

**UNITED
NATIONS**



**Economic and Social
Council**

Distr.
GENERAL

CEIP/S3.RR/2009/IE
21/08/2009

ENGLISH ONLY

**Report for the Stage 3 in-depth review of emission inventories
submitted under the UNECE LRTAP Convention and EU
National Emissions Ceilings Directive for:**

IRELAND

CONTENT

IRELAND	1
INTRODUCTION	3
PART A: KEY REVIEW FINDINGS.....	4
Inventory submission.....	4
Key categories	4
Quality.....	4
Transparency	4
Completeness	5
Consistency, including recalculations and time-series.....	5
Comparability.....	5
CLRTAP/NECD comparability.....	6
Accuracy and uncertainties	6
Verification and quality assurance/quality control approaches	6
Follow-up to previous reviews	6
Areas for improvements identified by Party	6
PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY	8
Cross cutting improvements identified by the ERT.....	8
Sector specific recommendations for improvements identified by ERT	9
Energy.....	9
Mobile sources	12
Industrial processes.....	14
Solvents.....	16
Agriculture	18
Waste	20
List of additional materials provided by the country during the review.....	23

INTRODUCTION

1. The mandate and overall objectives for the emission inventory review process under the LRTAP Convention are given by the UNECE document ‘Methods and Procedures for the Technical Review of Air Pollutant Emission Inventories reported under the Convention and its Protocols’⁽¹⁾ – hereafter referred to as the ‘Methods and Procedures’ document.
2. This annual review has concentrated on SO₂, NO_x, NMVOC, NH₃, plus PM₁₀ & PM_{2.5} with optional review of Cd, Pb and Hg for the time series years 1990–2007 reflecting current priorities from the EMEP Steering Body and the Task Force on Emission Inventories and Projections (TFEIP).
3. This report covers the stage 3 centralised review of the UNECE LRTAP Convention and EU NEC Directive inventories of Ireland, coordinated by the EMEP emission centre CEIP acting as review secretariat. The review took place from 22nd June 2009 to 25th June 2009 in Copenhagen, Denmark, and was hosted by the European Environment Agency (EEA).
4. The following team of nominated experts from the roster of experts performed the review: Lead Reviewer – Chris Dore (UK), Generalist – Jean-Pierre Chang (France), Energy – Stephan Poupa (Austria), Mobile – Michael Kotzulla (Germany), Industrial Processes – Kees Peek (Netherlands), Solvents – David Kuntze (Germany), Agriculture & Nature – Hakam Al-Hanbali (Sweden), Waste – Celine Gueguen (France).
5. The review was coordinated by Chris Dore and Katarina Marečková, (EMEP Centre on Emission Inventories and Projections – CEIP).

¹ Methods and Procedures for the Technical Review of Air Pollutant Emission Inventories reported under the Convention and its Protocols. Note by the Task Force on Emission Inventories and Projections. ECE/EB.AIR/GE.1/2007/16 <http://www.unece.org/env/documents/2007/eb/ge1/ece.eb.air.ge.1.2007.16.e.pdf>

PART A: KEY REVIEW FINDINGS

INVENTORY SUBMISSION

6. Within the 2009 submission, Ireland has reported emissions for its Protocol base years 1987 and 1990, but not for 1980 (as the reference year for the 1994 Sulphur Protocol). Ireland explained during the review that the 1980 inventory has not been recalculated and resubmitted because of the lack of new information on activity data for 1980. For pollutants under its Protocols as well as for CO the full time series 1990–2007 is submitted, and also a 2000–2007 time series for TSP, PM₁₀ and PM_{2.5}.

7. Ireland submitted a detailed IIR including most of the required information in the new IIR structure. The Party informed the ERT that Ireland's 2009 IIR is the first such report under the LRTAP Convention and that they will try to improve this report. The ERT welcome this improvement, and recommend that Ireland refer to the new IIR recommended structure when undertaking improvements for the next submission.

8. The CLRTAP inventory submitted by Ireland is of good quality and is, in general, well documented in the IIR.

KEY CATEGORIES

9. Ireland has compiled and presented in its IIR a tier 1 Key Category Analysis (KCA) for emission levels. The ERT recommends that Ireland also implement a KCA for trends (if not already done) and report this in their IIR. The KCA from Ireland is the same as that from CEIP analysis (except the threshold, which is 95% for IE, and 80% for CEIP).

QUALITY

Transparency

10. The ERT recognises the level of effort undertaken by Ireland in providing an inventory with a significant level of detail. The IIR report includes a specific, and detailed, chapter for the different NFR sectors (NFR sectors 1 to 6). This includes information on EFs, activity data and references. The ERT compliment Ireland on this.

