



Session II-1: Hands-on Training using the new IPCC Inventory Software Energy/IPPU IPPU Focus: HFCs (F gases) Refrigeration and Air-Conditioning

Keizo Hirai

Greenhouse Gas Inventory Office of Japan (GIO)
Center for Global Environmental Research (CGER)
National Institute for Environmental Studies (NIES)

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Why HFCs ?

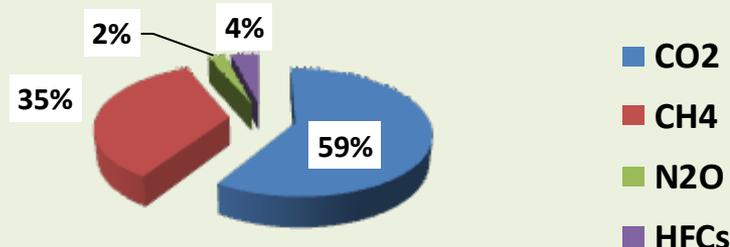
Review of Non-CO₂ Session in WGIA9

Even though currently HFCs are not “shall be reported gases” for Non Annex I parties,

- HFCs have very high Global Warming Potential,
- HFCs are contained in Automobiles, Air-conditioners, and Refrigerators, the quantity of HFCs has been becoming larger,
- 2 countries among 13 already reported HFCs in their NCs, Mongolia showed the emission of HFCs was 4% of total emissions.

Green House Gas	GWP
HFC-23	11,700
125	2,800
134a	1,300
143a	3,800
227ea	2,900
236fa	6,300

CO₂, CH₄, N₂O, Fgases in
Mongolia(2006) Non-CO₂ Total:
7,800Gg CO₂-eq.



Why HFCs ?

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Methodology for Consumption of HFCs

Revised 1996GL Tier 1=Potential Emission

(Production) +
(Imported in bulk + Contained quantity in imported systems) –
(Exported in bulk + Contained quantity in exported systems) –
(Destruction)

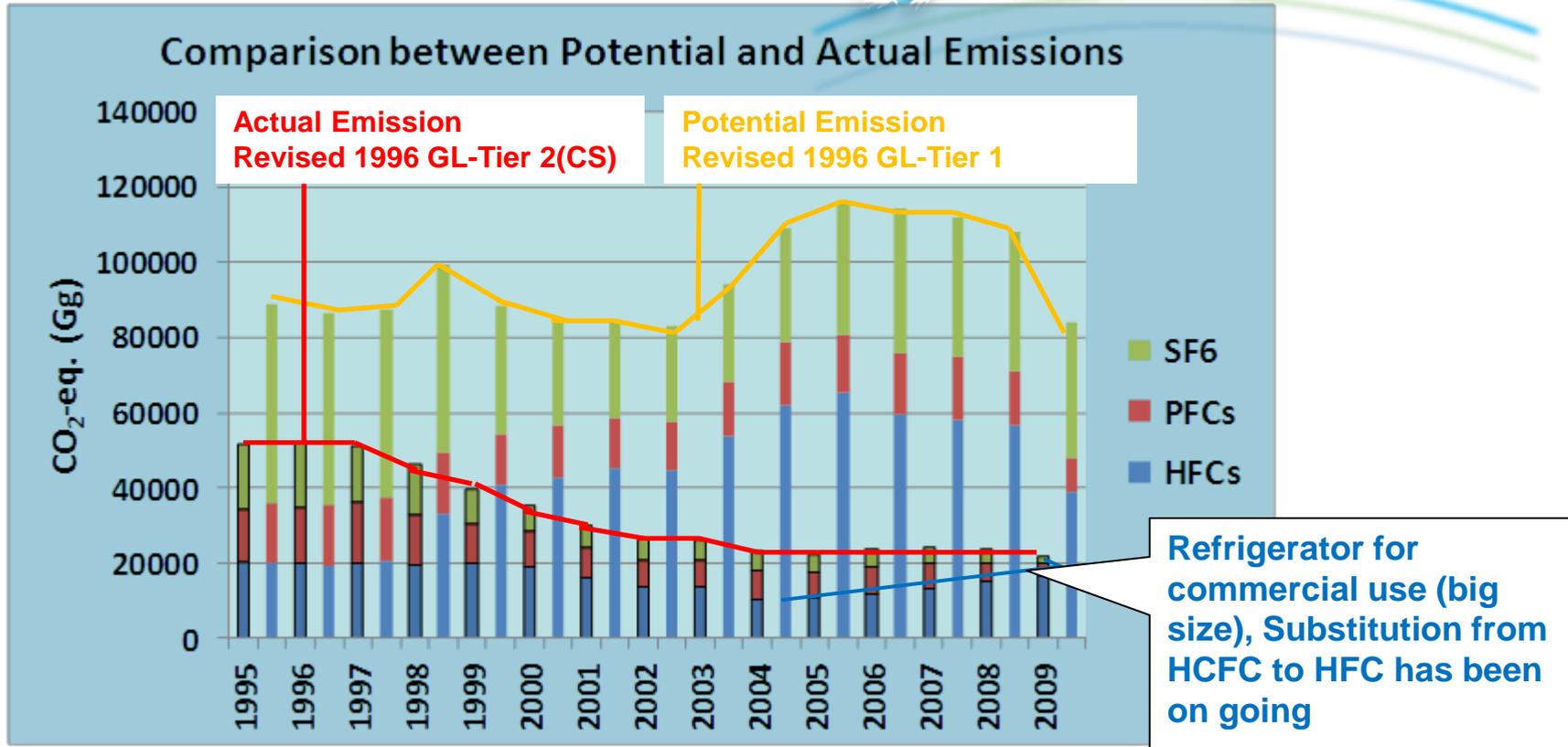
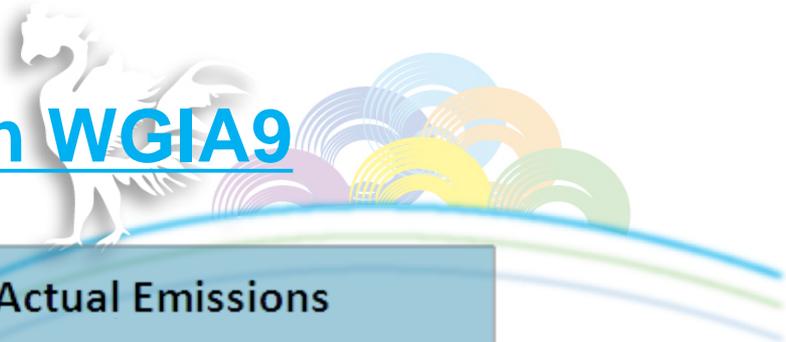
Revised 1996 GL Tier 2=Actual Emission

