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How to effectively collect recovered synthetic refrigerant gases and reclaim them instead of buying new ones

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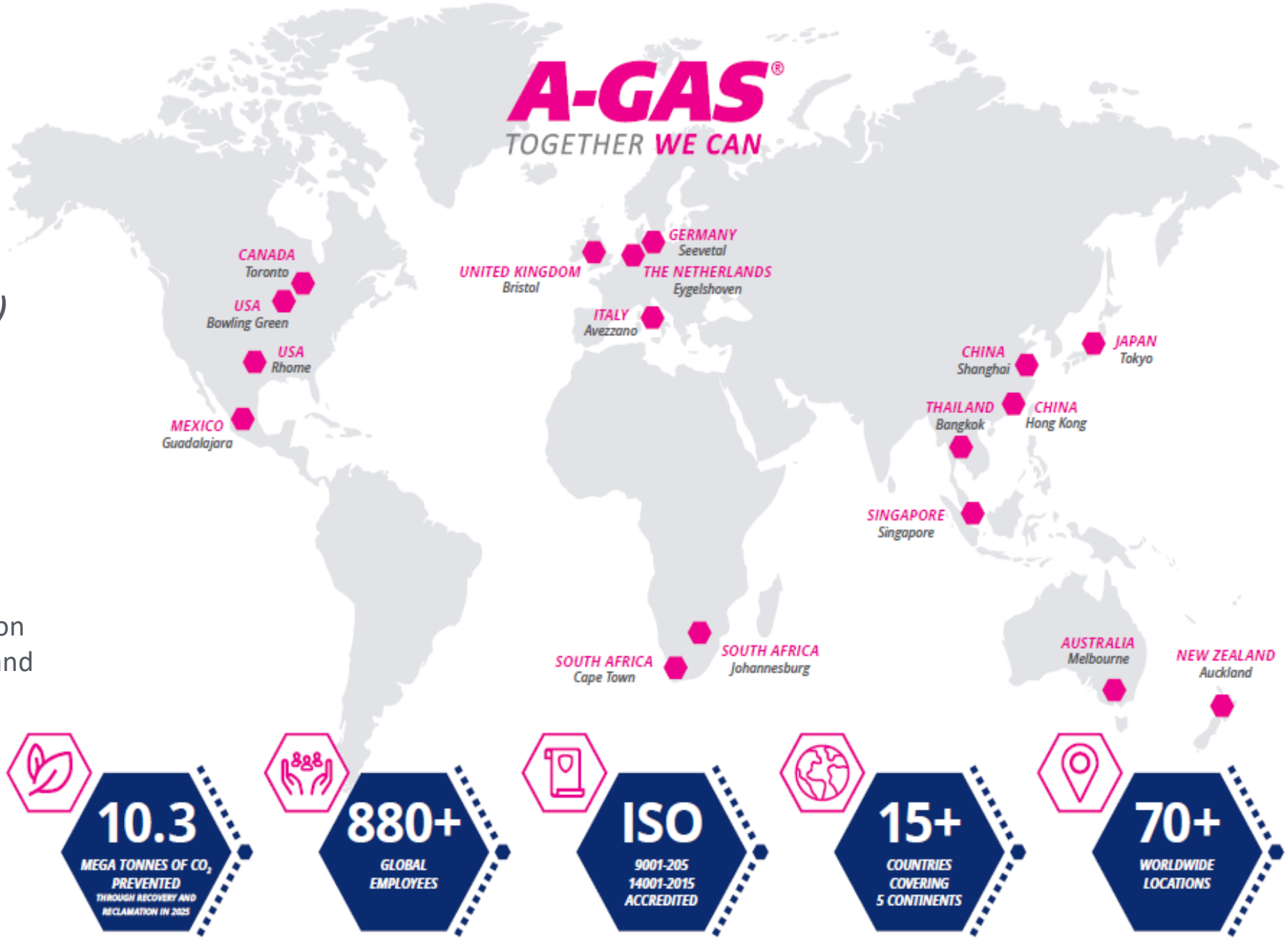
Towards ZERO Together

Global Leader In Lifecycle Refrigerant Management (LRM)

- World-leading platform in recovery, reclamation and destruction.
- Fully circular solution, preventing the release of refrigerant gases to atmosphere.
- Commitment to reduce carbon emissions by >50% by 2028 and to achieve net-zero by 2035.



