APAT
Agency for the Protection of the Environment and
for Technical Services

Quality Assurance/Quality Control Plan for the Italian Emission Inventory

Year 2008

April 2008

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ISBN 978-88-448-0352-0

Contents

QA/QC GENERAL **4**

QA/QC ENERGY **16**

QA/QC INDUSTRIAL PROCESSES **19**

QA/QC SOLVENT AND OTHER PRODUCT USE **23**

QA/QC AGRICULTURE **26**

QA/QC LULUCF **32**

QA/QC WASTE **37**

QA/QC General
2008 activities and future improvements

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April, 2008

National Air Emission Inventory: General overview

I. Objective

This document summarizes the specific Quality Assurance (QA) Quality Control (QC) activities and different verification procedures which are applied thoroughly the current inventory compilation as part of the estimation process.
In addition to a description of the current activities applied and the documentation, archiving and reporting processes, a specific section illustrates the main findings and recommendations of the latest review process together with the response and actions undertaken by the inventory team.
Further improvements and planned QA activities identified during the preparation of the National Inventory and National Inventory Report 2008 are also presented.
A summary of previous QA/QC procedures which helped to understand the improvement of the inventory over the years concludes the general part of the report.

Sector specific QA/QC and verification documentation are explained in the relevant chapters.

II. QA/QC activities and verification

Quality control checks and quality assurance procedures together with some verification activities are applied both to the national inventory as a whole and at sectoral level.
The QA/QC procedures are those described in the manual 'Quality Assurance/Quality Control Plan for the Italian Inventory' (APAT, 2006). Verification activities are also part of the overall QA/QC program. These activities have the ultimate objective of increasing the confidence and reliability of the inventory estimates.

Feedbacks for the Italian inventory derive from communication of data to different institutions and/or at local level. For instance, the communication of the inventory to the European Community result in a pre-check of the GHG values before the submission to the UNFCCC and relevant inconsistencies may be highlighted.

Results and suggestions from expert peer reviews of the national inventory within the UNFCCC process can provide valuable feedback on areas where the inventories can be improved.

An official independent review and public review of the Italian inventory are not implemented yet. Nevertheless, the process of review is carried out and has

feedbacks once the inventory, the inventory related publications and the national inventory reports are posted on the website, specifically www.apat.gov.it, and from the communication of data to different institutions and/or at local level.
The inventory is presented every year to a Technical Committee on Emissions (CTE), coordinated by the Ministry for the Environment , Land and Sea, where all the relevant Ministries and local authorities are represented. Emission figures and results are shared and discussed.

Expert peer reviews of the national inventory also occur annually within the UNFCCC process; results and suggestions can provide valuable feedback on areas where the inventory should be improved. Specifically, the Italian GHG inventory was subjected to in-country reviews by the UNFCC Secretariat in September 2005 and in June 2007; results and recommendations are available at http://unfccc.int/resource/docs/2005/arr/ita.pdf (UNFCCC, 2005) and at http://unfccc.int/resource/docs/2007/arr/ita.pdf (UNFCCC, 2007).

The responses and actions to the review process are described in details in section IV.
The only official review, apart from those from the UNFCCC, was performed by Ecofys, in 2000, in order to verify of the effectiveness of policies and measures undertaken by Italy to reduce greenhouse gas emissions to the levels established by the Kyoto Protocol. In this framework an independent review and checks on emission levels were carried out as well as controls on the transparency and consistency of methodological approaches (Ecofys, 2001).

The preparation of environmental reports where data are needed at different aggregation levels or refer to different contexts, such as environmental and economic accountings, is also a verification for emission trends. At national level, for instance, emission time series are reported in the Environmental Data Yearbook published by the Agency. Emission data are also published by the Ministry of Environment in the Reports on the State of the Environment, the National Communications as well as in the Demonstrable Progress report. Moreover, figures are communicated to the National Institute of Statistics to be published in the relevant Environmental Statistics Yearbooks as well as used in the framework of the EUROSTAT NAMEA accounting.

Comparisons between national activity data and data from international databases are usually carried out in order to find out the main differences and an explanation to them. Emission intensity indicators among countries (e.g. emissions per capita, industrial emissions per unit of added value, transport emissions per car, emissions from power generation per kWh of electricity produced, emissions from dairy ruminants per tonne of milk produced) can also be useful to provide a preliminary check and verification of the order of magnitude of the emissions. This is carried out at European and international

level by considering the annual reports compiled by the EC and the UNFCCC as well as related documentation available from international databases and outcome of relevant workshops.
Additional comparisons between emission estimates from industrial sectors and those published by the industry itself in the Environmental reports are carried out annually in order to assess the quality and the uncertainty of the estimates.
The quality of the inventory has also improved by the organization and participation in sector specific workshops. Follow-up processes are also set up in the framework of the WGI under the EC Monitoring Mechanism, which address to the improvement of different inventory sectors. In the last years, two workshops were held, one related to the management of uncertainty in national inventories and problems on the application of higher methodologies to calculate uncertainty figures, the other on how to use data from the European emissions trading scheme in the national greenhouse gas inventories. Previous workshops addressed methodologies to estimate emissions from the agriculture and LULUCF sectors, involving the Joint Research Centre, from the waste sector, involving the European Topic Center on Resource and Waste Management, as well as from international bunkers, involving the International Energy Agency and EUROCONTROL. Presentations and documentation of the workshops are available on the website at the address: http://air-climate.eionet.europa.eu/meetings/past_html.
A national conference on the Italian emission inventory was organized by APAT in October 2006. Methodologies used to carry out national figures and results of time series from 1990 to 2004 were presented detailing explanations for each sector. More than one hundred participants from national and local authorities, Ministries, Industry, Universities and Research organizations attended the two days meeting.
In 2007, in the framework of the National Conference on Climate Change, an event previous to the Conference presented the National GHG emission Inventory and specifically the time series of emission estimates from 1990 to 2005; besides a specific session of the Conference was dedicated to the National and local Inventories focusing on methodological issues and policies and measures to be adopted to reduce GHG emissions.

Other general improvements regarded the establishment of a National Inventory System and in general the implementation of QA/QC activities.
A specific procedure undertaken for improving the inventory regards the establishment of national expert panels (specifically, in the sectors of road transport, land use change and forestry and energy) which involve, on a voluntary basis, different institutions, local agencies and industrial associations cooperating for improving activity data and emission factors accuracy.
In addition to these expert panels, APAT participates in technical working groups within the National Statistical System (Sistan). These groups, named *Circoli di qualità*, coordinated by the National Institute of Statistics, are

constituted by both producers and users of statistical information with the aim of improving and monitoring statistical information in specific sectors such as transport, industry, agriculture, forest and fishing. These activities should improve the quality and details of basic data, as well as enable a more organized and timely communication.

QC procedures are also undertaken on the calculations of uncertainties in order to confirm the correctness of the estimates and that there is sufficient documentation to duplicate the analysis.
The assumptions on which uncertainty estimations are based are documented for each category. Figures to draw up uncertainty analysis are checked with the relevant analyst experts and literature references and they are proved to be consistent with the IPCC Good Practice Guidance (IPCC, 2000).
Quantitative estimates of the uncertainties for the Italian GHG inventory are calculated using a Tier 1 approach as defined in the IPCC Good Practice Guidance (IPCC, 2000), which provides a calculation based on the error propagation equations. In addition, a Tier 2 approach, corresponding to the application of Monte Carlo analysis, has been applied to specific categories of the inventory but the results show that, with the information available at present, applying methods higher than the Tier 1 does not make a significant difference in figures. The results of the study, 'Evaluating uncertainty in the Italian GHG inventory', were presented at a EU workshop on Uncertainties in Greenhouse Gas Inventories, held in Finland in September 2005, and they are also available on website at the address: http://air-climate.eionet.europa.eu/docs/meetings/050905_EU_GHG_Uncert_WS/meeting050905.html.
A further research on uncertainty, specifically on the comparison of different methodologies to evaluate emissions uncertainty, was also carried out (Romano et al., 2004).

