The Multi-Regional Pilot Project to Develop Monitoring and Reporting Capacity for Greenhouse Gases in Russia

- CENEf - Russian Center for Energy Efficiency
- PNNL - Pacific Northwest Nat’l Lab (US)
- WWF - World Wide Fund for Nature Russian Programme Office
Regional Inventory Initiative

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COP-6 Side Event on Inventories in EIT
The Hague
November 2000
Goal

• Create a bottom-up national inventory system in Russia that meets international standards of accuracy, completeness and transparency through high quality data collection and analysis
Current Status of Inventories in Russia

- National: very approximate estimates in First and Second National Communications, some estimates for 1995-1996
- Sectoral: Only about 1/3 of all GHG emissions (or 1/4 of CO2) well-documented through inventories. Power sector well documented because of RAO EES Rossii’s inventory.
First Phase of Inventory Project

1999

- Conducted first regional inventory in Novgorod Region
- Adapted IPCC Methodology to conditions in a Russian region
- Assessed institutional capabilities of regions to prepare sustainable, cost-effective GHG inventory practices
- Studied gases with high global warming potential (HFCs, PFCs and SF6) for first time in Russia
Reasons for regional approach

- Bottom-up regional inventories help to build capabilities, links and methodologies necessary for national system.
- Weak national inventory system and institutional problems at federal level, alongside growing role of regions.
- Need to solve methodological problems of bottom-up inventories.
- Need to develop sustainable, low-cost approach to monitoring.
Second Phase

2000 • Selected four regions with diverse economies for inventories
  • Overviewed sectoral and regional contributions to national GHG emissions
  • Prepared detailed energy balances to support GHG inventory in 2 pilot regions
  • Created solid institutional basis for the national inventory
  • Workshop in Chelyabinsk, 5-6 Dec. 2000
Possible Next Steps

2001
- Develop greater institutional capacity
- Prepare sectoral inventories
- Work with more regions
- Cover larger share of key sources
- Prepare national inventory guidelines for government approval
- Implement IPCC “Good practice”, including uncertainty analysis
National energy related CO$_2$ emissions, 1990 vs. 1997

Energy accounts for 76% of total GHG emissions
Regional analysis of national CO$_2$ emissions, 1997

Of Russia’s 80 regions:
- 15 top regions > 50% of total CO$_2$ emissions
- 32 bottom regions < 10% of total CO$_2$ emissions
- 7 top regions > 50% of emissions from coal combustion
- 10 top regions > 50% of emissions from gas combustion
Regional analysis of national CO₂ emissions, continued

The higher gross regional product (GRP) per capita, the lower CO₂ emission per unit of GRP

![Graph showing correlation between GRP per capita and CO₂ emission per unit of GRP in Russia. The graph includes points for Tyumen, Kostroma, and Moscow, with a trend line indicating the general trend for Russia.](image-url)
Estimate of sectoral contribution to the total CO₂ emission (1996)

Industry 67%

Residential/Municipal 18%

Transport 13%

Agric. 1%

Constr. 1%

Subdivision non-compatible with IPCC

Power & heat 73%
Metallurgy 15%
Fuel & refinery 4%
Chemicals 2%
Construction materials 2%
Machinery & metals 2%
Food & drinks 1%
Wood & paper 1%
Regional inventories

- Small but instructive cross-section of the country
- Diverse geographic and economic parts of Russia
Results of regional inventory

GHG emissions
- Energy
- Industry
- Agriculture
- Land Use Change & Forestry (LUCF)
- Waste

