



# Break-out group on Unidentified Sources of PFCs Emissions (BOG 1 – Closing Plenary)

IPCC Expert Meeting for Technical Assessment of IPCC Inventory Guidelines:  
follow-up on specified issues from the 2015 expert meetings

25-26 April 2016, Wollongong, Australia  
Rob Sturgiss, BOG1 Rapporteur

# Outline

1. BOG1
2. PFCs gap
3. Aluminium Industry
4. Semiconductor Industry
5. Fluorochemical Production
6. Rare Earth Elements

# BOG1

BOG1: Unidentified Sources of PFCs Emissions

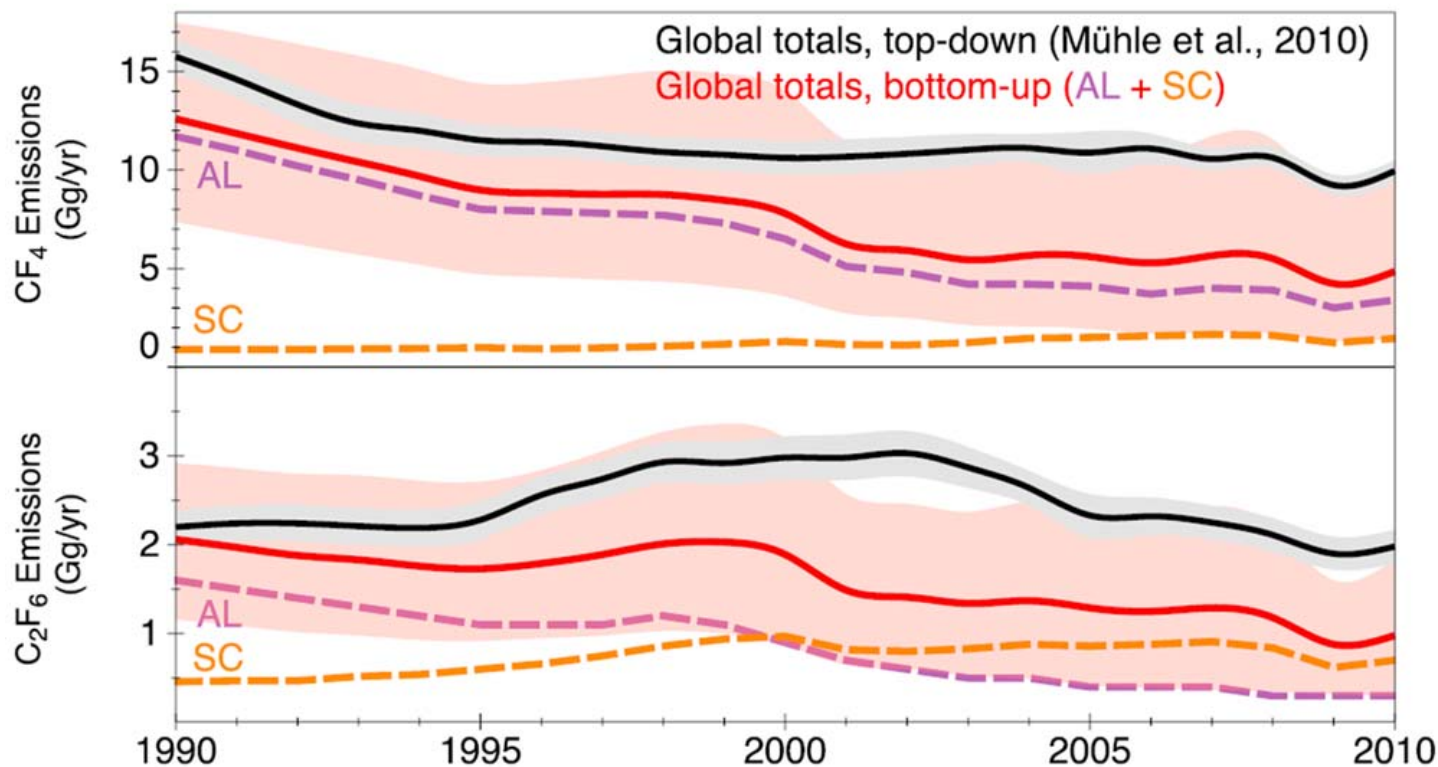
Chair: Deborah Ottinger (USA)

Rapporteur: Rob Sturgiss (Australia)

