

Spain Experiences on Inventory Reviews: From GHG to CLRTAP/NEC

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Reviews passed: their stages and outcomes

Spain has passed 5 (2001-2005) UNFCCC Secretariat reviews of its GHG Emission Inventory

Those reviews comprised of:

Initial Checks

- Adding-up constraints, CRF cells allocation of data, (Un)completeness diagnosis, checks on units and (non)-standard codes.

Synthesis and assessment report, part I and part II

- Relative time changes, Country IEF values relative to other Annex I countries, Comparison of key sources across countries.
- IEF outliers, fluctuating time series profiles (VA, IEF, Emissions), anticipated comments for (more) specific country review.

Specific country in-depth reviews

- Desk: 2002 and 2004
- Centralised: 2001 and 2005
- In country: 2003

Larger exchange of information between the country inventory team and the review team.

Detailed review report (main findings to be commented in the sequel).

Data sources of the emissions inventory (1/3)

One base inventory capable of satisfying various inventory reporting requirements (formats)

- Integrated data gathering procedure for the Base Inventory (based in SNAP-97 level 3 with extensions)
- From the base inventory various reporting formats (CRF, NFR, etc...) are produced.

Need for a updated comprehensive base nomenclature with crossings of all activities with pollutants

- Special focus on PM (TSP, PM₁₀, PM_{2,5}) new emitting activities.
- Ordinal ranking (a priori and a posteriori) of emitting activities according to their EU-wide contribution to total emissions of each pollutant.

Data sources of the emissions inventory (2/3)

Inventory (activity) data sources

Via specific questionnaire for a list of significant sectors:

- At **plant level**: namely: Power plants, Oil refineries, Collieries, Alumina-aluminium, Integrated Iron-Steel plants, Glass manufacturing, Paper pulp, Car manufacturing, MSW incinerators
- At **Province (52) level** (from the corresponding entrepreneurial associations: Cement, Lime, Bricks&tiles, Fine ceramics, ...)

Sectoral public (governmental) statistical sources and reports:

- Sectoral governmental statistics (industry, public works, transport, agriculture, horizontal data (population, meteorology), ...)
- Other data from entrepreneurial, professional associations (mainly at country level to be, later, spatially dis-aggregated with proxy indicators.

Priority in the inventory to traceable, checked specific data vs. non-specific sources

Data sources of the emissions inventory (3/3)

Discrepancies in activity data between emission inventory and International statistics

- **Inventory fuel balances vs. energy balances of IEA/EUROSTAT**
Aggregates match well although their sectoral allocations can differ
- **Inventory agricultural statistics (Ministry of agriculture) vs FAO statistics**
Crops, livestock, fertilizers statistics
- **Other** (transport, population, etc...)

Difficulties in tracing data back from international statistics to national statistical sources

- Possibly different country sources, internationally not up-dated data, international own additional data treatment

Priority in reconciling the data sources at the most aggregated levels

- Reviews recommendations still to be fully accomplished

Completeness and notation keys (1/2)

Completeness is contingent upon information on both VA and EF

- Activity data (VA) and
- Emissions estimating algorithm (EF)

Main niches of un-completeness in Spain GHG inventory

- LULUCF CRF categories 5B-5D, due to mainly to lack of VA that match the EF
- Potential emissions F-Gases, due to lack of appropriate VA
- Other more narrow-specific source categories/pollutants

Completeness and notation keys (2/2)

Un-completeness in reporting notation keys (NE vs. NA)

- How to choose between NE and NA. For an occurring activity, what is the complete list of emitted substances? It implies ambiguity in notation keys reporting.
- Action suggested: NA should as far as possible be pre-filled in the adopted Report Inventory Nomenclatures as well as in the Base Inventory Nomenclature.

Un-completeness in reporting notation keys (NE not NA)

- Main cause: lack of knowledge of the emissions estimating algorithm (EF). It implies that total emission per substance could be significantly downwards biased.
- Action suggested: check where the Emission Inventory Guidebook lacks information in non-NA cells of the Base Inventory Nomenclature.

