Uncertainty evaluation in Latvia

Training seminar on uncertainty evaluation

October 28th-29th, 2015
Norwegian Environment Agency

Vita RATNIECE
Latvian Environment, Geology and Meteorology Centre
Air and Climate Division

2009 – 2014 EEA GRANTS PROGRAMME
NATIONAL CLIMATE POLICY

PRE-DEFINED PROJECT
"DEVELOPMENT OF THE NATIONAL SYSTEM FOR GREENHOUSE GAS INVENTORY AND REPORTING ON POLICIES, MEASURES AND PROJECTIONS"
Nr.4.3-23/EEZ/INP-002

Contents

- Data sources for emission factors and activity data uncertainty
- Methods used (Tier 1)
- Uncertainty % for emission factors
- Uncertainty % for activity data

Data sources for emission factors and activity data uncertainty (%)

- 2006 IPCC Guidelines, 2013 Wetlands supplement, 2013 KP supplement, EMEP/EEA 2013 Guidelines;
- Central Statistical Bureau (CSB);
- Information by ETS operators;
- Judgements by enterprises («Latvijas Gāze»);
- Expert assumptions.

Methods used for Uncertainty evaluation in Latvia (I)

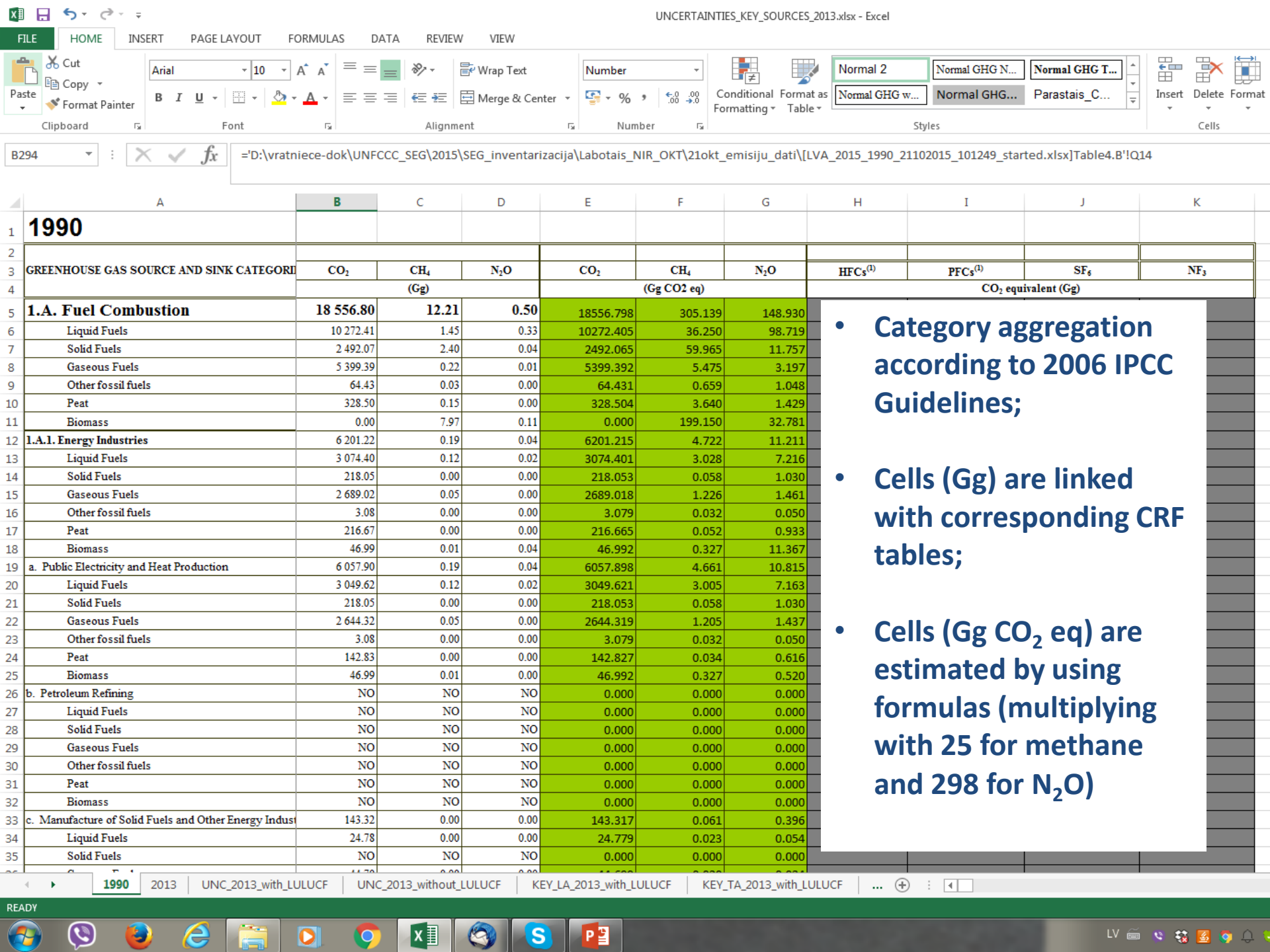
- In the annual meeting at the beginning of the inventory cycle the experts are advised to go through the uncertainty ranges of activity data and emissions factors in order to prioritize inventory improvements.

