

# I. GENERAL INFORMATION ON THE PROJECT

## OBJECTIVES AND PROJECT IMPLEMENTATION

According to the Terms of Reference, **the aim of this project** is to improve the capacity of Russia to monitor and report emissions of all six greenhouse gases. This work fulfilled the following objectives:

- *Increase Russian monitoring and reporting practices.* Rigorous measurement of greenhouse gases will be necessary for Russia to implement the United Nations Climate Change Convention, and the Kyoto Protocol. The results of this project could be replicated in other regions of Russia, and other countries in the New Independent States.
- *Foster credible and meaningful emissions reductions.* Efficient and cost-effective monitoring systems will attract climate-related investment in economies in transition by addressing investor concerns about compliance. A successful monitoring system could also serve as a preliminary step for introducing emission quotas on a regional basis.

**Specific Goal** - goal of the Pilot Project:

- Develop and test of cost-effective system of GHG monitoring and reporting in a Region with focus on repetition of experience in other Russian regions and the country as a whole.
- Create methodological background for GHG emission accounting. Assist to inventories and development of GHG monitoring systems in New Independent States.

Then (in year 2000) it is planned to undertake similar works in 2-3 regions.

**Other features:**

- 1) Maximum use of current Russian environment control and statistics systems *plus* implementation of the US experience in developing of monitoring/reporting systems; and
- 2) Identification of critical GHG sources for detail (high-cost) monitoring *and* developing of low-cost but reliable methods for other sources.

### **Context of Russia**

Context of Russia and current situation in the country is not very simple and a few main points should be highlighted.

1. Current and predicted economic situation in Russia causes rather limited possibilities for *developing and future operation* of the GHG monitoring and reporting. Therefore cost-effective options of the system should be developed and special guidelines should be prepared. It may include low-cost methods for main volume of GHG sources and detail (high-cost) methods for identified critical objects.
2. Russian Federation has two-level systems of administration, statistics, environment protection, taxation, etc. Top level is Federation as a whole. Low level consists of Subjects of Federation - Regions (Oblast, Capital City, Krai, Republic). Primary data are usually collected on low level and then transferred to Federal Level for aggregation. Monitoring system can be firstly implemented in one pilot Region. Such approach will allow to elaborate optimum system by modest funds instead of large expenses for simultaneous start of preparations in many regions. It is reasonable also to mention that regional level of

activity is associated with lower risk caused by influence of changes in Russian Government.

**3. Choice of a pilot region** requires very careful approach based on several **criteria**.

- Region should be characterized by relatively stable political situation, relatively small level of economic decline, good awareness of local administration (first of all, Environment Protection authorities) in climate problems and its wishes to play active role in solution of climate problems and relevant activities.
- Region should have main GHG sources typical for Russia (probably except coal mining because it is in contradiction with the first criterion).
- Region should not be too large (as Moscow, Leningrad or Tjumen') that allows to carry out the pilot project by modest funds. Geographical location is also important.
- Good local basis. Regional State Committee on Environment Protection (and desirable some other regional organizations) should have staff experienced in environment and monitoring projects as well as wishes to implement GHG monitoring and reporting system in the Region.
- Good technical possibilities for organization of Workshop for specialists of the different Russian regions in capital of the Region. Cost should be rather modest, essentially less than in Moscow or St. Petersburg.

**Low cost approach to creation of the system**

As it was highlighted above, efficient and *cost-effective* monitoring system will attract climate-related investments in economies in transition by addressing investor concerns about compliance. Moreover just not costly system is considered as the only feasible choice in Russia. Therefore it is necessary to explain our meaning of *low-cost approach*.

We should keep in mind future operational cost of GHG monitoring and reporting system in region. The cost should be measured in terms of the budget of Regional State Committee for Environment Protection. Percent will be specified later, however, according to preliminary considerations it may be from 20 to 40%.

“Low-cost activity” in our conditions do not mean investigation or non-investigation of emission factors, but only operation with activity data. Certainly that any useful information on emission factors should be collected and used to extent possible, however no special researches are planned.

It is evident that IPCC Worksheets will be filled out completely in any case. This procedure is not expensive if we have good guidelines and initial training of personal.

First step of low-cost work should be *Pre - study* (a few days of work of experts), approximate estimation by default methods for *identification of priorities* (e.g., heating and residential electricity proportional to population, industry proportional to per cent of industrial production, etc.). Identified priorities will be so-called metric of consequent work.

The main part of work will be *Analysis of activity data availability and/or estimation of feasibility of their determination*. It is necessary to subdivide required activity data by three categories:

- 1) data, which should be *collected*, (data are available somewhere);

- 2) data, which should be *pecially determined* (including measured), (highest priority of data and feasible determination, “feasible” means technical as well as financial feasibility);
- 3) data, which should be *estimated* (data are not available anywhere, middle or low priority of data or non-feasible determination).

The principal question of data collection is *Where data can be available?* Main suggestions are: Regional State Committee for Environment Protection, Regional Statistics Committee, Local Administration, etc. Then (if it is Not) level of enterprises of the region should be considered. It is probable that in this case enterprises should be subdivided into largest (where relevant activity data are available) and all other (where it is practically impossible to collect data).

If data (or data with required accuracy) are not available, it is possible: 1) to undertake special determination of activity data; 2) to conduct approximate estimation. Choice depends on 1) data priority; 2) technical possibility to get data; 3) cost of such determination (it can be special calculation of production or even direct measurements of GHG fluxes).

