



# **Accelerating Clean Cooling & Heating**

[www.atmosphere.cool](http://www.atmosphere.cool)



**Natural Refrigerants: Global refrigeration market update  
& emerging new applications**  
**天然制冷剂在全球制冷市场的最新进展和新兴应用**

**Jan Dusek**  
COO & Head of APAC  
ATMOsphere



ATMOsphere is a global, independent market accelerator on a mission to clean up cooling and heating. Since 2006.

自2006年以来,ATMOsphere致力于加速全球清洁能源制冷和供暖市场的发展。



A global industry label recognizing the best in class for natural refrigerants



Curated natural refrigerant products and services with news



Defining the future of cooling via exclusive in-person networking & best-practice



Understand the latest market trends, technologies and players

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## Selection of 250+ Partners







# Selection of 250+ Partners



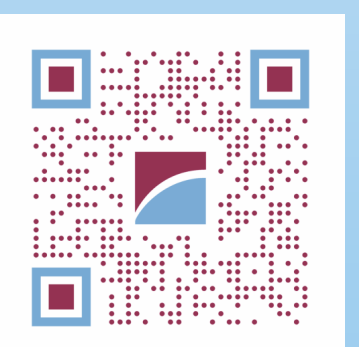
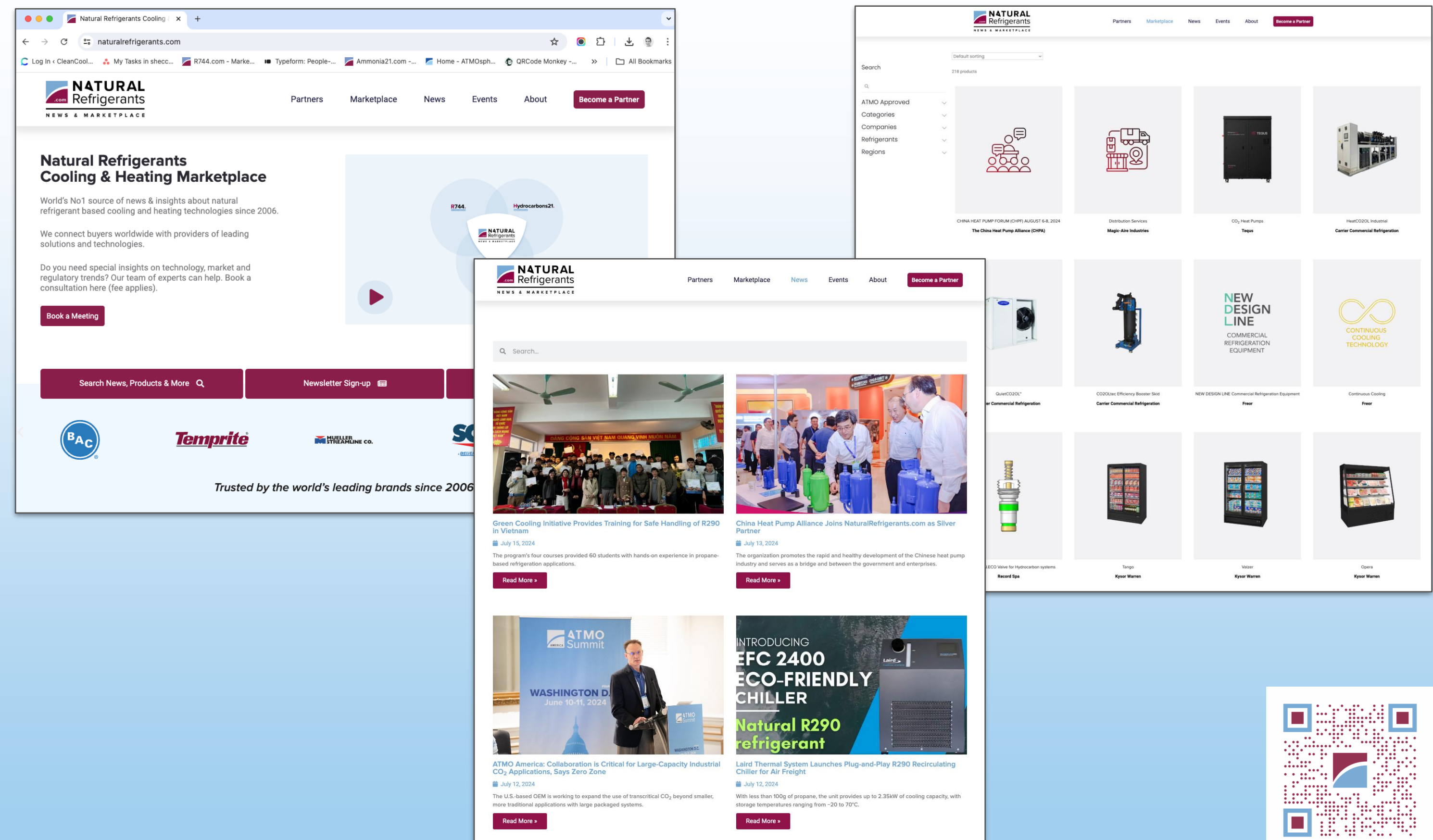
- No 1 Publisher of news and insights about Natural Refrigerants, worldwide.

