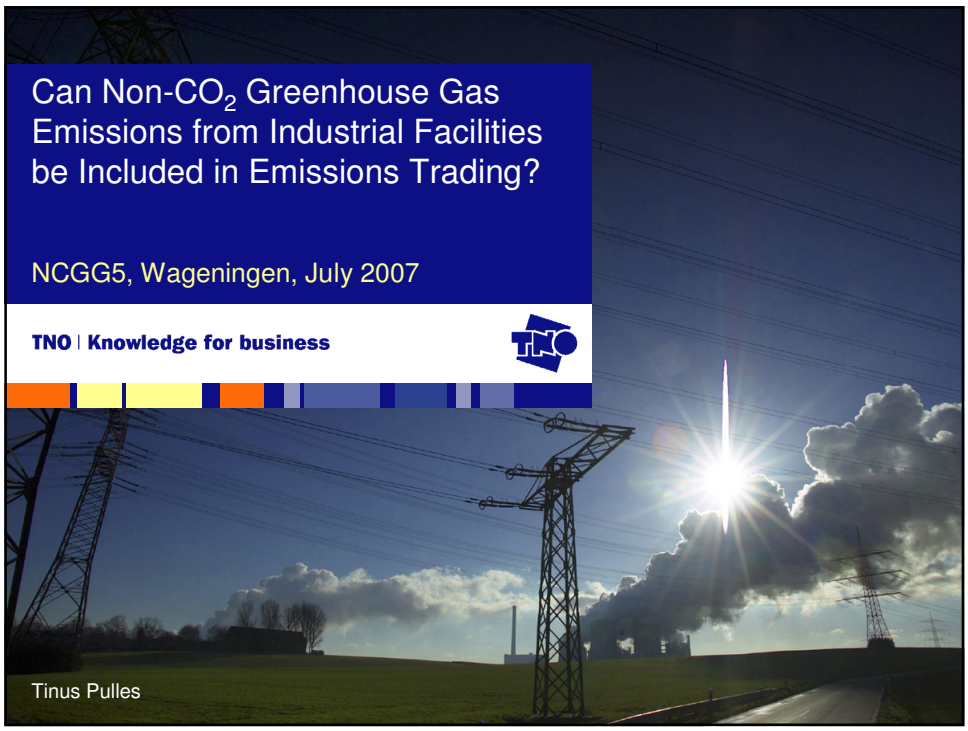
Can Non-CO_2 Greenhouse Gas Emissions from Industrial Facilities be Included in Emissions Trading?

NCGG5, Wageningen, July 2007

TNO | Knowledge for business



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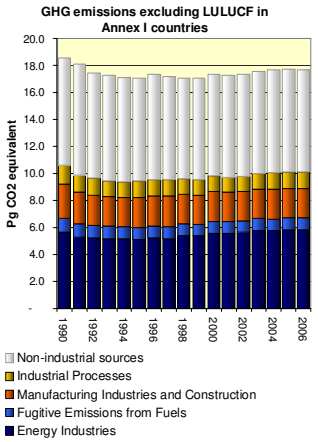
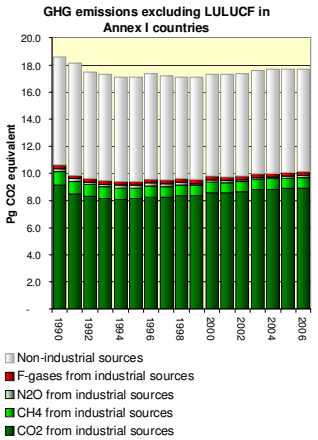
Contribution of industrial sources to Annex-I greenhouse gas emissions





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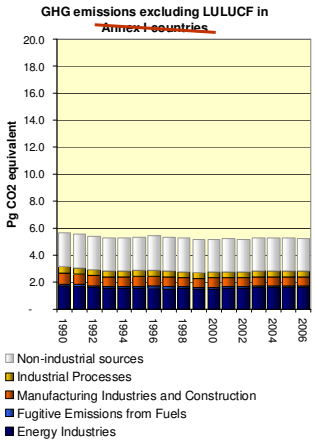
Contribution of industrial sources to EU Member States greenhouse gas emissions