III. Documentation, archiving and reporting

All the material and documents used for the inventory preparation are stored at the Agency.
All information relating to the planning, preparation, and management of inventory activities are documented and archived. The archive is organised so that any skilled analyst could obtain relevant data sources and spreadsheets, reproduce the inventory and review all decisions about assumptions and methodologies undertaken. A master documentation catalogue is generated for each inventory year and it is possible to track changes in data and methodologies over time. Specifically, the documentation includes:

- electronic copies of each of the draft and final inventory report, electronic copies of the draft and final CRF tables;
- electronic copies of all the final, linked source category spreadsheets for

the inventory estimates (including all spreadsheets that feed the emission spreadsheets);

- results of the reviews and, in general, all documentation related to the corresponding inventory year submission.

After each reporting cycle, all database files, spreadsheets and electronic documents are archived as 'read-only' mode.

A 'reference' database is also compiled every year to increase the transparency of the inventory. This database consists of a number of excel files that references all documentation used during the inventory compilation, for each sector and submission year, the link to electronically available documents and the place where they are stored as well as internal documentation on QA/QC procedures.

IV. Review process recommendations

In the following table, the list of recommendations from the latest review process related to cross-cutting and general issues, as reported in the documents FCCC/IRR/2007/ITA and FCCC/ARR/2006/ITA, which should be considered for the 2008 submission, is presented; responses to each subject are also included.

Par.	Subject	Description	Response
9 (ARR) 28 (IRR)	Key categories	Italy has not provided a key category analysis for 1990, either in the CRF tables or in the NIR. The ERT recommends that Italy also include in its next inventory submission a key category analysis for 1990.	Key category analysis for 1990 have been included since 2007 submission
10 (ARR)	Main findings	While the inventory is in general of high quality and in a continuous process of improvement, there are areas where further improvements are needed. They refer mainly to better documentation of decision making and the collection of activity data (AD) in some specific areas, such as the LULUCF sector.	Improvements have been implemented in the NIR to better describe emission trends and methodologies. The registry of carbon sinks has been officially instituted and funded to improve the data availability regarding the LULUCF sector with the aim to allow the reporting of 3.3 and 3.4 activities.
11 (ARR) 32 (IRR)	Completeness	Only potential emissions of PFCs from consumption of halocarbons and SF6 are not reported. The ERT recommends that Italy present them in the next submission. Emissions and removals from wetlands and other land categories were not estimated, based on the assumption that these are not occurring. The ERT recommends that Italy validate the assumption and report on this in its next submission.	Potential PFC emissions have been reported since 2007 submission. More information has been reported in the NIR for activities not occurring.
12 (ARR) 33 (IRR)	Completeness	CRF table 7 (Summary overview for key categories) and CRF table 8(b), with explanatory information on recalculations, were not filled in. In addition, table 9(a) submitted by Italy does not contain all the necessary explanations. The ERT recommends that Italy provide the above-mentioned tables in its next inventory submission.	All CRF tables have been filled in although it was not possible to include all key categories in Table 7 because of software constrains.
13	Transparency	The ERT encourages Italy to make further efforts	Some improvements have been done in

(ARR) 34-35 (IRR)		to fully explain in the NIR the methodologies and underlying assumptions and justify the expert judgement used in the elaboration of the emission estimates.	the NIR to increase the transparency. Further efforts will be done in the next submission where a complete revision of the energy chapter is planned.
14 (ARR) 38 (IRR)	Recalculation	The ERT recommends that Italy provide more information on the rationale for recalculations and provide more precise information on the changes made and parameters affected when recalculations take place.	In the 2007 submission a complete list of recalculations have been supplied. More information on the rationale for recalculations has been included in the NIR.
16 (ARR) 40 (IRR)	Uncertainties	The ERT recommends that Italy further use its uncertainty analysis to prioritize improvements to the inventory. The ERT noted that the growing amount of data available at plant level could be used to develop more sound AD uncertainties or to support the values used so far.	Planned methodological improvements in the different sectors have been funded with the aim to reduce uncertainty in estimation. Data collected at plant level refer usually to few plants and they are often not sufficient to evaluate the uncertainty.
17 (ARR) 19 (IRR)	QA/QC	Only tier 1 QC procedures are applied at present. The ERT recommends that Italy apply source-specific QC procedures for its next submission.	Source specific QC procedures have been applied since 2007 submission
19 (ARR) 21 (IRR)	Verification	Although no full independent review of the inventory was applied before submission of the inventory, Italy carries out several QA activities in different contexts: presenting the inventory to the technical committee on emissions; involving national expert panels (road transportation, land use, land-use change and forestry and energy production) in inventory preparation and applying voluntary European Community reviews. The ERT encourages Italy to make arrangements for an independent review of the inventory.	An independent review of the GHG emission inventory has been planned for 2009 because of resource constraints.
14 (IRR)	National System	The ERT noted that Italy.s national system has to be improved regarding some legal, institutional and procedural arrangements that should be further developed to ensure sustainability of existing capacities and competence of technical staff, to improve collection of input data in some specific areas, for example, LULUCF, and to ensure future reporting of supplementary information related to activities under article 3, paragraphs 3 and 4, of the Kyoto Protocol. In the course of the review, Italy provided information to the ERT showing that it is already taking measures to ensure the maintenance of existing capacities over time. In particular, APAT has recently elaborated a three-year plan to stabilize short-term staffing. The ERT encourages Italy to implement this plan as soon as is practicable.	APAT started to stabilize short –term staffing. Some of the resources involved in the inventory have been stabilized in 2007 and other are planned to be stabilized in 2008.
15 (IRR)	National System	Although APAT performs all the functions of a single national entity in relation to the national system under the Kyoto Protocol, during the in-country review the process of its official designation by the Ministry for the Environment, Land and Sea as such had not been finalized. The ERT recommended that Italy expedite the process of formalization of APAT as the single national entity. Italy then informed the ERT that this process had already been launched, and provided the ERT with a draft ministerial directive that will regulate this issue. The ERT encourages Italy to speed up and finalize the ongoing legal proceedings as soon as possible.	The Legislative Decree, 51 of March 7th 2008, institutes the National System for the Italian Greenhouse Gas Inventory. APAT has been officially designed as single national entity responsible for the national emission inventory. In the same Decree the procedure for the official consideration and approval of the GHG inventory has been addressed.
16 (IRR)	National System	There is no formal process in Italy for the official consideration and approval of the inventory, including recalculations, prior to its submission	See the comment above (paragraph 15)