全球领先的自然工质新闻与洞察发布平台

- Published thousands of articles and case studies showcasing technologies and solutions 已发表数千篇文章和案例研究，展示前沿技术与创新解决方案

- Millions of 'page views' 累计数百万“页面浏览量”

- 15K decision makers 'audience' 覆盖15000名决策者的受众






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Refrigerants

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Green Cooling Initiative Provides Training for Safe Handling of R290 in Vietnam

July 15, 2024

The program's four courses provided 60 students with hands-on experience in propane-based refrigeration applications.

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China Heat Pump Alliance Joins NaturalRefrigerants.com as Silver Partner

July 13, 2024

The organization promotes the rapid and healthy development of the Chinese heat pump industry and serves as a bridge and between the government and enterprises.

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ATMO America: Collaboration is Critical for Large-Capacity Industrial CO<sub>2</sub> Applications, Says Zero Zone

July 12, 2024

The U.S.-based OEM is working to expand the use of transcritical CO<sub>2</sub> beyond smaller, more traditional applications with large packaged systems.

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INTRODUCING EFC 2400 ECO-FRIENDLY CHILLER


Natural R290 refrigerant

Laird Thermal System Launches Plug-and-Play R290 Recirculating Chiller for Air Freight

July 12, 2024

With less than 100g of propane, the unit provides up to 2.35kW of cooling capacity, with storage temperatures ranging from -20 to 70°C.

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In Follow-Up Study, European NGO Finds TFA in Drinking Water Throughout Europe

July 11, 2024

PAN Europe links TFA in drinking water to pesticides and f-gases, after a similar study of surface/groundwater, raising safety questions.

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Leer Launches Weatherproof Reach-In R290 Cooler/Freezer Cabinet for Restaurants and Convenience Stores

July 11, 2024

The new reach-in cooler/freezer cabinet uses a Copeland compressor and offers up to 80ft³ of product space.

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Secon Invests in New Croatian Production Facility for Hydrocarbon Units

July 10, 2024

The new premises in Zagreb could produce up to 2,500 hydrocarbon units per year to meet growing demand.

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Within The Next Five Years, American Manufacturer G&D Chillers Sees Itself Producing Only R290 Units

July 10, 2024

The U.S. roll out of commercial and industrial propane chillers depends on regulators, according to company President Justin Thomas.

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Panasonic to Acquire CO<sub>2</sub> Condensing Unit OEM Area Cooling

July 9, 2024

With this transaction Panasonic aims to strengthen its condensing unit business in the European market.

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OLAB Managing Director Details Advantages of Company's Weld-Free CO<sub>2</sub> Ball Valve

July 9, 2024

With screw-on flange attachments, the valve prevents leaks caused by accidental gasket damage from proximity welding.

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New York Grocer Gristedes to Pay \$400K Fine and Make Repairs for F-Gas Leaks

July 8, 2024

In a federal consent decree, the 19-store chain also agreed to convert three locations to systems using 'advanced refrigerants with low global warming potential.'

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ATMO America: Vitalis to Install 1.5MW CO<sub>2</sub> Heat Pump at Canadian University

July 8, 2024

The air-source heat pump will serve the University of British Columbia's ambient low-temperature district energy system to provide heating and cooling.

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Rhoss Launches Two New R290 Heat Pump Ranges

July 5, 2024

Both ranges offer roughly the same 48-190kW heating capacities, but the POKER-PI uses inverter technology and the POKER-P on/off.

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ATMO America: Hillphoenix Ready to Accelerate U.S. Market Adoption of CO<sub>2</sub> Refrigeration Solutions

July 4, 2024

With over a decade of transcritical CO<sub>2</sub> experience, the OEM's product portfolio eases the regulatory transition for end users, says VP.

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CO<sub>2</sub> Refrigeration Systems Joins NaturalRefrigerants.com as Silver Partner

July 8, 2024

The Iowa-based company, founded in 2022, specializes in custom-capacity CO<sub>2</sub> refrigeration equipment.

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China Heat Pump Alliance to Host Industry Forum in Shanghai, August 6-8

July 5, 2024

The China Heat Pump Forum will attract more than 1,500 stakeholders from around the world.

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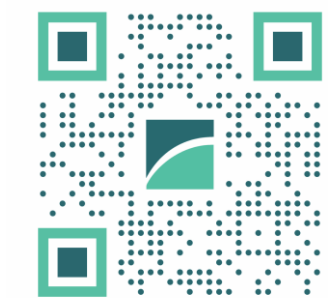


# ATMO Conferences

## 80+ conferences since 2009



More info on [www.ATMO.org](http://www.ATMO.org)