11. Ireland uses zero-values in relatively few cases in the reporting tables (mostly for reporting HMs). The ERT encourages Ireland to replace the few remaining 0s with appropriate notation keys where estimates are not available, or not applicable.

12. Information explaining the use of notation key IE (Included Elsewhere) is not provided in NFR tables IV 1F nor in IIR. The ERT strongly encourages Ireland to provide such information for better transparency of the inventory, and to investigate whether it is possible for future submissions to report these emissions in the appropriate NFR categories.

Completeness

13. The ERT acknowledges the effort to which Ireland has gone to provide estimates of emissions for all sectors and all pollutants reviewed, and compliments them on their achievement.

14. Ireland's inventory (for the pollutants reviewed) is generally complete. There are not many "NE" (Not Estimated) notation keys used in NFR tables (the most are for PM). However, explanations for the "Not Estimated" sources are not reported in NFR tables (tables IV 1F) nor in the IIR section on completeness. The ERT encourages Ireland to provide explanations for using this notation key in the IIR, and to include descriptions of plans to estimate these sources/pollutants in the future.

Consistency, including recalculations and time-series

15. Ireland has undertaken a recalculation of the complete time series since 1990 and for 1987 within their 2009 submission and has provided in each sector chapter of the IIR detailed data on recalculation. This is to be commended. At national level totals, recalculations are important (giving rises to changes of more than 10%) only for NMVOC, PM, Cd and Hg. The Hg time trend is particularly impacted by the recalculation. The ERT strongly encourages Ireland to provide complementary information in their IIR on recalculations, particularly for combustion sources. This could include the reasons for the changes, and the impacts on the emission trends.

16. The largest jumps, dips or fluctuations flagged from the S&A trend analysis are either explained within the IIR, or with complementary explanations given by the Party during the review week. The ERT recommends that, where needed, Ireland include in their IIR the explanations on time series consistency issues which were provided to the ERT during the review week. The ERT also recommends that the problem with 1A3bii HDV NMVOC in 2001, which was pointed out during the review week, be corrected.

Comparability

17. The change of the NFR format for 2009 submissions was published rather late (Decision on Dec. 2008), leaving little time for countries to implement the new NFR 2008 format. Ireland (and most other countries) did not have enough time to update the format of their submission. Nevertheless, during the review, Ireland informed the ERT that they will consider using NFR08 for their submission in 2010. Ireland also flagged potential difficulties associated with using the "flat file" format and aggregated levels. The ERT recommends that Ireland implement the NFR08 format as completely as possible, including the reporting of activity data (whilst noting that using the new NFR08 reporting nomenclature implies that emissions will no longer be reported at intermediate aggregated NFR levels).

CLRTAP/NECD comparability

18. From the LRTAP versus NECD comparison in the S&A, some significant differences are reported between Ireland's LRTAP submission and NECD submission (between -9.5% to 7.1% according to years and pollutants). During the review, Ireland explained that differences are mostly due to aviation emissions and also that the 2007 inventory for the NECD was provisional on the 31st Dec 2008 whilst the 2007 inventory for LRTAP was finalised on the 15th Feb 2009. This raises the point that there is no process for resubmission (during the same year submission) for the NECD dataset if better estimates are available by February. The ERT are keen to encourage Ireland to submit NECD and LRTAP data which are consistent, but are sympathetic to this problem. The ERT are not able to propose a specific solution, but the issue will be raised for more general discussion with the relevant individuals.

Accuracy and uncertainties

19. Ireland did not provide systematic quantitative estimates of uncertainties. However, during the review, Ireland informed the ERT that they hope to implement the guidance given in the EMEP/EEA Guidebook 2009 on Uncertainties, in its next submission in 2010. They intend to start with the "main pollutants". The ERT welcome this planned improvement to the emissions inventory, and commend Ireland on their willingness to implement improvements.

Verification and quality assurance/quality control approaches

20. Ireland have developed and implemented a good quality assurance/quality control (QA/QC) plan, which includes a good framework and general QA/QC procedures. Some sector specific checks are conducted on activity data, but the ERT encourages Ireland to increase the number of sector specific checks that are conducted, with particular focus on the Energy sector emissions, and EFs in general.

FOLLOW-UP TO PREVIOUS REVIEWS

21. Due to the quality of the IIR and Party's responsiveness, the ERT were able to review the inventory in detail and provide a number of detailed recommendations. The ERT would like to thank Ireland for their help through the review process.

AREAS FOR IMPROVEMENTS IDENTIFIED BY PARTY

22. The IIR includes information on planned improvements, at a sectoral resolution. For example, Ireland plans to improve EFs with the availability of the new EMEP/EEA Guidebook, and in particular more completely take into account technology changes across the time series. The ERT warmly welcomes this.