		and for responding to any issues raised by the inventory review in accordance with decision 13/CMP.1. During the review, the ERT recommended that Italy formalize the process for the official approval of the inventory. Italy properly responded to requests for further clarification during the review. Furthermore, Italy informed the ERT that the ministerial directive referred to in paragraph 15 will also address the process for the inventory approval. Again, the ERT welcomes this information and invites Italy to finalize ongoing procedures as soon as possible and report on them in its future inventory submission under the Kyoto Protocol	
18 (IRR)	National System	Italy informed the ERT that formal procedures to adopt the institutional arrangements and instruments regarding the implementation of Articles 3, paragraphs 3 and 4, of the Kyoto Protocol are ongoing and a specific work programme is under finalization with a budget of €4 million. The ERT recommends that Italy finalize these procedures in time to comply with all reporting requirements under Articles 3, paragraphs 3 and 4, of the Kyoto Protocol.	A Ministerial Decree has been approved in 2008 designing the institutional arrangements and the 2008-2010 funding for the National Registry for Forest Carbon Sinks. This will allow to improve LULUCF emission and removal estimations and to report 3.3 and 3.4 activities under the Kyoto Protocol.
114 (IRR)	National Registry	During the in-country review the ERT noted that the following two items have not yet been implemented: (a) Operationality of the registry system (planned to be operational in September 2007); (b) Recovery of registry services in the event of a disaster (planned to be operational in July 2007). After the in-country review Italy informed the ERT that these items were implemented. The ERT recommends Italy to provide information on this in its next inventory report under the Kyoto Protocol.	In the NIR, a specific annex has been added to supply updated information on the National Registry.
120 (IRR)	National Registry	The ERT recommends that Italy provide details on the recovery of registry services in its next inventory submission under the Kyoto Protocol.	See comment above (paragraph 114)
121 (IRR)	National Registry	The ERT gained the overall impression that Italy allocated few resources, including human resources, to the development, operation and maintenance of the registry. The ERT recommended increasing human resources by a minimum of two staff members for technical and administrative support plus one staff member for a help desk function. After the in-country review, Italy informed the ERT that it is aware of the need for additional staff and that actions are planned in this respect. Italy informed the ERT that APAT will continue acting as registry administrator on behalf of the Ministry for the Environment, Land and Sea in the first commitment period of the Kyoto Protocol. In this regard, the Ministry, which is responsible for the management and functioning of the registry by Legislative Decree 216/2006, has requested APAT to provide a detailed evaluation of the necessary resources. The ERT recommends that Italy provide details on the action taken to solve this issue in its next inventory submission under the Kyoto Protocol.	The Italian Government modified the previous Legislative Decree 216/2006 which enforced the Directive 87/2003/ CE, by the new Legislative Decree 51 of March 7th 2008. Due to this new Decree, Italy's Agency for the Protection of the Environment and for Technical Services (APAT) is responsible for developing, operating and maintaining the national registry under Directive 2003/87/CE. APAT, as Registry Administrator, becomes responsible for the management and functioning of the Registry, including Kyoto protocol obligations. The Decree 51/2008 also establishes that the economic resources for the technical and administrative support of the Registry will be supplied to APAT by operators paying a fee for the use of the Registry. The amount of such a fee will be regulated by a future Decree.

V. Planned improvements and QA activities

Improvements planned for 2008 especially regard the activities and results of the panels within the National Statistical System (SISTAN); in particular, information on the penetration of technologies in the agriculture and waste management sector will be used to update the last year emission data.

Comparisons between regional and local inventories and the results, at the same spatial levels, derived by a top-down disaggregation of the national inventory were performed in 2006. The study enhances areas where improvements still need to increase the comparability of figures. In 2008, the inventory comparisons with the local authorities will continue with a focus on actual emissions and future scenarios, including the evaluation of the adoption of local and national policies and measures. Furthermore, with the aim to share methodologies and improve the knowledge at national and local level, expert panels on waste and agriculture for GHG inventories are planned to be developed in addition to those already in place for road transport, energy and LULUCF sectors.

The top-down disaggregation of the national inventory, for the year 2005, to different spatial levels is going to be finalised in 2008.

For the LULUCF sector, following the election of the 3.3 and 3.4 activities and on account of an in-depth analysis on the information needed to report LULUCF under the Kyoto Protocol, the relevant national experts have been consulted in different meetings and an expert panel has been established in cooperation with the Ministry of Environment and with the Ministry of Agriculture and Forestry. In 2007 a national meeting regarding the forest statistics and the national forest inventory organised by the National Institute of Statistics (ISTAT) jointly with APAT and the Forest National Corp (CFS) was held. The 2005 National Forest Inventory was presented and the main results were released. In April 2008, the 'National Registry for Carbon sinks' was instituted by a Ministerial Decree; the registry is part of the Italian National System and includes information on units of lands subject of activities under Article 3.3 and activities elected under Article 3.4 and related carbon stock changes. The National Registry for Carbon sinks is the instrument to estimate, in accordance with the COP/MOP decisions, the IPCC Good Practice Guidance on LULUCF and every relevant IPCC guidelines, the greenhouse gases emissions by sources and removals by sinks in forest land and related land-use changes and to account for the net removals in order to allow the Italian Registry to issue the relevant amount of RMUs. Activities planned in the framework of the National Registry for Forest Carbon Sinks should also provide data to improve estimate of carbon sequestration due to Afforestation/reforestation activities and should allow to refine the estimate related to the carbon sequestration by IPCC categories. Specifically, for the LULUCF sector, following the election of the 3.3 and 3.4 activities and on account of an in-depth analysis on the information needed to report LULUCF under the Kyoto Protocol, a Scientific Committee, *Comitato di Consultazione*

Scientifica del Registro dei Serbatoi di Carbonio Forestali, constituted by the relevant national experts has been established by the Ministry for the Environment, Land and Sea in cooperation with the Ministry of Agriculture, Food and Forest Policies.
In the framework of the preparation of the fourth national communication on climate change and the demonstrable progress report, and in particular with the aim to develop scenarios consistent with emission estimates, many industrial associations have been consulted and relevant information has been collected and past and present emissions have been checked.
The databases of industrial emissions and basic information from the European Directives on the Emission trading scheme, Large Combustion Plant and EPER Registry, are being examined jointly and compared in order to check all the relevant information included.
Further improvements will concern the collection of statistical data and information to estimate uncertainty where available.

VI. Major QA/QC activities over the past years

- *Energy Balance Verification.* A task force made up of energy and inventory experts (Ministry of Production Activities, ENEA and APAT) established to examine differences in basic data between the CRF and the joint EUROSTAT/IEA/UNECE questionnaire submissions and to improve the details of the National Energy Balance finalised its study and reported the results in the document "Energy data harmonization for CO_2 emission calculations: the Italian case" (ENEA/MAP/APAT, 2004).
- *Carbon Emission Factors Review.* A sampling and measurement campaign was carried out jointly with the Stazione Sperimentale Combustibili in order to check the CO_2 emission factors used for emission estimation in the energy sector, specifically the road transport and residential and commercial sector. Representative samples of Italian fuels, specifically gasoline, diesel oil and LPG, were collected and analysed from September 2000 - August 2001. Measurements were compared with default CO_2 emission factors proposed by the IPCC in the 1996 Revised Guidelines and those proposed by the EEA and used in COPERT III methodology. Values of national emission factors resulted higher than the default ones for gasoline and LPG, while those of diesel were lower. Emission factors have been substituted for the years 2000 onwards. The study and the results are described in detail in the APAT report (Contaldi, Ilacqua, 2003).
- *Road Transport Emissions Review.* The Italian Expert Panel on Transport, which comprises experts from Research Institutes, Universities, Industrial Associations, Local Authorities, Ministries and Public Authorities, continues its work on the improvement and assessment of emission estimations from road transport. There has been a considerable improvement on the details of basic data to be used within the COPERT model, both in terms of

availability and timeliness. Studies of the expert panel group as well as presentations held in different meetings can be found on the website www.inventaria.sinanet.apat.it/ept.