**ATMO Australia**

May 12-13, 2025

Sydney

**ATMO America Summit**

June 11-12, 2025

Atlanta

**ATMO MAC Summit**

September 23-24, 2025

Berlin

**ATMO Europe Summit**

November 24-25

Padova

**ATMO LATAM**

February 2026

Bogotá





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2024 Edition

# Natural Refrigerants: State of the Industry

天然制冷剂应用的市场现状

Free report, welcome to use data,  
please refer to source  
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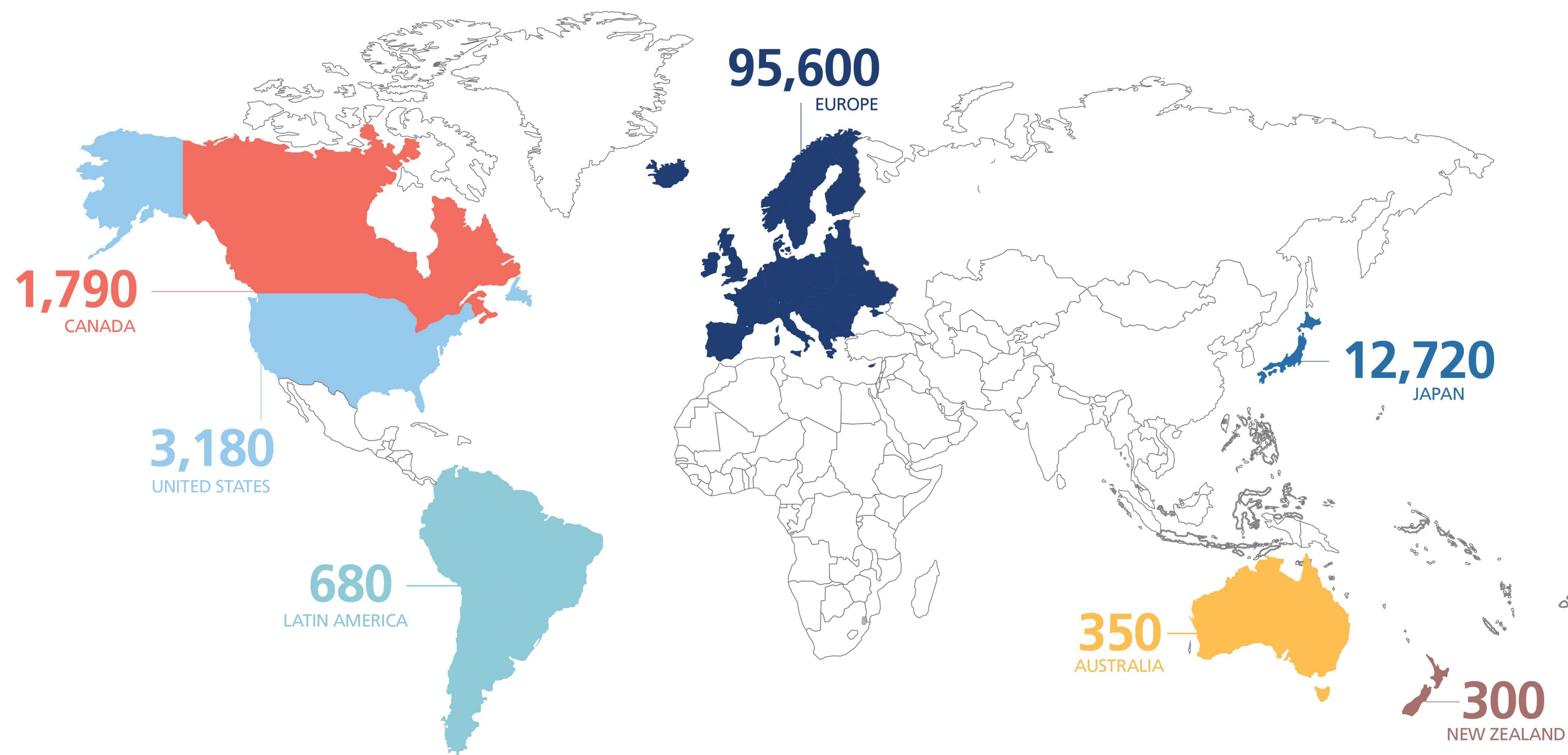
# GLOBAL



# Transcritical CO<sub>2</sub> Installations in Major Regions

(stores and industrial sites, as of December 2024)

