8 million tons of equivalent fuel compared to 2000.

As a result of implementing the Energy Conservation Programme for 2001-2005, actual GDP in 2004 grew up by 30.5% compared to 2000, while gross FER consumption rose by mere 3.9%.

To continue to implement the Energy Conservation Programme for 2001-2005 and to fuel work on achieving more efficient FER consumption, the Council of Ministers of Belarus has passed a resolution, entitled 'On Additional Measures for the More Rational and Efficient Use of Fuel and Energy Resources' (#1820, 27.12.2002). Some of the measures included installing energy efficient technology, main and auxiliary power saving equipment, efficient heat exchangers, controlled electric drives, automated FER consumption control systems, making wider use of department boilers, replacing low-efficiency boilers and other equipment with that of higher efficiency, making wider use of non-fossil fuels and combustible industrial wastes, etc. in various industries and sectors of the economy.

Reducing GDP energy intensity and introducing new technology led to savings worth of 9.2 million tons of equivalent fuel in 2004 compared to 2000. Over 5 years (2001-2005) GDP energy intensity has dropped by 25% (see Figure 1).

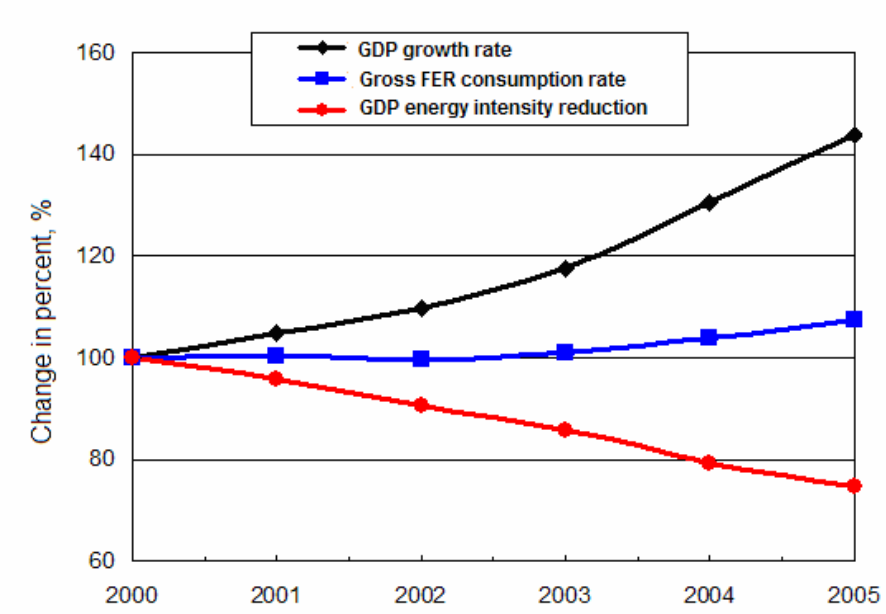

Figure 1. Rates of GDP growth, that of gross FER consumption and GDP energy intensity reduction

According to the International Energy Agency, GDP energy intensity was 0.46 t.o.e/thousand US dollars in Belarus in 2003 (based on purchasing power parity in 2000 prices), or 34.3% lower than that in 1995. At the same time GDP energy intensity (based on purchasing power parity) remains 1.6-2.2 times as high as in Canada, Finland, Sweden (countries with similar climate conditions). These data are evidence that Belarus still enjoys great potential for reducing GHG emissions even within action on saving FERs only.

These measures may ensure steady and sustainable development of this country's economy in the midterm with GHG emissions declining concomitantly. It is measures in the energy sector upon which the key focus should be placed for the time being (e.g. increasing the efficiency of power generators, wider use of renewable sources of energy, reducing leaks in pipelines), but in the fullness of time power saving and emission reduction measures may start to be taken in other sectors too – such as communal services (e.g. landfill methane capture), industrial production (e.g. reducing energy intensity in the production cycle), agriculture and transport. It is planned that most of investment required will be obtained through the Kyoto Protocol mechanisms.

Another important aspect to effective GHG emission reduction lies in measures on enhancing sinks and reservoirs of greenhouse gases. Measures on using forest ecosystems as absorbers of carbon dioxide from the atmosphere are of great importance in Belarus, with forests taking up around 42% of the country's total area.

According to Strategic Forestry Development Plan, it is planned that transition toward continued forest management in forest industry should be effected and a country-wide forest management information system should be put in place. Changes in forested area would correspond to statistics and projected afforestation rates in the country: from 37.6 to 39%.

A set of measures have been and are being taken to reduce CO2 emissions from drained wetlands:

- A Government resolution to confer powers on local administrations in taking decision how to use worked out peat deposits abandoned by peat production companies.
- Environmental rehabilitation of drained wetlands by re-bogging with peat formation processes set in motion concomitantly.
- Putting arable farming practices on drained peat soils in accordance with set rules and scientific evidence based recommendations.
- Wider use of environmentally sound and cost-effective methods in using degraded peat soils.
- Peat fire prevention.

2.3. Domestic policies and measures by economic sectors

2.3.1. Energy

The National Energy Conservation Programme for 2006 to 2010 has among its objectives achieving a 26.1-30.4% reduction of GDP energy intensity with a mean annual GDP growth of 5.0-5.6%. It is planned to save up to 7.7-9.1 million tons of equivalent fuel over 2006 to 2010 while having attained all socio-economic

objectives set for the period, including GDP size and breakdown, imported electric power, local fuels consumption, houses made available to the public, etc.

The objectives regarding the increased use of local sources of power until 2010 envisage their growth to 4.9 million tons of equivalent fuel, including secondary energy resources and alternative sources of power, but excluding existing reserves, local natural gas and masut.

In addition, the Government has adopted the 'Target programme for ensuring that at least 25% of electric and heat power in the country is produced using local fuels and alternative sources of power until 2012.' According to this Programme it is planned to have a 1.7 times growth of GDP, while having reduced GDP energy intensity by 2012 by 39%, as well as to increase the use of local FERs to 5.93 million tons of equivalent fuel, and that of secondary heat energy resources, wind and biogas power plants to 0.82 million tons of equivalent fuel a year. To attain these objectives 9.4 million cubic meters of wood fuel per year will be required by 2010, or about 2.5 million tons of equivalent fuel; and 10.2 million cubic m, or 2.7 million tons of equivalent fuel, by 2012.