Introduction to A-Gas

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EU presence:

- The sites in DE, IT & NL focus on recovery, reclamation and distribution of refrigerants
- Refrigerants are recovered accross the EU and shipped to the various sites
- A-Gas' main reclamation site in the EU is based in NL – reclamation of unmixed refrigerants and separation/distillation of mixed blends

Who Are We and What Do We Do?

Since 1993, A-Gas has evolved from refrigerant distribution to managing the lifecycle of refrigerants and increasing their circularity; focusing on reusing what we already have, rather than constantly sourcing and producing new materials.

Recovery and reclamation is key to driving a circular economy and is at the core of the A-Gas business strategy:

- Bespoke reclamation facilities, designed, commissioned and built in-house
- On-site recovery services, utilising a fleet of mobile vehicles
- Ability to handle complex refrigerant mixtures achieving purity levels in compliance with AHRI700
- State-of-the-art laboratories, compliant with AHRI 700 standards

Recovering and reclaiming refrigerants reduces the amount of virgin product created, while preventing its release into atmosphere.

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What is the difference between recycled and reclaimed refrigerant?

'**recycling**' means the reuse of a recovered fluorinated greenhouse gas after a **basic cleaning** process such as filtration and drying;

'reclamation' means the reprocessing of a recovered fluorinated greenhouse gas to achieve performance **equivalent to that of a virgin substance**, taking into account its intended use, in **authorised regeneration plants** that have adequate equipment and procedures to enable the recovery of those gases and can **assess and attest to the required level of quality**;

➔ **Concerns with implementation & enforcement**

- Recycling is always mentioned together with reclamation which creates the perception that these are equal to ensure compliance although there are significant differences such as quality assurance & reporting requirements
- Difficulties in enforcing that recycling is done in a proper way
- Currently, a lot of hoarding of recovered refrigerants is noticeable which will undergo (some form of recycling) rather than sending it for reclamation
- More flexible approach for recycling e.g. for transportation rules
- No reporting requirements for recycling

A-Gas' LRM Strategy – Our Circular Model

RECOVERY

Recovery of refrigerants from existing systems in a safe and compliant manner to avoid their release to atmosphere.

RECLAMATION

Oil and moisture removal/separation of mixed refrigerant and purification to AHRI-700 specification.

DESTRUCTION

Destruction of gases (where no re-use is possible, or by customer choice) using a TEAP-approved destruction technology.

SUPPLY

- Supply of reclaimed refrigerant to reduce the need for virgin product.
- Sale of lower GWP alternatives.