- Novgorod
- Sakhalin
- Chelyabinsk
- Khakasia

- Brief overview
- Specific features
- Conclusions and recommendations
Total emissions (Gg)
- CO$_2$: 3942
- CH$_4$: 33.04
- N$_2$O: 5.57
- HFCs: 0.00014
- PFCs, SF: ~0
- LUCF: -5293
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<tr>
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<td>Large thermal power and heat stations</td>
<td>1112</td>
<td>952</td>
<td>827</td>
<td>839</td>
<td>693</td>
<td>693</td>
<td>699</td>
<td>19%</td>
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<td>Production of power and heat by non-energy enterprises</td>
<td>606</td>
<td>495</td>
<td>522</td>
<td>542</td>
<td>507</td>
<td>508</td>
<td>559</td>
<td>15%</td>
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<td>Transport</td>
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<td>Domestic aviation</td>
<td>32</td>
<td>3</td>
<td>1</td>
<td>1</td>
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<td>1</td>
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<td>Road</td>
<td>654</td>
<td>680</td>
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<td>681</td>
<td>650</td>
<td>682</td>
<td>550</td>
<td>15%</td>
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<td>National navigation</td>
<td>133</td>
<td>60</td>
<td>50</td>
<td>42</td>
<td>44</td>
<td>47</td>
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<td>Residential sector</td>
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<td>Small heat stations</td>
<td>78</td>
<td>223</td>
<td>253</td>
<td>219</td>
<td>284</td>
<td>279</td>
<td>196</td>
<td>5%</td>
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<td>Private residential sector</td>
<td>1850</td>
<td>1956</td>
<td>1789</td>
<td>1494</td>
<td>1655</td>
<td>1544</td>
<td>1623</td>
<td>44%</td>
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<td>Total by specified sources</td>
<td>4465</td>
<td>4369</td>
<td>4122</td>
<td>3818</td>
<td>3834</td>
<td>3754</td>
<td>3688</td>
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<td>Total by non-specified sources</td>
<td>655</td>
<td>334</td>
<td>202</td>
<td>132</td>
<td>74</td>
<td>103</td>
<td>28</td>
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<td>Total by Reference approach</td>
<td>5120</td>
<td>4703</td>
<td>4324</td>
<td>3950</td>
<td>3908</td>
<td>3857</td>
<td>3716</td>
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Novgorod - lesson for all

Changes in market situation directly influence GHG emissions. Variations can be especially fast where installed production capacity is significantly larger than actual production now.
Carbon Dioxide Emissions in Sakhalin by Fuel Type

- **Liquid Fuel**
- **Solid Fuel**
- **Gaseous Fuel**

**GG CO₂**

**1990**  **1999**
CO₂ Emissions in Chelyabinsk by Fuel Type

Gg CO₂

<table>
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<th>Fuel Type</th>
<th>1990</th>
<th>1999</th>
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<tr>
<td>Liquid Fuel</td>
<td></td>
<td>5000</td>
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<tr>
<td>Solid Fuel</td>
<td>10000</td>
<td>20000</td>
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<td>Gaseous Fuel</td>
<td>30000</td>
<td>40000</td>
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CO2 Emissions in Chelyabinsk by Industrial Process

- Cement & Lime
- Iron & Steel and Ferroalloys

Chelyabinsk - industry

Gg CO₂
Khakasia - lesson for all
Aluminium production

- In some economically vibrant enterprises GHG emissions are already higher than in 1990
- Healthy companies depend heavily on international trade (potential effect of international “GHG leakage”)

Potential problem: AAU allocation for new and growing enterprises
Agriculture - all Regions

- Long-term downward trend
- Low quality of activity data, large uncertainty
- Difficult conditions for any business and in particular “GHG projects”

No chance for large-scale involvement in “Kyoto process” in near future
JI projects can be a tool for solving ecological problems and promoting reforestation and afforestation.

- Very large values and variations, important role of forest fires
- Uncertainty is about +/- 30%, difficult to improve
- Institutional problems

![Graph showing CO₂ emissions for different regions from 1990 to 1999.](image-url)
Waste - all Regions

- Moderate variations, moderate uncertainties
- Key role of regional projects on waste utilization
- Dependence on regional incentives for waste management; GHG reduction not driver

Regional approach to inventory recommended. Large-scale GHG reduction activity unlikely
Main barriers

- No government decision on establishing National Inventory System
  - Ministry of Natural Resources has no formal mandate for GHG monitoring
- Absence of long-term incentives because carbon credits have no value under current international system
- Methodological problems
- Technical problems
Conclusions

Hybrid of regional and centralized systems for national GHG Inventory

Agriculture

LUCF

Waste

Energy

Regional energy balances

Industry

Sector by sector with focus on major emitters

New gases

Centralized data collection

National-scale studies
GHG Inventory Goals:
- precision
- completeness
- transparency
- fulfillment of IPCC Revised Guidance requirements

Meeting these goals is feasible and relatively low-cost for Russian Regions
Conclusions

Inventory creates infrastructure to stimulate GHG mitigation through:

- Joint Implementation
- Domestic ERU/AAU production

Important factors for successful mitigation:

- Identify proactive “host” enterprises and address potential problems upfront
- Build awareness of decision-makers
- Enforce local legislation on GHG emissions
Recommendations

- Decide on institutional home for GHG National Inventory System
- Identify responsibilities of Regions and Federal Institutions
- Finalize and adopt official Russian GHG methodology
- Prepare Russian Guidance on cost-effective approach to GHG Inventory (consistent with IPCC Revised Guidelines and “Good Practice”)