2.3.2. Transport

Belarus oil refineries have done a lot to reduce sulfur levels in diesel fuel (less than 0.035%) and gasoline (less than 0.05%). Higher quality fuels have been developed based on new quality standards.

The Minsk Automobile Plant has started producing EURO-1 and EURO-2 emission level trucks and buses, and it is planned to produce 22,350 trucks and 780 buses of EURO-2 and EURO-3 standard in 2005.

Belarusian companies have been active in switching to more environment friendly types of motor fuels (gas and other fuels alternative to gasoline).

Cars imported from other countries account for over 80% of all cars available in Belarus. It is 7 or less years old cars that are mainly imported as of today. There has been a reduction in importing 10 or more year-old cars since the customs duty per 1 cm^3 of engine displacement was increased some time ago.

2.3.3. Industry

The Concept of and Programme for Industrial Development in the Republic of Belarus for 1998 to 2015 look forward to serious reforms in various sectors of industry that are aimed at achieving some high results through introducing new cost-effective and environment friendly technologies.

The following measures were taken in 2000 to 2004:

- Construction and reconstruction of environment protection installations and facilities;
- Introduction of new energy efficient technologies and equipment;
- Introduction of automated waste control systems;

- Development and putting in place STB ISO 14000 environmental management systems.

2.3.4. Agriculture and forestry

Agriculture accounts for two key sources of GHG emissions, that is CH_4 emissions from enteric fermentation in livestock (7.7% of all GHG emissions) and N_2O emissions from soils (7.9%). In view of this, more efficient use of nitrogen fertilizers and reducing the time for lands to stay fallow are amongst the main measures and policies in the area of reducing GHG emissions in agriculture.

As at the beginning of 2005, forest reserves in the country had a total area of 9.3 million ha, including forest-covered land (less glades, cuttings or fire-sites) – 7.8 million ha. Compared to 1990, it grew by 14.8% largely at the expense of artificial and natural afforestation of low-productive or unfit-for-agriculture lands. The volume of GHG sinks in the forest sector is superior to that of emissions. In 2004 the net amount of greenhouse gases absorbed by sinks in this sector was 16% of the total GHG emissions in the country. The size of sinks has virtually not changed since 1990, with the total reduction having been 0.9% which is largely due to increased tree felling. It is planned that forest uses will increase: by 2015 annual felling will be over 19 million m^3. However, total annual biomass growth in Belarus forests is already 26 million m^3 and continues to increase as afforestation rate grows and forest age structure gets more homogenous. In addition, it is planned to allocate more lands for artificial plantations. The latter's total area is around 3 million ha, or 25% of forest-covered lands. It is planned to increase significantly forest restoration operations by 2015 – so as to supply Belarus forests with young tree stands on an area of 70 thousand ha per year.

2.3.5. Wastes

The amount of CH_4 emitted by landfills is 5.7% of all GHG emissions. Methane emissions have gone up by 80% compared to 1990 largely due to an increased amount of wastes being disposed of at landfills. Emission reduction policy here is aimed at creating conditions for reducing organic contents in waste disposed of at landfills through sorting and separate processing, as well as encouraging projects on putting in place special plants for landfill gas capture and utilization.

2.3.6. Using worldwide experience

In the process of developing its climate change policy, Belarus cooperated quite a lot and fruitfully with international organizations involved and widely used experience gained in developed countries. The following international projects should be mentioned as having been instrumental in facilitating Belarus accession to the Kyoto Protocol:

- World Bank/GEF Project 'Preparation of the First National Communication in Response to Belarus Commitments under the UNFCCC.' Its immediate objective was to facilitate the preparation of the First National Communication for the Conference of the Parties in accordance with

Article 12 of the UNFCCC and subsequent CP decisions regarding national communications. The grant let Belarus review its GHG inventory system, develop an emission projection methodology, estimate the vulnerability of ecosystems in the country and set up an information exchange system for its both internal and international needs.

- UNDP/UNECE Project 'A review of opportunities for Belarus to accede to the Kyoto Protocol to the UN Framework Convention on Climate Change.' The project objective was to remove obstacles to taking the decision about Belarus accession to the Kyoto Protocol by reviewing the situation in other countries and informing relevant decision makers. Some action was taken jointly with the abovementioned World Bank/GEF project.
- UNDP/GEF Project 'National Capacity Self-Assessment for Global Environment Management.' The project objectives included the development of a national strategy and action plan for enhancing capacity in implementing three global UN Conventions: Framework Convention on Climate Change, Convention to Combat Desertification, and Convention on Biodiversity. The project aimed at reviewing existing environmental management and protection systems at all levels (district, Oblast and national), assessing the ways the conventions were implemented in the country and addressing identified cross-cutting issues in meeting commitments under the conventions.
- Regional EU TACIS Project 'Technical assistance to Ukraine and Belarus in respect to their global climate change commitments' (ongoing). The ultimate project objective is to raise awareness about UNFCCC processes, facilitate a dialog inside the country on Belarus' participation in UNFCCC and the Kyoto Protocol, assist with preparing GHG inventories and inventory report, as well as raise technical and institutional capacity in the field of national GHG inventories and using Kyoto flexibility mechanisms aimed at combating global climate change.

In addition, there are some ongoing international projects aimed to address issues related to the reduction of GHG emissions:

- Social Infrastructure Retrofitting in Belarus Project funded through a WB loan. The key objective is to reduce the consumption of fuel and energy resources at social infrastructure sites. The project encompasses around 550 sites belonging to the Ministries of Health, Education and Social Protection (schools, preschool institutions, policlinics, hospitals, homes for elderly). Of these 110 will have boiler rooms renovated and switched to other fuels (mainly those available locally). Also, one of the major outcomes of the project will be reduced GHG emissions as a result of some power saving measures. It is planned that by the time the project is completed (in 2008) a total of 105-120 thousand tons of CO_2 equivalent will have been deducted from the emissions.