23. During the review, Ireland identified some areas for improvement: They will consider using the new NFR 2008 format, they will investigate changing their IIR by using the most recently available guidance, and they will also consider using the latest version of COPERT IV (6.1 or upper) to estimate road transport emissions. Ireland also indicated that they aim to apply a higher tier methodology to residential combustion, and to improve the completeness of the waste sector (estimating main pollutants). The ERT welcomes these planned improvements, and commends Ireland on their efforts to continue to improve their emissions inventory.

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

CROSS CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

24. The ERT identified the following cross-cutting issues for improvement:
25. Implementing the new NFR 2008 format, including activity data, and including explanations for the use of notation keys (especially IE and NE), etc.
26. Applying as closely as possible the new recommended structure for the IIR: annexes; section on “General assessment of completeness”, etc.
27. Including more information in the IIR. In particular, including the information provided to the ERT which explains the time series consistency, including the impacts of recalculations on national totals and trends. There are also a number of sector specific recommendations for additions to the IIR included in the relevant sections of this report.
28. Addressing the few remaining 0s which should be replaced with appropriate notation keys where estimates are not available or necessary.
29. Including a Key Category Analysis of trend, as well as emission levels.
30. Fixing the problem of time series consistency for 1A3bii HDV NMVOC in 2001.
31. Implementing systematic uncertainty estimates and using the uncertainty analysis as a tool to focus planned improvements to the key categories.
32. The use of literature or UK based EFs is noted for a number of sources. The ERT encourage Ireland to try to develop and use country specific EFs for the largest sources where this is practical.
33. To continue incorporating high quality facility level data into the national estimates and to generate country specific emission factors.
34. Improvements relating to specific source categories are presented in the relevant sector sections of this report.

SECTOR SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY ERT

Energy

Review scope

Pollutants reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , PM ₁₀		
Years		1990–2007		
NFR Code	CRF_NFR Name	Reviewed	Not reviewed	Recommendation provided
1.A.1	Energy industries	x		yes
1.A.2	Manufacturing industries and construction	x		yes
1.A.4	Commercial, residential, agriculture & forestry	x		yes
1.A.5	Other	x		
1.B.1	Fugitive emissions from solid fuels	x		yes
1.B.2	Fugitive emissions from oil and natural gas	x		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

General recommendations on cross cutting issues

35. **Completeness:** The ERT consider the Energy sector to be **mostly** complete and comprehensive with good levels of detail in the methodology descriptions.

36. **Transparency:** Ireland uses some zero-values in the reporting tables. The ERT encourages Ireland to use the appropriate notation keys (e.g. NO where emissions are “Not Occurring”, NE where emissions are “Not Estimated” and IE where emissions are “Included Elsewhere”) for reporting where estimates are not available or necessary.

37. Ireland has provided a detailed and generally transparent emissions inventory. Estimates are provided at the most detailed level for all energy sectors. Ireland’s methodology and emission factors in the IIR are considered by the ERT to be transparent and well described for the Energy Sector.

38. **Uncertainty:** The ERT encourages Ireland to undertake uncertainty analysis for the Energy Sector in order to help support the improvement process and to provide an indication of the reliability of the inventory data.

39. **QA/QC procedures:** The Party has some basic QA/QC checks for activity data. The ERT encourages the Party to implement sector specific QA/QC procedures for emissions/emission factors.

40. **Recalculations:** Ireland has recalculated its inventory for all sectors in the year 2006. The IIR includes some explanation. The ERT encourages Ireland to provide also a more detailed rationale for the recalculations and the implication for trends in the Energy sector, and report this in its IIR.

41. **Improvement:** The ERT notes the Parties' intention to apply a higher tier method for category 1.A.4.b Residential plants, and commends Ireland for this.

42. 1.A.1.a Public Electricity and Heat Production – PM₁₀

43. The ERT notes that the estimates of PM₁₀ are based on CEPMEIP emission factors and that this is a key source, with about 30% contribution to the national total. Ireland responded that it intends to revise the PM emission factors in order to reflect abatement technologies. The ERT recommends that Ireland use a higher tier method, e.g. consider combustion and existing abatement technologies or use measurement data, as the ERT suspects that this source is significantly overestimated in the current version of the inventory.

1.A.1.a Public electricity and heat production – Natural gas – NO_x

44. The ERT notes that the IEF for natural gas of about 260 kg/TJ (page 31 of Ireland's IIR, figure 2.1) is higher than the upper limit of the Guidebook which is 180 kg/TJ. Ireland responded that this reflects the specific emissions of gas turbines. In this case the IEF seems reasonable to the ERT.

