# Implementing the EU F-gas Regulation

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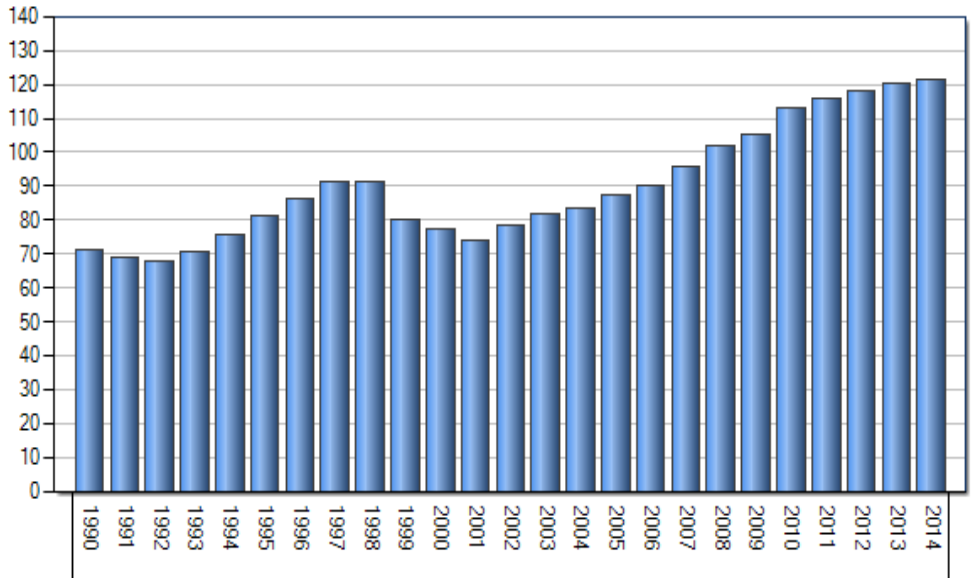
# Relevance of F-gases

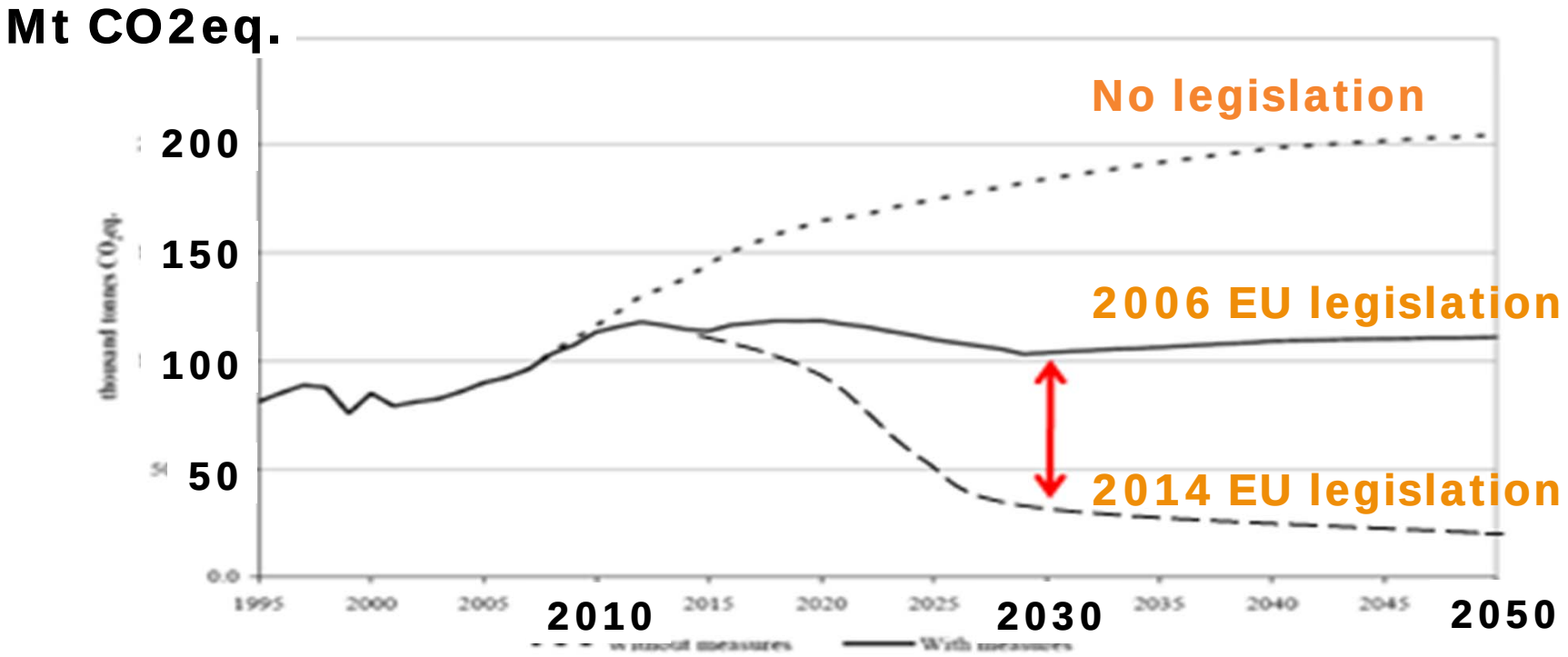
| Gas | GWP (AR 4, 100 year) |
|---|---|
| $CO_2$ | **1** |
| Methane | **25** |
| Nitrous Oxide | **298** |
| HFC 134a | **1 430** |
| HFC 404A | **3 922** |
| HFC 410A | **2 088** |
| HFC 125 | **3 500** |
| PFC 14 | **7 390** |
| SF6 | **22 800** |