Methods used for Uncertainty evaluation in Latvia (II)

- The uncertainty estimates of the 2015 submission have been done according to the Tier 1 method presented in 2006 IPCC Guidelines;
- The uncertainty calculation is based on the Excel file, which is send to sectoral experts for updating annually;
- The uncertainty analysis was done for the all sectors: Energy, Industrial Processes and Product Use, Agriculture, Waste and LULUCF;
- Uncertainties are estimated for direct greenhouse gases, e.g. CO_2, CH_4, N_2O and F-gases only.

Uncertainty of Central Statistical Bureau (CSB) activity data

- CSB data are used:
  - Energy – Environment and energy statistics (Energy balance), annual questionnaires;
  - Transport – Environment and energy statistics (Energy balance), Transport and tourism statistics;
  - IPPU - Population Statistics, Industrial Statistics;
  - Agriculture – National agricultural statistics;
  - LULUCF – Harvested wood products, National agricultural statistics;
  - Waste - Population Statistics, Economy and Finance.
- Data uncertainty by CSB 2%;
- According to CSB, as data are obtained using information given by respondents, this number is a variation coefficient which characterizes selection of respondents.


UNCERTAINTIES_KEY_SOURCES_2013.xlsx - Excel
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1990
GREENHOUSE GAS SOURCE AND SINK CATEGORI
CO2
CH4
N2O
CO2
CH4
N2O
HFCs(1)
PFCs(1)
SF6
NF3
(Gg)
(Gg CO2 eq)
CO2 equivalent (Gg)
1.A. Fuel Combustion 18 556.80 12.21 0.50 18556.798 305.139 148.930
Liquid Fuels 10 272.41 1.45 0.33 10272.405 36.250 98.719
Solid Fuels 2 492.07 2.40 0.04 2492.065 59.965 11.757
Gaseous Fuels 5 399.39 0.22 0.01 5399.392 5.475 3.197
Other fossil fuels 64.43 0.03 0.00 64.431 0.659 1.048
Peat 328.50 0.15 0.00 328.504 3.640 1.429
Biomass 0.00 7.97 0.11 0.000 199.150 32.781
1.A.1. Energy Industries 6 201.22 0.19 0.04 6201.215 4.722 11.211
Liquid Fuels 3 074.40 0.12 0.02 3074.401 3.028 7.216
Solid Fuels 218.05 0.00 0.00 218.053 0.058 1.030
Gaseous Fuels 2 689.02 0.05 0.00 2689.018 1.226 1.461
Other fossil fuels 3.08 0.00 0.00 3.079 0.032 0.050
Peat 216.67 0.00 0.00 216.665 0.052 0.933
Biomass 46.99 0.01 0.04 46.992 0.327 11.367
a. Public Electricity and Heat Production 6 057.90 0.19 0.04 6057.898 4.661 10.815
Liquid Fuels 3 049.62 0.12 0.02 3049.621 3.005 7.163
Solid Fuels 218.05 0.00 0.00 218.053 0.058 1.030
Gaseous Fuels 2 644.32 0.05 0.00 2644.319 1.205 1.437
Other fossil fuels 3.08 0.00 0.00 3.079 0.032 0.050
Peat 142.83 0.00 0.00 142.827 0.034 0.616
Biomass 46.99 0.01 0.00 46.992 0.327 0.520
b. Petroleum Refining NO NO NO 0.000 0.000 0.000
Liquid Fuels NO NO NO 0.000 0.000 0.000
Solid Fuels NO NO NO 0.000 0.000 0.000
Gaseous Fuels NO NO NO 0.000 0.000 0.000
Other fossil fuels NO NO NO 0.000 0.000 0.000
Peat NO NO NO 0.000 0.000 0.000
Biomass NO NO NO 0.000 0.000 0.000
c. Manufacture of Solid Fuels and Other Energy Indust 143.32 0.00 0.00 143.317 0.061 0.396
Liquid Fuels 24.78 0.00 0.00 24.779 0.023 0.054
Solid Fuels NO NO NO 0.000 0.000 0.000
Category aggregation according to 2006 IPCC Guidelines;
Cells (Gg) are linked with corresponding CRF tables;
Cells (Gg CO2 eq) are estimated by using formulas (multiplying with 25 for methane and 298 for N2O)
1990
2013
UNC_2013_with_LULUCF
UNC_2013_without_LULUCF
KEY_LA_2013_with_LULUCF
KEY_TA_2013_with_LULUCF
READY