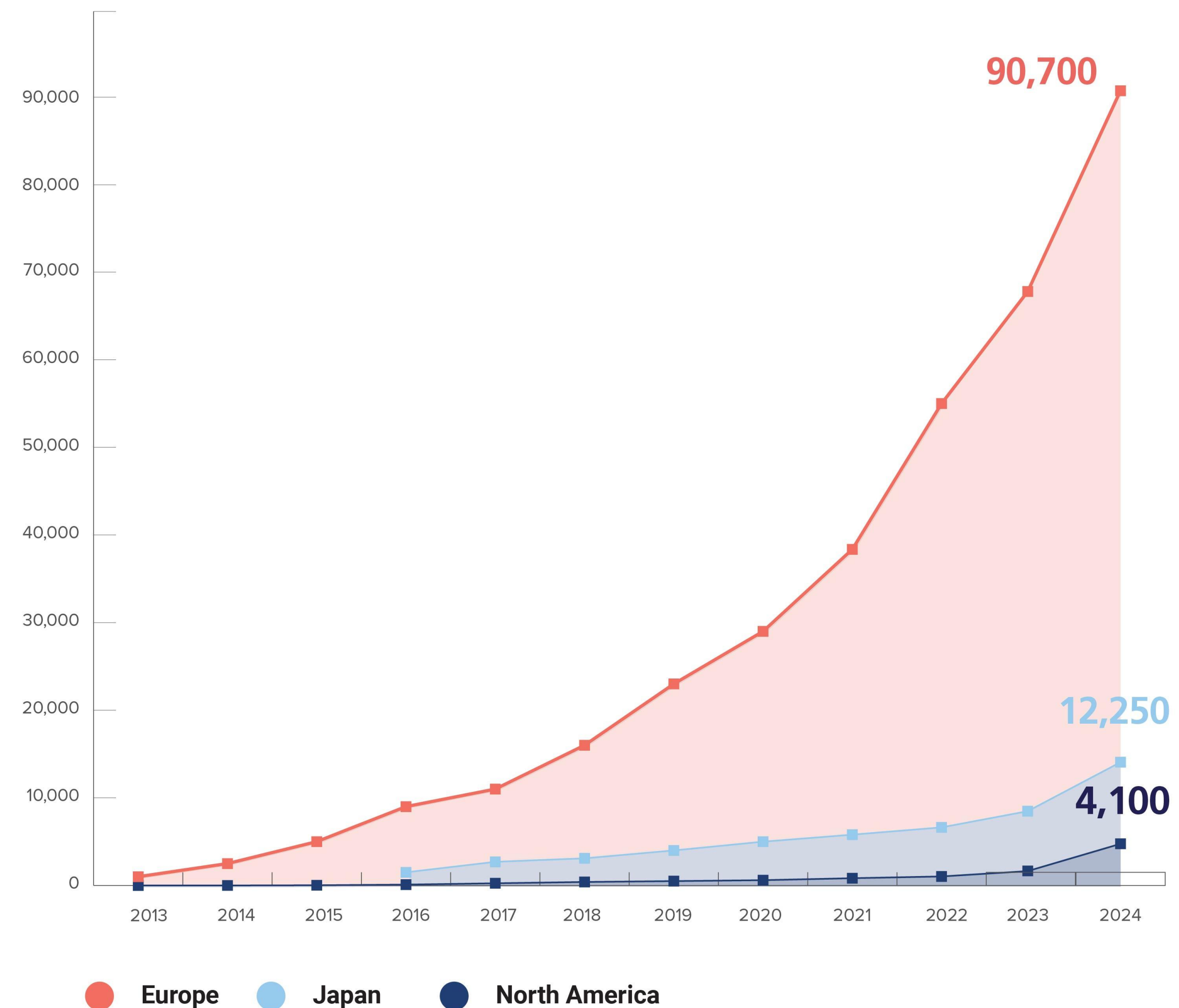
**Approx 115,000  
installations  
worldwide (2024)**  
全球约11.5万次安装  
(截止2024年年底)



# Transcritical CO<sub>2</sub> Installation Growth in Major Regions

**North America  
where Europe  
was 10 years ago**

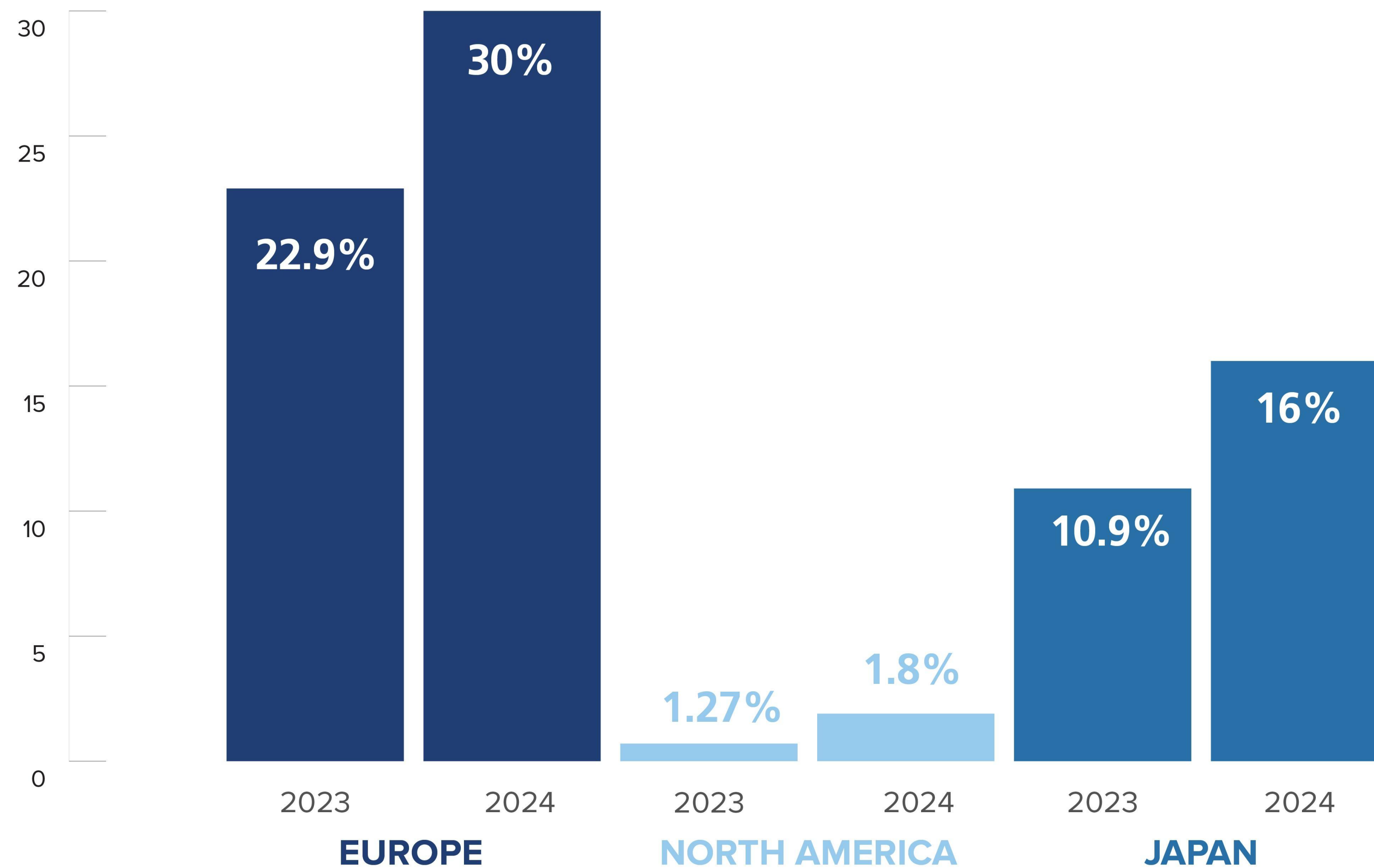
(stores)