- Social Infrastructure Retrofitting in Belarus Investment Project. The Government of Japan provided a grant to fund switching part of a boiler plant in the settlement of Lesnoy (new boiler's heat output is around 6 MW), that supplies heat to the Borovliany Hospital, from natural gas to wood waste fuel. The replacement of 5.7 million m^3/year of natural gas with wood waste fuel will allow reducing a total of approximately 11.3 thousand tons CO_2 per year.
- UNDP/GEF Project 'The Use of Biomass in Heating Systems in Belarus.' The project's objective is to reduce GHG emissions through eliminating the factors that hinder the cost-effective use of wood and wood waste in heating systems. First of all this applies to district heating systems for homes, industrial and public buildings, such as schools, hospitals and rest houses. It is planned to install boilers consuming as little as 38 thousand tons of equivalent fuel per year, as well as take measures aimed at demonstrating and eliminating problems with sustainable bio-fuel supplies. From 2006 (when the project finishes) onward total GHG emission reductions resulted from the whole project are estimated at 76 thousand tons of CO_2 equivalent. Total emission reductions related to the project should reach 895 thousand tons of CO_2 equivalent by 2015.
- UNDP/GEF Project 'Removing Barriers to Increased Energy Efficiency in the Public Sector in Belarus, PDF B stage.' Its objective is to prepare full scale demonstration project aimed at more cost-effective use of energy resources in the public sector. By the time the pilot project is completed, total fuel savings are expected to be 33 thousand tons of equivalent fuel, and estimated GHG emission reductions are estimated at 65 thousand tons CO_2 equivalent.

3. GHG TRENDS AND SCENARIOS

3.1. Past emission trends

In accordance with the Action Plan for the Implementation of the Provisions of the Kyoto Protocol to the UN Framework Convention on Climate Change in Belarus for 2005-2012 adopted by the Council of Ministers of the Republic of Belarus on 30.12.2005, # 1582 'On the Implementation of the Provisions of the Kyoto Protocol to the UN Framework Convention on Climate Change', the 1990-2004 National Inventory Report has been prepared and submitted to the UNFCCC Secretariat.

The inventory data in the NIR 2004 suggest that the key greenhouse gas in Belarus is carbon dioxide (CO_2) which accounted for 73.9% of all GHG emissions in CO_2 equivalent (excluding land use and forestry) in 2004, followed by methane (CH_4) – 17.0%, and nitrous oxide (N_2O) – 9.0%. HFC, PFC and SF_6 accounted for about 0.1%. The largest GHG emitter was the energy sector – 74.1%, followed by agriculture – 16.6%, wastes – 6%, and industrial processes – 3.3%. Emissions in the Solvents category accounted for around 0.1%.

Total GHG emissions in CO2 equivalent was 74.36 million tons in 2004, and it is less by 41.6% than in 1990. Emissions in the energy sector declined by 46% over the same period, while in industrial processes these grew by 7.7%, in agriculture – declined by 39.5%, and in the waste management sector – rose by 73.3%.

In the land use and forestry sector CO_2 removals exceeded emissions during the whole period 1990 – 2004, and there was a total growth of 5.3%.

At present, natural gas accounts for around 78.7% of boiler and furnace fuels, compared to 42.2% in 1990; furnace oil (masut) declined from 47.7% in 1990 to 7.9% in 2004. There has been considerable growth in using other fuels, mainly locally available – wood, peat, combustible industrial wastes and secondary energy resources (around 12%).

The fact that as of now natural gas is dominating fuel in Belarus, furnace oil consumption is quite low, there are no coal-fired power stations any more and there is low use of coal by boiler plants in the country has allowed cutting down more than 3 times polluting emissions from stationary sources over 1990 to 2004, which include both power generating and power consuming sites. Whereas a drop in polluting emissions from 1990 to 1995 largely resulted from a declining economy, the key reason behind emission reductions in 1995 to 2000 was a changed fuel structure and purposeful power conservation policy pursued by the Government. The further period 2000-2004 saw emissions from stationary sources level out, while there was a slight growth in FER consumption (by 3.9%) and a GDP growth of 130.5%.

In consequence of abovementioned changes in fuel consumption, replacement of coal, masut and some other fuels with more environment friendly natural gas and wood fuel, GHG emissions (in CO_2 equivalent) have declined from 113.9 million tons

in 1990 to 58.9 million tons in 2002, or by 55 million tons. Changing GHG emissions from 1990 until 2004, according to the most recent inventory, are presented in Annex (Table A) and shown in Figure 2. As can be seen, the way GHG emissions in CO_2 equivalent (global warming effect) have been changing has virtually the same curve as that of gross FER consumption.