- *F-gases Review*. A review with industrial associations and the electrical company ENEL was undertaken in order to improve the quality of estimates by implementing the use of the Tier2 methodology. SF_6 estimates improved with the cooperation of the national electrical company ENEL and the main electrical associations. Specifically, for PFC emissions from aluminium production, the estimates were carried out jointly with the only national producer. The Tier 1 method was applied for the time series from 1990-1999, whereas from 2000, the Tier 2 method has been followed using national site specific values. A revision has also concerned HFC emissions on account of major information on the leakages made available by the European Association of Responsible Use of HFCs in Fire Fighting.
- *MeditAIRaneo Project.* A three years project involving the Inventory Reference Centres of the European Mediterranean Countries (Italy, Spain, France, Greece, Portugal) started at the end of the year 2000. The aim was to examine in details emissions that are specific and/or typical of the Mediterranean Countries. Four different studies on air emissions from vegetation, agriculture, solvent use and urban road transport in Mediterranean areas were funded by APAT. Common objectives are analysis of methodologies and emission factors used by Mediterranean countries for estimating emissions, individuation of Mediterranean peculiarities, in comparison with other European countries, such as climate, technologies, industrial management, identification of methodological points which need in-depth examination and uncertainty assessment. An Italian case study has been developed for each of the four projects. By 2006, all the projects are concluded and the results have been used in the national inventory to improve country-specific emission factors.
- *Emissions Trading Scheme*. The analysis of sectoral industrial data from the Italian Emission Trading Scheme database has been used to develop country-specific emission factors and check activity data levels.
- *European Pollutant Emission Register (EPER).* Data from the Italian Pollutant Emission Register from some industrial sectors are used as a check and comparison with the estimates carried out at national level. In particular, this regards the production of non-ferrous metals, chemical productions, and the production of iron and steel.
- *Local inventories.* A study on the top-down approach to the preparation of local inventories was conducted and Italian emissions for different local areas were derived for the years 1990, 1995 and 2000. The results were checked out by regional and local environmental agencies and authorities in order to find out the main weak points and contribute with information available to characterise the local environment, this contributing as well as a feedback to the improvement of the national inventory. A workshop was

also held in 2004 involving local inventory experts with the aim to share experiences and compare national and local estimates and methodologies to carry out emission figures. Final estimates and the detailed methodologies followed for each SNAP sector to carry out emission figures are published in a technical report (Liburdi et al., 2004).

QA/QC Energy
2007 activities and future improvements

Prepared by: Riccardo De Lauretis

April, 2008

National Air Emission Inventory: Energy

I. Objective

The improvements carried out during the preparation of the 2008 national inventory submission for the energy sector and those expected for the next future are summarised in the following.

II. Review process recommendations

In the following table, the list of recommendations from the latest review process related to the energy sector, as reported in the documents FCCC/IRR/2007/ITA and FCCC/ARR/2006/ITA, which should be considered for the 2008 submission, is presented; responses to each subject are also included.
Further improvements and planned QA activities identified during the preparation of the National Inventory and National Inventory Report 2008 are also presented

Par.	Subject	Description	Response
47	Transparency	Transparency could be increased by including in the NIR some description of methodologies used in particular areas where data and methodology are in fact very good.	The energy chapter of the NIR will be revised in the next submissions, in agreement with the UNFCCC reporting guidelines allowing a better description the methodologies followed.
48	Recalculation	As in the other sectors, the transparency of the inventory will benefit from including more information on the NIR and table 8(a) on the rationale and the changes made.	See the comment above (paragraph 47)
50	International bunker fuel – aviation and maritime estimates	The ERT recommends that efforts be made to have the new data available for the 2008 submission. The ERT agrees with Italy in assessing that re-examining the split between domestic and international for shipping is a lower priority because, unlike aviation, there have not been great changes in the relative number of sea voyages on different routes over recent years.	A research activity is in progress to update for the last years aviation and maritime estimates and average emission factors on the basis of detailed information directly collected from the operators and the port and airport authorities. First results are expected for the 2009 submission. At the same time agreement are establishing with the EUROCONTROL and the National aviation authorities (ENAC) for aviation and with ISTAT for maritime to allow a yearly availability of basic data with the aim to apply more advanced Tier of estimation for these sectors.
55	Oil and natural gas - CO2 and CH4	Italy informed the ERT that companies have provided further additional, more detailed data that could be used for the 2007 submission. The ERT recommends that Italy assess the quality of these data and recalculate the time series if it is in accordance with the IPCC good practice guidance.	Information supplied by industry has been verified and taken in account, and emissions have been recalculated for the latest years.

III. Planned improvements and QA activities

The revision of the Energy chapter of the NIR is planned for the next submission, with the aim to increase the transparency of the reporting.
Documentation collected in the framework of the different European Directives, Decisions and Regulations (EPER/E-PRTR, Large Combustion plants and the Emission Trading scheme) is planned to be integrated in a unique database with the aim to verify emissions and activity data reported for the same year under different reporting obligations and identify possible improvements in emission estimations.
Regarding the road transport estimates, COPERT4 will be used in the next submission after a verification of the results and time series consistency.
A research activity is in progress to update aviation and maritime estimates and average emission factors for the last years on the basis of detailed information directly collected from the operators and airport and port authorities. First results are expected for the 2009 submission. At the same time, agreements have been established with EUROCONTROL and the National aviation authority (ENAC) for aviation and with ISTAT for maritime which should allow a yearly availability of basic data and the application of more advanced Tiers of estimation for these sectors.
Off-road basic activity data are planned to be checked and updated especially concerning technological information. The project is waiting for being funded.

QA/QC Industrial Processes
2007 activities and future improvements

Prepared by: Barbara Gonella, Riccardo De Lauretis

April, 2008

National Air Emission Inventory: Industrial Processes

I. Objective

The improvements carried out during the preparation of the 2008 national inventory submission for the industrial processes sector and those expected for the next future are summarised in the following.

II. Review process recommendations

In the following table, the list of recommendations from the latest review process related to the industrial processes sector, as reported in the documents FCCC/IRR/2007/ITA and FCCC/ARR/2006/ITA, and which should be considered for the 2008 submission is presented; responses to each subject are also included.
Further improvements and planned QA activities identified during the preparation of the National Inventory and National Inventory Report 2008 are also presented.

Par.	Subject	Description	Response
59	Completeness	One missing source is potential PFC emissions	Potential PFC emissions have been included since 2007 submission.
60	Transparency	In some cases, to add transparency, additional explanatory information could be included in the NIR regarding rationale for applied recalculations or information on peculiarities in the IEF trends, such as changes due to plant closures or process changes, for example, in the case of nitric acid or aluminium production.	Additional information has been added in the NIR to better explain emission trends in the case of nitric acid and aluminium production. No relevant recalculations have been carried out in the 2008 submission.
62	Uncertainty	For the uncertainties calculation, IPCC default values are mainly used. The ERT recommends deriving specific uncertainty values from plant-specific data used in Italy's next submission.	For many activities average emission factors are calculated starting from data submitted by plants in the framework of European Directives such as IPPC/EPER, LCP and EU/ETS. Data collected are in general no sufficient to estimate uncertainties because they refer to few plants, but we plan to calculate them where possible.
65	Ammonia production – CO2	The ERT recommends that Italy verify emission data published in the EPER registry based on the amounts of natural gas used as production input in ammonia plants.	We plan to develop this verification activity for the next submission.
54 (ARR)	Consumption of halocarbon and SF6 - HFC	Regarding refrigeration and air conditioning, a model for the calculation of annual emissions from HFCs in the equipment is used. This model projects annual emissions at a steady rate without consideration of equipment lifetimes and without considering imports and exports. The ERT recommends that for its next submission Italy introduce standard lifetimes for all types of equipment into the model and use assumptions about the level of gas reclaiming, based on existing legislation and its	We plan to improve estimates in the next submission when data collected in the framework of the European regulation on F-gases will be available.

		implementation. In addition, the ERT recommends that Italy consider the imports and exports of fluorinated gases in the equipment in order to improve the accuracy of the estimates.	