Implementing Regulation Article 14: Reporting on uncertainty and completeness

1.For the purposes of reporting on uncertainty under Article 7(1)(p) of Regulation (EU) No 525/2013, Member States shall report approach 1 uncertainty estimates for:

(a) emission levels and trends and

(b) activity data and emission factors or other estimation parameters used at the appropriate category level using the tabular format set out in Annex VII to this Regulation.

Member State:	Latvia
Reporting year:	2013

IPCC category/Group	Gas	Base year emissions or removals	Year 2013 emissions or removals	Activity data uncertainty (1)	Emission factor / estimation parameter uncertainty (1)	Combined uncertainty	Contribution to variance by category in year x	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor / estimation parameter uncertainty (	Uncertainty in trend in national emissions introduced by activity data uncertainty (3)	Uncertainty introduced into the trend in total national emissions	Comments (optional)
		Gg CO2 equivalent	Gg CO2 equivalent	%	%	%		%	%	%	%	%	
		input data	input data	input data Note A	input data Note A	$\sqrt{E^2+F^2}$	$\frac{(G \bullet D)^2}{(\sum D)^2}$	Note B	$\left\|\frac{D}{\sum C}\right\|$	I*F Note C	J*E*sqrt(2) Note D	K^2 + L^2	
1.A.1.a Public Electricity and Heat Production - Liquid Fuels	CO2	3049.621305	15.86030086	2%	10%	0.1020	0.0000	0.1088	0.0009	0.0109	0.0000	0.000118337	
1.A.1.a Public Electricity and Heat Production - Solid Fuels	CO2	218.053	40.1104	2%	20%	0.2010	0.0000	0.0055	0.0023	0.0011	0.0001	1.23029E-06	
1.A.1.a Public Electricity and Heat Production - Gaseous Fuels	CO2	2644.318679	1789.305004	2%	5%	0.0539	0.0001	0.0082	0.1035	0.0004	0.0029	8.74175E-06	
1.A.1.a Public Electricity and Heat Production - Peat	CO2	142.826737	4.15465786	2%	15%	0.1513	0.0000	0.0049	0.0002	0.0007	0.0000	5.41582E-07	
1.A.1.a Public Electricity and Heat Production - Other fossil fuels	CO2	3.0786	0	2%	20%	0.2010	0.0000	0.0001	0.0000	0.0000	0.0000	4.92272E-10	
1.A.1.a Public Electricity and Heat Production - Liquid Fuels	CH4	3.00505	0.015625	2%	50%	0.5004	0.0000	0.0001	0.0000	0.0001	0.0000	2.88271E-09	
1.A.1.a Public Electricity and Heat Production - Solid Fuels	CH4	0.057625	0.0106	2%	50%	0.5004	0.0000	0.0000	0.0000	0.0000	0.0000	5.3557E-13	
1.A.1.a Public Electricity and Heat Production - Gaseous Fuels	CH4	1.20535	0.824925	2%	50%	0.5004	0.0000	0.0000	0.0000	0.0000	0.0000	6.42517E-12	
1.A.1.a Public Electricity and Heat Production - Biomass Fuels	CH4	0.327	6.940298662	5%	50%	0.5025	0.0000	0.0004	0.0004	0.0002	0.0000	3.87806E-08	
1.A.1.a Public Electricity and Heat Production - Peat	CH4	0.034425	0.001	2%	50%	0.5004	0.0000	0.0000	0.0000	0.0000	0.0000	3.49661E-13	
1.A.1.a Public Electricity and Heat Production - Other fossil fuels	CH4	0.0315	0	2%	50%	0.5004	0.0000	0.0000	0.0000	0.0000	0.0000	3.22108E-13	
1.A.1.a Public Electricity and Heat Production - Liquid Fuels	N2O	7.1626684	0.0371308	2%	50%	0.5004	0.0000	0.0003	0.0000	0.0001	0.0000	1.63782E-08	

Problems to resolve

- High uncertainties (%) for activity data and emission factors (especially for LULUCF);

- Expert judgement documentation.

Thank you for your attention!

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