## **Outputs**

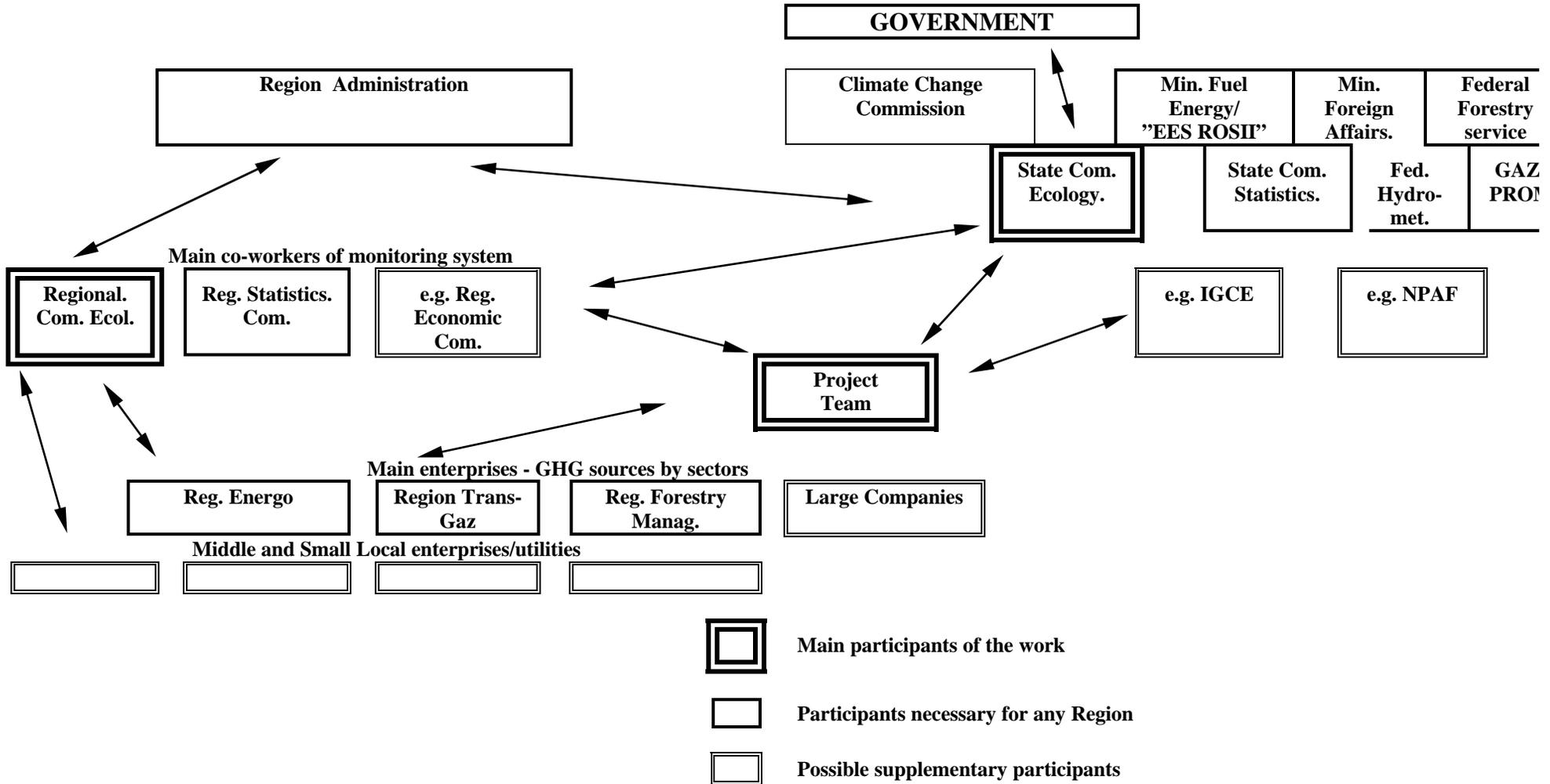
1. GHG inventory system in a Region (Oblast) focused on subsequent repetition and development of inventory in other regions (see, Section 2 of the Final Report).
2. “Guidelines for GHG inventory on regional level in Russia” focused on subsequent wide implementation in different Russian regions and Russia as a whole and use in other New Independent States (see, Section 4 and Annex 1 of the Final Report).
3. Some elements of inventory – “Case Studies”, applicable to all country or deeply considering the pilot region (see, Section 3 of the Final Report)

These are main “products” of the project, they were considered and discussed in detail on the special Workshop on Project (see, Section 5 of the Final Report, where there are also conclusions on materials presented and recommendations for future).

## **Institutional chart of works**

Critical element of low cost system is *use of existing structure of environment protection*. Such system is the only Russian system which works on level of enterprises and simultaneously has control functions to provide compliance. This fact determines institutional scheme of new system. Institutional chart is presented on the next page. This is generic chart applicable to any Russian region.