## HFC Emissions 1990 – 2014 (EU)




Source: European Environmental Agency

# Projected EU F-gas emissions




Cumulative savings of 1.5 Gt by 2030 and 5 Gt by 2050!

# Two strategies to reduce emissions

- Prevent leakage and emissions
  - Emission prevention and leak checks -> Art. 3 - 5
  - Control of by-production -> Art. 7
  - End of life treatment of products and equipment -> Art. 8,9
  - Training and qualification -> Art. 10
  - Information for users (labelling, product infos) -> Art. 11
- Avoid the use of F-gases
  - Training and qualification
  - **Ban on new applications ->** Art. 11
  - **Ban on uses** -> Art. 13
  - **Phase-down of HFC supply** -> Art. 14, 15ff.

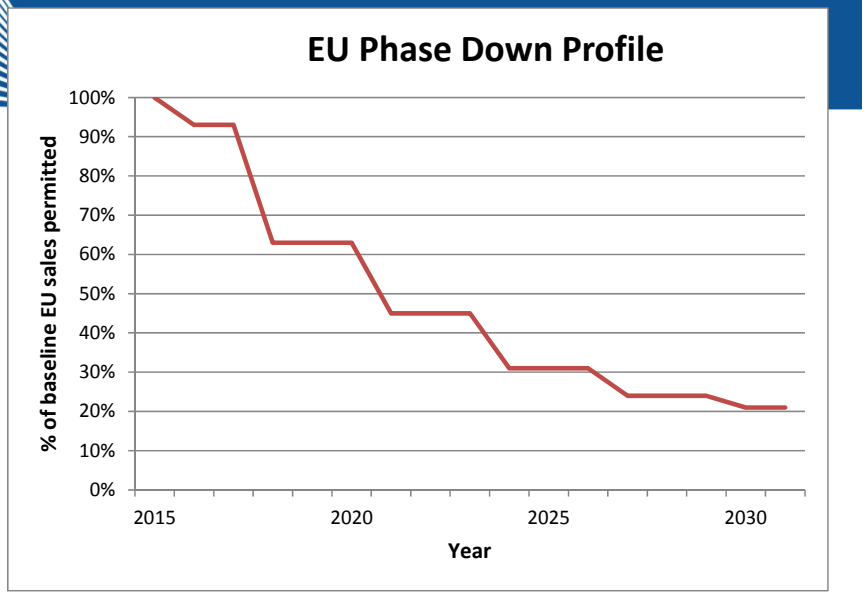
# Phase-down quota system

***Upstream Market Measure**: Reduce EU HFC sales (measured in CO2eq.!) in 3 year steps by 80% (2030)*

- Companies importing or producing HFCs (bulk!) get **HFC quota** every year (in CO2eq) → more metric tonnes for climate-friendlier substances can be sold
- A company can only place quantities of HFCs on the EU market up to their quota limit
- *All HFCs in Precharged RAC equipment need to be accounted for in the quota system from 2017*