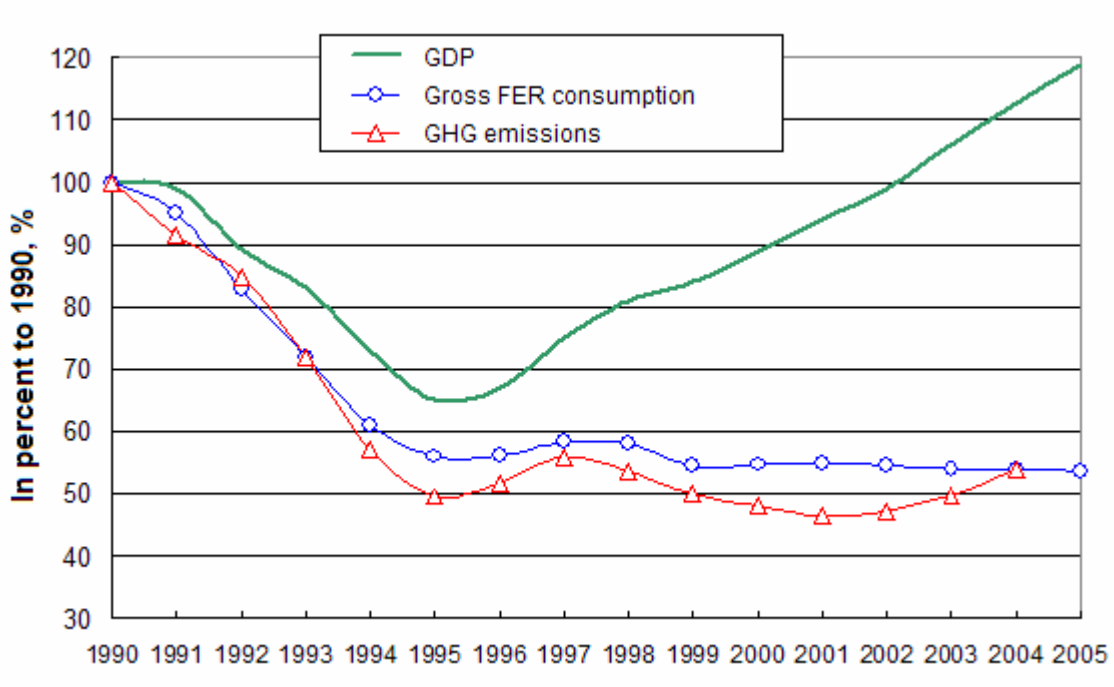

Figure 2. Changing GDP, gross FER consumption and greenhouse gas emissions

3.2. Projected GHG emissions for different economic development scenarios and domestic measures

Four scenarios were used to make projections of GHG emissions. The scenarios were based on the 'Energy Policy Guidelines in the Republic of Belarus for 2001-2005 and until 2015', endorsed by the 27.10.2000 Council of Ministers of Belarus' Resolution # 567, and on the State Integrated Programme for Modernizing Main Production Assets in the Power Generation Sector, Energy Conservation and Increasing the Use of Belarus Own Fuel and Energy Resources, endorsed by the 25.08.2005 Decree of the President of Belarus # 399.

The basis scenario is that without domestic measures taken and no Kyoto mechanisms made use of, for the main purpose of having something to compare alternative scenarios against. It is based on the Energy Policy Guidelines in the Republic of Belarus for 2001-2005 and until 2015, endorsed by the 27.10.2000 Council of Ministers of Belarus' Resolution # 567. The Programme planned for measures to improve energy efficiency and reduce GDP energy intensity, however it took into account no commitments of Belarus under the Kyoto Protocol, as the country was not Party thereof yet at the time. To diversify fuel resources it was

planned to use coal for heat and electric power production. The scenario makes no allowance either for using up to 25% of locally available fuels, mainly plant biomass and wood waste, which is a more recent initiative.

GDP contribution growth rates and other macroeconomic indicators were selected in line with the National Strategy of Sustainable Development in Belarus until 2020. GDP growth rates were calculated for each sector of economy separately. It was assumed that the service sector's contribution to GDP would have a higher growth rate, than that of industries or other sectors. What GDP growth rate different sectors of the economy are expected to have is presented in Figure 3.

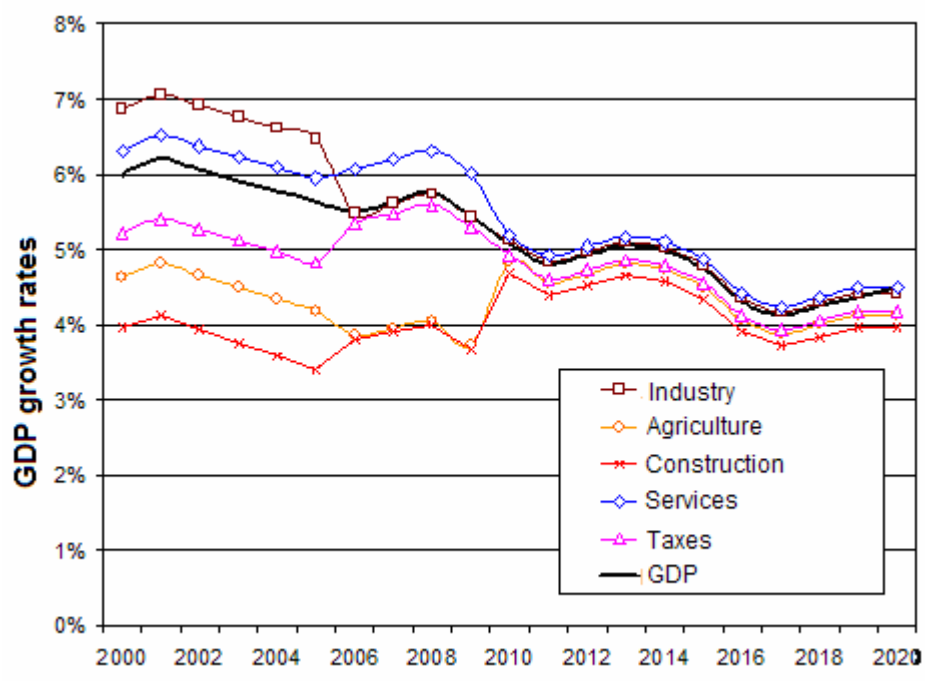

Figure 3. Projected GDP growth in various sectors of the economy

Intensive development basis scenario is different from the basis one in that it proposes higher GDP growth rates in all sectors of the economy, on an average 5-6% a year, however within the same structure of primary energetic resources.

Domestic measures plus intensive development basis scenario differs from the above ones in that it takes into account contributions made through the emission reduction measures set out in the State Integrated Programme for Modernizing Main Production Assets in the Power Generation Sector, Energy Conservation and Increasing the Use of Belarus Own Fuel and Energy Resources, endorsed by the 25.08.2005 Decree of the President of Belarus # 399.

Additional measures plus intensive development basis scenario differs from the other ones in that it incorporates some additional measures aimed at reducing GHG emissions under Kyoto Protocol flexibility mechanisms, as laid down in the Belarus Action Plan for the Implementation of the Provisions of the Kyoto Protocol to the UN Framework Convention on Climate Change for 2005-2012, endorsed by

30.12.2005 Resolution of the Council of Ministers of the Republic of Belarus, #1582 'On the Implementation of the Provisions of the Kyoto Protocol to the UN Framework Convention on Climate Change.'

