Compilation of Technical Information on the New Greenhouse Gases and Groups of Gases Included in the Forth Assessment Report of the IPCC

Katia Simeonova

Vitor Gois

Reporting, Data and Analysis Programme

Mandate

- The AWG-KP, at its sixth session, requested the secretariat to prepare a compilation of technical information on the new gases

- The list of new gases covers substances in table 2.14 (errata of 5 August 2008) of the Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC), that were not listed in the Second Assessment Report (SAR).

- According to the IPCC (section 2.10.2 of volume 3 of the AR4) table 2.14 covers all gases for which:
  - → either significant concentrations or large trends in concentrations have been observed,
  - → or a clear potential for future emissions has been identified

Approach and Sources of Information

- The secretariat used input from:
  - → Submissions by Parties;
  - → Further information from Parties and their experts;
  - → Experts from the Montreal Protocol secretariat and the Technology and Economic Assessment Panel (TEAP);
  - → IPCC.

- Other sources of information used:
  - → The Intergovernmental Panel on Climate Change (IPCC) and TEAP special report on "Safeguarding the Ozone Layer and the Global Climate System: Issues related to hydrofluorocarbons and perfluorocarbons".
  - → The TEAP "Assessment of Alternatives to HCFCs And HFCs and Update of the TEAP 2005 Supplement Report Data" (May, 2009)

Compilation of Information on new gases

New HFCs and PFCs

Gas	GWP	Application and methodologies	Emissions reduction options
New HFCs	**12–1,370**	Ozone depleting substitutes (ODS), refrigeration and air conditioning, foam blowing, aerosols and fire extinguishing. Two new HFCs have current commercial use (HFC-245fa and HFC-365mfc), but its use is being replaced. No current significant uses for the others. Methodologies available in the 2006 GL (substitutes for ODS; specific EF for production and use of foams).	Several non-fluorocarbon blowing agents technologies (applying other products such as hydrocarbons, carbon dioxide, water and supercritical carbon dioxide gas).
New PFCs	**>7,500**	Only one new PFC listed (PFC 9-1-18): used in cosmetics and medical applications; potential use in vaccines; but it has a high boiling point and low volatility, and large emissions and atmospheric abundance are not expected. Methodologies in the 2006 IPCC GL.	

NF_3 and HFEs

Gas	GWP	Application and methodologies	Emissions reduction options
NF_3	**17,200**	NF_3 is already being used (semi-conductors, LCD and photovoltaic panels – thin-film solar cells): 4,000 t in 2007 and 8,000 t per year by 2010. Emissions within the range of 2–16% of use. Methodologies in the good practice guidance and the 2006 IPCC GL.	Mitigation efforts in the semiconductor industry focus on process improvements/source reduction, alternative chemicals, capture and beneficial reuse, and destruction technologies. E.g. systems that generate fluorine on-site. More information on this issue received during this week will be used to update the web page.
HFEs	**11–14,900**	Use as solvents, for precision cleaning and medical agent. Potential applications: refrigerants, heat transfer fluids, foam blowing, plasma etching; industrial heat transfer fluids and fire suppressant. Methodologies in the IPCC 2006 GL (ODS similar).	Current use of HFE is concentrated in specialised high value sectors (e.g. precision cleaning) where the main alternatives are higher GWP fluorocarbons. There is therefore limited scope for mitigation. HFEs are expensive to produce, and use as replacement of other ODS is difficult to forecast.

SF_5CF_3 and PFPE/PFPMIE

Gas	GWP	Application and methodologies	Emissions reduction options
PFPE/ PFPMIE	**10,300**	PFPMIE: use as dermatological/cosmetic product; heat transfer fluid and dielectric applications. Potentially low volatility. Methods in the 2006 IPCC GL.	Largely, this industry has adopted alternative technologies (e.g. no-clean, aqueous and semi-aqueous cleaning; and other solvents; but certain specific solvent applications (mainly precision cleaning) still require PFPEs because of reliability, compatibility, stability and low toxicity.
SF5CF3	**17,700**	Concentrations in the atmosphere have been increasing; but here are assumptions that it could originate as a breakdown product of SF6 in high voltage equipment.	

Other gases

Gas	Name	GWP	Application and methodologies
CH_3OCH_3, CH_2Cl_2, CH_3Cl, CH_2Br_2, CF_3I	Dimethylether, Methylene chloride, Methyl chloride, Dibromomethane, Trifluoroiodo-methane	**1** **8.7** **13** **13** **0.4**	Low GWP and lifetimes. Methyl chloride and dibromomethane from biogenic sources mainly.
CH_3CCl_3, $CHBrF_2$	Methyl chloroform, Bromodifluoro-methane	**146** **404**	Already included in the annexes of the Montreal Protocol. Concentrations in the atmosphere are stable or declining.

Thank you!