# Phase-down

*Fast inital slope*




*2015: freeze @ 2009-2012 levels*

*2016: 93%*

*2017: pre-charged equipment covered by quota system (>10% of market of top of phase-down step)*

*2018: 63% plus pre-charged equipment*

# Phase-down effects:

- Prices for high GWP gases may rise if users do not switch to low GWP equipment quickly enough

The initial slope is rather steep! → Changes will be noticeable quickly!

- Today: $GWP_{average}$ = 2000 → 2030: GWP 400 (21%)

  i.e. a GWP 700 solution is in principle not sufficient to comply with the phase-down in the long run…

- There is lots of potential to reduce the use of GWP > 2500 (404A, 507) → 407c,f; CO2 transcritical, cascade systems

**→ Operators investing in new equipment today should seek good guidance!**

## Registration in the F-gas Portal is required for…

- all companies concerned by the reporting obligations (Art. 19) **including equipment importers** and destruction compnanies
- *all companies wishing to ask for quota [HFC Registry]*
- *all companies receiving or supplying exempted gases (import for destruction, feedstock, direct export, military use, semiconductor production or MDI production) [HFC Registry]*

*How to register?*

http://ec.europa.eu/clima/policies/f-gas/reporting/docs/guidance_registration_f-gases_portal_en.pdf

# Yearly Company Reporting

- **Entrance gateway is the F-gas Portal**
- Companies must fill in an electronic reporting template. Relevant for:
  - **Producers / Importers / Exporters of bulk Fgases**
  - **Undertakings destroying Fgases**
  - **Feestock users**
  - **Importers of precharged equipment**

- **The (audited) data is used to check if companies are in compliance with the quota obligations, and to allocate new reference values!**

- Deadline is 31 March each year! First time was **31 March 2015** (for activites concerning 2014)

# Pre-charged HFC equipment

- From 2017, pre-charged HFC equipment can only be placed on the market, if the HFC charge is covered by quota!

How?

- *Filling in the EU (or even outside the EU), with HFCs **bought in the EU**, or*
- *authorisation to use quota from a quota holder (producer/importer of bulk HFCs) for HFCs **bought outside the EU***
- *Need for a **Declaration of Conformity***

http://ec.europa.eu/clima/policies/f-gas/docs/guidance_equipment_importers_en.pdf

# Bans on new RAC equipment

| | |
|---|---|
| Domestic fridges/freezers | 2015 (GWP>150) |
| Commercial plug-in/stand alone | 2022 (GWP>150) |
| Stationary Refrigeration Systems | 2020 (GWP>2500) |
| Multipack Supermarket Systems | 2022 (GWP>150)<br>* Some cascades can use 1500 in circuit |
| Movable room AC (including window units) | 2020 (GWP>150) |
| Small single split AC | 2025 (GWP>750) |

Also: fire protection, aerosols, foams

# Bans on new RAC equipment

*Lots of attention by stakeholders has been on the bans*

*but in reality we think it`s the phase-down (even though not sector-specific and thus flexible) that is driving most changes*

→ Bans are an absolute endpoint, but action is often possible much earlier and makes economic sense under the scenario of a phase-down

# Service ban

- Targets **existing equipment** and prohibits use of refrigerants with GWP > 2500 *[e.g. R-404a]*
- From 2020
- *Only for larger refrigeration equipment:*

  *Charge >40t CO2eq.*

  –50°C excluded
- Reclaimed and recycled gases allowed until 2030

| Refrigerant | Charge size threshold (40 t $CO_2$-equiv.) |
|---|---|
| R23 | 2.72 kg |
| R404A | 10.20 kg |
| R507 | 10.04 kg |
| R422D | 14.66 kg |