The projected values of gross GHG emissions for each scenario were calculated using the widely recognized BALANCE software. The findings are presented in Figure 4.

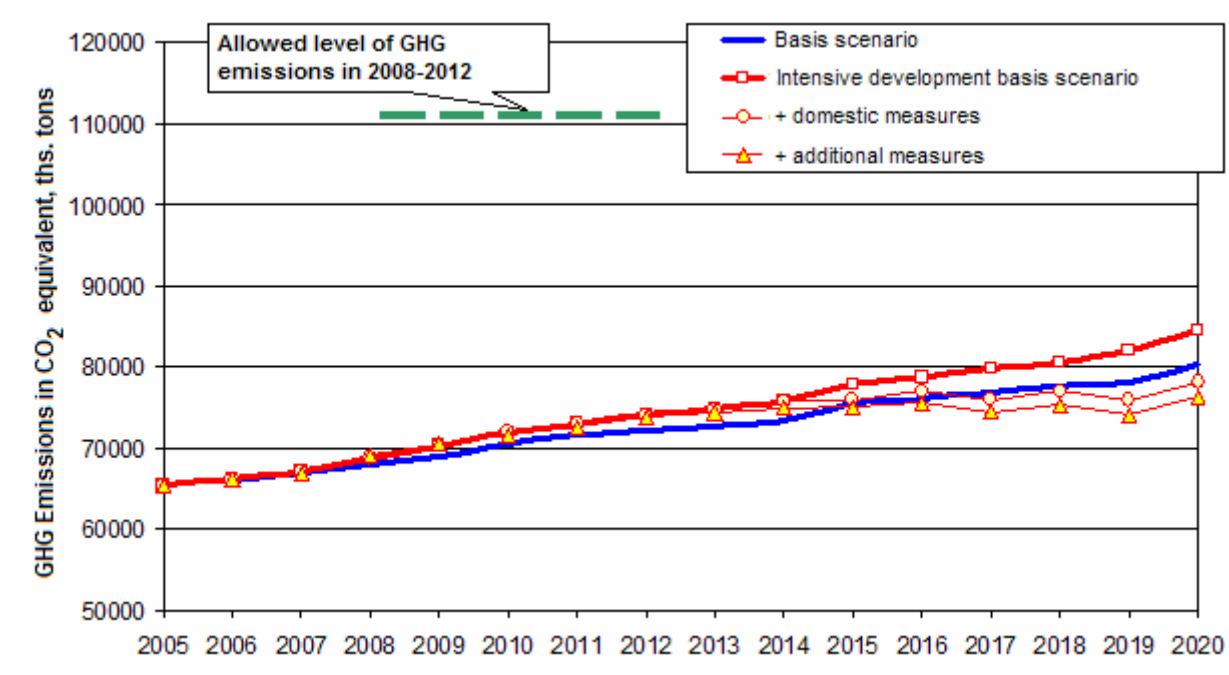

Figure 4. Projected annual GHG emissions for each of the four economic development scenarios

Analyzing the projections for each of the four scenarios allows arriving at the following conclusions:

- Total GHG emissions in 2020 will not exceed the ones in the basis year 1990 under the intensive development basis scenario, without taking into consideration domestic measures or additional emission reduction effort, provided for in some Belarus Government resolutions;
- Domestic measures, both main and additional, that are planned to be taken to reduce GHG emissions in the energy, municipal services and industry sectors, will allow reducing such emissions by around 25% per year by 2020, as compared to the intensive development basis scenario.

4. EVALUATION OF DOMESTIC MEASURES

4.1. Expected emission reductions in the energy sector

Making the most of the use of renewable sources of and more efficient use of available energy are where key opportunities for reducing GHG emissions lie. The State Integrated Programme for Modernizing Main Production Assets in the Power Generation Sector, Energy Conservation and Increasing the Use of Belarus Own Fuel and Energy Resources, endorsed by the 25 August 2005 Decree by the President of Belarus # 3996 is the fundamental document that stipulates how the fuel and energy system should develop in Belarus. Therefore, this Programme served a benchmark for assessing existing opportunities for reducing GHG emissions.

Renewable and alternative sources of energy in Belarus, in view of its climate, geographical and meteorological properties, include hydro-, wind and solar power, biogas, municipal waste, phytomass and wood, and plant residues in agriculture.

Although all these sources put together are able to replace but a small fraction of fuel consumed in the country today, using them in the nearest future is important for a number of reasons. Firstly, relevant projects would help the country to develop its own relevant technology and equipment, which may become export items in the long run; secondly, these sources are normally environmentally clean; and, thirdly, using them would help educate the population to use energy in a more rational way.

Hydroelectric schemes. Water courses in Belarus have potential capacity of 850 MW, of which technically available is 520 MW, and economically feasible – 250 MW. Developing hydroelectric schemes of small scale would involve building new, and reconstructing or restoring existing hydro power stations.

Erecting hydropower cascades on the Sozh, Dnieper and Pripyat rivers should be given special thought as radioactively contaminated areas are relatively close to the proposed sites. Hydropower units to be used would lie within 50 to 5,000 kW.

Turbine expanders. As there is a high level of gasification in Belarus and large amounts of natural gas are consumed, there is a source of energy virtually unused today, that is through reducing the pressure of natural gas in pipelines from high to low. It is estimated at around 60 MW. To use this source of energy turbine expanders need to put in place at some gas distributing stations in the country, as well as at those owned by large gas consumers.

Wind power plants. One thousand eight hundred and forty sites suitable for wind power plants have been identified across the country, with a theoretical power output of over 1,600 MW. Operational wind power plants had an output of 1.1 MW on January 1, 2005, in lieu of 0.4 thousand tons of equivalent fuel.