# Institutional Chart of Works



## Timetable

Stages	June -Aug. 99			Sept.- Oct. 99		Nov. 99 – Jan 00			
	Months	Jn	Jl	A	S	O	N	D	J
Workplan; recommendations of a pilot region (selection of a region); outline of Guidelines; outline of Inventory	V								
Summary of current state of GHG inventories in Russia, role of project in forwarding the goals of the UNFCCC.	V								
<b>Inception Report</b>	V								
Novgorod Oblast , first elements of Inventory		V	V						
Guidelines for some first elements of Inventory		V	V						
<b>First Progress Report</b>		V	V						
Novgorod Oblast, almost full Inventory					V				
Guidelines, several Modules (including forestry and coal bed methane)					V				
<b>Second Progress Report</b>					V				
Novgorod Oblast, full Inventory (in forestry – preliminary)						V	V		
Guidelines, all Modules						V	V		
Case Studies Inventory Software					V	V	V	V	
<b>Third Progress Report</b>							V		
<b>Workshop</b>								V	
Correction of Guidelines and software.							V	V	
<b>Final Report, including Report of the Workshop</b>								V	V

At the first stage: The Workplan had been prepared, selection of a region has been done and the Project Team was created. More detail general information on the region as well as all already available information on GHG emission in the region was collected. This stage took only a month because there was a lot of preliminary work before. The results of the first stage were presented in the Inception Report.

Subsequent several months were devoted to step by step process of inventory and preparation of the methodological Guidelines. Progress Reports (First, Second and Third) have been prepared each 1.5 – 2 months. In the first period a great attention has been paid to creation and testing of institutional system in the region. The second period included on in-site consideration of largest regional enterprises. The Case Studies were carried out during the third period (see, Section 3).

Project has been implemented by the central Team (Moscow), which work almost permanently during the project: project leader (Alexey KOKORIN); expert in UN FCCC issues, international requirements to inventory and reporting system, Russian institutional issues relevant to climate change and flexibility mechanisms (Vladimir BERDIN); expert - economist with focus on environmental issues (Alexander GOLUB); expert responsible for activities and Guidelines in Energy, including all types of fuel use and fugitive leakage (George SAFONOV); expert responsible for activities and Guidelines in Industry and Waste (Alexander NAKHUTIN); expert responsible for activities and Guidelines in Agriculture and Land Use and Forestry (Mike GYTARSKY);

and Regional Team: expert - regional team leader with focus in local institutional and statistics system, problems of data collection, general environmental issues, including organization and future operation of the system (Vladimir SAVIN); expert responsible for Energy sector and Industry (Vladimir SEROV); expert responsible for Waste and Agriculture (Nataliya FEDOROVA); expert in forestry and local economy (Yuri FEDOROV); expert in agriculture, regional data collection system, GHG inventory calculations and computer databases (person who also will feed GHG computer database in 1999 and in future) - Janna LODGUN

About 10 people from Moscow, Novgorod and Kemerovo were attracted as short time consultants. They were specialists in energy, chemical industry, coal mining, waste deposition, GHG methodology, IPCC software, and relevant computer problems.

Case Studies were carried out mainly by central team with exception of coal bed methane, where special expert (Oleg TAILAKOV) was invited.

Additionally a few people of technical staff worked part-time, especially in preparation to the Workshop, totally 6 people from Moscow and Novgorod.

## **MATERIALS ON CURRENT STATE OF INVENTORY IN RUSSIA AND ROLE OF THE PROJECT IN FORWARDING THE GOALS OF THE UNFCCC**

### **General principles of the UN Framework Convention on Climate Change and the link between emissions inventory and other aspects of activity under the UNFCCC**

One of the obligations of the Russian Federation as a Party of Annex 1 of the UNFCCC is a periodic informing of other countries about greenhouse gas (GHG) emissions in the country. All countries of Annex 1 are to provide once in three years the special reports - National Communications to the UNFCCC. One of the key chapters of the National Communications should be "Inventory of GHG Emissions". Other important chapters are "Policy and Measures for Emission Mitigation" and "Measures for Adaptation to Climate Change". The first National Communication of Russia was presented in 1995, the Second in 1998 and the Third, according to the decision of the Fourth Conference of the Parties in Buenos-Aires (November 1998), should be submitted to UNFCCC Secretariat before the 30<sup>th</sup> November, 2001 (Decision 11/CP.4). Together with the National Communications, Annex 1 countries must annually submit "The GHG Emission Inventory". This obligation was once again confirmed in Buenos-Aires (Decision 11/CP.4): each year on the 15<sup>th</sup> of April the Inventory for "the year prior to a previous year" should be submitted (i.e. till the 15<sup>th</sup> of April, 2000 the report for 1998 should be submitted). The detailed description this issue is included in a special Document prepared by the Secretariat (FCCC/SBSTA/1999/INF/1/Add/1 of the 10<sup>th</sup> February 1999). In particular, it was mentioned there that those countries that have not submitted Inventories for some of the years since 1990 must do it in the current year.

The UNFCCC has got a principally new economic sense after adoption of Kyoto Protocol by the Parties of the Convention in December 1997. Currently 84 Parties signed Protocol, including Russia. The Protocol will be in force after its ratification which is expected to happen in Annex 1 countries in 2000-2001. The economic and investment basis for joint activities under the obligations and, particularly, the possibilities of joint implementation (JI) projects and international emission trading (IET) make it necessary to operate with more precise data on emissions calculated according to some standard procedures. Article 5 of Kyoto Protocol states as obligatory creation of "... a national system for the estimation of anthropogenic emissions by sources and removals by sinks..." not later than a year before the first period of obligations under the Protocol, i.e. before 2007. This obligation is frequently referred to as "creation of the GHG emissions monitoring system", that is true if we understand a word "monitoring" not only as a measurement but also as a calculation-based assessment of emissions. Article 7 of the Protocol also underlines the necessity for annual inventory according to \*the internationally approved guidelines. Obviously, no one country could participate in the international cooperation, particularly in JI and IET, if it would not follow these Articles of the Protocol.