(Emissions during system manufacture/assembly) +
(Emissions during system operation) + (Emissions at system disposal)

The potential emission likely to overstate
(particularly when the market is growing),
as shown in next figure

Why HFCs ?

Review of Non-CO₂ Session in WGIA9



Reference: National Greenhouse Gas Inventory Report and CRF of JAPAN

HFCs is the most concerned F-gases

Why HFCs ?

Review of Non-CO₂ Session in WGIA9



A conclusion at Non-CO₂ Session in WGIA9

It was recognized by the attendees that F-gases (HFCs) emissions were a potential and important missing emission source, and they showed interest in estimating F-gases (HFCs) emissions. Even though the problem of data collection still remained in some countries, the IPCC TFI TSU suggested that the Tier.1 method of the “2006GL (NOT the 96GL)” was very helpful for calculation.

Estimation of HFCs

Using the new IPCC Inventory Software



Method: 2006GL-Tier 1:

Used defaults:

Assumed Equipment Lifetime = 15 years

Emission Factor from installed base = 15% annually

Needed Data: Activity Data;

**(1) Produced quantity (ton) of a specific refrigerant in the year;
Example: 10000 refrigerators for home use were produced in 2004. These refrigerator contains 1kg R-410A (HFC-32/HFC-125=50/50) on average. In this case, the production of HFC-32 and HFC-125 in 2004 is 5 ton each.**

Estimation of HFCs

Using the new IPCC Inventory Software



Needed Data: Activity Data;

(2) Exported quantity (ton) of a specific refrigerant in the year;
Example: 1000 refrigerators for home use were exported in 2004. These refrigerator contains 1kg R-410A (HFC-32/HFC-125=50/50) on average. In this case, the exported quantity of HFC-32 and HFC-125 in 2004 is 0.5 ton each.

(3) Imported quantity (ton) of a specific refrigerant in the year;
Example: 2000 refrigerators for home use were imported in 2004. These refrigerator contains 1kg R-410A (HFC-32/HFC-125=50/50) on average. In this case, the imported quantity of HFC-32 and HFC-125 in 2004 is 1 ton each.