Experts: Mr. Prosser (Australia), Ms. Hatanaka (Japan), Mr. Wong (NZ), Mr. Buendia (Peru), Mr. Limmeechokchai (Thailand), Mr. Mr.Czerniak (UK), Mr. Raoux (USA/France) and Ms. Nunez (IAI)

TSU: Mr. Shermanau and Mr. Matsumoto

# Message from the 2015 Geneva meeting



Kim, J., et al. (2014), "Quantifying aluminum and semiconductor industry perfluorocarbon emissions from atmospheric measurements," *Geophys. Res. Lett.*, 41, 4787-4797, doi: 10.1002/2014GL059783

# Aluminium Industry

## Main conclusion:

Yes. Refinement is needed:

- *to develop new guidance on “non-anode effect” (“low-voltage anode effect”) emissions; and*
- *to update tier 1 and tier 2 defaults*
- *to integrate new guidance and factors into the existing methodology on anode-effect (“high-voltage anode effect”) emissions*
  
- *“Low-voltage anode effect” is a better term*

# Aluminium Industry

Question	Details (Where in 2006 GLs?)
What kind of refinements?	
Update or addition of defaults?	High-voltage anode effect defaults
Elaboration of existing guidance?	
Development of new guidance?	Low-voltage anode effect
What are sources of data/information?	Literature exist, more information is expected to come from IAI

# Semiconductor Industry

## Main conclusion:

Yes. Refinement is needed:

- *to update default Tier 2 emission factors and elaborate existing guidance;*
- *to update default Tier 1 emission factors (from Tier 2) and elaborate existing guidance (more differentiated emission factors).*
- *to improve Tier 3 guidance (but there is a lack of relevant studies)*
- *to elaborate guidance on generation of by-products from abatement technologies (CF<sub>4</sub> from NF<sub>3</sub>). More publications are expected to be available soon*

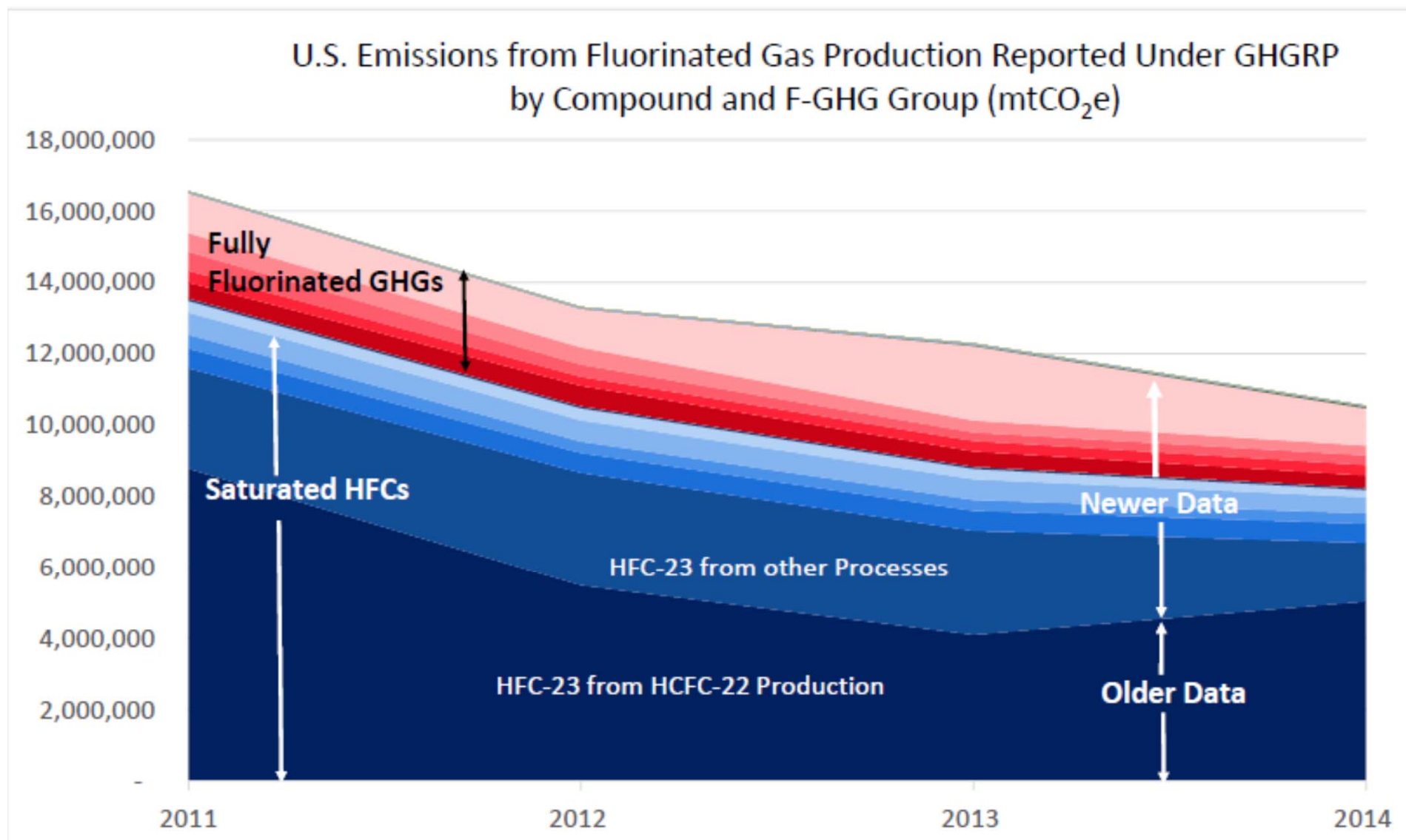
*To TFI TFB: to approach industry representatives (e.g., World Semiconductor Council)*