Other improvements not identified during the review process have been carried out. In particular, the time series of HFC consumption has been revised since 2007 on the basis of information collected from industry during the preparation of emission scenarios and the demonstrable progress report.
Many QA/QC activities adopted in the preparatory period of the 2007 and 2008 National Inventory submission led to various improvements regarding fluorinated gases estimation. In the last years, in order to update the government's strategy to achieve Italy's emissions reduction target under the Kyoto Protocol, the GHG emission projections up to 2010 and 2020 have been implemented. This activity has involved all relevant industries, which produce or use fluorinated gases, to supply projections for the future; in some cases the industries have also revised data provided for previous National Inventory submissions. In particular, Solvay Solexis, which is the only national producer and provides trends about the consumption of HFCs per gas and per final use, has revised data from 1996 to 2005 for some substances. Detailed explanation, together with recalculation, is reported in the NIR 2007.
In October 2006, the internal review of the EU-15 GHG inventory, which is an important element of the QA/QC programme for the inventory of the European Community activities, and for Member States as well, regarded specific sectors, e.g. 2C, 2E and 2F. The review process has identified that Italy does not estimate PFC potential emissions and made a recommendation for future submissions. As known, potential emissions are calculated as 'Production + Imports - Exports - Destruction'. Thus, the national producer Solvey Solexis has been contacted in order to investigate available data on production, import and export. Data on destruction are not available, but, as mentioned in the IPCC Guidelines, destruction of HFCs and PFCs may be technically difficult and thus not so practised. Regarding PFC production, Solvay Solexis has confirmed that no production occurs in Italy. As a consequence, this assumption has been applied for the 2007 National Inventory submission: exports are negligible, whereas imports are equal to the amount treated by semiconductor manufactures that use these substances. However, verification on importer and exporter in national territory is planned for future submissions on the basis of data collected in the framework of the EU F-gases regulation.
Furthermore, in the framework of the disaggregation of national emissions at provincial level with reference to the 2005 emissions, production data have been collected at a detailed level from the industrial category association and checked with the official statistics supplied by ISTAT.

III. Planned improvements and QA activities

Planned improvements mainly focus on the improvement of EFs and AD by means of a detailed sectoral analysis of the national EPER and Emissions Trading data for all the industrial sectors. We plan to integrate the documentation collected in the framework of the different European Directives (EPER, Large Combustion Plants and Emission Trading Scheme) in a unique database with the aim to verify emissions and activity data reported for the same year under different reporting obligations and identify possible improvements in emission estimations.

As for the QA activities of the sector, emission estimates and methodologies were presented to the Italian stakeholders, in a workshop held in October 2006 dedicated to the Italian emission inventory, and in two events in 2007 in the framework of the national conference on climate change.

The implementation of verification activities especially regarding F-gas emissions are planned for future submissions on the basis of data collected in the framework of the EU F-gas regulation.

In particular, further investigation on fire extinguishers is planned as well on the activity levels of other companies possibly involved in the import/export of fluorinated gases.

QA/QC Solvent and other product use
2007 activities and future improvements

Prepared by: Eleonora Di Cristofaro, Riccardo De Lauretis

April, 2008

National Air Emission Inventory: Solvent and other product use

I. Objective

The improvements carried out during the preparation of the 2008 national inventory submission for the solvent sector and those expected for the next future are summarised in the following.

II. Improvements

In the following table, the specific planned improvements and remarks to be taken into account in the future submissions of the national air inventory for the solvent and other product use sector are reported. The improvements carried out during the 2008 submission regarded some update of activity data for the last years and the correction of an error detected in 2005 calculation of emissions for some processes.

	Sub-category	**NMVOC Emission**	**Activity data**	**Emission factor**
Paint application	Construction and buildings	11%		Check the constant trend of EF in accordance with the Decopaint European Directive
	Domestic use	9%	Update time series	
	Coil coating	0%	Update time series	
	Boat building	1%	Updating time series	
	Other industrial	10%	Update time series	
	Updating of the time series of apparent consumptions of paints. We are investigating if alternative sources of information are available, such as import export statistics supplied by ISTAT[1] .			
	Check of average EFs and their possible reduction for paint application, especially in construction and buildings, on the basis of data collected in the framework of the Decopaint EU Directive.			
Degreasing, dry cleaning and electronics	Metal degreasing	4%	Update information, from Federchimica[2], on activity data and emission factor (these values have been found in literature, but should be reconsidered for new plants).	

In the second table, emission sources of the sector are listed and information is supplied regarding the need of future improvements.

[1] National Statistics Institute

[2] National chemical industrial association

Future improvements	Cumulative percentage	NMVOC emissions	Sub-categories	Categories
	28%	28%	Domestic solvent use	Other use of solvents and related activities
	39%	11%	Paint application : wood	Paint application
✓	50%	11%	Paint application : construction and buildings	Paint application
✓	59%	10%	Other industrial paint application	Paint application
✓	68%	9%	Paint application : domestic use	Paint application
	73%	5%	Application of glues and adhesives	Other use of solvents and related activities
	77%	4%	Printing industry	Other use of solvents and related activities
✓	81%	4%	Metal degreasing	Degreasing, dry cleaning and electronics
	85%	4%	Leather tanning	Chemical products manufacturing or processing
✓	88%	3%	Paints manufacturing	Chemical products manufacturing or processing
	91%	3%	Paint application : car repairing	Paint application
	92%	2%	Paint application : manufacture of automobiles	Paint application
	94%	1%	Fat, edible and non edible oil extraction	Other use of solvents and related activities
	95%	1%	Rubber processing	Chemical products manufacturing or processing
		1%	Pharmaceutical products manufacturing	Chemical products manufacturing or processing
✓		1%	Paint application : boat building	Paint application
		1%	Inks manufacturing	Chemical products manufacturing or processing
		1%	Dry cleaning	Degreasing, dry cleaning and electronics
		0%	Polyurethane processing	Chemical products manufacturing or processing
		0%	Vehicles dewaxing	Other use of solvents and related activities
		0%	Glues manufacturing	Chemical products manufacturing or processing
		0%	Textile finishing	Chemical products manufacturing or processing
		0%	Polystyrene foam processing	Chemical products manufacturing or processing
✓		0%	Paint application : coil coating	Paint application
		0%	Glass wool induction	Other use of solvents and related activities
		0%	Polyester processing	Chemical products manufacturing or processing

QA/QC Agriculture
2008 activities and future improvements

Prepared by: Rocío D. Cóndor

April, 2008

National Air Emission Inventory: Agriculture

I. Objective

The sixth report describes activities and improvements carried out during the preparation of the national agriculture emission inventory - submission 2008 (section II). Moreover, responses to the review process recommendations are reported (section III and IV).