1.A.2 Manufacturing industries and construction – NO_x, CO

45. The ERT has noted that NO_x and CO emissions from Manufacturing Industries and Construction have been partly estimated by using a Tier 1 method. Ireland responded that for category 1.A.2.b non ferrous metals and coal and petrol coke used in cement and lime plants country specific emission factors are used for NO_x and CO estimates. The ERT encourages Ireland to quantify the estimates based on a tier 3 method in their future inventories.

1.A.4.a-b Commercial/institutional and residential plants – NO_x, CO, NMVOC, PM₁₀

46. The ERT has noted that Ireland applies a simple tier 1 methodology for this key source, using guidebook and CEPMEIP emission factors without consideration of technologies. Ireland responded that it plans to use higher tier methods in the future by considering different boiler and fuel types. The ERT strongly encourages the Party to improve the accuracy of this important key sources.

1.A.1, 1.A.2, 1.A.4 Stationary combustion plants – NH₃

47. The ERT has noted that Ireland reports NH₃ emissions from stationary combustion as "NO". Although it is not expected that these are key sources, the ERT recommends that Ireland estimate NH₃ emissions from these sources, or use the appropriate notation key "NE".

1.A.3.e Pipeline compressors – activity data (NO_x)

48. The ERT has noted that Ireland uses some kind of “residual” activity data of the energy balance as natural gas fuel consumption of pipeline compressors which leads to a volatile trend in NO_x emissions. The ERT encourages Ireland to use a bottom up approach or ask energy suppliers for activity data as this is an increasing source of NO_x emissions.

1.B.1 Fugitive emissions from solid fuels

49. The ERT has noted that Ireland reports fugitive NMVOC emissions from Solid Fuel Mining and Handling as “NO”. Ireland responded that the last coal mine closed in 1995 and that peat extraction is rather seen as “harvesting” than mining. The ERT encourages Ireland to include an explanation for these circumstances in their IIR. However the ERT encourages Ireland to include estimates of fugitive emissions (VOC, PM) from solid fossil fuels production under category 1.B.1.

Mobile sources

Review scope

Pollutants reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , CO, TSP, PM ₁₀ & PM _{2.5}		
Years		1990–2007 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not reviewed	Recommendation provided
1.A.2	Manufacturing industries and construction mobile sources	1.A.2.f ii		1.A.2.f (1.A.2.f ii)
1.A.3		x		1.A.3.b iii, v, vi, vii
1.A.4	Commercial, residential, agriculture & forestry mobile sources	x		mobile sources within 1.A.4
1.A.5	Other mobile sources	x		1.A.5.b
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

General recommendations on cross cutting issues

50. **Completeness:** The ERT considers the Transport Sector to be complete and comprehensive with good levels of detail in the methodology descriptions.

51. Ireland has provided a detailed and generally transparent emissions inventory. Estimates are provided at the most detailed level for the Transport Sector as well as most other sectors including mobile sources. Ireland's methodology and emission factors described in the IIR are mostly considered to be transparent and well described for the Transport Sector. For mobile sources included in sectors other than the Transport Sector, the ERT encourages the Party to fully implement the NFR08 nomenclature (especially for 1.A.2.f) and to include more detail in the IIR. For example, there is little information given on the 1.A.4 sub-sectors and no information on the 1.A.5.b sub sectors.

52. **Uncertainty:** The ERT encourages Ireland to undertake uncertainty analysis for the Transport Sector in order to help support the improvement process and to provide an indication of the reliability of the inventory data.

53. **QA/QC procedures:** The ERT consider the QA/QC procedures implemented by the Party to be quite good. It appears that there are specific procedures/checks for the Energy sector as a whole, but not for the Transport sub-sector in particular. The ERT encourages the Party to undertake continuous improvement, as is best practice.

54. **Recalculations:** Ireland has recalculated emissions from Road Transport as well as parts of the Aviation sector. However, the IIR does not include a comprehensive explanation. The ERT encourages Ireland to provide a more detailed explanation of the recalculations in the IIR, including the rationale, the impact on the sector and implications for trends in the Transport sector.

55. **Improvement:** The ERT commends Ireland for its improvement in the Transport Sector as well as most other sectors including mobile sources. The ERT notes the Party's intention to improve the Road Transport sector by using an updated version of the software used for estimating emissions, and to also improve sub-sector 1.A.4.c ii. The ERT encourages Ireland to continue to report and implement planned improvements.

56. The ERT note that the origin of emission factors for the Transport Sector (and others) is a combination of EFs from the Guidebook, CEPMEIP and NAEI have been used for the main pollutants, particles, and heavy metals and POPs, respectively. The ERT encourages Ireland to improve the inventory by implementing more country specific emission factors.