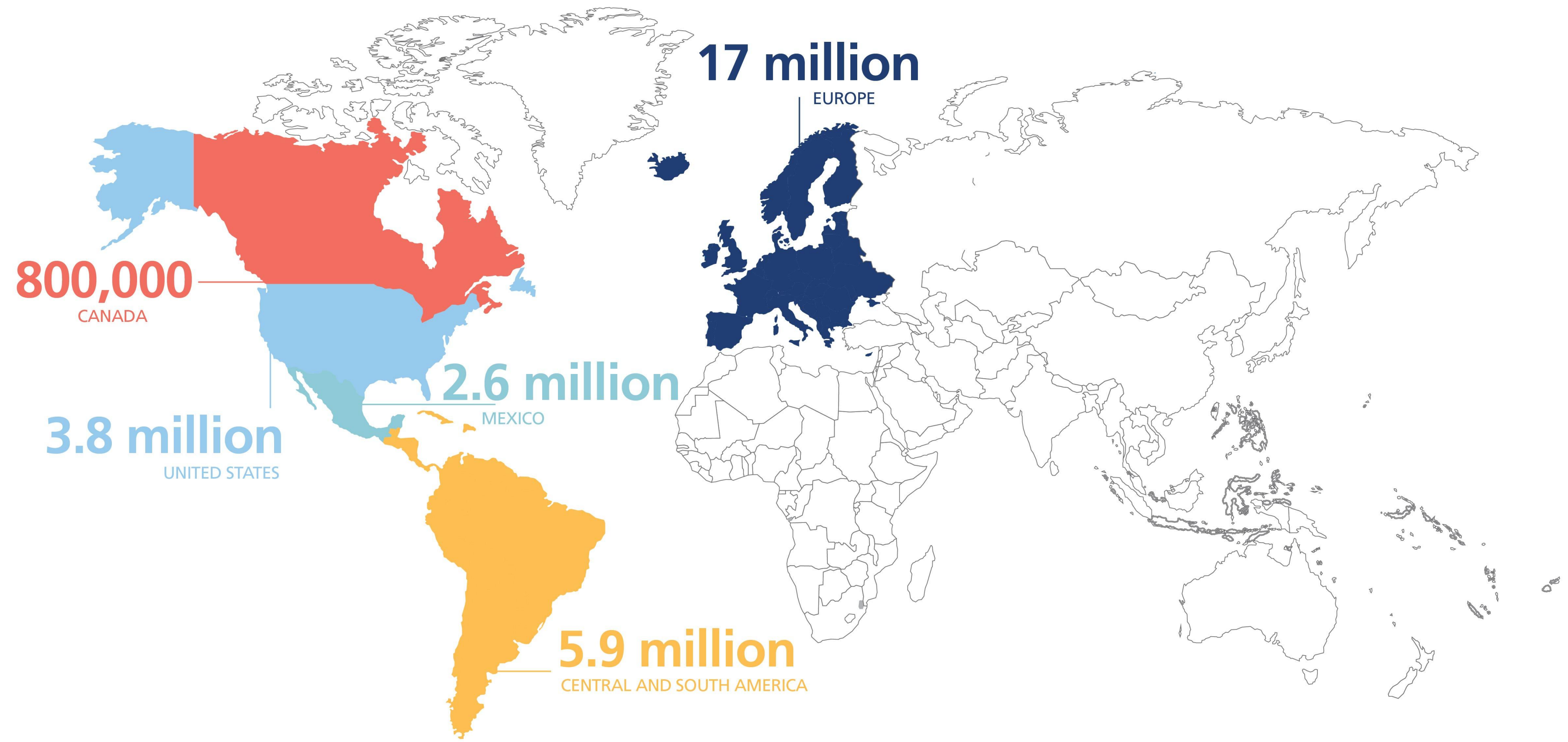
# Transcritical CO<sub>2</sub> Market Penetration Growth in Major Regions