Un-complete list of notation keys: case of known biased (upwards, B+/downwards, B-) estimates

- Main cause: uncomplete information (or lack of detail in description coverage) of the emissions estimating algorithm (FE). It has implications for outliers' detection.
- Action suggested: check where the Emissions Inventory Guidebook does not provide sufficient guidance on coverage that matches the Report Inventory Nomenclature requirements.

Inventorying Guidance and Review

Guidelines to include always proposed central estimates and uncertainty bands.

- A large number of references on EF can be provided but this should not prevent the presentation of the, default, proposed methodology (EF)

Guidelines with information on time dependency (vintages) of the technology dependent EFs

- Related to technology progress and incorporated primary-secondary emission reduction techniques
- Rationale of the relative levels of EF based on knowledge of the influencing factors of the emitting processes
- Information on ranges for ratios between EFs of couples of pollutants

Recommended (minimum) list of Reference Guidelines and normative compliance reporting

- For GHG inventories it appears that, apart from country specific methods, the IPCC Guidelines contain the relevant information for UE and UNFFCCC normative compliance assessment
- What is the case for EMEP/CLRTAP inventories in regard of their use for NEC Directive compliance assessment? Apart from country specific methods, is the EMEP/CORINAIR Guidebook to be supplemented with other reference manuals (RAINS)...

Transparency and review

The Spain base emission inventory report comprises of three main volumes with the following contents:

- Volume 1 “Approach, general methodology and summary of results
- Volume 2 “Analysis by emitting activities in the SNAP-97 nomenclature”,
- Volume 3 “Detailed results by SNAP-97 activities

Transparency in reporting can be best evaluated with this base emission inventory report

For Spain transparency in reporting to CRF/NIR or NFR/IIR is somehow conditioned by the more aggregated level of those two reporting nomenclatures

- Information on activity data and emissions estimating algorithms (FE) has, in general, to be **pooled** to report in CRF/NFR formats.
- To prevent loss of transparency for reporting in CRF/NFR formats **considerable additional effort** has to be undertaken.

Outliers diagnosis and treatment (1/6)

Review ID: Synthesis and Assessment Part II

Party: SPAIN

Submission year: 2004

Case study: N₂O IEF (g /GJ) for Paper, Pulp and Print Industry

Sector	Source / sink category	Fuel	Gas	KS
Energy	1.A.2. Manufacturing industries and construction	Liquid	N ₂ O	Yes

Issue	Response by Party
The 2002 value of the N ₂ O IEF (12.18 kg/TJ) for liquid fuels from 'Pulp, paper and print' is the highest of the reporting Parties (0.003 – 12.18 kg/TJ). The trend is unusual.	We are presently considering the revision of N ₂ O emission factors for these activities.

Note: Ireland, Greece and Belgium report IEFs of similar range (In-country review 2003 for Spain)

Outliers diagnosis and treatment (2/6)

Case study: N_2O IEF (g /GJ) for Paper, Pulp and Print Industry (cont.)

Fuel	Technical Specification	N ₂ O IEFs from Guidelines ^(*)			N ₂ O IEF applied in Spain Inventory				
		EMEP/CORINAIR		IPCC	API	2004 Submission		2005 Submission	
		(1)	(a)(c) (b)(c)	(2)	(3)	IEF	Source	IEF	Source
Residual Oil	Boiler	1.4-14.8 0.8-46.5	(a)(c) (b)(c)	0.3	1.58	14	(1)	1.5	(3)
	Gas Turbine	2.5-14 2.5-25	(a) (b)	-	-	N.E		1.75	(4)
	Stationary Engine	2.5 1.1-2.1	(a) (b)	-	-	2.5	(1)	1.75	(4)
	Lime kiln	2-14 2.5-14	(a) (b)	N.A	-	14	(1)	1.75	(4)
	Paper mill kiln	14	(b)	-	-	14	(1)	1.75	(4)
Gas Oil	Boiler	0.6-14 0.6-17.8	(a)(c) (b)(c)	0.4	0.77	14	(1)	0.7	(3)
	Gas Turbine	2-3 0.5-25	(a) (b)	-	-	N.E		1.85	(f) (3)
	Stationary Engine	2.5 0.6-14	(a) (b)	-	2.2	2.5	(1)	1.85	(3)
	Paper mill kiln	14	(b)	-	0.77	14	(1)	0.7 1.5	(d) (3) (e) (4)
Black Liquor	Boiler	1-21.4	(a)(c)	-	-	4	(1)	4	(1)