"The IPCC 1996 Revised Guidelines for National GHG Inventories" were adopted as a guidelines for the first budget period of obligations (up to 2012). Such a "fixing" of rules of emissions calculation actually is an establishment of most clear and unchangeable "rules of the game". Of course this may lead to some difference between actual anthropogenic GHG emissions and emissions considered in Kyoto Protocol. However countries that are the Parties of UNFCCC came to a conclusion that such a difference is an unavoidable "payment" for the possibility to get legally obligatory decisions about emissions reduction.

## **The state-of-the-art with greenhouse gas emission inventory**

The general assessments of GHG emissions in Russia were made in 1995 and 1998. They were presented to FCCC Secretariat as the apart chapters of First and Second National Communications. The First National Communication comprised the data for 1990, whereas the data for 1994 were included in the Second National Communication. The assessments were performed by a small group of specialists from the Institute of Global Climate and Ecology of the Russian Federal Service for Hydrometeorology and Environment Monitoring and Russian Academy of Sciences in cooperation with representatives from various ministries, agencies, and institutions. The background for the activities formed in 1994-1995, when the appropriate GHG inventory tasks were carried out within the frames of Russian-US Country Studies Program. The work was proceeded within the frames of the Federal Target Program "Prevention of Dangerous Climate Change and Its Negative Consequences". The Program was approved in 1996 and a subprogram dealing with GHG inventory activities. Unfortunately, the Program had strongly limited funds, which enabled implementing customary and approximate assessments only. The standard table forms were not filled in (except of two summary and overview Tables 7A and 8A of the IPCC Guidelines included as Annexes in the Second National Communication). No regional assessments or evaluations on the enterprise-base level were performed in neither First nor Second National Communications.

Brief overview of the data quality and assessments together with information on the present GHG inventory activities in Russia are given below.

The Energy sector and, first of all, fuel combustion are the dominant GHG source in Russia. In the Second National Communication the emissions in Energy sector are estimated according to detailed fuel country balance developed in 1994 by the State Committee of Russia for Statistics. However, they present only aggregated estimates included in one column of the summary table. The detailed assessments and filling in standard table forms are planned in the future as a cooperative work with the specialists of the Institute of the Energy Strategy under the Ministry of Fuel Energy of the Russian Federation and the Institute of Global Climate and Ecology. Similar national assessments for 1995-1997 are planned in the near future. All these refer to simply balance level of estimates. The source category-based evaluations have not been performed yet.

The upgrading the data of 1990 may be a serious problem. That is because Russia was not independent at that time. Therefore, the necessary data must be subdivided from the general USSR country statistics. The National Communications present the approximate data taken from the book "Energy Strategy of Russia", which was published in 1993. The book is mainly based on the data on fuel utilization. It seems necessary to perform appropriate treatment and analysis of the detailed statistical data for 1990.

The National Communications also include general assessments of methane emissions (leakage) during extraction and gas, oil, and coal transportation. However, they are implemented with the use of greatly approximate default emission factors and do not consider specific Russian features. Meanwhile, the later is strongly desirable.

In 1999, the specialists of United Energy System of Russia "EES Rossii" initiated the work on inventory emissions caused by fuel combustion on "EES Rossii" power stations. Currently this work is almost completely done. There is information on the emission inventory activities started by "LUKoil", "Tyumen' Oil Company", and "GASPROM".

Non-relevant to fuel combustion industrial GHG emissions, first of all, include CO<sub>2</sub> emissions released during clinker production (that is the intermediate product in the cement processing), N<sub>2</sub>O from production nitric acid and fertilizers and some other chemistry. The estimates of these fluxes were performed based on summary statistical data on appropriate production in 1990 and 1994. The technology applied was not considered, and the calculations for other years than 1990 and 1994 were not performed.

The other large section of GHG industrial emissions includes so-called “new gases”, which are all the greenhouse gases other than the “old” ones (CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O) regulated under Montreal Protocol and Vienna Convention of Ozone Layer Protection. Within the frames of preparation the Second National Communication, the Institute of Global Climate and Ecology performed first expert assessments of the emission of CF<sub>4</sub>, C<sub>2</sub>F<sub>6</sub>, HFC-23, and HFC-134a for 1990 and 1994. The SF<sub>6</sub> emissions were qualitatively considered less significant, and its quantitative assessments were not undertaken. CF<sub>4</sub> and C<sub>2</sub>F<sub>6</sub> were estimated based on the gross data on aluminum production without detalization for type of processes. The HFC-23 release was estimated based on statistical data for total HCFC-22 production. Expert estimate of HFC-134a release was made according to Russian per capita average data for amount of refrigerators, and it has the accuracy of an order of magnitude. Not detailed assessments according to types of refrigerator equipment were made.

It is necessary to highlight that regional specialists are not familiar with problems of “new gases” at all. Therefore special very simple memo - “supplementary reference material” was prepared under the project just in the first month of implementation, this material is presented in the end of the section of the report.

The section “Use of Solvents and Other Production” comprised the assessment of application pure N<sub>2</sub>O for medical purposes (anesthesia), which was obtained from the gross sales of production.

The Agriculture Section provided rather detailed assessment of methane output from livestock. The emission relevant to burning agricultural residues and rice farming were estimated extremely low. The N<sub>2</sub>O emissions from application fertilizers and manure storage were calculated with the use of simplified assumptions for 1990 and 1994 only. A detailed review of possible losses of soil carbon (C<sub>2</sub>O emissions) was carried out. However, it was found possible to make only a qualitative conclusion on the lack of net-emission/sink of C<sub>2</sub>O in the national agriculture.