2.F.1.a: Refrigeration and Air-conditioning

2006 IPCC Software for National Greenhouse Gas Inventories - hirai - [Worksheets]

Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help

IPCC 2006 Categories

- 2.F.1.a - Refrigeration and Stationary Air Conditioning
 - 2.F.1.b - Mobile Air Conditioning
- 2.F.2 - Foam Blowing Agents
- 2.F.3 - Fire Protection
- 2.F.4 - Aerosols
- 2.F.5 - Solvents
- 2.F.6 - Other Applications (please specify)
 - Other Product Manufacture and Use
 - 2.G.1 - Electrical Equipment
 - 2.G.1.a - Manufacture of Electrical Equipment
 - 2.G.1.b - Use of Electrical Equipment
 - 2.G.1.c - Disposal of Electrical Equipment
 - 2.G.2 - SF6 and PFCs from Other Product Manufacture and Use
 - 2.G.2.a - Military Applications
 - 2.G.2.b - Accelerators
 - 2.G.2.c - Other (please specify)
 - 2.G.3 - N2O from Product Uses
 - 2.G.3.a - Medical Applications
 - 2.G.3.b - Propellant for pressure applications
 - 2.G.3.c - Other (Please specify)
 - 2.G.4 - Other (Please specify)
 - Other
 - 2.H.1 - Pulp and Paper Industry
 - 2.H.2 - Food and Beverages Industry
 - 2.H.3 - Other (please specify)
 - 2.I.1 - Agriculture, Forestry, and Other Land Use
 - Livestock
 - 3.A.1 - Enteric Fermentation
 - 3.A.1.a - Cattle
 - 3.A.1.a.i - Dairy Cows
 - 3.A.1.a.ii - Other Cattle
 - 3.A.1.b - Buffalo
 - 3.A.1.c - Sheep
 - 3.A.1.d - Goats
 - 3.A.1.e - Camels
 - 3.A.1.f - Horses

IPCC 2006 Guidelines

Emissions from Refrigeration and Air Conditioning

Worksheet

2010

Sector: Industrial Processes and Product Use
 Category: Refrigeration and Air Conditioning
 Subcategory: 2.F.1.a - Refrigeration and Stationary Air Conditioning
 Sheet: CHF3 Emissions

Data

Gas: HFC-23 (CHF3) Intro Year: 1995 Growth Rate (%): 3 Lifetime (years): 15 EF (%): 15 Destroyed (%): 0

	A	B	C	D	E	F	G	H	I						
	Production (tonnes)	Exports (tonnes)	Imports (tonnes)	Total new agent to domestic market (tonnes)	Agent in retired equipment (tonnes)	Destruction of agent in retired equipment (tonnes)	Release of agent from retired equipment (tonnes)	Bank (tonnes)	Emissions (tonnes)						
				D = A - B + C		F = E * Recovery	G = E - F		I = H * EF + G						
			139625	139625	15.44	0	15.44	73851.06287	11093.09943						
Year	199	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Production	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Imports	1	31	49.15	67.5	325	863	2149	3599.5	6028	9376	13045.5	16619	20178	17254.5	15735.5
Total new agent to d...	1	31	49.15	67.5	325	863	2149	3599.5	6028	9376	13045.5	16619	20178	17254.5	15735.5
Agent in retired equi...	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15.44
Destruction of agent...	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Release of agent fro...	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15.44
Bank	1	44	87...	141...	445.4...	1241.65...	3204.40...	6323.24...	11402.7...	19068.3...	29263.5...	41484.5...	55439.8...	64378.3...	70457.1...
Emissions	2	6.7	13...	21.2...	66.82...	186.248...	480.661...	948.487...	1710.41...	2860.25...	4388.03...	6222.68...	8315.98...	9656.75...	10568.5...

F-Gases Data Time Series data entry... Uncertainties Import from Excel

Worksheet remarks

2.F.1.a - Time Series

HFC-23 (CHF3) Emissions (Gq CO2 Equivalents)

* Base year for assessment of uncertainty in trend: 1990

Gas: HFC-23 (CHF3)

Country/Territory: Japan Inventory Year: 2010 Base year for assessment of uncertainty in trend: 1990 CO2 Equivalents: SAR GWPs (100 year time horizon) Database file:



Let's move to Excel Dummy Data

Thank you
Cám ơn