+ Norway



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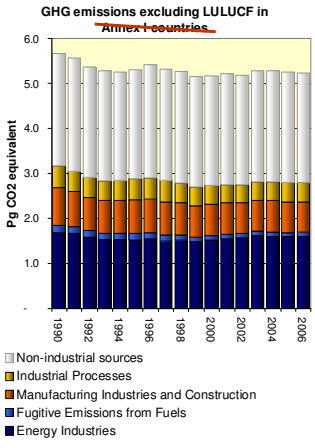
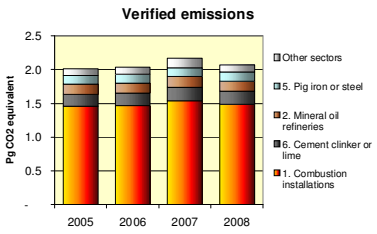
Contribution of industrial sources to EU Member States greenhouse gas emissions

+ Norway





EU-ETS covers a considerable part of these emissions

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Data from several Emissions Reporting procedures

1. Annual emission reports:
   - the United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol
2. Communtiy Right to Know:
   - the European Pollutant Emissions Register (EPER, now E-PRTR)
3. Emission Trading
   - the European Union's Emission Trading Scheme (EU-ETS)

- **EPER** *European Pollution Emissions Register*:
  URL: http://eper.ec.europa.eu/eper/
- European Pollutant Release and Transfer Register (E-PRTR):
  URL: http://eper.ec.europa.eu/eper/documents/E-PRTR%20Regulation.pdf

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Combustion Processes
Compare EPER with UNFCCC reporting

Country	*Percentage of UNFCCC report in EPER reports*		
	CO2	**CH4**	**N2O**
Austria	33.4%	*no EPER report*	4.9%
Belgium	37.8%	11.9%	8.2%
Cyprus	*no UNFCCC report*	*no UNFCCC report*	*no UNFCCC report*
Czech Republic	79.1%	9.1%	**192.6%**
Denmark	64.3%	*no EPER report*	50.2%
Estonia	86.1%	*no EPER report*	*no EPER report*
Finland	63.3%	*no EPER report*	44.8%
France	27.1%	88.5%	28.2%
Germany	72.7%	15.6%	11.9%
Greece	79.9%	*no EPER report*	*no EPER report*
Hungary	47.4%	*no EPER report*	*no EPER report*
Ireland	69.9%	*no EPER report*	*no EPER report*
Italy	54.6%	37.7%	24.9%
Latvia	36.3%	*no EPER report*	*no EPER report*
Lithuania	7.5%	*no EPER report*	*no EPER report*
Luxembourg	31.1%	*no EPER report*	*no EPER report*
Malta	*no UNFCCC report*	*no EPER report*	*no EPER report*
Netherlands	53.0%	29.7%	**950.0%**
Norway	1.4%	*no EPER report*	*no EPER report*
Poland	62.0%	*no EPER report*	7.2%
Portugal	59.4%	*no EPER report*	38.8%
Slovakia	7.5%	**263.4%**	*no EPER report*
Slovenia	71.3%	42.8%	**116.5%**
Spain	50.7%	2.0%	33.0%
Sweden	21.5%	*no EPER report*	9.6%
United Kingdom	65.9%	37.3%	30.9%
Weighted average	**58.8%**	**32.8%**	**35.9%**

Observations:

- CO_2
  - no inconsistencies

- CH_4
  - limited data in EPER
  - Slovakia !

- N_2O
  - Not many EPER reports
  - Several inconsistencies

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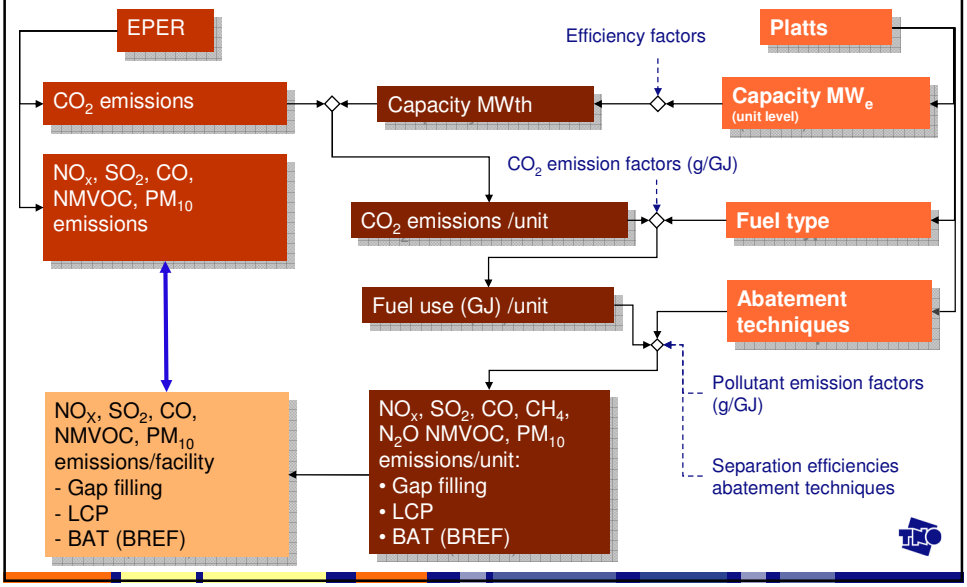
Combustion Processes
Method to Estimate Emissions