(supermarkets, grocery stores and convenience stores, as of December 2024)



# Self-Contained Hydrocarbon Cabinets Installed in Major Regions

(as of December 2024)



**At least 30 Million  
worldwide (2024)**

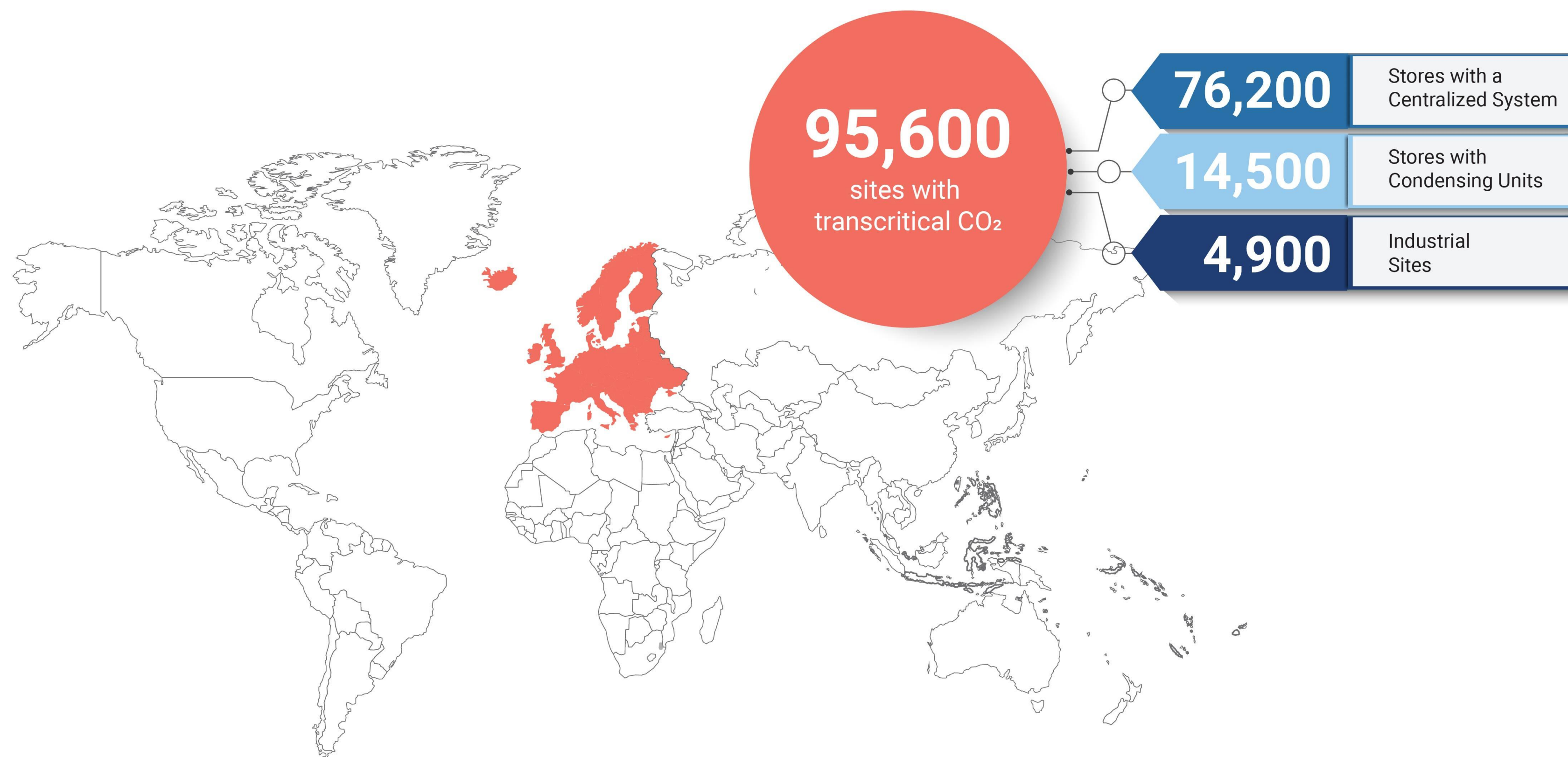




# EUROPE



# Transcritical CO<sub>2</sub> Installations in Europe (as of December 2024)



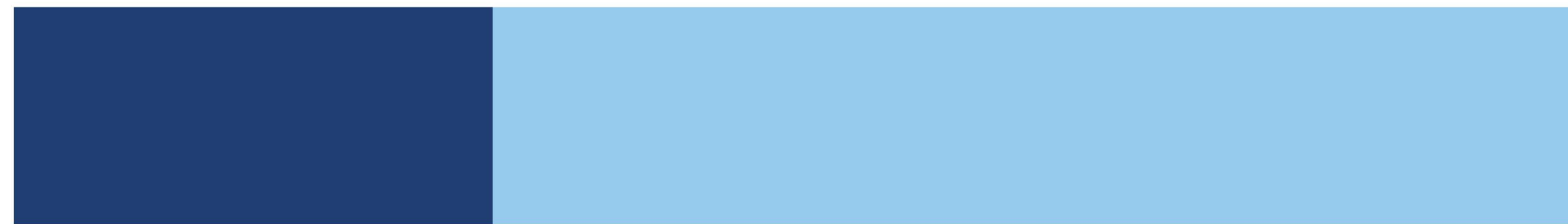
**Close to 50% stores  
retrofits / remodels**

