International New Technology and Refrigerant Symposium

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The European Partnership for Energy and the Environment (EPEE)

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Who is EPEE?
The full value chain. A true voice.

1. Small – medium – large size companies

2. Over 200,000 direct employees, over €30bn turnover

3. Production throughout Europe

4. Main Activities:
   - Promote Energy Efficiency
   - Ensure responsible refrigerant management
   - Raise awareness on market surveillance

5. Use of all types of refrigerants
The European context:
New F-gas Rules to meet ambitious EU targets

- The need for a European answer to reduce emissions from HFCs
- 2006 Fgas Rules would only stabilize emissions
- The wish to be a leader in terms of combatting climate change
- The need to adopt ambitious yet feasible rules.
The Main Pillars of the new EU F-Gas rules: Reducing emissions. Moving to lower GWP solutions.

2050
EU Low Carbon Roadmap

**Prevent Emissions**

**Containment & Competence**
- Regular leak checks
- Certification and training of installers

**Reduce the Use of High GWP HFCs**

**Phase-Down**
- Consumption
- Reduction of HFCs
  - Y 2020: -37%
  - Y 2030: -79%

**GWP Limits**
- 2015: GWP 150
  - Fridges & Freezers
- 2020: GWP 150
  - Moveable A/C
- 2020: GWP 2500
  - New Stat. Refr. Equipment & service, maintenance
- 2022: GWP 150
  - Multipack refrigeration systems >40kW (except cascades: GWP1500)
- 2025: GWP 750
  - Single split a/c < 3kg

**Control & Monitor**

**Others**
- 2015: Reporting obligations
- 2017: Traceability systems for pre-charged equipment
- 2015 – 2022: various reports
The phase-down schedule:
A step-by-step reduction of HFCs, based on CO2-eq

Entry into force of GWP limits

- HFCs to become less available, more expensive
- Push towards alternatives

<table>
<thead>
<tr>
<th>Year</th>
<th>Reduction (Y2020/2022/2025)</th>
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<tr>
<td>2015</td>
<td>93%</td>
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<tr>
<td>2016</td>
<td>63%</td>
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<tr>
<td>2018</td>
<td>45%</td>
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<td>2021</td>
<td>31%</td>
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<td>2024</td>
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<td>2027</td>
<td>21%</td>
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<td>2030</td>
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How to make it happen:
The EPEE Gapometer

A 2-stage project to understand and monitor the phase down of HFCs in the EU

Stage 1: EU Phase Down Roadmap (developed 2015)
- to show how the challenging phase down targets can be met
- creating a good understanding of what actions must be taken

Stage 2: Reality Check (ongoing)
- market research to assess the actions being taken
- and to identify any significant “gaps” between required and actual progress
Core actions to achieve the EPEE roadmap

1. **Actions for new equipment**
   - use lower GWP alternatives
   - design for less refrigerant charge and low leakage

2. **Actions for existing equipment**
   - leak prevention
   - retrofit with low GWP alternatives

3. **Use of reclaimed refrigerant**
   - recovered from equipment at end-of-life
   - recovered during retrofit of existing equipment
Contributions from core actions

Cuts in MT CO$_2$

- New Equipment
- Existing Equipment
- Reclaimed Refrigerant

Baseline
2018
2021

Million tonnes CO$_2$ equivalent

-64
-39
-20
-30
-24
-36

EPEE
European Partnership for Energy and the Environment
Contributions from main market sectors

- Commercial Refrigeration: -51
- Industrial Refrigeration: -15
- Mobile AC: -14
- SAC: -20
- Non RAC: -15
- Small hermetic Condensing units
- Large packs
- Chillers
- Transport

Million tonnes CO2 equivalent
Example of roadmap scenario: Modelling assumptions

- early switch from R-404A to lower GWP alternatives
- small split air-conditioning: switch from R-410A to R-32 and HFC/HFO blends
- retrofit of R-404A systems affected by service ban
- significant efforts made to reduce leakage in large commercial refrigeration systems
- significant use of reclaimed refrigerants between 2017 and 2025
R-404A is quickly phased out in new commercial refrigeration equipment. It is replaced with a range of different low GWP alternatives.