Combustion Processes
Estimated Emissions from Combustion

Country	UNFCCC Industrial Combustion	EPER Large Combustion	EPER Power plants linked to PLATTS		
	Emission in 2004 (Gg CO2 equivalents)				
	CO2			CH4	N2O
Austria	31 626	10 555	8 657	3.0	26.9
Belgium	58 900	22 246	18 720	5.5	62.3
Cyprus		3 250	3 250	2.7	7.9
Czech Republic	83 280	65 878	42 880	9.2	192.2
Denmark	31 211	20 075	19 471	5.2	72.5
Estonia	13 993	12 053	371	0.1	0.2
Finland	44 228	28 015	17 769	5.4	65.6
France	143 358	38 899	24 730	8.3	100.8
Germany	471 706	343 152	291 201	67.7	1 272.1
Greece	66 808	53 375	48 134	13.3	198.7
Hungary	29 091	13 775	10 162	2.4	40.0
Ireland	21 042	14 708	10 566	3.2	30.5
Italy	244 125	133 260	113 712	60.3	239.6
Latvia	3 183	1 155	1 023	0.4	0.6
Lithuania	6 915	519	519	0.4	1.2
Luxembourg	3 154	980	980	0.4	0.5
Malta		1 962	1 962	1.6	4.8
Netherlands	97 207	51 561	43 473	13.1	114.9
Norway	16 261	232			
Poland	219 228	135 916	101 862	23.2	474.5
Portugal	32 585	19 357	18 386	6.1	68.7
Slovakia	25 155	1 891	128	0.0	0.1
Slovenia	8 546	6 092	5 250	1.1	24.2
Spain	184 928	93 692	77 897	20.4	340.1
Sweden	23 669	5 090	3 495	1.5	7.1
United Kingdom	293 105	193 200	142 000	38.8	510.9
Total	**2 153 304**	**1 270 888**	**1 006 598**	**293.4**	**3 856.9**

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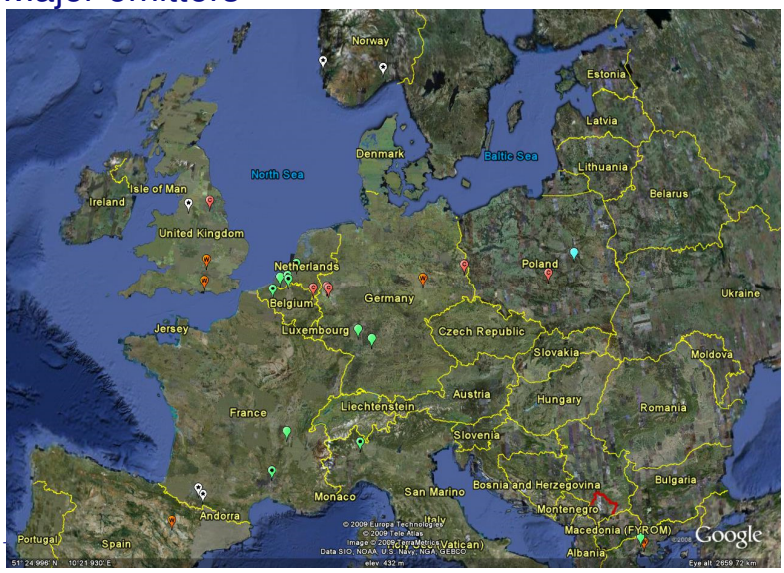
Combustion Processes
in Trading Systems?

- CO_2
  - Works fine in European Union:
  - Large fraction of CO_2 emissions included
- CH_4
  - Emissions **very** small compared to CO_2
  - Possibly inconsistencies
- N_2O
  - Emissions small compared to CO_2
  - Confusion between combustion and process emissions