**近50%的门店是翻新  
或改造**



# Transcritical CO<sub>2</sub> Commercial Refrigeration Market Penetration in Europe

**300,000** total stores



**30%** transcritical  
CO<sub>2</sub> stores

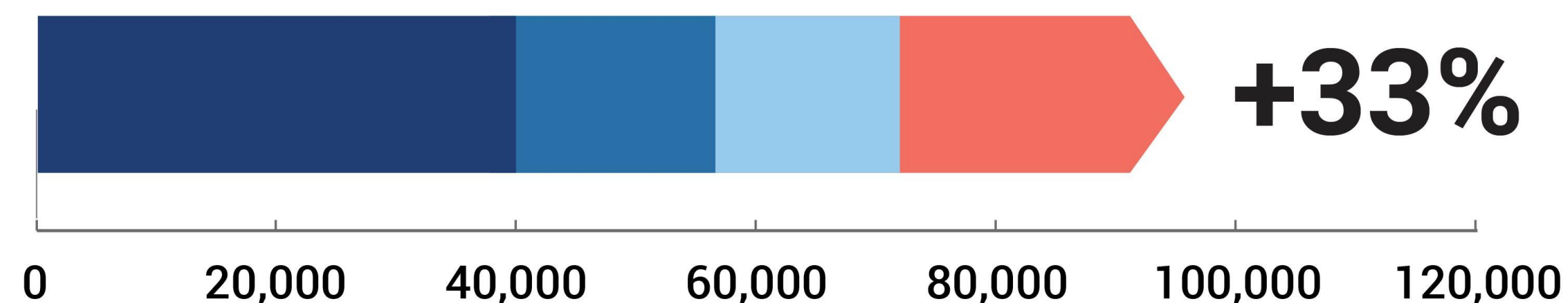
**+90% new stores**

# Transcritical CO<sub>2</sub> Installation Growth in Europe

(stores and industrial facilities)



