

## **EPEE SIDE-EVENT**

**THE NEW F-GAS RULES IN EUROPE AND THEIR GLOBAL IMPACT:  
CHALLENGES AND OPPORTUNITIES FOR THE EUROPEAN  
HEATING AND COOLING INDUSTRY**

# **The impact of legislation and trends for the industry**

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**July 15<sup>th</sup> 2014, OEWG, PARIS**

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- Comments on the new F-Gas Regulation
- Key issues for the RACHP industry
- Refrigerants: where are we heading?

# Industry Reaction to New F-Gas Regulation

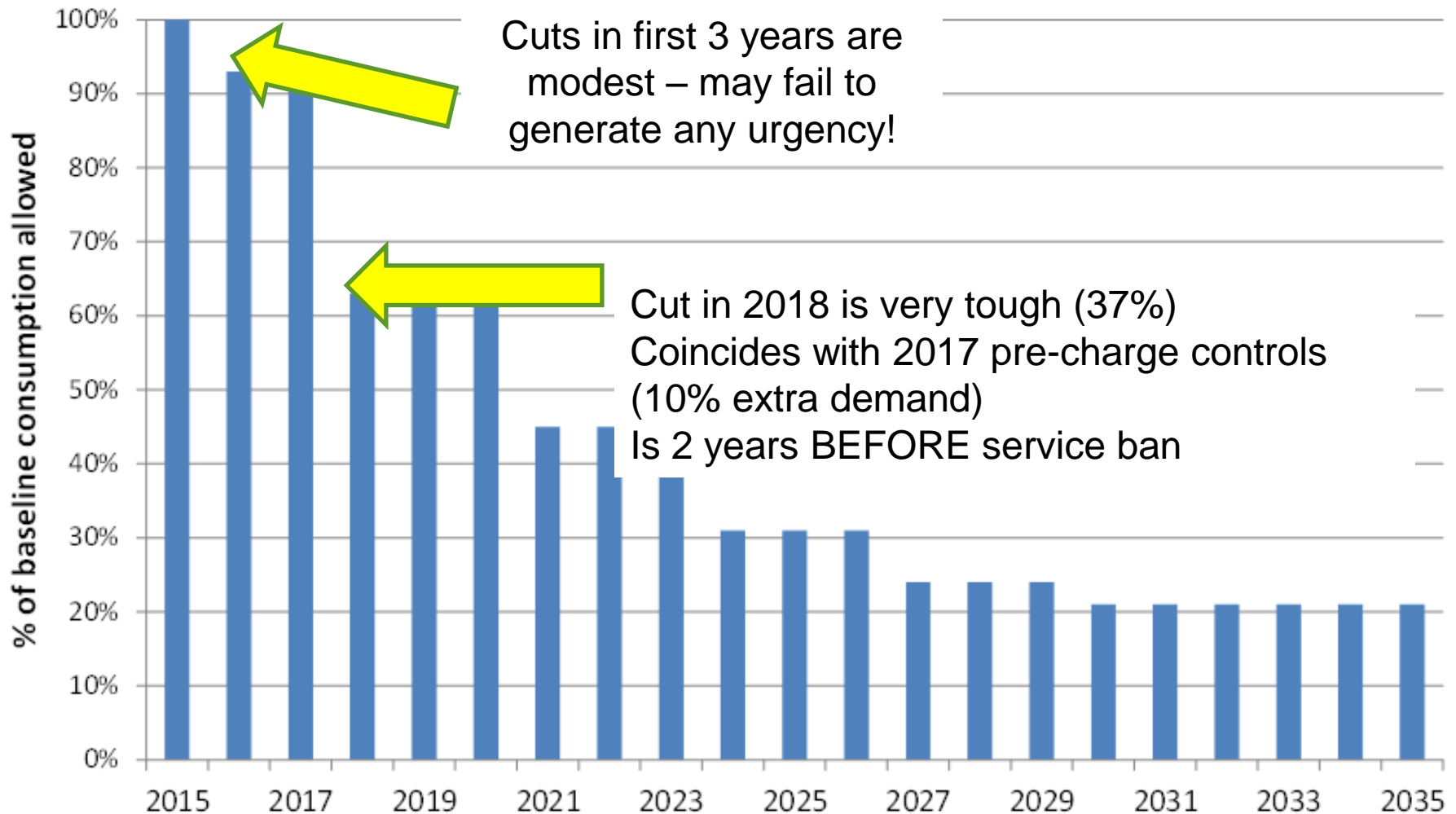
- generally very positive
- lots of new technologies are “near market”
  - can lead to large cuts in F-Gas use and emissions
- the Regulation provides important clarity about future
  - will stimulate investment and rapid technology change
- the EU has adopted a bold and challenging approach
  - the developments in the EU will be readily transferable across the world
  - an international agreement based on the EU approach will be very beneficial to minimise global F-Gas emissions

# Key Issues for RACHP Industry

- HFC phase down will require much action and innovation
- early implementation of service ban is crucial
  - delivers quick savings through retrofill of HFC 404A systems
  - but, service ban date (2020) does not “fit” phase down profile
- use of low GWP refrigerants in all new equipment is crucial
  - avoid using very high GWP refrigerants immediately (e.g. 404A)
  - options available for lowest practical GWP refrigerant will rapidly change over next 3 to 5 years
    - as new lower GWP refrigerants are introduced
    - as our understanding of the “operating envelop” for these new refrigerants improves