LRM - Lifecycle Refrigerant Management

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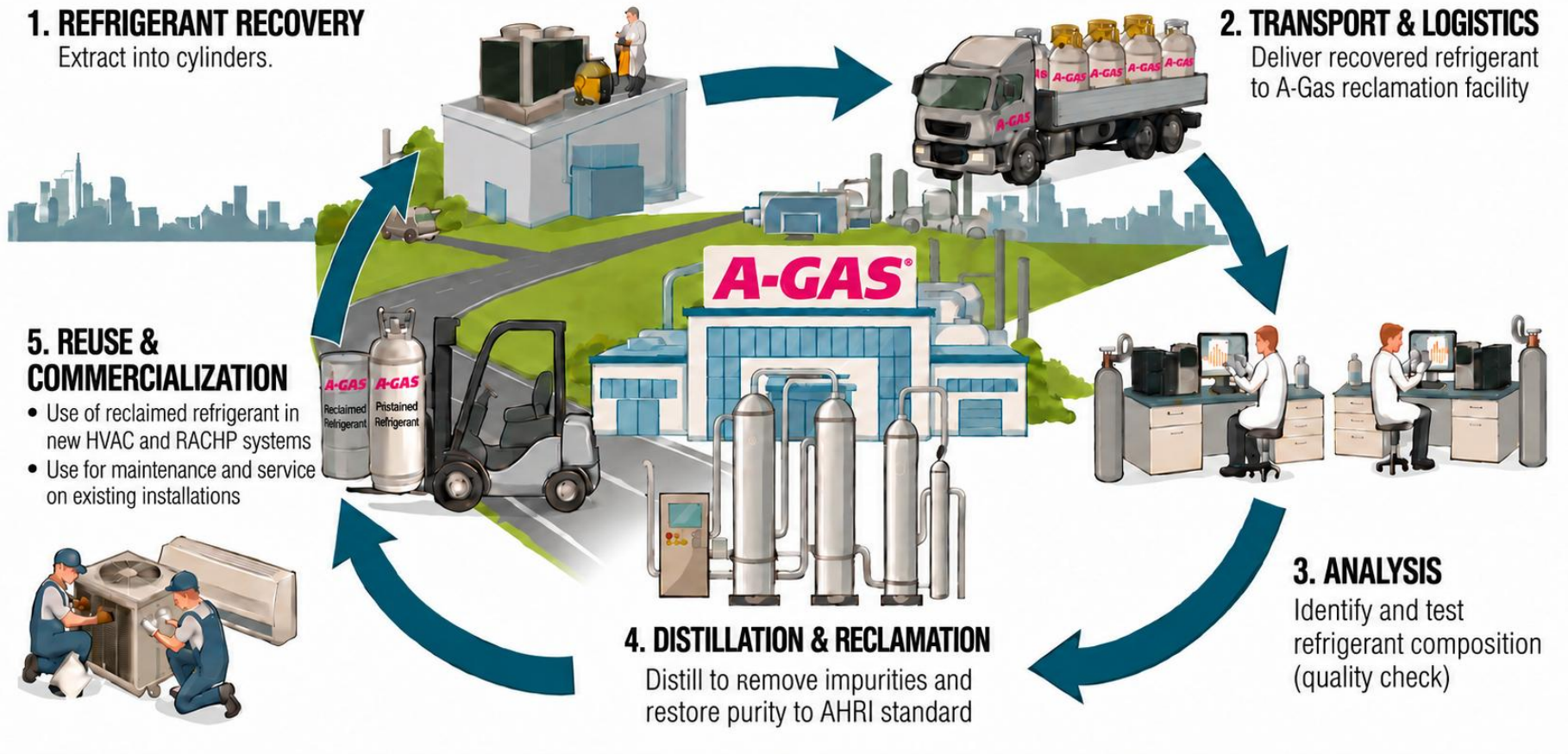
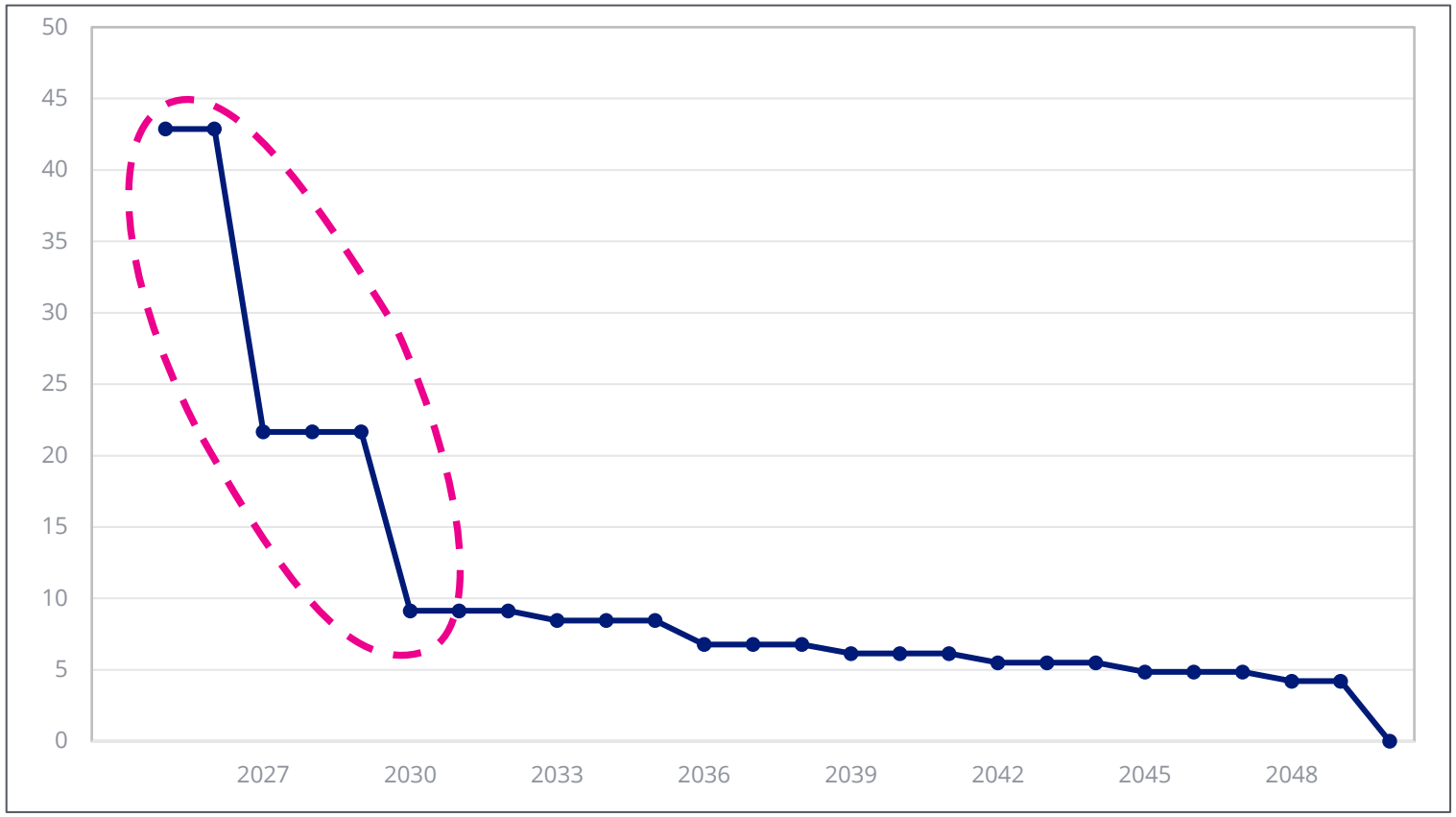