Outliers diagnosis and treatment (3/6)

Case study: N_2O IEF (g /GJ) for Paper, Pulp and Print Industry (last)

Notes to table in preceeding slide

- (*): (1) : EMEP/CORINAIR Emission Inventory Guidebook. February 1996
(Chapters B111, B112, B3312 and B3321)
- (2): Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories
(Page 1.54)
- (3): API (American Petroleum Institute) Compendium of Greenhouse Gas Emissions Estimation Methodologies for the Oil and Gas Industry. February 2004.
(Appendix C. Table C-1. Uncontrolled residual oil/destillate-fired boilers and heaters & Large bore diesel engine). IEFs, expressed in lb/103 gal or g/l, have been converted.
- (4): CITEPA. Facteurs d'émission du protoxyde d'azote pour les installations de combustion et les procédés industriels. Etude bibliography. Feb.2002.
(Section 3.1. Table of IEFs proposed)
- (a): Point source IEF (EMEP/CORINAIR) ; (b): Area source IEF (EMEP/CORINAIR)
- (c): Without specification
- (d): Area source; (e): LPS, Large Point Source
- (f): Assumed N_2O IEF for stationary engine

Outliers diagnosis and treatment (4/6)

Review ID: Synthesis and Assessment Part II

Party: SPAIN

Submission year: 2004

Case study: CO₂ Emissions for Civil Aviation

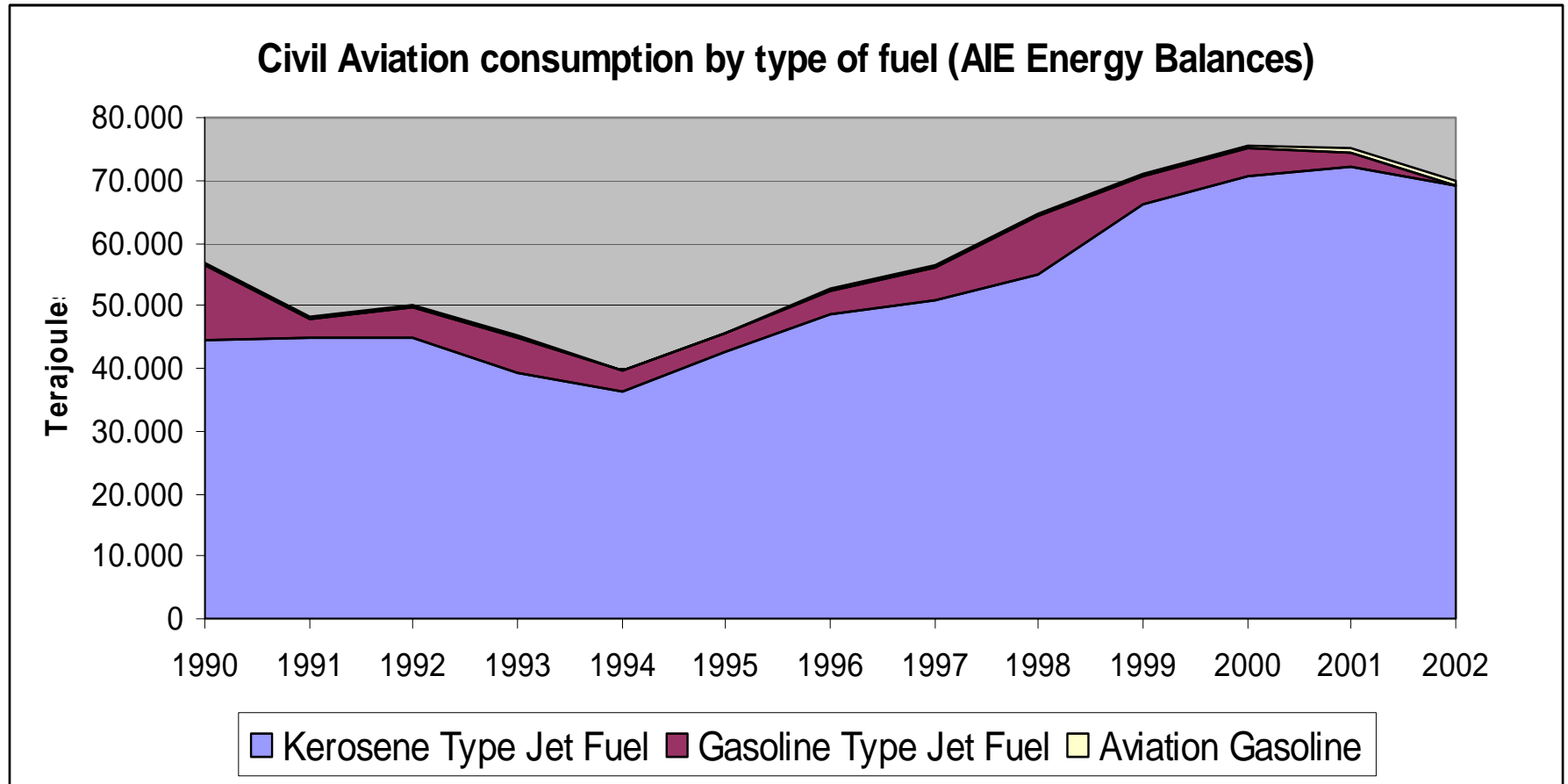
Sector	Source / sink category	Fuel	Gas	KS
Energy	1.A.3.a Civil aviation	Liquid	GEN	

Issue	Response by Party
The 2002 value of the CO ₂ emissions from 'Civil aviation' (5,084.17 Gg) has increased by 22.9% compared to its 1990 level (4,135.39 Gg). The inter-annual changes in CO ₂ emissions between 1990 and 1991, 1992 and 1996, 1997 and 1998, and 2001 and 2002 have been identified as outliers. The changes are in the range of 15.1% of decrease (between 1990 and 1991) and 15.8% of increase (between 1995 and 1996). The trend is unusual.	We consider that information provided is correct. ^(*)

(*) Note: A mistake had been detected as consumption estimation for 2001 hadn't been modified according the values from IEA Energy Balance 2001. Data for 2002 were provisional.