The recently available technical solutions to transform wind power to electrical one, by means of traditional blade wind turbines, are not cost-effective

with current prices for electricity in Belarus. However, there is technology today that allows building wind power plants with the lowest starting wind speed of 3 m/sec and nominal operational speed of 7-8 m/sec. They cost US$ 800-1,200 per 1 kW of installed output, thus making investing in them much more attractive. In addition, as imported natural gas tends to grow in price, it will cause electricity to get more expensive too, and this may eventually make currently available wind power installations cost-effective after all.

Projected annual power output from wind power plants by 2010 is estimated at 7.34 million kW-h (2.05 ths t equivalent fuel) with full installed capacity of 4.1 million MW, while by 2012 – 9.31 million kW-h(2.61 ths t equivalent fuel) with full installed capacity of 5.2 million MW. These values need to be adjusted on a yearly basis to allow for changing energy prices.

Biogas. Testing biogas installations for producing biogas from animal farming wastes confirmed that their cost-effectiveness must be assessed from many points of view, as using them for biogas production only is not cost-effective compared to other fuels. However, a sum of effects, such as manures and improved environmental situation around farms, makes developing biogas installations feasible.

It is estimated that up to 160 ths t equivalent fuel equivalent biogas can be obtained from all available sources in the country.

Solar power. According to meteorology data an average year in Belarus has 250 cloudy, 185 partly cloudy, and 30 clear days. There is around 243 cal per sq.cm per day of solar light reaching the Earth surface, which is equivalent to 2.8 kW-h per sq.m per day, or, taking into account the efficiency conversion rate of 12%, it is 0.3 kW-h per sq. m per day. However, lessons from other countries suggest that investment into solar power plants and costs of electricity produced thereby are many times in excess of the cost of energy produced by other methods. As technology progresses, the costs are likely to go down quite naturally, however within the period that the above scenarios are valid for solar power generation will have but a minuscule share.

The main uses for solar power will likely include water heaters, dryers or other solar units to be used in agriculture or for other purposes.

Economic conditions permitting, it can reasonably be assumed that solar energy will allow replacing around 5 ths t s.f. equivalent of fossil fuel per year in the period in question.

Municipal wastes. The potential energy contained in municipal wastes is estimated at 470 thousand tons of equivalent fuel. In processing them for gas extraction efficiency will not exceed 20-25%, which is equivalent to 100-120 thousand tons of equivalent fuel. In addition, one must bear in mind landfills in all large towns in Belarus that have accumulated wastes for many years, and are almost full by now. For Oblast towns only annual output of biogas from processed municipal waste might be around 50 thousand tons of equivalent fuel in total, and that for Minsk – up to 30 thousand tons. It is not only biogas output that should be used in

estimating efficiency here, but also the environmental dimension which would be key in tackling this issue. The existing landfills were designed and built without consideration for biogas, and, as required data are largely lacking, it is hardly that this source of energy could be harnessed within next 10 to 15 years.

Phytomass. One type of renewable sources of energy – phytomass of fast growing plants – can be used as fuel in power production. The climatic conditions in Belarus allow harvesting plants with up to 10 t of dry matter per 1 ha, which is equivalent to around 4 tons of equivalent fuel. Using special techniques, productivity per hectare can be raised 2 or 3-fold. It is worked out peat lands unfit for use in agriculture that are the best choice for producing phytomass fuel. There are around 180 thousand ha of such lands in the country. As experience in large-scale use of phytomass fuel is largely lacking in the country, to estimate costs, including transport ones, is difficult in view of the fact that special machinery, road infrastructure, processing plants and other measures would be needed. Some experts estimate that up to 50-70 thousand tons of equivalent fuel could be obtained from this source by 2010. Together with wood waste, this source of energy might help replace fossil fuels worth of 1.4 million tons equivalent fuel by 2010.

Plant residues in agriculture. Using arable farming wastes as fuel is a quite new area in power generation policy in Belarusd. Countries that have gained some experience using them for this purpose include Belgium and the Scandinavian states. Plant residues in Belarus have total potential fuel capacity estimated at 1.46 million tons equivalent fuel per year. Decisions as to what amounts of these could be used as fuel should be decided on a farm to farm basis. The likely amount of plant residues to be put to use as fuel by the end of the period covered by the scenarios is estimated at 20-30 thousand tons equivalent fuel.

Secondary heat energy resources. These have total output of 17.9 million Gcal/year, technically feasible – 10 million Gcal/year, actual use in 2003 – 2.9 million Gcal/year, or 17.2%; and forecast by 2010 – up to 4.5 million Gcal/year. The Belneftekhim Concern (11.1 million Gcal), Belenergo Concern (2.72 million Gcal), Ministry for Architecture and Construction (1.77 million Gcal) and Ministry of Industry (0.97 million Gcal) share the largest output of secondary energy resources (around 96.5%).

Other secondary heat energy resources of significance include off-gases – 4 million Gcal, or 22.3% (when efficiency is not high enough – 1.33 million Gcal, or 33%), as well as product gases and substances, chemical reactions, pyrolysis and exhaust steam, where efficiency is normally as high as 84-100%. The use of heat of condensate, blowdown water and secondary steam is the most efficient of all (56-76% efficiency) although they account for only around 3% in the total output of secondary energy resources.

Estimates of expected GHG emission reductions were made for various types of fuels used in power generation, as presented in Table 1. The estimates themselves are given in Table 2.