Sub-sector specific recommendations

1.A.3.b v Road transport – non-exhaust NMVOC from evaporation

57. The ERT note that emissions from evaporation are reported as “IE” in 1A3b. The ERT urges the Party to provide separate data with the next submission, and welcomes the Party's plan to use COPERT 4 version 6.1 for the 2010 submission, as this version allows that evaporative emissions are reported separately.

1.A.3.b vi & vii Road transport – non-exhaust particle emissions

58. The ERT notes that emissions of PMs and TSP are reported as ‘Not Estimated’ (NE) and therefore recommends that the Party provide the missing data with the next submission. As mentioned above, Ireland plans to use COPERT 4 version 6.1 for the 2010 submission, which should be able to calculate the data requested.

1.A.3.b vi & vii Road transport – non-exhaust heavy metal emissions

59. During the centralized review the ERT noted that heavy metals from tyre and brake wear as well as road surface abrasion are reported as ‘NE’ in the NFR tables. The ERT therefore encourage Ireland to check this use of notation key, and provide emission estimates in future submissions if possible.

1.A.5.b Other, mobile (including military, land based and recreational boats)– overall

60. The ERT note that the whole sub-category is reported as “IE” – included elsewhere, but the IIR does not provide any information on what data is collected at all and where this data is included. The ERT asked the Party to provide additional data on this issue and Ireland explained that (as mentioned in Annex B of the IIR) the national energy balance gives no breakdown for NFR 1.A.5.b “Other, Mobile including Military” and that the fuel used by military vehicles is reported in sectors 1.A.3.a for military aviation and 1.A.3.b for land based vehicles. The ERT encourages the Party to utilize data sources other than the national energy balance (for example military authority, Air Traffic Control or (military) airport authorities) or to use expert estimates to allow emissions to be reported in the military mobile sources under sub-category 1.A.5.b, instead of including them in 1.A.3.b.

Industrial processesReview scope

Pollutants reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , PM ₁₀ & PM _{2.5} , Pb, Dioxins		
Years		1990–2007 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not reviewed	Recommendation provided
2.A.1	Cement production	X		X
2.A.2	Lime production	X		X
2.A.3	Limestone and dolomite use			
2.A.4	Soda ash production and use			
2.A.5	Asphalt roofing			
2.A.6	Road paving with asphalt			
2.A.7	Other including non fuel mining & construction			
2.A.7.c	Handling of cereals grain	X		
2.A.7.d	Glass, bricks and ceramics, asphalt production	X		
2.B.2	Nitric acid production	X		
2.B.3	Adipic acid production			
2.B.4	Carbide production			
2.B.5 2.B.5.b	Other storage and handling of fertilizers	X		
2.C.1	Iron and steel production	X		X
2.C.2	Ferroalloys production	X		
2.C.3	Aluminium production	X		
2.C.4	used in aluminium and magnesium foundries			
2.C.5	Other – all non ferrous metal production	X		
2.D.1	Pulp and paper			
2.D.2	Food and drink			
2.D.3	Wood processing			
2.G	Other: leakage from electrical equipment and fragmentisers and shredders	X		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

General recommendations on cross cutting issues

61. **Completeness:** In spite of the small number of key sources within the Industrial Processes sector, the ERT consider the Industrial Processes sector to be complete and comprehensive with good levels of detail in the methodology descriptions.
62. **QA/QC procedures:** The ERT noted that Ireland has implemented a QA/QC plan in which all calculation workbooks for the individual sectors contain a QA/QC worksheet, which are collectively compiled.
63. **Recalculations:** The ERT noted that because of Ireland's QA/QC plan a transcription error was identified for NO_x in the nitric acid sector in 1990. The corrected NO_x emission is 75 percent higher than in the last submission.
64. **Uncertainty:** The ERT noted that Ireland had difficulty performing a meaningful uncertainty analysis because good quantitative information on the individual uncertainties in activity data and emission factors is not available for the pollutants concerned. The ERT compliments Ireland for this clear explanation. The ERT encourages Ireland to find out if it is possible to obtain good quantitative information on the individual uncertainties in activity data and emission factors, and then undertake an uncertainty analysis with this information (even if this is based on expert judgment).
65. **Transparency:** The IIR is generally transparent and well organised. The ERT also noted that Ireland used country-specific Emission Factors. The ERT encourages Ireland to continue with this approach.
66. **Improvement:** The ERT noted that Ireland will continue to review emission estimates for the whole Industrial Processes sector. Furthermore, Ireland plans to continue to outsource contracts on a periodic basis to re-examine and extend the inventory time-series with respect to heavy metals and persistent organic pollutants. The ERT compliments Ireland on this and encourages them to implement the planned improvements, and to incorporate the results in their next submission.