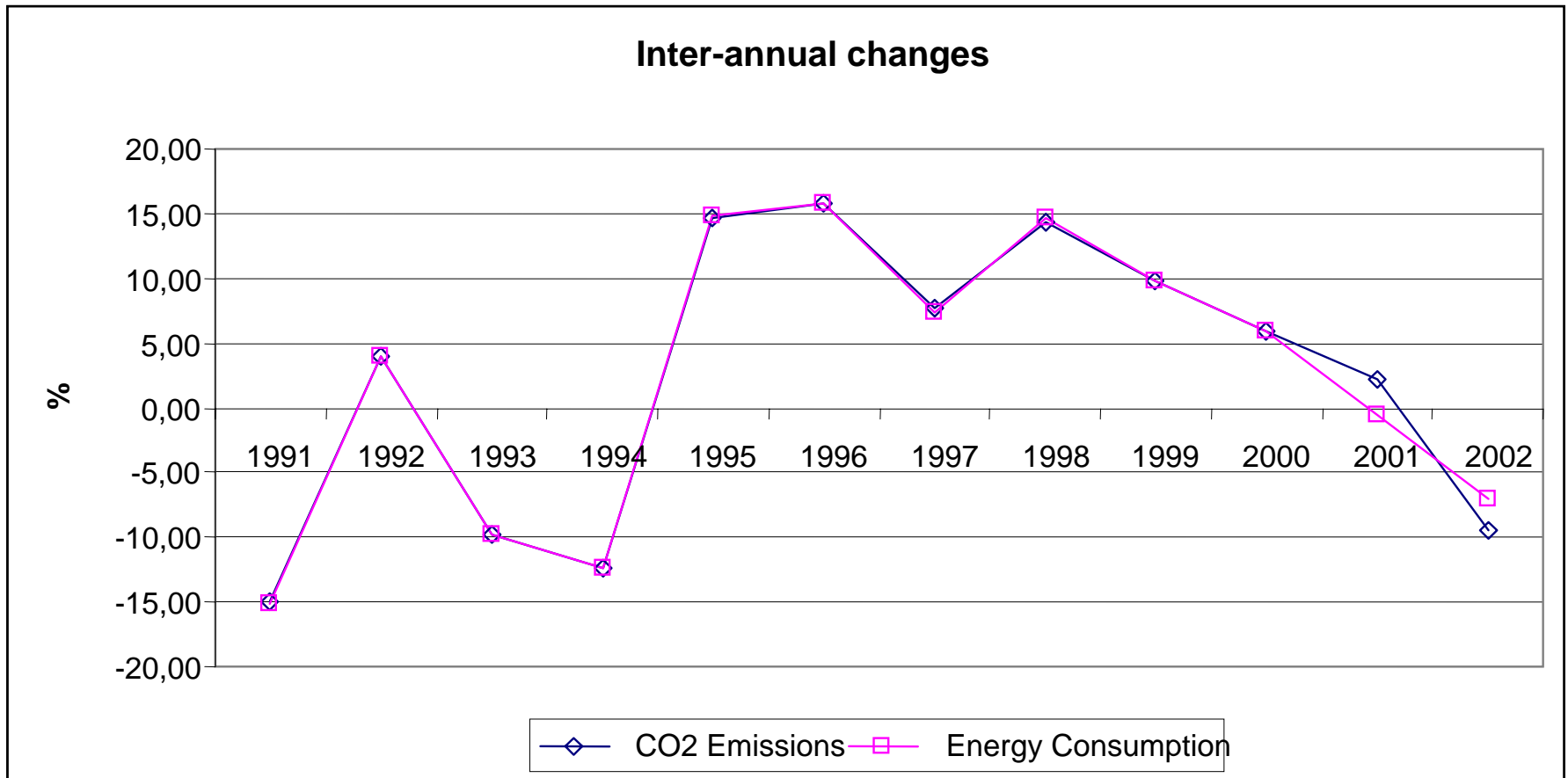
Outliers diagnosis and treatment (5/6)

Case study: CO₂ Emissions for Civil Aviation (cont.)



Outliers diagnosis and treatment (6/6)

Case study: CO₂ Emissions for Civil Aviation (last)



Costs of the review for the reviewed country

Human resources allocated to exchange information with the review team

- In country review (2003)

A) Before the review

2 weeks * 3 persons (6 person-week) to prepare documentation and specific presentations

B) At the review

1 week * 8 person (8 person-weeks) presentations, attendance to meetings

C) After the review

1 week * 2 persons (2 person-week) to provide supplementary information and to revise the drafts reports to end with the final review report

Total around 15 person-week

- Centralised review

Centralised could be scaled to 25% of [A) +C)]

Total around 2 person-week

Benefits of specific (in)-country reviews

New impetus for systematic procedures in the inventorying process

- Institutional arrangements and inventory system
- Documentation of QA/QC procedures applied
- Record keeping and archiving
- Plan for inventory improvement.

Finding ways to make inventory principles operational

- Significantly the transparency principle

Value of the review report itself as a reference document

- For the future working plan of the emission inventorying unit
- For institutional units other than the emission inventorying unit but involved within the country inventory system action plan.