# Semiconductor Industry

Question	Details (Where in 2006 GLs?)
What kind of refinements?	
Update or addition of defaults?	Tier 2 and Tier 1 default EFs
Elaboration of existing guidance?	Tier 3
Development of new guidance?	
What are sources of data/information?	US GHG RP

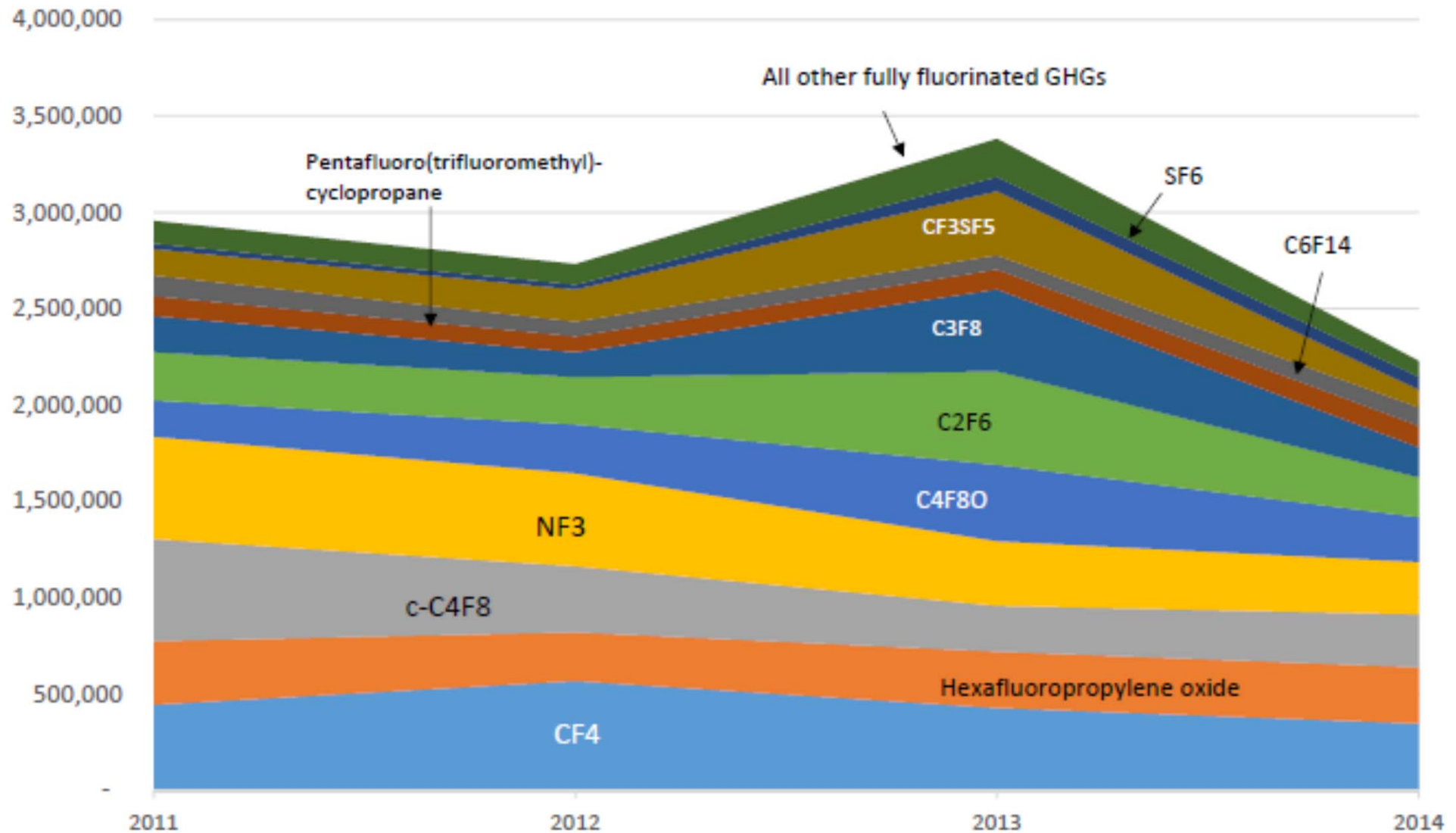


# Fluorochemical Production (USA)



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Emissions of Fully Fluorinated GHGs Reported by Fluorinated Gas Producers Under GHGRP (mtCO<sub>2</sub>e)



# Fluorochemical Production (USA)

F-Gas Quantity	2011	2012	2013	2014
Supplies of Saturated HFCs, excluding HFC-23. Includes production, imports, and exports (TgCO <sub>2</sub> e)	241	227	278	254
Emissions of saturated HFCs from fluorinated gas production, excluding HFC-23 generated during HCFC-22 production (TgCO <sub>2</sub> e)	4.8	5.0	4.7	3.2
Implied emission factor <b>with controls</b>	2.0%	2.2%	1.7%	1.3%
Implied emission factor <b>without controls</b> (lower- bound)	9%	8%	5%	6%

# Fluorochemical Production

Main conclusion:

Yes. Refinement is needed:

- *to update default Tier 1 emission factor (0.5%) and*
- *to elaborate existing guidance*

# Fluorochemical Production

Question	Details (Where in 2006 GLs?)
What kind of refinements?	
Update or addition of defaults?	Tier 1 default EF
Elaboration of existing guidance?	
Development of new guidance?	
What are sources of data/information?	US GHG RP

# Rare Earth Elements

## Main conclusion:

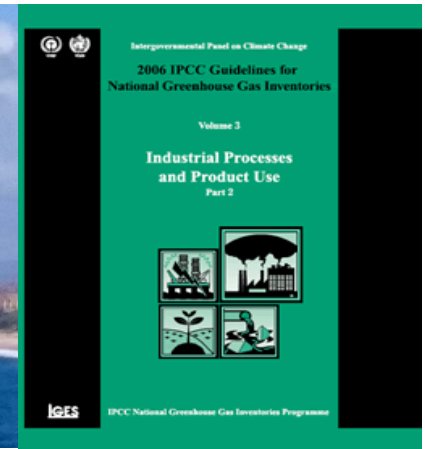
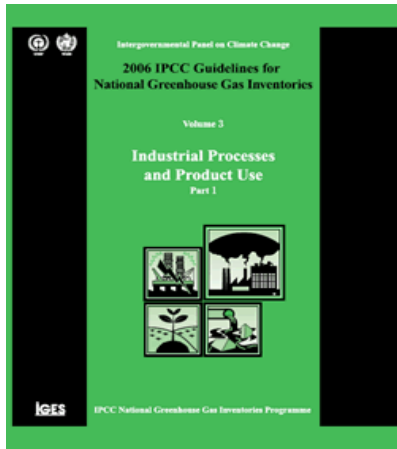
Yes. Refinement is needed.

- This is a missing category and potentially significant
- Development of new guidance on PFCs (taking into that CO<sub>2</sub> will be also emitted)
- Literature sources: *current literature limited, some laboratory studies exist. It is expected that more literature will be available within the next two years*

# Rare Earth Elements

Question	Details (Where in 2006 GLs?)
What kind of refinements?	
Update or addition of defaults?	
Elaboration of existing guidance?	
Development of new guidance?	New guidance
What are sources of data/information?	





Thank you for your attention!