Table 1. Expected fuel consumption in 2010 (million tons of equivalent fuel)

Masut	0.9
Liquefied gas	0.33
Coal	0.15
Peat	1.18
Natural gas	20.5
TOTAL	23.06

Table 2. Expected GHG emission reductions

Emission reduction area	Saved fuel, TJ/yr	Expected emission reductions, t/year						
		CO_2	CH_4	N_2O	NO_x	CO	SO_2	NMHC
Hydropower	7,188.6	393,821.3	23.5	2.4	3,528.8	469.6	1,085.8	117.4
Turbine expanders	1,725.3	94,517.1	5.6	0.6	846.9	112.7	260.6	28.2
Wind power	76.4	4,185.5	0.2	0.0	37.5	5.0	11.5	1.2
Biogas	4,689.2	256,895.8	15.3	1.6	2,301.9	306.3	708.3	76.6
Solar power	146.5	8,028.0	0.5	0.0	71.9	9.6	22.1	2.4
Municipal wastes	2,930.8	160,559.9	9.6	1.0	1,438.7	191.4	442.7	47.9
Phytomass and wood waste	41,030.6	2,247,838.5	134.0	13.7	20,141.7	2,680.2	6,197.5	670.1
Plant residues in agriculture	732.7	40,140.0	2.4	0.2	359.7	47.9	110.7	12.0
Secondary heat resources	35,587.8	1,949,655.9	116.2	11.9	17,469.8	2,324.7	5,375.4	581.2
TOTAL	94,107.9	5,155,642.0	307.4	31.5	46,196.9	6,147.3	14,214.6	1,536.8

4.2. Expected GHG emission reductions under flexibility mechanisms

Measures to ensure GHG emission reductions, which are planned to be taken under flexibility mechanisms offered by the Kyoto Protocol, are additional to domestic measures taken by Belarus in line with its own climate protection policy. It is expected that after National JI Secretariat has been set up in the country, it will initiate the preparation of JI project proposals in the following three key sectors of the economy:

Energy and Transport

- Wider use of renewable sources of energy, especially projects on utilizing plant biomass and biogas;
- Increase the efficacy of power generation, especially projects offering a combined power generation cycle or cogeneration schemes;

- Power saving, including more efficient lighting, heating, cooling and air conditioning systems;
- Bring to a minimum leaks and spills of fossil fuels, including technology for compression, liquefaction and leak utilization;
- Increase the efficiency of motor vehicles, including wider use of hybrid engines as well as bio-diesel, bio-ethanol, and fuel cells.

Industry

- Reduce energy and material intensity of products;
- Use of secondary raw materials and more efficient waste handling;
- Catalytic decomposition of nitrous oxide present in nitrogen industry emissions;
- Landfill methane recovery.

Agriculture and forestry

- Improvement of technology, including return of crop residues, shallow cultivation, and shorter fallow cycles;
- Increased efficiency in using fuel wood and wood wastes;
- Improving livestock breeding methods, using balanced fodder and mineral and vitamin additives.
- Newest techniques to improve the quality of soils with increased uptake of nitrogen by plants, and special schedule and volumes of nitrogen fertilizer application, as well as methods to increase the efficiency of fertilizer application;
- Reducing human pressures on forests as arable farming and livestock breeding expand;
- Restoration of natural carbon sinks.

Around 100 industrial and power generation companies with potential GHG emission reductions likely to be at least 20 thousand tons CO_2 per year have been looked at by now. Sites have been identified where projects aimed at emission reductions could be implemented under the JI mechanism. As a review of potential projects suggests, total emission reductions that could be achieved through the JI mechanism as part of additional measures in the country can be preliminary estimated at 1.5 million tons of CO_2 equivalent per year.

5. MEETING OTHER COMMITMENTS

5.1. The creation of the National GHG Inventory System

A national GHG inventory system must include all institutional, legal and procedural arrangements for conducting inventories of emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol, as well as for preparing relevant reports and storing data. The national GHG inventory system must ensure that inventories meet requirements for transparency, consistency, compatibility, completeness and accurateness, as well as high quality of inventory work (i.e. in data collection, selection of methodology and emission factors). The Belarus Research Centre BelNIC Ecology is the head organization responsible for GHG inventories and coordination of all relevant activities. The Centre develops all necessary methodologies concerning data collection, processing and analysis, as well as national inventory reporting. Research institutes of the National Academy of Sciences of Belarus and other relevant ministries and institutions are involved as and when required. Employees of 15 ministries and institutions in total take part in UNFCCC and KP relevant activities to some extent. There is ongoing work in the country on creating a legal framework to ensure that GHG inventories are conducted on a sustainable basis.

5.2. GHG inventories for the whole period

The Ministry of Natural Resources and Environmental Protection of Belarus is fully responsible for the preparation and submission of national communications and GHG inventories to the UNFCCC Secretariat.

The Research Centre BelNIC ECOLOGY has a group of specialists each of whom is responsible for his or her own sections in the inventory. There is a list of ministries and institutions responsible for providing data required for an inventory, complete with a descriptor of information needed from each of them, and their contact persons. As and when required, the BelNIC Ecology has the right to ask relevant organizations for additional information it needs. Most of data for GHG inventory comes from the Ministry of Statistics and Analysis that is charged with synthesizing all available statistical data and publishing them in yearly statistics books. Published data cannot usually be changed or modified without prior permission by the Ministry of Statistics. It is the BelNIC ECOLOGY that analyzes and processes baseline data, as well as updates appropriate data bases and makes all required calculations. As part of quality control, activity data and emission factors are compared with previous years' values, IPCC data and those reported by countries with similar economic or other circumstances.

The National GHG Inventory Report for 1990-2004 has been prepared and submitted to the UNFCCC Secretariat, pursuant to the Belarus Action Plan for the Implementation of the Provisions of the Kyoto Protocol to the UN Framework

Convention on Climate Change for 2005-2012, endorsed by the 30.12.2005 Resolution of the Council of Ministers of the Republic of Belarus, #1582 'On the Implementation of the Provisions of the Kyoto Protocol to the UN Framework Convention on Climate Change.'

5.3. Creating JI Infrastructure

The year 2005 saw the development of recommendations, draft legal acts and other norm-setting documents for JI institutional arrangements, including those on powers and responsibilities of JI authorities, requirements imposed on bodies of executive power and companies under the JI mechanism, as well as procedure for developing, submitting, selecting, endorsing and implementing JI projects.

As was mentioned in section 2.1, JI authorities in Belarus include the State Interdepartmental Commission on Climate Change and the Ministry of Environment's Department for State Control over Impacts on Climate that performs the functions of JI Secretariat for the above Commission. Draft Resolution of the Council of Minister of Belarus has been prepared by now, named 'On Approving the Provision on the Procedure of Submission, Review and Monitoring of Joint Implementation Projects.' The resolution is designed to set out JI project cycle procedure in accordance with the Kyoto Protocol.