Sector specific recommendations**2.A.1, 2.A.2, 2.C.1 – Most of the pollutants (NO_x, SO_x, PM₁₀, NMVOC, etc)**

67. The ERT noted that in most cases it is not possible to distinguish the process and combustion emissions from these sources. Most of the pollutants originate from fuels, and therefore these emissions are reported under the NFR category 1A2f (Other Industries).
68. Ireland explained that the approach whereby process emission estimates are obtained – as the difference between total emissions on a “unit production” basis and those estimated from fuel combustion – is the only basis on which to make the split. However, Ireland noted that the emissions from lime production show that this approach does not always provide adequate results.
69. Ireland indicated that they would re-evaluate the representativeness of the emission factors being used in an attempt to adequately reflect the relationship between total emissions and emissions from fuels.
70. The ERT encourages Ireland to continue with the process of finding a reliable approach to split the combustion and process emissions of these sources in the future.

Solvents

Review scope

Pollutants reviewed		NMVOC		
Years		1990–2007		
NFR Code	CRF_NFR Name	Reviewed	Not reviewed	Recommendation provided
3.A.1	Decorative coating application	3A1		X
3.A.2	Industrial coating application	3A2		X
3.A.3	Other coating application (please specify the sources included/excluded in the notes column to the right)	3A3		X
3.B.1	Degreasing	3B1		x
3.B.2	Dry cleaning	3B2		x
3.C	Chemical products, manufacture & processing	3C		X
3.D.1	Printing	3D1		X
3.D.2	Domestic solvent use including fungicides	3D2		x
3.D.3	Other product use	3D3		x
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

General recommendations on cross cutting issues

71. **Completeness:** The ERT consider Ireland's reporting on the solvent sector to be very detailed and comprehensive with good levels of detail in the methodology descriptions. But Ireland is not reporting the emissions in 3A1, 3A2, 3B2, 3D1 and 3D2. The ERT encourages Ireland to report the emissions in these subcategories and not as – so far – aggregated in 3A3, 3B1 and 3D3. For some subcategories the activity data is interpolated and extrapolated (paint application of boat building, sales data of paints for wood, paint application of other non-industrial sources, in Dry Cleaning quantities of perchloroethylene). The ERT encourages Ireland to close the gaps in the activity data.

72. **QA/QC procedures:** The ERT considers the Party to have good QA/QC checks. But the ERT encourages the Party to implement sector specific checks.

73. **Recalculations:** The description of the recalculations in the IIR is comprehensive and easily understandable. The ERT encourages Ireland to continue with this good reporting process.

74. **Uncertainty:** The ERT encourages Ireland to undertake uncertainty analysis for the solvent sector in order to improve the reporting process and to provide an indication of the reliability of the inventory data.

75. **Transparency:** The IIR is very transparent. But in detailed reporting there are some items that can be improved. The source of the data for paint application in other industrial sources is not described transparently enough in the IIR. In “Other use of Solvent and Related Activities” the data is scaled up, but how this is done is not transparent in the IIR.

76. **Improvement:** The ERT strongly encourages Ireland to check the use of the emission factors of the UK. They should not replace these by the emission factors of the EMEP EEA Guidebook 2009. This is because the ERT does not think that the emission factors of the EMEP EEA Guidebook 2009 are better than the emission factors of UK. The difference between the EFs for the UK and Ireland are only expected to be small. So the Guidebook default emission factors will probably not improve the quality of the EFs. The ERT suggest that Ireland check the details of how the UK emission factors were developed, and introduce these methodologies into the Ireland inventory, to allow the development of their own country specific EFs.

Agriculture

Review scope

Pollutants reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , PM ₁₀ & PM _{2.5}		
Years		1990–2006 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not reviewed	Recommendation provided
4.B	Manure management	NH ₃		X
4.D1	Direct soil emissions	NH ₃		X
4.F	Field burning of agricultural wastes	NMVOC, CO, PM ₁₀ , PM _{2.5}		X
5E	Other	CO, NMVOC		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

General recommendations on cross cutting issues

77. **Completeness:** The agriculture inventory of Ireland covers a wide set of pollutants and source combinations and is generally complete with the exception of some pollutant emissions from some subcategories of 4.B (Manure Management) and 4.D.1a (synthetic N-fertilizers) which are reported as not estimated “NE”.

78. **Transparency:** The agriculture inventory of Ireland is generally transparent, well presented and organised. The ERT commends Ireland for its efforts to improve the estimates over the last few years.