# CO2 metric

## Converting tons CO2 equivalents to metric kilograms

| | | Charge limits in t $CO_2$-equiv. | | | | |
|---|---|---|---|---|---|---|
| | | 5 | 40 | 50 | 500 | 1,000 |
| **Refrigerant** | **GWP** | **Conversion of charge limits in kg** | | | | |
| R134a | 1,430 | 3.50 | 27.97 | 34.97 | 349.65 | 699.30 |
| R32 | 675 | 7.41 | 59.26 | 74.07 | 740.74 | 1,481.48 |
| R404A | 3,922 | 1.27 | 10.20 | 12.75 | 127.49 | 254.97 |
| R407C | 1,774 | 2.82 | 22.55 | 28.18 | 281.85 | 563.70 |
| R410A | 2,088 | 2.39 | 19.16 | 23.95 | 239.46 | 478.93 |
| R422D | 2,729 | 1.83 | 14.66 | 18.32 | 183.22 | 366.43 |
| R507A | 3,985 | 1.25 | 10.04 | 12.55 | 125.47 | 250.94 |

→ Rules are less strict for users of low GWP technology

# Obligations for operators and technicians

| Measure | Stationary refrigeration and AC | | | |
|---|---|---|---|---|
| | A | B | C | D |
| Leakage prevention and repair as soon as possible (Art. 3) | ✓ | ✓ | ✓ | ✓ |
| Installation[13], maintenance or servicing of the equipment by certified personnel and companies (Art. 3) | ✓ | ✓ | ✓ | ✓ |
| Minimum frequency of leak checks by certified personnel (Art. 4) | | **12 mo.** (*) | **6 mo.** (*) | **3 mo.** (*) |
| Installation of leakage detection system which must be checked at least every 12 mo. (Art. 3) | | | | ✓ |
| Record keeping (Art. 6) | | ✓ | ✓ | ✓ |
| Recovery of F-gases before final disposal of the equipment, and when appropriate during maintenance or servicing, by certified personnel (Art. 8 and Art. 10) | ✓ | ✓ | ✓ | ✓ |
| Labelling of equipment (Art. 12) | ✓ | ✓ | ✓ | ✓ |

(*) If the stationary refrigeration or air conditioning equipment is equipped with a leakage detection system the frequency of leak checks doubles to 24 months, 12 months and 6 months for classes B, C and D, respectively.

Legend. A: <5, B: <50, C<500, D>=500 tonnes CO2 equivalent

http://ec.europa.eu/clima/policies/f-gas/docs/f-gas_equipment_operators_nl.pdf

# Certification of technical personnel

| Activiteit | Gecerti-ficeerd personeel | Gecertifi-ceerde firma |
|---|---|---|
| Installatie | ✓ | ✓* |
| Onderhoud of service | ✓ | ✓* |
| Controle op lekken van apparatuur die ≥5 t $CO_2$-eq gefluoreerde broeikasgassen bevatten (≥10 t $CO_2$-eq indien hermetisch afgesloten en als zodanig geëtiketteerd) | ✓ | |
| Terugwinning van gefluoreerde gassen | ✓ | |

* niet nodig voor koelwagens en -aanhangwagens en werk dat niet voor een derde partij wordt uitgevoerd.

http://ec.europa.eu/clima/policies/f-gas/docs/technical_personnel_brochure_nl.pdf

OZONE SECRETARIAT

UNEP

Tribute to Dr. Mostafa Tolba

# DUBAI PATHWAY ON HFCs

**37th Meeting of the Open-ended Working Group of the Parties to the Montreal Protocol**

Geneva, Switzerland, 4th - 8th April 2016

Conference Portal

Ozone Secretariat Website

# To know more..

http://ec.europa.eu/clima/policies/f-gas/index_en.htm

Legislation:
http://ec.europa.eu/clima/policies/f-gas/legislation/index_en.htm
Quota Allocation & Reporting:
http://ec.europa.eu/clima/policies/f-gas/reporting/index_en.htm
Alternatives:
http://ec.europa.eu/clima/policies/f-gas/alternatives/index_en.htm
**Guidance documents:**
**http://ec.europa.eu/clima/policies/f-gas/documentation_en.htm**

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