The Section “Land Use and Forestry” comprised evaluations of C<sub>2</sub>O sources and sinks together with the estimates of CH<sub>4</sub> and N<sub>2</sub>O emissions due to forest fires. The assessments were detalized for the level of various nature and climate regions and in general seem to be the best of possible at present. However, they have two important constraints, which are: the estimates are exclusively performed based on the data on forest inventory of 1993; and they cannot enable subdividing “Kyoto forests” input.

The last Section of inventory deals with the waste treatment and storage. It comprises assessments based on the national statistical data on municipal solid wastes and approximate estimates of methane emissions from sewage cleaning. It was assumed that no GHG emissions occur from the waste in rural areas and small towns that are not involved in communal systems of waste management. Besides, 1995 IPCC Guidance was applied for assessments because of the lack of appropriate data. And it differs from the revised in 1996 IPCC Methodology. Significant sources of uncertainty were found during the assessments (such as actual waste burning instead of landfill deposition and etc.), which need additional detailed consideration.

In the end of June - beginning of July, 1999, special In-Depth Review Team of the UNFCCC Secretariat visited Moscow to review the Second Russian National Communication. Moscow's participants of our project took very active part in work with the Team because they were among authors of the draft version of the Communication, which has been prepared in the IGCE.

International experts noted that in general level of the work was satisfactory. At the same time they expressed some preliminary comments.

- There are gaps in inventories, in particular, it is difficult to estimate emissions by separate economic sectors, including transport; liquid waste; land use change and forestry. Russia did not present annual inventories to the UNFCCC Secretariat. Outstanding work of RAO «EES Rossii», which covers 370 power plants, was highlighted;
- The Second National Communication contains only general information on policies and measures. There was not considered effectiveness of policies and measures. There was not enough financial support for implementation of the Federal target program «Prevention of dangerous climate changes and their negative consequences»;
- The Second National Communication was not available for general public. Representatives of NGO are not members of the Interagency Commission of the Russian Federation on Climate Change Problems, etc.

### **Role of the Project in forwarding the goals of the UNFCCC**

From the previous section one can conclude that existing inventory data in Russia:

- 1) are provided only on the simplest version of IPCC 1996 Revised Guidelines and with a large number of additional simplifying assumptions;
- 2) are carried out only for two years: 1990 and 1994;
- 3) are not "transparent" absolutely and difficult for comparison with the data from other countries because the standard IPCC worksheets were not filled in yet.

All this means that the existing level of inventory does not satisfy the requirements of Kyoto Protocol. This fact is clearly understood at all levels: by members of the Interagency Commission on Climate Change Problems, by state authorities and experts of different Ministries and institutions dealt with the inventory.

In spite of strict limitation of resources some efforts are undertaken to improve the situation. In energy sector, for example, the Ministry of Fuel and Energy (in particular, the Institute of Energy Strategy) is planning to get estimates of emissions in 1995-96 for the whole country. A number of large companies, first of all, "EES Rossii" is planning to do inventory of their own emissions themselves. The Institute for Global Climate and Ecology is planning to reallocate partly the resources under the Federal program "Preventing of dangerous climate changes and their negative consequences" and to direct more resources to the sub-component on emissions inventory to get at least approximate estimates of GHG emissions in the country as a whole in 1996 and provide UNFCCC Secretariat with the summary data.

However all this activity (except activity of some companies) is a so-called "top-down" assessment. To achieve the level of "transparency" and detalization required for international certification of emissions assessment system (which in turn is required for starting a large-scale process of emission trading) it is necessary to overcome a hard way of creating the system of data collection and analysis of rather detailed data in the scale of the whole country.

Certainly, going in a "top-down" manner and creation of a very new system would require a huge amount of resources which cannot be supplied from the Federal budget in sufficient amount.

There arise the following questions about:

- 1) the possibility of creating a system satisfying the international standards for a minimal amount of money
- 2) the well-justified calculation of the really needed expenses for more precise calculation of emissions.

It is possible to answer these questions only if going in a "bottom-up" manner: to do inventory in one of the administrative regions of Russia, get the required experience and then copy this process in the other regions of Russia. The situation here is eased by the fact that there exist regional authorities that control atmospheric emissions and accumulate a big share of information needed for calculation of GHG emissions. They have also a qualified personnel and very well established mechanism of supplying the Federal authorities with the emissions data. That is this fact which allows to hope for reducing substantially the total costs of creation the assessment system in Russia.

The pilot project in one of the regions of Russia (Novgorod Region) is aimed at making a first and principally important step in the above mentioned direction.. Obviously work on the project does not contradict with the other works on getting approximate estimates for the whole country for the last years that were mentioned above. The initiatives of the several largest companies in emissions inventory of their own enterprises are worth of support of any kind and those enterprises located in Novgorod region any results already obtained were used in our work and their inventory specialists were involved in the project.

Taking the above mentioned circumstances into account, it is not a surprise that the idea of the pilot project was immediately supported by officials in Moscow (State Committee on Ecology and Ministry of Fuel and Energy) as well as in Novgorod.

Considering the project in a more wide - international - context it could be noticed that it allowed:

- 1) to use maximally the experience of other countries in this field and especially the recommendations presented at the IPCC workshops in 1998 and 1999 in the framework of preparation the future "Best Practice Guidelines for Inventory at the High Level";
- 2) to show intentions of Russia to create inventory system;
- 3) to demonstrate the intentions of the USA in creation the economically effective system of international cooperation in reduction of GHG emissions.

Recommendations on GHG emissions control in the pilot region and possible measures in implementation of the JI projects are the additional results of this pilot project (see also Sections III and IV of the Final Report).