Non-Combustion Processes
Major emitters



Non-Combustion Processes
Largest Emitters in Europe

pollutant	Nat ID	Facility Name	Main Activity	Total	
CO2	FR_070.00956	SOLLAC ATLANTIQUE DUNKERQUE	Metal industry	11 900 000 000	0.6%
	IT_16073001	ILVA S.P.A. - ILVA S.P.A. Stabilimento di Taranto	Metal industry	9 560 000 000	0.5%
	FR_064.01052	SOLLAC MEDITERRANEE SITE DE FOS	Metal industry	8 590 000 000	0.4%
	ES_816	CERAMICAS PRINCEP S.L.	Cement, lime, glass, mineral substances or ceramic products	7 910 000 000	0.4%
	AT_1036310456	voestalpine Standort Linz:voestalpine Stahl GmbH,voestalpine Gießerei Linz GmbH,voestalpine Schmiede GmbH,voestalpine Grobblech GmbH & Co KG	Metal industry	7 430 000 000	0.4%
CH4	DE_06-15-th06	HMD Halle-Lochau	Disposal of non-hazardous waste and landfills	36 600 000	2.2%
	GR_EL5401287	LANDFILL OF TAGARADES THESSALONIKI	Disposal of non-hazardous waste and landfills	23 900 000	1.4%
	ES_1516	CENTRO ELIMINACIÓN RESIDUOS DE ZARAGOZA	Disposal of non-hazardous waste and landfills	18 500 000	1.1%
	UK_EA-1201	Gerrards Cross Waste Disposal Ltd	Disposal of non-hazardous waste and landfills	15 100 000	0.9%
	UK_EA-2900	Waste Management Ltd	Disposal of non-hazardous waste and landfills	14 600 000	0.9%
N2O	IT_01003004	RADICI CHIMICI S.P.A. - RADICI CHIMICA SPA	Basic organic chemicals	24 000 000	14.0%
	DE_06-07-8290552 (154001100)	BASF AG	Basic inorganic chemicals or fertilisers	14 000 000	0.2%
	NL_51105	YARA Sluiskil BV	Basic inorganic chemicals or fertilisers	10 400 000	0.1%
	NL_62	DSM LIMBURG BV	Basic organic chemicals	7 340 000	0.2%
	BE_vl001121200001B7	BASF Antwerpen nv	Basic organic chemicals	6 630 000	0.2%
HFCs	BE_vl003029900001 47	BUBBLE AND FOAM INDUSTRIES	Basic organic chemicals	339 000	24.4%
	GR_EL5401097	PHOSPHORIC FERTILIZERS INDUSTRY S.A. THESSALONIKI FACTORY	Basic inorganic chemicals or fertilisers	152 000	11.0%
	FR_061.03685	ATOFINA	Basic inorganic chemicals or fertilisers	83 000	6.0%
	FR_066.01578	RHODIA ORGANIQUE	Basic organic chemicals	78 900	5.7%
	NL_10079	DU PONT DE NEMOURS NED. BV	Basic organic chemicals	72 300	0.0%
PFCs	FR_068.02504	Aluminium Pechiney Lannemezan	Metal industry	172 000	24.9%
	FR_066.01578	RHODIA ORGANIQUE	Basic organic chemicals	82 800	5.7%
	BE_vl01851258000121	3M Belgium NV	Basic organic chemicals	42 900	6.2%
	SE_2281-103	Kubikenborg Aluminium AB	Metal industry	38 900	0.0%
	NO_A40007	HYDRO ALUMINIUM AS KARMØY	Metal industry	34 900	0.0%
SF6	UK_EA-1739	MAGNESIUM ELEKTRON LTD	Metal industry	14 200	18.4%
	PL_07W000057	Drwalewskie Zaklady Przemyslu Bioweterynaryjnego BIOWET Drwalew S.A.	Pharmaceutical products	10 800	14.0%
	DE_06-08-7047053	Solvay Fluor u. Derivate GmbH	Basic inorganic chemicals or fertilisers	10 000	2.9%
	FR_068.02551	Péchiney Electrométallurgie (Usine de MARIGNAC)	Metal industry	9 930	12.9%
	NO_A21037	NORSK HYDRO PRODUKSJON. Porsgrunn Ind - Magnesiumfabrikken	Metal industry	8 600	11.2%

NON-Combustion Processes
in Trading Systems?

- CO_2
  - Metal industry, cement
  - Relatively small emissions
- CH_4
  - Landfills are the main sources
  - Many relatively small sources
- N_2O
  - A limited number of sources in the chemical and fertilizer industry
- “F-gases”
  - A limited number of sources, mainly in the metal industry

Conclusions

- We showed that:
  - Emissions trading for CO_2 from large industrial sources covers a signficant part of national greenhouse gas emissions
  - Emissions of non-CO_2 GHGs from industrial sources are relatively small for most industrial sources
  - Emissions reports from industry on non CO_2 GHGs are not always consistent with other (national) emission reports
- We conclude:
  - Including non_CO_2 GHG in industrial emissions trading might be worthwhile for only a limited number of sources
  - Quality issues must be solved first