Lower Flammability blends

CO₂

Non-flammable blends (GWP 1400 – 2100)

% of total tonnes of refrigerant used in new equipment
New small / medium split air-conditioning equipment

R-410A is phased out in new split air-conditioning equipment. It is replaced with lower flammability refrigerants R-407C, R-32, and R-32 / HFO blends. % of total tonnes of refrigerant used in new equipment.
Gapometer Phase 2 – Reality Check
New Equipment – Small Split A/C <3kg

Percentage of R-410A in new small split air-conditioning (<3 kg)

More needs to be done!
Gapometer Phase 2 – Reality Check
New Equipment – Residential Hydronic Heat Pumps

Percentage of R-134a / R-410A in new residential hydronic HPs

On track!
Percentage of R-410A / R-134a in new commercial hydronic heat pumps

On track short term, more needs to be done medium term
By 2018 we need average leakage from commercial refrigeration below 10%.
We need nearly half of supermarket packs retrofitted by end 2017 – a tough challenge
Gapometer Phase 2 – Reality Check
Existing Equipment – Leakage Rates

![Graph showing average annual leakage rate from equipment bank over time for commercial refrigeration, industrial refrigeration, and stationary AC & HP systems. The graph indicates a decline in leakage rates from 2010 to 2030.]
Assumed reclaim rates can be improved if proper action is taken.

If reclaim rate is doubled the impact on the required cuts will be very significant – an extra 20 MT CO₂ cut in both years.

But, significant new infrastructure required to support active reclaim industry.
What do roadmap scenario and preliminary results of reality checks tell us so far?

- **New Equipment**
  - early move away from R-404A in new systems is important
  - introduction of a range of new lower GWP fluids needs to be done quickly
  - wider use of flammable refrigerants (both A3 and A2L) is vital

- **Existing Equipment**
  - early retrofit of R-404A is crucial
  - leak prevention remains important – proper implementation of rules in the EU F-Gas regulation is key

- **Reclaimed Refrigerant**
  - compliance with mandatory recovery rules is important
  - setting up a good infrastructure for reclaim / recycling is crucial

- **Work has started**
- **More needs to be done to be on track, in particular in a/c applications**
- **Good progress in leakage prevention**
- **More needs to be done on retrofits**
- **Reality check ongoing**
To continue to make progress, further work on standards & building codes is needed

- **EU**: F-gas regulation
  - EN 378
  - EN 60335-2-40
  - EN 60335-2-89
  - EN 13313

- **Member states**: Building codes

- **Local level**: Fire fighting departments, City council, licensing

  Codes **may** refer to EN 378. But **not all** building codes do. *(MS do not necessarily follow standardisation work)*

  No particular standards in place: application is limited as in general these instances look at the refrigerant type and ATEX requirements

Source: CEN/CENELEC
And training needs to be further improved

The legislative framework complemented by existing standards at the European level appears appropriate to assure safe handling of equipment

• Further legislative action at EU level on this issue seems therefore not appropriate at this time

• Shortcomings were identified in the existing training offer (e.g. training facilities, practical training, number of skilled personnel)
Outlook – Europe and the global context

HFC Phase Down Profiles, Montreal Protocol Amendment (Kigali, 2016)

- 15 oct 2016: Kigali amendment on global HFC Phase-Down
- Needs to be ratified by at least 20 Parties to the Montral Protocol by 1 Jan 2019
- Does not require changes of EU F-Gas Regulation

Source: Gluckman Consulting
Conclusion

• Change is already happening, but we cannot sit back and relax!
• R-404A needs to go quickly!
• Standards and building codes need to be adapted to achieve the F-Gas Regulation’s goals
Thank you very much for your attention!

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