## GENERAL DESCRIPTION OF THE NOVGOROD REGION

Novgorod Oblast is situated in the western part of European territory of the Russian Federation. It was formed 5 July 1944. Area is 55,300 km<sup>2</sup>. Population is 738 thousand (1998), 755 thousand in the 1990, including 525 thousand of urban and 213 thousand of rural population. The greater part of population is Russians by nationality (about 97%). Average density of population is near 13 habitant/km<sup>2</sup>.

By its administrative division, Novgorod Oblast consists of 20 districts (raiony). It includes 10 cities and 19 other urban settlements. The most important cities are Novgorod (in the year 1999 the original name Velikiy (Great) Novgorod was officially restored), Borovichi, Staraya Russa. All urban settlements except Novgorod obtained urban status in the period after 1917.

On the nature of relief Novgorod Oblast divides on plain western and more elevated eastern parts. Western part is occupied by the Priilmen lowland, which is partially strongly waterlogged (peat moss bogs occupy 11% territory of area). On the south-east the Valday eminence is situated with height up to 296 m., on the north-east – the Tikhvin chine (up to 280 m.) Climate is moderately continental, peculiar to the most of Russia European territory. Winter is mild, rich with snow; average temperature of January  $-7,5...-10,2^{\circ}\text{C}$ . Summer sparingly warm (from 16,5 to 17,5<sup>°</sup>C in July). Precipitation falls out 700-800 mm per annum. Length of vegetation period is 119-132 day. Rivers mainly belong to lake Il'men's basin. From this lake river Volkhov outflows, falling into Ladozhskoe lake. Novgorod Oblast is rich in lakes, woods occupy more than 50% its territory. On the North and Northeast are saved coniferous forests (spruce, pine), in west part forests are leafy, dominating birch, aspen, alder. Oak wood occurs in some places. Total area of forest makes 2.4 M hectares, from this quarter has a greater environment value, half is open for economic use. Afforestation inheres on the stable level near 30,000 hectares per annum. Near 7% territory of area occupied by meadows.

Novgorod Oblast is included into North-West economic region of the RF. Total length passing on the territory of Novgorod Oblast railway lines is more than 1,100 km. The whole on the territory laid 4 lines, including most important railway pathway Moscow – St. Petersburg. Extent of roads is more than 6 thousand km. Motor transport is broadly used for long-distance, regional and local transportation. Some rivers and lakes are used for the navigation.

Novgorod Oblast has developed industry, particularly electric, electronic, instrumental and chemical. Significant interest for the given project can present a major concern of chemical industry - AO "Akron" situated in Novgorod, there 9% of Russian of mineral fertilisers produced, as well as nitric acid, nitrate ammonium and other chemical production. In chemical branches is noted growing of total production (7,2% growth in 1995-1996 ãã.) on the background of falling total production (13% in this period). There are enterprises of light, food and wood industry, industry of building materials in Oblast. Some enterprises of food industry are enough large, including built in the last years and equipped by modern equipment. Primary fossil fuels are not produced on the territory of Novgorod Oblast; oil- and natural gas processing is absent, as well as iron and other metal production. On the territory of area passes' oil pipeline Rybinsk - Kirishi and gasmain Torzhok - Pskov - Riga with branches on Novgorod - St. Petersburg and Borovichi. The gas-storage situated on the Territory of Oblast is largest in Europe.

Agriculture enough developed, including private farms (total number near 2,500 with average land lot of 18 hectares). Livestock is about 200,000 heads of cattle, meat production near

10,000 tons per annum. Grain production is about 100,000 ton per annum, potato - 180,000 ton. Mineral and organic fertilisers are used. Particularity of Novgorod Oblast is developed production of flax.