Reclamation meets virgin-equivalent purity standards (AHRI 700) and comes with a quality assurance which is not the case for recycled refrigerants

LRM - Lifecycle Refrigerant Management

EU quota phase down

Signification quota reductions in 2027 (50%) & 2030 (58%)



HFC supply is declining rapidly

- ➔ **Servicing demand remains**
- ➔ **Reclamation helps bridge the gap**

Why recovered refrigerants matter

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Supports the EU's heating & cooling transition

- Today's growing installed base will require refrigerants throughout its operational life.
- Recovery and reclamation help secure refrigerant availability as virgin HFC quotas continue to decline and support the climate strategy of the EU.

Supports circularity

- Reclamation transforms used refrigerants into high-quality products that can be reused, reducing waste and the need for virgin production.

Enhances supply security

- Recovered refrigerants help address supply constraints and price volatility resulting from the HFC phase-down.

Delivers climate benefits

- Recovering and reclaiming refrigerants prevents the release of high-GWP gases and supports responsible lifecycle management.

Unlocks the value of the installed refrigerant bank

- Refrigerants already circulating in existing equipment are a valuable resource that should be retained within the economy rather than lost as waste.

➔ ***The installed refrigerant bank has significant material value***

Market barriers / opportunities

- **Getting hold of the waste refrigerant remains challenging**
  - Increased retention/re-use of refrigerants due mainly to its commercial value
  - A-Gas aims to overcome these through its service offering
    - Financial incentives for the return of waste for reclamation
    - Dedicated service offerings to facilitate the recovery/ return of waste
    - Assistance with retrofit programs for Commercial Refrigeration
- **Enforcement concerns with recycling**
  - Are all recycled refrigerants in line with the definition of the F-gas regulation?
- **Transportation rules**
  - Administrative heavy but A-Gas is able to manage this
  - Concern with unequal approach between refrigerants transported for reclamation and recycling
- **Trade in illegal refrigerants undermining:**
  - Legitimate business goals
  - Overall objectives of the F-gas Regulation
  - Circular economy initiatives
- **Waste legislation not enabling circularity of refrigerants**
  - Example: Depollution requirement under WEEE: Too many different gases are mixed together which makes separation difficult, if not impossible, which then leads to destruction instead of a circular solution

What refrigerants can be reclaimed?

- Not-mixed HFC (known products), HFC mixtures (mixtures of known products), HFC/HFO mixtures (mixtures of known products)
- HFC/HFO mixtures that do not correspond to any product type (e.g. R1234YF plus R404A)
- HFC/HFO mixtures with a CFC and HC content of < 4,5 %. If the concentration of CFCs and HCs in the mixture is > 4,5 %, distillation/separation becomes difficult due to azeotropes
- A small percentage of the fractions remaining after distillation is sent for destruction

