



Hands-on training:

Estimation of actual emissions of F-gases from refrigeration and air-conditioning (2F1)

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INTERGOVERNMENTAL PANEL ON climate change

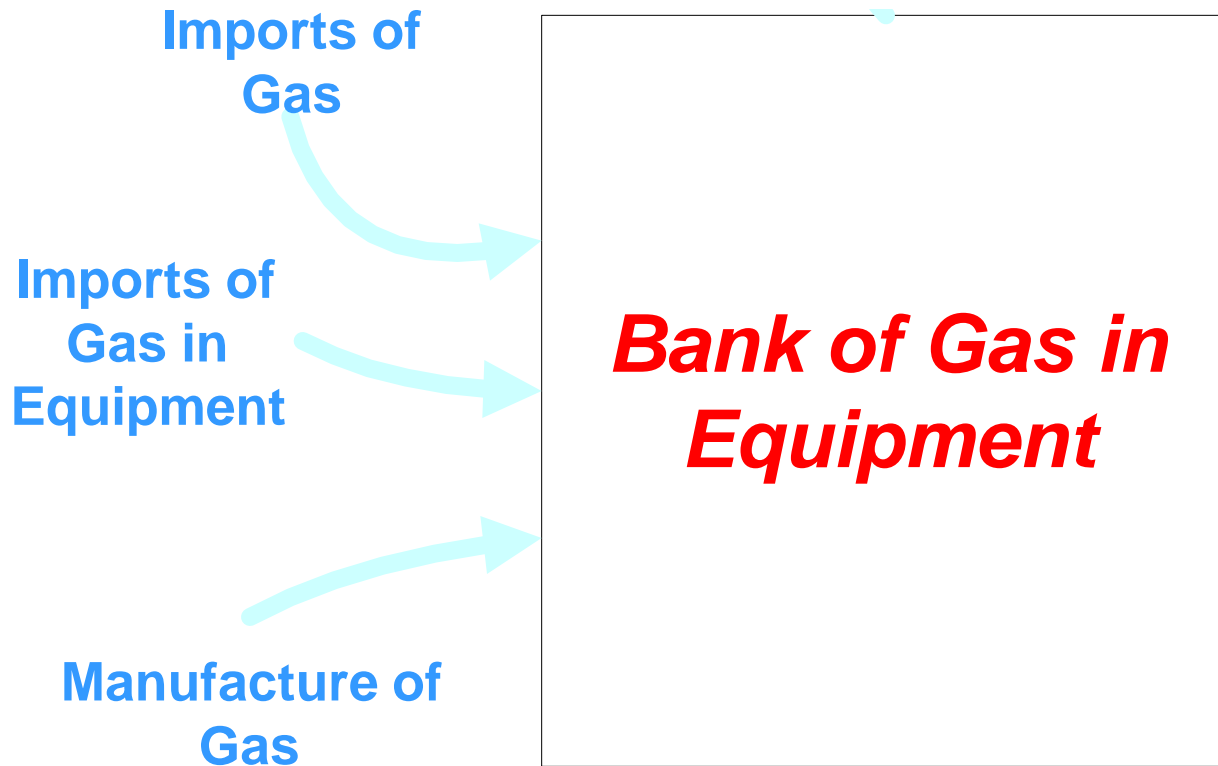
Actual Emission Estimates

- Why are actual emission estimates better than potential emission estimates...? That is because:
 - ✓ It takes into account the time lag between consumption and emission, which may be considerable in some application areas, e.g., refrigeration.
 - ✓ Time lag results from the fact that a chemical is placed in new products and then slowly leaks out over many years.

Potential emission estimates do not take this fact into account at all!!

“Bank”

Total amount of substances contained in existing equipment, chemical stockpiles, foams and other products not yet released to the atmosphere



Difficulties

- However, estimation of actual emissions is not as easy as potential emissions, because it has to take the “bank” into account, which requires:

- ✓ Complex calculation as compared to very simple equation for potential emission estimates

$$Emissions_t = Bank_t \bullet EF + RRL_t$$

and

$$Bank_t = \sum_{i=t_0}^t (Production_i + Imports_i - Exports_i - Destruction_i - Emissions_{i-1}) - RRL_t$$

- ✓ Historic data on production, exports, imports, etc of chemicals (cf., potential emission estimates require only the current year data)

We have just learned this can be overcome by the software.

What about this difficulty...?
Can we overcome it, too?

Yes, we can!!

- New IPCC software enables you to estimate actual emissions even if you do not have historic data – if you have at least the data/information on:
 - Year of introduction of agent
 - Domestic production of agent in current year
 - Imports of agent in current year
 - Exports of agent in current year
 - Growth rate of sales of equipment that uses the agent
- ✓ For example, in the case the data are available only for 2005 and 2010 while you know the chemical has been used since 1995...

(tonne)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Produced Quantity											26091					27925
Exported Quantity											18046					23963
Imported Quantity											9287					17222

Data will be automatically estimated using an empirical assumption.

Data will be automatically estimated using interpolation.

Empirical assumption...

- In the absence of historic data on production, imports and exports, the calculations assume that the total market for equipment grows exponentially while the share of the market which is taken by the F-gas grows linearly between the year of introduction and the current year.

$$M(t+1) = (1+r) \times M(t) \times (t - t_0 + 2)/(t - t_0 + 1)$$

$M(t)$ = Production, Exports or Imports of F-gas in year t

r = Growth rate of sales of equipment that uses the agent (fraction)

t_0 = Year of introduction of agent

Let's try calculation!