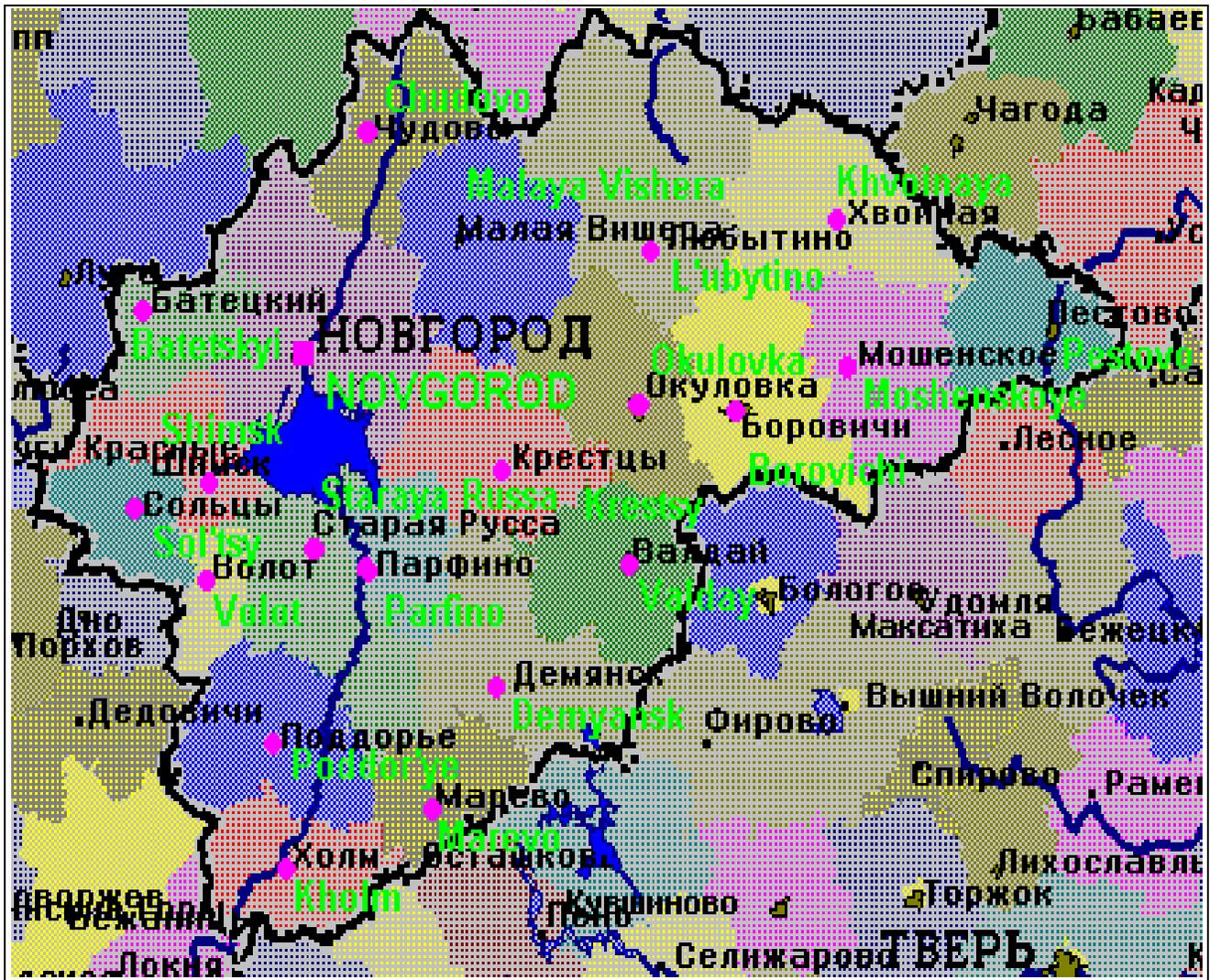
In general, economic situation in the Novgorod Oblast can be considered to be peculiar to majorities of Russian regions. GDP in 1996 was near 50% from the level 1990. At present there are no extraordinary situations of social, political and ecological nature.

Regional centre of Novgorod Oblast – Velikiy (Great) Novgorod is situated on both coasts of river Volkhov, 6 km. from the lake Il'men, on highway Moscow - St. Petersburg. Junction of railway lines on St. Petersburg, Chudovo, Batetskaya. Industrial centre, river ghaut. Population 232 thousand persons (1998.) Novgorod – one of the most ancient russian cities, for the first time mentioned in chronicles under 859.. On length of long period played highly significant role in Russian histories. Large tourism centre. (At present this branch outlives a decline alongside with other.) Abound with ancient monuments of architecture and arts, archaeological monuments.

### Geographic location of Novgorod Region



## Districts and district centers of Novgorod Region



The Novgorod Oblast has a number of various large entities in different sectors of the economy of the Oblast, (detail list see in Case Study, Section 3 of the Final Report).

The main sources of data and information for the study are considered below in the next subsection, where institutional system of inventory is described.

### Previous international projects in the region

The Novgorod Oblast has a good practice in international cooperation at the regional level with a number of countries. Traditionally in such a cooperation are interesting Nordic countries.

#### USA Project on Environmental Policy and Economy on Use of Natural Resources

The Projects were implemented with participation of the USAID-ROLL Programme and Harvard Institute of International Development on the following issues:

- Estimation of risks for human health from the stationary sources of air pollution in Novgorod

- Regulations in water resources in Chudovsky district of the Novgorod Oblast
- Social-economic analysis of prevential behavior of the population and of the willingness of the population to pay for reduction of potential environmental health risks from drinking water consumption
- A system of discount for environmental friendly investments provided by payments for pollution of the environment.
- Integrated health risk assessment and economic analysis of reduction strategy

#### Denmark

- Building of the third line of the refinery constructions in Novgorod. Cooperation started with the company SOWI in 1993, finished in 1998.
- Modernization of sewerage refinery constructions in Novgorod (second phase). Cooperation started in 1995, finished in 1998.
- Modernization of solid waste management system in Novgorod. Under implementation with the company SOWI.

#### Sweden

- Monitoring of Ilmen lake and rivers of its basin. Started in 1996, under implementation.
- Training of young administrators in the area of ecology. Started in 1996, under implementation.

#### Finland

- Development of the management system on water collection, transportation and processing in Borovichi (Stock Company PLANCENT). First stage finished, second stage is under implementation.
- Reconstruction of the Sewerage Pump Station - 2 in Borovichi (Stock Company PLANCENT). Under implementation.
- Sewerage service and solid waste management in Novgorod. Under implementation.

#### **Additional institutional and technical issues, workshop facilities**

In the Novgorod Region the regional branch of the State Committee for Environment Protection (SCEP) has very good experience in implementation of international projects. During these about 10 projects as well as during their routine duties they established good links of data collection and data exchange with regional administration, capital city administration, all regional agencies and largest enterprises. The SCEP has good knowledge on availability of data in the Region, situation with production, finance and management on 20-30 largest enterprises (main GHG sources). The people from SCEP are familiar with typical style of implementation of international projects, organization of workshops and preparation reports consistent with international practice.