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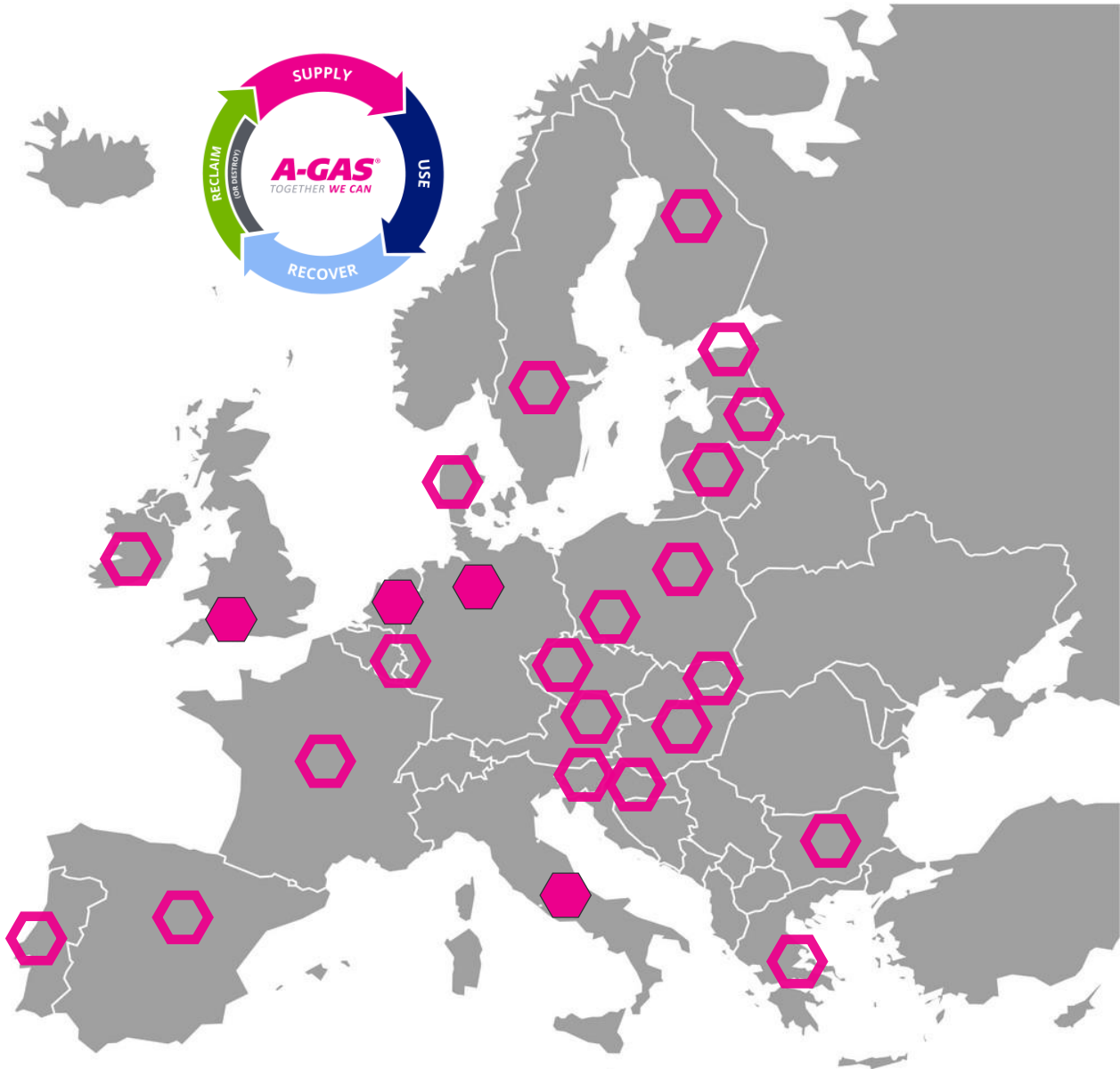
The EU A-Gas refrigerant transfer system

A-Gas sites

- A-Gas UK (Ltd.)
- A-Gas Nederland BV
- A-Gas Deutschland GmbH
- A-Gas Italia SrL