II. Activities and improvements

Since 2006 submission, results from the MeditAIRaneo project have been included in the preparation of the Agriculture emission inventory (GHG/CLRTAP). Besides, results from the convention signed between APAT and the Ministry for the Environment, Land and Sea have been incorporated.
Improvements for the Agriculture sector are described in detail in this section. Moreover, an internal APAT report describing the procedure for the preparation of the agriculture UNFCCC/CLRTAP emission inventory is under revision.

The Italian National Statistical System (SISTAN) revises every year the National Statistical Plan that covers three years. In this framework, the Agriculture, Forestry and Fishing Quality Panel (*Circolo Qualità Agricoltura, Foreste e Pesca*) has been established under the coordination of the Agriculture service of ISTAT. Through this process different improvements at activity data level have been reached in the last years.

In the future, the implementation of an *ad hoc* survey on "Agricultural Production Methods", regulated by the European Commission will be crucial for improving the preparation of the national agriculture emission inventory (GHG/CLRTAP). This survey will be carried out during the 2010 Agricultural Census in Italy. Detailed data such as animal grazing information, animal housing and storage systems characteristics, and use of manure/slurry for land application information will be collected. Already, initial efforts have been oriented to collect these data at provincial level through the incorporation of specific queries in the Farm Structure Survey (FSS) from 2005 and 2007 (see Table 1). APAT is coordinating with the Agriculture Services of ISTAT to incorporate the Italian peculiarities of agricultural production in this survey.

In Table 1, a list with the different activities developed for the 2008 submission and future improvements are described.

Category	Sub-category	Parameter	Years		Activities
			2008	2009	
General	Activity data	Population	√		Data from 2001, 2004 and 2005 have been updated according to ISTAT publications.
	Activity data	Surface/production	√		According to the last update from ISTAT, we have updated activity data from 2004 (rice), 2005. Data from 2006 have been collected (ISTAT web site)
	Activity data	Milk production	√		Milk production data 2006 have been collected (ISTAT web site)
	Activity data	Fertilizer	√		Data from 2006 have been collected (ISTAT web site)
Enteric fermentation	Dairy cattle	Fat content	√		Data from 2006 fat parameter have been collected (ISTAT web site)
	Dairy cattle	Portion cow giving birth	√		Data AIA web site for 2006 have been collected
	Dairy cattle/buffalo	Milk production	√		Data from 2006 on milk production have been collected (ISTAT web site)
	Cow buffalo	Emission factor	√		A reporting error has been detected in the estimation of the buffalo CH_4 enteric fermentation emission factor. The time series 1990-2005 has been corrected.
	Buffalo	Bo parameter	√		A reporting error has been detected in the estimation of Bo parameter for the buffalo category. The time series 1990-2005 has been corrected.
Manure Management	Livestock categories	Type of housing		√	A query on the type of housing of different livestock categories has been introduced in the **Farm and Structure Survey** 2005 (FSS 2005). Results need to be further analysed and are expected to be incorporated in a coming submission.
	Livestock categories	Slurry and solid manure storage facilities		√	We expect to get more detailed data from the Farm and Structure Survey 2007, where a query related to storage facilities for slurry and solid manure have been incorporated.
	Livestock categories	Type of housing	√		We have incorporated results from an APAT/MINAMBIENTE convention related to ammonia reduction for swine and poultry (CRPA, 2006[b])
	Livestock categories	Biogas	√		Data on biogas have been collected for 2006 (web site TERNA)
	Non Dairy: Less one year for slaughter category	Weight	√		The parameter: weight for the category included in the non-dairy cattle of less than one year for slaughter has been updated.
Rice cultivation	Activity data	Days of cultivation and cultivars	√		Update data 2004, 2005 and collected 2006.
	Rice	Emission factor		√	We have to control if new measurements on paddy fields have been developed in the last years
	Activity data	Cultivated surface	√		Update of activity data. Personal communication with ENR. Update data from 2004, 2005 and collected 2006.
Agricultural soils	Direct emissions	Sewage sludge		√	Appropriate activity data needs to be refined, till now emissions are estimated in the waste sector (Wastewater Handling - N_2O from human sewage).
	Activity data	Fertilizer		√	Verify outcomes from APAT/MINAMBIENTE project for the use of slow release fertilizers.
Residues burning	Activity data	% cereal crop residue burnt	√		Data from the **Farm and Structure Survey** 2003 (FSS 2003) has been used to verify the surface where agricultural residues burning are practised. Further explanations can be found in the NIR submission 2008.

Table 1. Improvements for the Agriculture emission inventory (GHG/CLRTAP)

III. Individual review process recommendations

In Table 2, responses to the recommendations from the "*Report of the individual review of the greenhouse gas inventory of Italy*" which took place in June 2007 are reported (see FCCC/ARR/2006/ITA; 10 December[3]).

Par.	Subject	Description	Response
56	Sector overview	The ERT encourages Italy to make further efforts to develop dynamic country-specific EFs across the time series for dairy cattle and to take into account available statistical information in line with the IPCC good practice guidance.	Initial verification on the availability of data has been carried out.
60	Sector overview	Further information in the NIR explaining the trend fluctuations and justifying the country-specific parameters used would further enhance the overall transparency of the reporting within the sector.	Since NIR submission 2007, additional explanations as required by the ERT have been added.
61	Sector overview	However, the ERT recommends that further attention be given to the documentation of recalculations carried out in the sector, including further details on methodological changes and justification of these changes, in both the NIR and CRF table 8(b).	Recalculations on emissions estimations have been included in the CRF, explanations are reported in the NIR and in the QA/QC Agriculture.
62	Sector overview	The ERT encourages further implementation of the QA/QC plan in the sector, further steps to improve uncertainty analyses for the agriculture sector, and documentation of the verification process from peer review	In the 2009 submission, uncertainty analyses will be incorporated where information is available (e.g. rice cultivation).
63	Enteric fermentation	The ERT recommends that Italy consider using a higher-tier methodology for the estimation of emissions from the category sheep, which is significant	Data collection required for estimating sheep category with Tier 2 is necessary. Therefore, an initial verification of parameters and activity data will take place.
63	Enteric fermentation	The ERT advises that Italy clearly specify in its next NIR the data sources, the criteria for their choice, the way the AD are collected and the influence of the AD trend on emissions.	Since the 2007 submission, information on activity data used for the inventory preparation is described.
65	Manure management – CH_4	The ERT recommends that Italy apply the same information for animal populations split across all categories in the agriculture sector in its next submission, since currently different levels of aggregation for cattle are applied in enteric fermentation and manure management.	This suggestion has been considered and improved the 2008 submission and NIR.
66	Manure management – N_2O	The ERT also recommends that Italy reconsider the use of notation keys in CRF table 4.B(b). For example, for other AWMS (chicken-dung drying system) for poultry for the period 1990.1994, .not applicable. (.NA.) should be replaced with the appropriate notation key.	This suggestion has been considered and improved the 2008 submission and NIR.
67	Direct soil emissions - N_2O	The ERT encourages Italy to develop country-specific EFs according to the available country-specific data on N sources.	Country specific data are already being used for estimations. Further efforts will be done for improving, where information is available.
69	Pasture, range and paddock manure . N_2O	The ERT recommends that Italy highlight the factors affecting the trend, the circumstances of collection of the AD and the criteria for choosing the AD.	This suggestion has been considered and improved the 2008 submission and NIR.
71	Rice cultivation	The change of the methodology is not reflected in the uncertainty analysis and the ERT recommends that Italy update the uncertainty values for	This suggestion has been considered and will be improved in the submission 2009.