# Big Cut in 2018

**Figure 1: EU HFC Phase Down Steps**



# Future refrigerant options in new RAC equipment?

- R404A (GWP 3,922) will go quickly
  - it will be replaced in short term by lower GWP options like R407A (GWP 2,107) and R407F (GWP 1,825)
- but in longer term we need lower GWPs
  - otherwise we cannot meet phase down
- common refrigerants like R410A (GWP 2,088) and R134a (GWP 1,430) will also need to be replaced
  - by ultra-low GWP options (like ammonia, CO<sub>2</sub>, HFOs)
  - by moderate GWP options (R32 and blends of HFOs / HFCs)

## GWP groups (slightly contentious choice of bands!)

| GWP Group | GWP Range      |
|-----------|----------------|
| Ultra-low | 0 to 10        |
| Low       | 10 to 200      |
| Moderate  | 200 to 1,400   |
| High      | 1,400 to 2,500 |
| Very high | >2,500         |

# Commonly Used Refrigerants, 2012

| GWP Group | GWP Range      | Refrigerant              | GWP  | Flammability   |
|-----------|----------------|--------------------------|------|--|
| Ultra-low | 0 to 10        | R 717 (ammonia)          | 0    | <b>2L mildly flammable</b><br>1 non-flammable<br><b>3 highly flammable</b><br><b>3</b> |
|           |                | R 744 (CO <sub>2</sub> ) | 1    |  |
|           |                | HC 290 (propane)         | 5    |  |
|           |                | HC 600a (isobutane)      | 5    |  |
| Low       | 10 to 200      | None in common use       |      |  |
| Moderate  | 200 to 1,400   |                          |      |  |
| High      | 1,400 to 2,500 | HFC 134a                 | 1430 | 1  |
|           |                | HFC 407C                 | 1774 | 1  |
|           |                | HFC 407F                 | 1825 | 1  |
|           |                | HFC 410A                 | 2088 | 1  |
|           |                | HFC 407A                 | 2107 | 1  |
|           |                | HFC 417A                 | 2346 | 1  |
| Very high | >2,500         | HFC 422D                 | 2725 | 1  |
|           |                | HFC 434A                 | 3245 | 1  |
|           |                | HFC 404A                 | 3922 | 1  |
|           |                | HFC 507                  | 3985 | 1  |



# Recently commercialised / being developed 2014

| GWP Group | GWP Range      | Refrigerant<br>(Note: NB refers to “new blend”) | GWP    | Flammability |
|-----------|----------------|---|--------|--------------|
| Ultra-low | 0 to 10        | HFO 1234yf                                      | 4      | <b>2L</b>    |
|           |                | HFO 1234ze                                      | 7      | <b>2L</b>    |
|           |                | HCFO 1233zd                                     | 4      | 1            |
| Low       | 10 to 200      | None currently proposed                         |        |              |
| Moderate  | 200 to 1,400   | HFC 32 mildly flammable R410A alternative       | 675    | <b>2L</b>    |
|           |                | NB 1, mildly flammable R 404A alternative       | ~ 300  | <b>2L</b>    |
|           |                | NB 2, mildly flammable R 22 alternative         | ~ 350  | <b>2L</b>    |
|           |                | NB 3, mildly flammable R410A alternative        | ~ 600  | <b>2L</b>    |
|           |                | NB 4, non-flammable R134a alternative           | ~ 600  | 1            |
|           |                | NB 5, non-flammable R404A alternative           | ~ 1300 | 1            |
| High      | 1,400 to 2,500 | None currently proposed                         |        |              |
| Very high | >2,500         | None being considered                           |        |              |

# Using Mildly Flammable Refrigerants

- a key response is better knowledge of mildly flammable refrigerants such as R32, HFOs and new blends
  - it will be impossible to meet phase down without widespread use of mildly flammable refrigerants
- current understanding is relatively poor
  - we need to define safe system charge in different applications
  - we need to know what safety precautions are needed
  - without being too conservative
- much work still needed
  - by refrigerant producers
  - by equipment manufacturers
  - by standards committees and Member State safety authorities

# What is most urgent (1)

- avoid buying new equipment with R404A now
  - or any refrigerant with GWP > 2,500
  - don't be fooled by 2020 new equipment ban
    - you want to avoid the 2020 service ban
    - this creates an immediate 'de facto' ban
- for large systems, check the threshold for mandatory automatic leak detection
  - from Jan 1<sup>st</sup> 2015, R404A size threshold drops
    - from 300 kg
    - to 127 kg

## What is most urgent (2)

- check if you are affected by service ban
  - make plans for early actions
- develop (and regularly update) a strategy for all new plants
  - use lowest GWP refrigerants that are efficient / cost effective
  - be prepared to use mildly flammable refrigerants
- be aware of big cut in 2018
  - 2018 cut will only be achieved with early actions related to high GWP refrigerants
    - investments to prevent leakage
    - retrofit R404A before 2018

# Concluding Comments

- the Regulation will create a massive cut in GHG emissions
  - nearly 80% cut in EU F-Gas emissions by 2035
- it will help industry invest in new technologies to meet phase down targets
- it is logical that other developed countries could adopt a similar approach
  - and that every effort should be made to help A5 countries adopt the new technologies as soon as possible

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