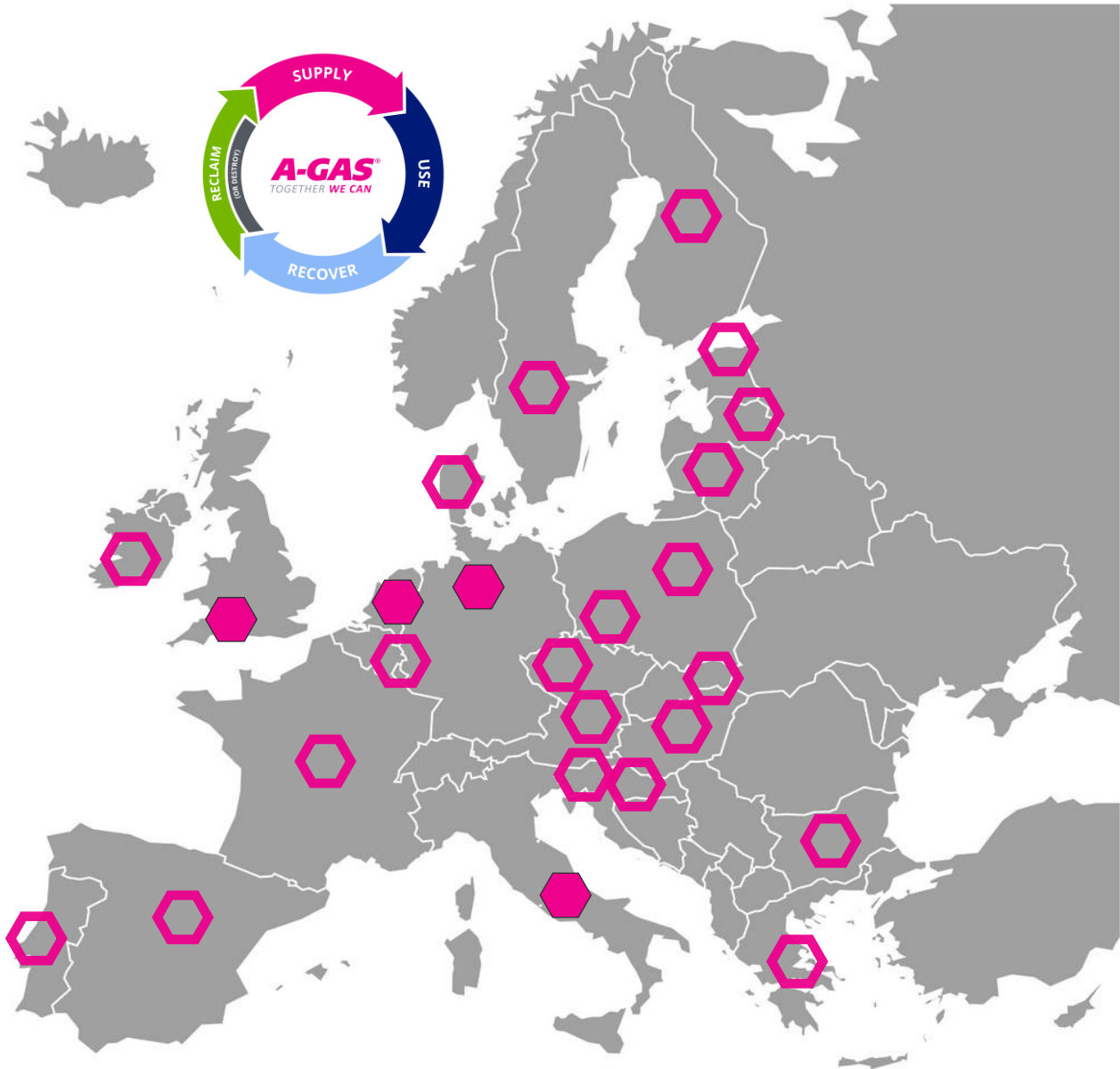
Internal waste transportation network (TFS)

- Austria
- Belgium
- Bulgaria
- Croatia
- Czech Republic
- Denmark
- Estonia
- Finland
- France
- Germany
- Greece
- Hungary
- Italy
- Latvia
- Lithuania
- Luxembourg
- The Netherlands
- Poland
- Portugal
- Slovakia
- Slovenia
- Spain
- Sweden



The A-Gas offer for the EU

- Collection of recovered refrigerants for export and reclamation
- Buy-back recovered refrigerants (compensation fee per 1 kg)
- Rapid Recovery Services for large systems in Germany, Poland
- Reclamation services for the patented products R448A/R449A and other used HFC/HFO's
- Waste transport costs on the part of A-Gas
- Recovery cylinders and drums on the part of A-Gas
- Cooperation with owners of refrigeration systems and RACHP service providers
- Supply of low-GWP refrigerants and reclaimed refrigerants compliant with the AHRI700 standard