[3] http://unfccc.int/resource/docs/2007/arr/ita.pdf

		country-specific EFs and AD (e.g. irrigated area), reflecting the revised methodology, in its next NIR.	
73	Field burning of agricultural residues . CH_4 and N_2O	The ERT welcomes Italy's efforts to estimate emissions from this category, considering that the activity is illegal in the country and that data are difficult to collect. The ERT recommends that Italy estimate emissions only from regions where this activity takes place as farming practice for its next submission.	This suggestion has been considered and improved the 2008 submission. Verification has been carried out with data coming from the National Institute of Statistics (ISTAT) – **FSS 2003**.

Table 2. Response to the Individual Review Process recommendation document

IV. Initial report recommendations

In Table 3, responses to recommendations from the "*Report of the review of the initial report of Italy*" which took place in June 2007 is reported (see FCCC/IRR/2007/ITA; 10 December 2007 [4]).

Par.	Subject	Description	Response
72	Sector overview	The ERT recommends that Italy in its next NIR improve explanations on decisions with regard to the use and choice of data sources, especially for the base year. The ERT believes that a consistent dataset should be used to avoid increasing the uncertainty of the estimates.	Since the 2007 submission, information on activity data used for the inventory is described.
73	Sector overview	The ERT encourages Italy to make further efforts to develop dynamic country-specific EFs across the time series for dairy cattle and to take into account available statistical information in line with the IPCC good practice guidance.	Verifications will be implemented.
74	Sector overview	Further information in the NIR explaining the trend fluctuations and justifying country-specific parameters used would further enhance the overall transparency of the reporting within the sector.	Since NIR submission 2007 additional explanations, as required by the ERT, have been added.
75	Sector overview	ERT recommends further attention to the documentation of conducted recalculations in the sector, including further details on methodological changes and justification of these changes	Since the 2006 submission, documentation is available through a database.
76	Sector overview	The ERT encourages further implementation of the QA/QC plan in the sector and further steps to improve uncertainty analyses and documentation of verification processes from peer-review	In the 2009 submission uncertainty analyses will be incorporated where information is available (e.g. rice cultivation).
77	Enteric fermentation	The ERT advises that Italy clearly specify the data sources, the criteria for their choice, the way the AD are collected and the influence of the AD trend on the emissions in its next NIR.	Since the 2007 submission, information on activity data used for the inventory is described.
79	Manure management – CH_4	The ERT recommends that Italy apply the same information for the animal population split across all categories in the agriculture sector in its next submission, since currently different levels of aggregation for cattle are applied in enteric fermentation and manure management.	This suggestion has been considered and improved the 2008 submission and NIR.
80	Manure management – N_20	The ERT also recommends that Italy reconsider the use of notation keys in CRF table 4.B(b), for example, for other AWMS (chicken-dung drying system) for poultry for the period 1990−1994, where not applicable (.NA.) should be replaced with the appropriate notation key.	This suggestion has been considered and improved in the 2008 submission and NIR.
81	Direct soils- N_2O	The ERT encourages Italy to develop country-specific EFs according the available country-specific data of N sources.	Country specific data are already being used for estimations. Further efforts will be done for improving, where information is available.

[4] http://unfccc.int/resource/docs/2007/irr/ita.pdf

83	Indirect soil emissions . N_2O	The ERT welcomes the efforts made by Italy to develop country-specific parameters and recommends that Italy improve documentation on how the country-specific parameters were developed in its next NIR.	Country specific data are already being used for estimations. Further efforts will be done for improving, where information is available.
84	Rice cultivation	The change of the methodology is not reflected in the uncertainty analysis and the ERT recommends updating uncertainty values for country-specific EFs and AD (e.g. irrigated area) reflecting the revised methodology in Italy's next NIR.	This suggestion has been considered and will improve the 2009 submission.
86	Field burning of agricultural residues . CH_4 and N_2O	The ERT welcomes Italy's efforts to estimate emissions from this category, considering that the activity is illegal in the country and that data are difficult to collect. The ERT recommends that Italy estimate emissions only from regions where this activity takes place as farming practice for its next submission.	This suggestion has been considered and improved this submission. Verification has been implemented with data coming from the National Institute of Statistics (ISTAT) – **FSS 2003**.

Table 3. Response to the Initial Report Review Process recommendation document

QA/QC LULUCF
2008 activities and future improvements

Prepared by: Marina Vitullo

April, 2008

National Air Emission Inventory: LULUCF

I. Objective

The report summarizes the improvements and remarks, which have been identified during the preparation of the 2008 inventory submission for the LULUCF sector.

II. Improvements

In the following, specific improvements and remarks to be taken into account in the next submission of the national air inventory for LULUCF sector are reported.

Forest land (5A)
Since the 2007 submission, preliminary results of the first inventory phase of the Second Italian National Forest Inventory, consisting in interpretation of orthophotos, were used as input data for the model, in carbon stocks. This source of information refers to the year 2002. The final results of the new forest inventory will allow a more precise evaluation of the estimated time series, in order to reduce the related uncertainty. Data collection in the new national forest inventory should also allow an accurate analysis of aboveground - litter carbon amount relationship, in order to find the most appropriate mathematical representation.
The 'National Registry for Carbon sinks', instituted by a Ministerial Decree on 1st April 2008, is part of the Italian National System and includes information on units of lands subject of activities under Article 3.3 and activities elected under Article 3.4 and related carbon stock changes. The National Registry for Carbon sinks is the instrument to estimate, in accordance with the COP/MOP decisions, the IPCC Good Practice Guidance on LULUCF and every relevant IPCC guidelines, the greenhouse gases emissions by sources and removals by sinks in forest land and related land-use changes and to account for the net removals in order to allow the Italian Registry to issue the relevant amount of RMUs. Activities planned in the framework of the National Registry for Forest Carbon Sinks should also provide data to improve estimate of carbon sequestration due to Afforestation/reforestation activities (with a special focus on soil organic content), and should allow to refine the estimate of forest land category.
A specific procedure undertaken for improving the inventory regards the establishment of national expert panels which involve, on a voluntary basis, different institutions, local agencies cooperating for improving activity data and emission factors accuracy.

Specifically, for the LULUCF sector, following the election of the 3.3 and 3.4 activities and on account of an in-depth analysis on the information needed to report LULUCF under the Kyoto Protocol, a Scientific Committee, *Comitato di Consultazione Scientifica del Registro dei Serbatoi di Carbonio Forestali,* constituted by the relevant national experts has been established by the Ministry for the Environment, Land and Sea in cooperation with the Ministry of Agriculture, Food and Forest Policies; the principal aim of the panel is the formalisation of Kyoto network, for the acquiring and elaboration of data needed for the reporting activities.
An expert panel on forest fires has been set up, in order to obtain geographically reference data on burned area; the fraction of CO_2 emissions due to forest fires, now included in the estimate of the forest land remaining forest land, will be pointed out in the next submission.
In addition to these expert panels, APAT participates in technical working groups, denominated *Circoli di qualità*, within the National Statistical System (Sistan). Concerning LULUCF sector, this group, coordinated by the National Institute of Statistics, is constituted by both producers and users of statistical information with the aim of improving and monitoring statistical information for forest sector. These activities should improve the quality and details of basic data, as well as enable a more organized and timely communication.
Carbon stocks change due to land converting to Forest Land has been estimated and reported since the 2007 submission, as anticipated in the "2005 Quality Assurance/Quality Control plan for the Italian Inventory[5]". In the next submissions, an upgrade of the used model is foreseen to achieve the abovementioned improvements and to obtain more accurate estimates of the carbon stored in the dead wood, litter and soil pools, using the outcomes of the national forestry inventory.