The Ministry of Natural Resources and Environmental Protection has been active in building cooperation with potential investors (Great Britain, Japan, etc.) in the area of preparing JI project proposals. The Ministry takes other necessary measures to ensure Belarus' full-scale participation in Kyoto mechanisms.

5.4. National Registry

At present there is ongoing work on collecting and analyzing all available data and experiences from other countries as concerns systems for accounting and transferring (selling) carbon credits. Relevant findings were used in developing recommendations for setting up a national GHG registry in Belarus in terms of both software and hardware. Based on these recommendations as well as proposals received from the three key developers of GHG registry software products in the world, the Ministry of Natural Resources and Environmental Protection of Belarus has started making preparations for organizing and holding a tender to purchase and install a national registry. A tender dossier has been developed to include both soft- and hardware specifications, and commercial requirements that potential bidders will have to meet, as well as selection criteria that will be used to select winner.

6. PUBLIC EDUCATION AND AWARENESS

Pursuant to Article 6 of UNFCCC, the Parties, including Belarus, should "promote and facilitate" the development and implementation of educational and public awareness programmes on climate change and its effects; public access to information on climate change and its effects; public participation in addressing climate change and its effects and developing adequate responses; and training of scientific, technical and managerial personnel.

Environmental education, training and retraining of personnel and public environmental awareness systems are all available in the country. There is ongoing cooperation between the Government and environmental NGOs. It is evidence that there is capacity in the country to meet the above commitments under UNFCCC. The key documents that set out guidelines for environmental education in the country are the Concept of Environmental Education and the National Programme of Action to Improve Environmental Education, approved by the 21 April 1999 Decision of the Ministry of Education # 12/362 and that of the Ministry of Natural Resources and Environmental Protection # 31 of 19 March 1999.

It is required that both governmental and non-governmental organizations, as well as mass media should work to raise public awareness of climate change and its effects on a system basis. The population in Belarus has some access to environmental information and that on measures taken to address environmental problems. People learn about environmental issues from newspapers, magazines, radio and TV. Programmes on radio and TV specifically covering environmental stuff are relatively few.

There are monthly environmental columns in such newspapers as 'Narodnaya Gazeta', 'Byelorusskaya Niva', 'Kultura', 'Vecherni Minsk', 'Minski Kurier' and in many local papers. The 'Zvezda' newspaper has regularly published articles on environmental issues for many years.

Amongst radio programmes the 'Ecological Monitoring' is notable, with 60 minute running time, and from time to time presenting information related to UNFCCC.

TV-viewers learn about UNFCCC issues mainly through pieces on energy conservation, transition to domestic fuels (bio-fuel, peat), etc. The Russian channels occasionally broadcast reports on UNFCCC and Kyoto Protocol as Russia makes moves toward acceding to the latter. Climate change (and the greenhouse effect) is discussed on TV far more frequently in summer, especially when the weather is hot, as well as when extreme climatic events (drought, gale, etc.) are reported.

A series of short TV videos (over 25 in number, 5 minutes long each), commissioned by the Ministry of Environment and dedicated to natural heritage in Belarus and broadcast on all Belarus TV channels, are thought to contribute nicely to public environmental awareness. However, it is not uncommon, that following a feature on the exceptional role wetlands play for the environment, a viewer is

offered a piece about the Government's recent plans to considerably increase the use of peat in the country.

A website has been set up and regularly updated within the EU Tacis Technical Assistance to Ukraine and Belarus in Respect to their Global Climate Change Commitments Project, at the address: www.climate-by.com. The site offers detailed news on global climate change events and action taken worldwide to tackle it. There is a large section with information on the latest methodologies in JI and GHG inventory. The site has a forum section too.

A brochure 'Global Climate Change Problems and How These Are Addressed in the Republic of Belarus', published within the said EU technical assistance project, is designed to raise public awareness on how UNFCCC and the Kyoto Protocol try to tackle global climate change challenges.

The same Project has had a number of conferences and workshops on GHG inventory and ways for Belarus to participate in the Kyoto mechanisms. The workshops and conferences were held in 2004, 2005 and 2006.

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ANNEX

Table A: Total GHG emissions in various sectors of the economy, Gg CO_2 equivalent

Source Categories	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Energy	102,104	95,240	88,429	76,076	63,919	56,962	57,835	59,338	57,132	54,424	52,470	51,594	51,647	51,638	55,078
Industrial processes	2,249	2,142	2,086	1,889	1,416	1,206	1,256	2,133	1,832	1,783	1,673	1,646	1,899	2,179	2,421
Solvents	74	72	70	66	64	62	60	58	69	87	76	83	81	79	81
Agriculture	20,365	19,478	17,549	16,342	13,785	12,569	13,067	13,564	13,490	12,583	12,613	11,838	11,424	11,850	12,321
Wastes	2,575	2,573	2,571	2,568	2,092	2,138	2,590	2,623	2,732	2,922	2,956	3,001	3,092	4,068	4,462
Total (less LULUCF)	**127,367**	**119,505**	**110,705**	**96,942**	**81,276**	**72,937**	**74,807**	**77,716**	**75,256**	**71,799**	**69,788**	**68,162**	**68,143**	**69,815**	**74,363**
LULUCF	-11,307	-13,316	-12,257	-13,591	-15,129	-15,429	-14,769	-12,820	-13,124	-13,801	-14,126	-14,406	-13,298	-11,985	-11,900
Sinks	-25,132	-26,890	-25,759	-26,720	-27,654	-28,138	-27,931	-26,521	-27,144	-27,953	-28,227	-28,224	-26,894	-25,295	-24,911
Emissions	13,825	13,574	13,502	13,129	12,525	12,709	13,162	13,701	14,020	14,152	14,100	13,818	13,596	13,310	13,011
Total, including LULUCF	**116,060**	**106,189**	**98,449**	**83,351**	**66,147**	**57,508**	**60,038**	**64,896**	**62,132**	**57,998**	**55,661**	**53,756**	**54,845**	**57,830**	**62,463**