79. **Consistency:** The notation key not applicable “NA” was used in the IIR (*Annex A.1 Table IV 1A*) for emissions of PM from 4.B (Manure Management). However, this is reported as not estimated “NE” in the NFR (Excel sheets). Ireland responded during the review week that the notation keys used in the inventory data submission are correct (“NE”) and that the NFR table for 2007 emission data in Annex A.1 of the IIR is in error. The ERT recommends that Ireland ensure consistency for emission data in its next annual submission.

80. **QA/QC:** The ERT acknowledges that Ireland has provided specific information on QA/QC and related approaches and undertaken recalculations for its Agriculture inventory in its IIR submission. The ERT encourages Ireland to continue these procedures in future submissions.

81. **Improvements:** The ERT welcomes initiatives taken by Ireland to make further improvements in emission estimates from the agriculture sector, so that national circumstances can be reflected in future submissions.

Sector specific recommendations

4.B Manure management: NH₃

82. The ERT noted that Ireland did not estimate emissions of NH₃ from 4.B.4 (Goats), 4.B.6 (Horses), and 4.B.7 (Mules and Asses) which are reported as “NE”. Activity data (population of animals) were provided in the IIR (Table E.1). Even though emissions from these categories might be small, the ERT suggests that these animals should be accounted for in the inventory. The ERT recommends that Ireland estimate emissions of these pollutants in its next annual submission.

4.D.1 Agricultural soils: PM

83. Ireland reported emissions of PM from 4.D.1a (Synthetic N-fertilizers) as not estimated “NE”. The ERT recommends that Ireland include emissions of these pollutants in its next submissions.

84. The ERT requested that Ireland should clarify the reason for reporting emissions of pollutants from 4.F (Field Burning of Agricultural Waste) as not occurring “NO”. Ireland responded during the review week and indicated that this practice is no longer undertaken in the country as all cereal crop (stubble) on arable land after harvesting is ploughed in when cultivation takes place for the subsequent crop. The ERT recommends that Ireland include a clearer description for this issue in its next submission to improve the overall transparency of the inventory.

85. During the review week, Ireland provided an explanation of the reason for the drop in NH₃ emissions from N fertilizers (more than 14 percent) between 2007 and the previous year. The ERT recommends that Ireland give detailed information on this issue in the IIR for its next submission.

Waste

Review scope

Pollutants reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , PM ₁₀ & PM _{2.5} , Cd, Hg, Pb		
Years		1990–2006 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not reviewed	Recommendation provided
6.A	Solid waste disposal on land	x		x
6.B	Waste-water handling	x		x
6.Ca	Hospital waste incineration	x		x
6.Cb	Hazardous waste incineration			
6.Cc	Municipal waste incineration			
6.Cd	Cremation			
6.Ce	Open burning			
6.D	Other waste (e)	x		x

Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.

General recommendations on cross cutting issues

86. **Comparability and transparency:** The new NFR reporting format for incineration of waste (6Ca to 6Ce) is not applied in the 2009 Irish submission. As emissions have to be calculated at the disaggregated level and have to be reported in a transparent manner, the ERT strongly suggests that Ireland report emissions from waste incineration at the disaggregated level (6Ca to 6Ce).

87. **Transparency:** Activity data are not presented in Ireland's IIR. The ERT encourages Ireland to provide in its IIR activity time series for each NFR6 sub-sector. Ireland presents EF values, but no EF time series. The ERT encourages Ireland to present in its IIR complete EF time series whenever it is necessary (i.e. where EFs change across the timeseries).

88. **Completeness:** Ireland includes the most important sources in its waste inventory, but only for a selection of pollutants (HM, POP). The ERT encourages Ireland to calculate emissions for all sub-sectors existing within the country, or at least for all the pollutants documented in the EMEP/Corinair Guidebook. The ERT also encourages Ireland to specify in the IIR the reason for any exclusion where applicable. Ireland indicated during the review that it would document all SNAP/NFR source categories in the 2010 submission, and the ERT expresses its support for this.

89. **QA/QC procedures:** Specific QA/QC procedures have been applied on POPs (external review) and HMs (internal review). These QA/QC checks are of special importance for NFR6 as this NFR is an important source for HM and POPs, and the ERT commends Ireland on performing this work for other pollutants.

90. **Recalculations:** The ERT notes that recalculations were undertaken for HM emissions from NFR6, which resulted in the exclusion of emissions from the incineration of treated wood. POPs from this source are still being estimated. Ireland indicated in the report that it would develop a methodology for future submissions, to include both HMs and POPs. As wood is an important source of HMs, the ERT encourages Ireland to make this estimate in the 2010 submission as the exclusion of this source has an important impact on NFR6C emissions.