Cropland (5B)
In the next submission, estimates of carbon change in cropland biomass will be provided at a higher disaggregate level, with the subdivision of the activity data in the main categories of woody cropland (orchards, citrus trees, vineyards, olive groves); in particular, specific coefficients for aboveground woody biomass and harvest cycles in cropping system containing perennial species, representative of the Mediterranean area, will be looking for, with the purpose to use them in the estimation improvement process.
The research project SOILSINK, financed by the Italian Ministry for University and Research, has the purpose of studying the climate change impact on carbon stocks in the agro-forestry sector; hopefully this project will contribute to a better characterisation of agricultural soil, in terms of impact, on carbon stocks, of different management practices.
The research project AGRIT, carried out by the Italian Ministry of Agriculture (MIPAF), will be useful to supply data on land use change, with a special focus

[5] APAT 2005, *Quality Assurance/Quality Control plan for the Italian Inventory*

on *Cropland* transition. A study, with the participation of National Statistics Institute, and MIPAF members, has been undertaken to compare AGRIT outcomes with the future data of the new forest inventory, in order to supply ancillary information on confidence level of the AGRIT data and to provide an integrate estimate of crops and forestry area.
Concerning the areas in transition to *Cropland*, investigation will be done to obtain additional information about the final crop types, to obtain a more precise estimate of the carbon stocks change.
Activities planned in the framework of the National Registry for Forest Carbon Sinks should also provide data to improve estimate of carbon sequestration due to Afforestation/reforestation activities (with a special focus on soil organic content), and should allow to refine the estimate of soil organic content in cropland category.

Grassland (5C)
Concerning land in transition to *Grassland*, further investigation will be made to obtain additional information about different types of management activities on *Grassland*, and the crop types of land converting to grassland, to obtain a more accurate estimate of the carbon stocks change. Activities planned in the framework of the National Registry for Forest Carbon Sinks should also provide data to improve estimate of carbon sequestration due to Afforestation/reforestation activities (with a special focus on soil organic content), and should allow to refine the estimate of soil organic content in grassland category.

Wetlands (5D)
The acquirement of data about flooded lands will allow, in next submission, to implement GPG method to estimate CO_2, CH_4 and N_2O emissions from flooded lands.

Settlements (5E)
In 2006 submission a *Settlements* time series has been developed from *Corine Land Cover*[6] data; changes in living biomass soil carbon stocks from land converting to settlements have been estimated in the latest submission; studies will be done to obtain additional statistics about *Settlements* and urban trees formation, in order to provide carbon stocks estimates. Moreover improvements will concern acquirement of data adequate to estimate carbon stocks changes in dead organic matter for land converting to *Settlements*.

Biomass Burning (5(V))
The forest fires expert panel plan to obtain geographically reference data on burned area; the overlapping of land use map and georeferenced data should assure the estimates of burned areas in the different land uses. The fraction of

[6] Corine Land Cover Programme: http://www.clc2000.sinanet.apat.it/cartanetclc2000/

CO_2 emissions due to forest fires, now included in the estimate of the forest land remaining forest land, will be pointed out in the next submission. Estimates on CO_2 release from *Grassland* fires will be also supplied. Activities planned in the framework of the National Registry for Forest Carbon Sinks should also provide data to improve estimate of estimate of emissions by biomass burning.

QA/QC Waste
2007 activities and future improvements

Prepared by: Barbara Gonella

April, 2008

National Air Emission Inventory: Waste

I. Objective

This report summarises the improvements, which have been identified during the preparation of the 2008 inventory submission for the waste sector.

II. Improvements in 2008 submission

An error has been detected in the industrial waste water sector on the unit of beer activity data; this error applies for the whole time series. In general, 2005 activity data have been updated especially for industrial waste incineration.

Solid waste disposal on land

During 2007-2008, in order to update the government's strategy to achieve Italy's emissions reduction target under the Kyoto Protocol, the GHG emission projections for 2010 and 2020, specifically for waste management, have been implemented. A complete scheme of waste management has been reconstructed on the basis of national regulations and policies planned for the future, for the waste sector as well energy sector. Energy production data from waste, such as biogas from landfills and wastewater treatment plants and energy from waste incinerators, coming from different sources of information and reported in different units, have been compared and checked.

Waste incineration

A study on the top-down approach to the preparation of local inventories was conducted and Italian emissions for different local areas were derived for the years 1990, 1995 and 2000. The results were checked out by regional and local environmental agencies and authorities (the last comparison has been performed in 2006) in order to find out the main weak points and contribute with information available to characterise the local environment, this contributing as well as a feedback to the improvement of the National Inventory. Moreover, in 2008, the top-down disaggregation of the National Inventory, for the year 2005, is being finalized. This activity has been carried out all together with the preparation of the 2008 GHG inventory submission suggesting some improvements in the waste incineration plants database.

III. Planned improvements and QA activities

With the aim to share methodologies and improve the knowledge at national and local level, an expert panel on waste is planned.

Solid waste disposal on land

Other improvements are expected due to the entering in force of the Landfill Directive 1999/31/EC. The application of the Directive could implement the availability of data regarding the main parameters influencing the estimation of emission from landfills:

- waste composition;
- fraction of methane in the landfill gas;
- amount of landfill gas collected and treated.

The Landfill Directive has been transposed in the national legislation by the Legislative Decree 13 January 2003, n° 36. From July 2005 all the landfills should be in compliance with the new legislation: thus, it is expected that every year, starting at least from July 2006, all the Regions will receive from each landfill the information reported above. These parameters could be available thanks to the Ministry for the Environment, Territory and Sea that has the authority to ask the Regions to provide this information.
These improvements will regard submissions not before 2009.

Wastewater handling

In the following, remarks on possible improvements in future submissions are reported.
CH_4 emissions from industrial wastewater are estimated from the organic content, once known the wastewater production for each industrial sector and the specific COD. It is assumed that 15% of industrial wastewaters are treated in anaerobic systems, as indicated in the IPCC guidelines, but there is no information on whether the wastewater plant is a:

- on site plant;
- off site plant (depuratori consortili);
- municipal wastewater plant.

In Italy many industries discharge in the same sewage collector as municipal wastewaters. Alternatively, some industries that are located in the same area can discharge in a dedicated plant, specific for industrial wastewaters (i.e. Cuoiodepur).
In the first case, CH_4 emissions have been already estimated in Domestic and Commercial sector. For this reason a double counting could be expected.
Regarding off site plants (depuratori consortili), a survey is conducting by Federgasacqua: some information could be available on type of wastewaters treated, equivalent inhabitants and type of biological treatment (aerobic or anaerobic). At this step, only industrial wastewaters that are treated directly in the industrial plant (on site) remain.
Some improvements could also come from the analysis of EPER/E-PRTR data.

Waste incineration

As reported for solid waste disposal on land, the waste composition is very important to improve CO_2 emission factor on the basis of carbon content. As reported above, in order to update the government's strategy to achieve Italy's emissions reduction target under the Kyoto Protocol, the GHG emission projections for 2010 and 2020, specific to waste management, have been prepared. As a consequence, a focus on waste management and how this could influence the waste composition is expected. These improvements are linked with those regarding solid waste disposal on land and the collection of new information on waste composition.

Compost production

In 2008, the attendance at national Conferences and Workshops on waste sector has helped contacts with experts in composting plants: a comparison between data reported in the National GHG Inventory and data carried out by these experts is planned for the next submission, especially for CH_4 emission factor and the input percentage of waste treated as compost in mechanical-biological treatment plants.