

Annex 8.2 Elements on verification activities under the Energy Sector

Comparison between Romanian and Bulgarian NGHGI submitted in April 2014 - Energy Sector IEFs data, in respect of 2012 year

The following table presents a comparison between the implied CO₂ emission factors resulting from the Romanian and Bulgarian current submission, on 2012 year – Energy Sector.

It could be observed that, generally, the related values of the implied emission factors are close values in some situations. An explanation could be the fact that, the two countries are located in the same geographical area, and the influence of the climate conditions in the demand of the energy are almost the same.

Using similar methodology, the countries specific emission factors are determined based on the operators reporting under the European Union Emissions trading Scheme (EU-ETS, functioning under the Kyoto Protocol umbrella). The differences are due to the quality and supply sources of the fuels used in the combustion process, in different activity categories and, in the same measure due to the different technologies of the plants in the energy sector activities.

Furthermore, due to the same source of an important quantity of the natural gas fuel (supplied in the two countries from Russia explorations, in Bulgaria most of it being transported, passing through Ukraine, by the Romanian operator - Transgaz), it could be observed that the differences between the IEFs of this type of fuel are very small.

In transport sub-sector, mainly in road transport (due to the fact that the fleets structure is close of the two countries, and also due to the liquid fuels which are mixed, import with local supply), the IEFs values are close, too.

**Table 1 Comparison between Romanian and Bulgarian Energy Sector IEF data in April
2014 NGHGI submission, in respect to 2012 year**

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO₂ IMPLIED EMISSION FACTORS (t/TJ)	
	BULGARIA v1.3	ROMANIA v1.4
1.A Fuel Combustion Activities		
Liquid Fuels	73.83	72.77
Solid Fuels	103.00	88.59
Gaseous Fuels	54.96	55.58
Biomass	108.98	109.96
Other Fuels	85.34	83.81
1.A.1 Energy Industries		
Liquid Fuels	77.88	65.56
Solid Fuels	103.41	88.09
Gaseous Fuels	54.92	55.58
Biomass	112.00	112.00
Other Fuels	NO	NO
a. Public Electricity and Heat Production		
Liquid Fuels	88.09	68.38
Solid Fuels	103.41	88.09
Gaseous Fuels	54.92	55.58
Biomass	112.00	112.00
Other Fuels	NO	NO
b. Petroleum Refining		
Liquid Fuels	72.20	62.27

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO ₂ IMPLIED EMISSION FACTORS (t/TJ)	
	BULGARIA v1.3	ROMANIA v1.4
Solid Fuels	NO	NO
Gaseous Fuels	54.92	55.58
Biomass	NO	NO
Other Fuels	NO	NO
c. Manufacture of Solid Fuels and Other Energy Industries		
Liquid Fuels	NO	68.90
Solid Fuels	95.49	87.67
Gaseous Fuels	54.92	55.58
Biomass	NO	112.00
Other Fuels	NO	NO
1.A.2 Manufacturing Industries and Construction		
Liquid Fuels	84.65	74.98
Solid Fuels	96.63	91.03
Gaseous Fuels	54.92	55.58
Biomass	111.98	110.33
Other Fuels	85.34	83.81
a. Iron and Steel		
Liquid Fuels	NO	87.43
Solid Fuels	NO	94.13
Gaseous Fuels	54.92	55.58
Biomass	NO	NA,NO
Other Fuels	NO	83.81

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO ₂ IMPLIED EMISSION FACTORS (t/TJ)	
	BULGARIA v1.3	ROMANIA v1.4
b. Non-Ferrous Metals		
Liquid Fuels	74.37	IE
Solid Fuels	NO	NO
Gaseous Fuels	54.92	IE
Biomass	NO	NO
Other Fuels	NO	NO
c. Chemicals		
Liquid Fuels	74.91	59.38
Solid Fuels	96.38	89.68
Gaseous Fuels	54.92	55.58
Biomass	112.00	91.36
Other Fuels	NO	83.81
d. Pulp, Paper and Print		
Liquid Fuels	76.59	74.08
Solid Fuels	NO	NO
Gaseous Fuels	54.92	55.58
Biomass	112.00	112.00
Other Fuels	NO	83.81
e. Food Processing, Beverages and Tobacco		
Liquid Fuels	72.60	75.58
Solid Fuels	100.13	92.54
Gaseous Fuels	54.92	55.58

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO ₂ IMPLIED EMISSION FACTORS (t/TJ)	
	BULGARIA v1.3	ROMANIA v1.4
Biomass	112.00	109.62
Other Fuels	NO	83.81
f. Other - Other Industries		
Liquid Fuels	87.68	80.42
Solid Fuels	96.88	88.83
Gaseous Fuels	54.92	55.58
Biomass	111.94	110.54
Other Fuels	85.34	83.81
1.A.3 Transport		
Liquid Fuels	72.37	74.44
Solid Fuels	NO	NA,NO
Gaseous Fuels	55.19	55.58
Biomass	74.52	74.10
Other Fuels	NA,NO	NA,NO
a. Civil Aviation		
Aviation Gasoline	70.30	70.00
Jet Kerosene	72.00	72.24
b. Road Transportation		
Gasoline	70.62	76.36
Diesel Oil	74.50	73.92
Liquefied Petroleum Gases (LPG)	65.73	65.90
Gaseous Fuels	56.05	NO

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO ₂ IMPLIED EMISSION FACTORS (t/TJ)	
	BULGARIA v1.3	ROMANIA v1.4
Biomass	74.52	74.10
c. Railways		
Liquid Fuels	73.00	72.82
Solid Fuels	NO	NO
Gaseous Fuels	NO	NA
d. Navigation		
Residual Oil (Residual Fuel Oil)	NO	NO
Gas/Diesel Oil	74.10	72.83
Gasoline	NO	70.90
Solid Fuels	NO	NA
Gaseous Fuels	NO	NA
e. Other Transportation		
Liquid Fuels	NO	70.90
Solid Fuels	NO	NO
Gaseous Fuels	54.92	55.58
Biomass	NO	107.44
Other Fuels	NO	NO
1.A.4 Other Sectors		
Liquid Fuels	71.37	69.46
Solid Fuels	96.80	87.26
Gaseous Fuels	54.92	55.58
Biomass	112.00	112.00

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO ₂ IMPLIED EMISSION FACTORS (t/TJ)	
	BULGARIA v1.3	ROMANIA v1.4
Other Fuels	NO	NO
a. Commercial/Institutional		
Liquid Fuels	70.60	70.97
Solid Fuels	97.39	87.67
Gaseous Fuels	54.92	55.58
Biomass	111.94	NO
Other Fuels	NO	NO
b. Residential		
Liquid Fuels	62.87	62.77
Solid Fuels	96.79	86.96
Gaseous Fuels	54.92	55.58
Biomass	112.00	112.00
Other Fuels	NO	NO
c. Agriculture/Forestry/Fisheries		
Liquid Fuels	73.15	73.30
Solid Fuels	96.47	104.91
Gaseous Fuels	54.92	55.58
Biomass	112.00	112.00
Other Fuels	NO	NO
1.A.5 Other (Not specified elsewhere)		
a. Stationary (please specify)		
Liquid Fuels	NO	73.56

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO ₂ IMPLIED EMISSION FACTORS (t/TJ)	
	BULGARIA v1.3	ROMANIA v1.4
Solid Fuels	NO	NO
Gaseous Fuels	NO	NO
Biomass	NO	111.28
Other Fuels	NO	NO