Rapid Recovery Services ®

Fast recovery service where specialized equipment is used to recover directly from large units

Advantages:

- time saving from client
- we get access directly to client waste refrigerant sources
- client (end user and maintainer) save time and money

Rapid Recovery Services ®

UK petrol station network, September 2022

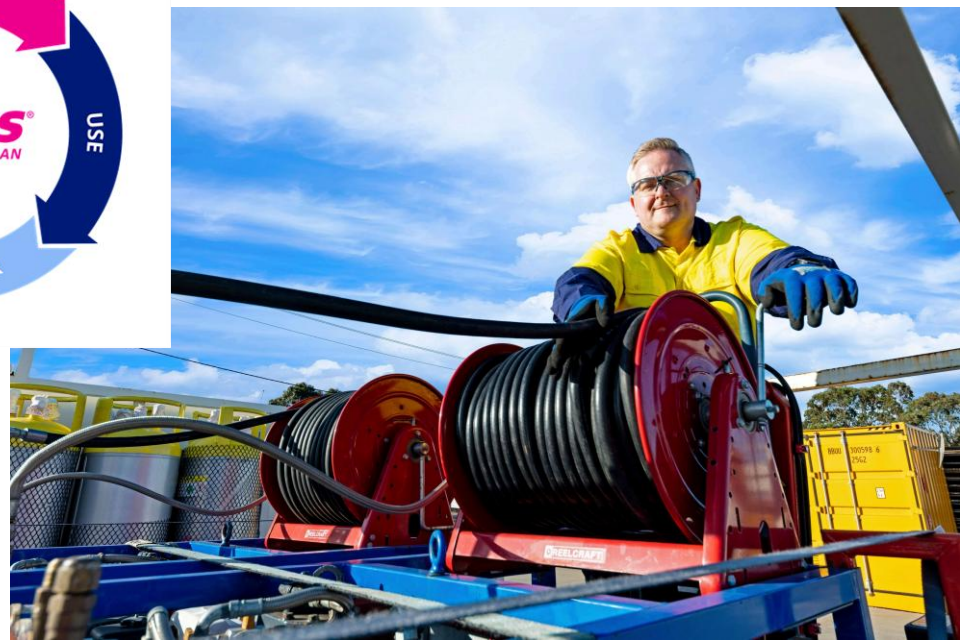
UK fuel manufacturer and supplier, in cooperation with Carter Synergy

- 4 mt of R407C/R404A, refrigerant replacement
- Petrol station network
- Recovery time: 50% reduction in recovery time
- Retrofit of refrigerant – reduction of GWP
- Complete waste documentation
- Reclamation and production of a product that complies with the AHRI 700 standard

Rapid Recovery Services ®

The Netherlands, Province of Limburg, November 2024

- 20 mt (10 mt R134a and 9,50 mt R1234yf)
- VDL Nedcar (BMW MINI), cooperation with Equans Refrigeration & Heating Solutions, 2 tanks
- Recovery time: 3 days - overestimated for safety reasons, 2AL compressor
- Confirmed leak-tightness of emptied tanks, safety device
- Modification of tank piping
- Precise planning and realisation
- Complete waste documentation
- Reclamation and obtaining a product that complies with the AHRI 700 standard



Rapid Recovery Services ®

Poland, Masovian Province, January 2025

- 8 mt of R507A
- Meat industry, white meat processing plant, cooperation with Probon Sp. z o.o.
- Deep-freeze installation for R507A
- Recovery time: 4 days with technological breaks
- Demolition of the plant, construction of a new NH_3 and CO_2 plant
- Precise planning and realisation
- Complete waste documentation
- Transfer of waste to the Netherlands
- Reclamation and production of a product that complies with the AHRI 700 standard

Rapid Exchange Services ®

Fast full/empty exchange of cylinders for service companies

Compensation for waste refrigerants:

- client recovers refrigerant (A-Gas collects it on-site)
- fast analysis using portable analyser
- A-Gas analyses the cylinders
- A-Gas pays client compensation according to type/quality of refrigerant

Conclusions

- The regulatory pressure on the refrigerants sector will only increase in the coming years
- Effective refrigerant life-cycle management (LRM) is an essential tool for supporting the transformation of the RACHP market
- The consent of refrigeration system owners and the companies that maintain them to allow reclaiming is key to availability of reclaimed gases
- Every 1 kg of reclaimed gas keeps refrigeration systems operational for many years

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