On the other hand, as usual in Russian region, they have very limited English language skills. Speaking about Novgorod, it is necessary to attract people from Moscow for written and oral translation during a workshop. Several international workshops were held in Novgorod in last three years. They were organized by team of local people, Moscow or St. Petersburg people

and international experts, *inter alia*, people from the Harvard Institute of International Development. One of key members of Moscow team of given project Mr. Safonov and technical staff Ms. Majorova and Ms. Chepiga took part in organization of one of workshops in Novgorod. It is also agreed that the same translators will work on our workshop in December on Novgorod City.

There are also good and rather cheap hotels for foreign and Russian participants: five star hotel “Beresta” (really it could be evaluated as “good four” stars), cost about 150\$ per night, and three star hotel “Intourist” (really two-three star: small shower + WC, telephone, TV set in each room, cost for Russians is about 25\$ single room and about 40\$ for double, including breakfast, cost for foreign guests can be 2 times higher, so 50-80\$), where usually groups of foreign tourists stay (many people form Germany, Finland and other Baltic countries, Japan), there is no air conditioning. Transportation is usually taxi, prices are very modest in comparison with Moscow, usually about 2\$ per trip in the city (if about 5-10 km). There are no problems to get good lunch or dinner. We can recommend restaurant “Dvor” for lunch, where menu ‘de jour’ has only 2-4 \$ in lunch time.

## **BRIEF DESCRIPTION OF THE INSTITUTIONAL SYSTEM OF GHG INVENTORY IN THE NOVGOROD REGION**

The principally important element of work on the project was the practical approbation of the institutional system of data collection and emission calculation in the region. As it was emphasized above, we do not aim at creating a principally new system, but augmenting the existing system of environmental pollution control with additional functions. The regional Environmental Protection Committee has already had the established connections with all the enterprises and organizations in the region, so the only thing needed was to clarify how operative and qualitatively the “request-reply” system works for the aim of collecting the data that was not collected by the regional Committee before. The work was done at three stages:

1. The emission inventory experts, working in Moscow, prepared the Questionnaires and Lists of data required for inventory. It was done, in accordance with the Revised IPCC Guidelines, the international experience and their own experience of work in Russian circumstances.
2. When being in Novgorod the Questionnaires and Lists of data were considered and discussed in details together with the specialists of Novgorod regional Committee for Environmental Protection. After that, the regional colleagues prepared and sent the special official requests for collection and reporting the data to all related organizations and had the meetings with the representatives of those organizations. The importance of quick and precise reporting of data was emphasized since this stage of work was devoted not only to collection of data but also the testing of workability of the system.
3. Almost all the requested data, that were available at these organizations, were obtained within 1-3 weeks. The principally important fact is that all organizations expressed their readiness to work on the proposed scheme and confirmed it in practice.

The system could be presented as follows:

- A small group of specialists of the regional Committee for Environmental Protection (4-5 persons) accumulates the data on the volumes and kinds of activity, etc., coordinate collection of this data from the related organizations and enterprises of the region (the Committee itself collects the data on some positions), after that it calculates the emissions of greenhouse gases according to the methodology and with standard computer software and send the results to the corresponding central all-Russia agency (tentatively SCEP, but it even may be another body).
- Regional organizations and enterprises respond to the official requests for data from the regional Committee for Environmental Protection. The request to the regional State Statistical Committee should be sent through the regional Administration.
- The regional Committee for Environmental Protection, if required, attracts the representatives of some regional organizations and enterprises for analysis of data and calculation of emissions (on a short-term basis, as consultants).
- Representatives of the Committee for Environmental Protection in the local administrative areas (‘raions’) of the region, if needed, assist in obtaining the data,

establishes the working connections, and controls the appearance of new sources of emissions not covered with the monitoring and accounting system before.

- In case of absence of the necessary methodological materials for calculation of the emissions (or analysis of the data on volume and kind of activity) at the regional Committee for Environmental Protection, a request should be sent to the corresponding central all-Russia agency.
- In case of absence of the required data in the regional organizations and enterprises, the regional Committee for Environmental Protection consider the possibilities and costs of getting this data (if needed. with the help of specialists from Moscow), after that either the additional work on getting the data should be done (including special measurements, etc.) or, if there is no funds for that, a request should be sent to the corresponding central all-Russia agency.

In the context of Novgorod region, a list of the main requested organizations is as follows:

- Committee on Statistics of the Novgorod Oblast
- Committee on Agriculture and Food of Novgorod Oblast
- Regional Branch of the Forestry Service
- Regional Committee on Land Planning
- Municipal authorities, such as NOVZHILKOMMUNSERVICE, including its special automobile department for waste transportation and road department
- Regional water transport organization - Joint Stock Company “NOVGORODSKY PORT”
- Regional State Inspection on Safety Road Traffic (former “GAI”)
- Novgorod region Automobile Roads Management “NOVGORODAVTODOR”

And a number of biggest enterprises:

- Joint Stock Company AKRON
- Novgorod Power Plan TES-20
- UGLOVSKY Lime Production Factory
- Underground Gas Storage NEVSKAYA and some others (full list see in Case Study on Largest Enterprises, Section III of the Final Report)

In addition, the own data of the regional Committee for Environmental Protection and the data obtained by the Committee under different environmental projects carried out in the region before (e.g. the data on waste water treatment facilities) were used.

Certainly, the activity mentioned above showed a number of serious gaps in existing data, some of them were closed during the project. Some secondary importance questions (e.g. in forests and agriculture) were left for future works.. The methodology of calculation should also be developed and improved more and more. However, from the institutional point of view, we can state that the system is working fairly well (this problem was discussed in detail at the Workshop, see Section V of the Final Report).