Sector Specific Recommendations

6A Solid waste disposal on land – Hg

91. Ireland provides estimates of Hg emissions from landfills. As there is no direct Irish estimate of activity data (equipment containing Hg disposed of in SWDS), an estimate is made using UK emission estimates scaled by population/ household numbers. As 6A is a key source category for Hg in the Irish inventory the ERT encourage Ireland to investigate the use of additional datasets in order to obtain national activity data and to check how applicable the UK EFs are for Ireland. Ireland has indicated that it will request further information concerning the UK methodology, to see whether improvement is possible, and the ERT welcomes this initiative.

6A Solid waste disposal on land – NMVOC

92. As "a large proportion of LFG escapes to air", the ERT recommends that Ireland should estimate other air pollutants emitted from landfills (especially NMVOC). Ireland could use either 2009 EMEP/CORINAIR default NMVOC EF or use information concerning landfill gas composition (from field measurement data or analysis of the literature in general) to determine a pollutant/CH₄ ratio to be applied to CH₄ emission estimates realised for UNFCCC.

6B Waste-water handling – NMVOC

93. Ireland used the NE notation for NMVOC, PM&TSP for NFR 6B emissions as it is suggested in the 2009 EMEP/Corinair Guidebook. As NE is used, the ERT recommends that Ireland should indicate in its IIR the reason for this exclusion, especially as the activity exists within the country. Moreover, as an NMVOC EF is proposed, the ERT encourages Ireland to investigate if this default value is adapted for its own treatment plants, and if so to estimate NMVOC emissions from wastewater handling.

6Ca Hospital waste incineration – main pollutants

94. Ireland provides no estimate of the main pollutant emissions from the incineration of hospital waste. As EFs are available in the 2009 EMEP/Corinair Guidebook, the ERT encourages Ireland to improve the completeness of its inventory by estimating the main pollutant emissions from the incineration of hospital waste. Ireland has indicated during the review that it will investigate this possibility in future submissions, and this is welcomed by the ERT.

6Ca Hospital waste incineration – HM

95. Ireland applied constant HM EFs over the 1990–2007 period. The ERT encourages Ireland to check if the introduction of improved environmental performance has had an impact on the HM EFs. Ireland indicated during the review that it would investigate and update the methodology if relevant, and the ERT welcomes this development.

6Cb Hazardous waste incineration – HM

96. In its IIR Ireland presents HM EFs for NFR6 sub-sectors (Table F.1). But the EFs indicated for the incineration of hazardous waste correspond to the 1990 value. The ERT encourages Ireland to update this annexe and, moreover, to present in its IIR a complete time series of EFs.

97. Ireland applied constant HM EFs over the 1990–2007 period, corresponding to “relatively modern units” (p. 98 of the IIR). The ERT encourages Ireland to take into account the impact of abatement system on HM EFs across this period.

6Cb Hazardous waste incineration – main pollutants

98. Ireland provides no estimates of the main pollutant emissions from incineration of industrial waste. As EFs are available in the EMEP/Corinair Guidebook, the ERT encourages Ireland to estimate the main pollutant emissions from the incineration of industrial waste in its inventory. Ireland indicated during the review that it would investigate this possibility for the next submission, and this is welcomed by the ERT.

6Cd main pollutants

99. Ireland provides no estimate of the main pollutant emissions from cremation. As EFs are available in the EMEP/Corinair Guidebook, the ERT encourages Ireland to estimate the main pollutant emissions from cremation in its inventory. Ireland indicated during the review that it would investigate this possibility for the next submission, and the ERT looks forward to seeing this development.

6D Cremation – all pollutants

100. Ireland allocates emissions from open burning of agricultural waste to NFR 6D. The ERT recommends that Ireland allocate the incineration of agricultural waste to NFR 6Ce as specified in the 2009 EMEP/Corinair Guidebook. Ireland indicated during the review that it would consider allocating to sector 6Ce in future submissions, and this is welcomed by the ERT.

**LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING
THE REVIEW**

1. Response to preliminary question raised prior to the review:

IE_Ind_Proc_Initial_Qns_v1_IE Response.doc

Ie_Waste_Initial_Qns_v1_IE Response.doc IE_Gen_Initial_Qns_Response_v3_cleared.doc

2. Response to questions raised during the review:

IE_Ind_Procs_Second_24juni_2009_IE Response.doc

Ie_Waste_Initial_Qns_v2_230609_IE Response.doc and Ie_Waste_Second_Qns_v1_IE
Response-1.doc

Ie_Mobile_Initial_Qns_v1_IE Response.doc

3. Additional materials provided by Ireland during the Review:

POP's_Cement Production.doc

IIR and associated submission, data analysis provided by the CEIP

Activity data for waste sector 6.xls

HDV_NMVOC_1990-2007.xls

Review Stage 2: Synthesis and Assessment Country report