Percentage growth in 2023 - 2024

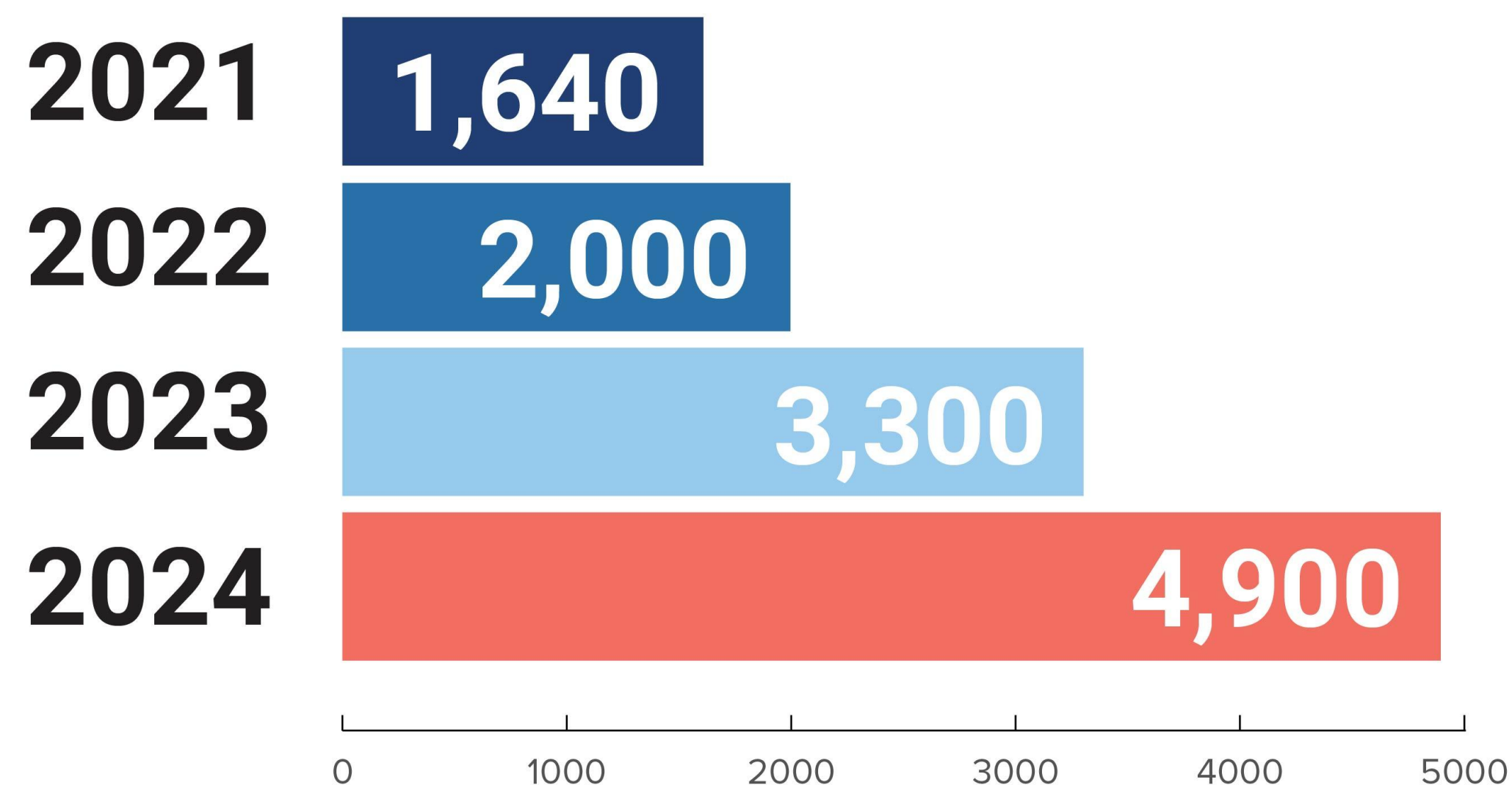


# Growth of Transcritical CO<sub>2</sub> Installations in Europe

(industrial sites)

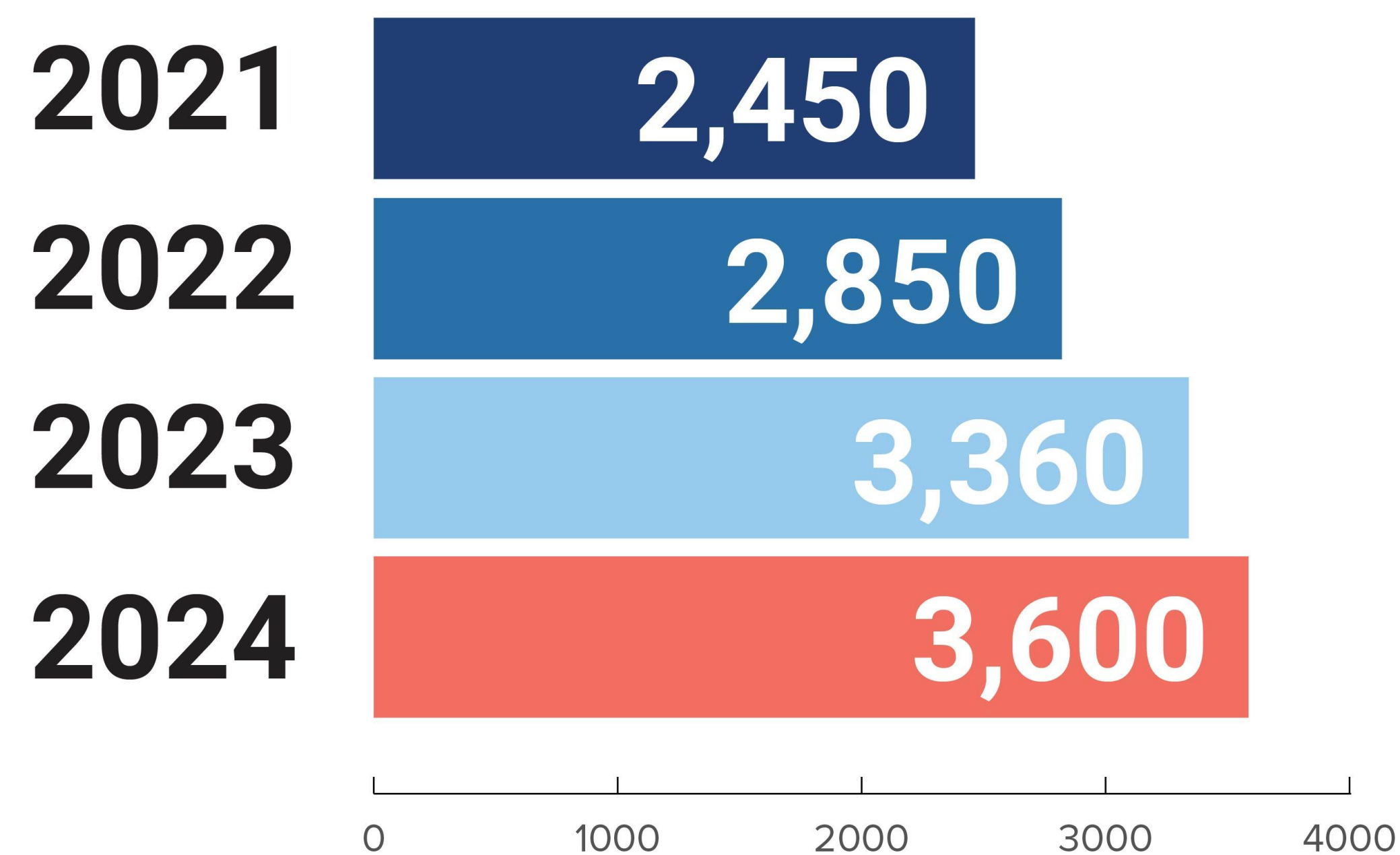
**Ever larger capacities  
into the multiple MWs**

**制冷系统容量持续扩大，  
达到数兆瓦级规模**



# Growth of Low-Charge Ammonia in Europe

(industrial sites)







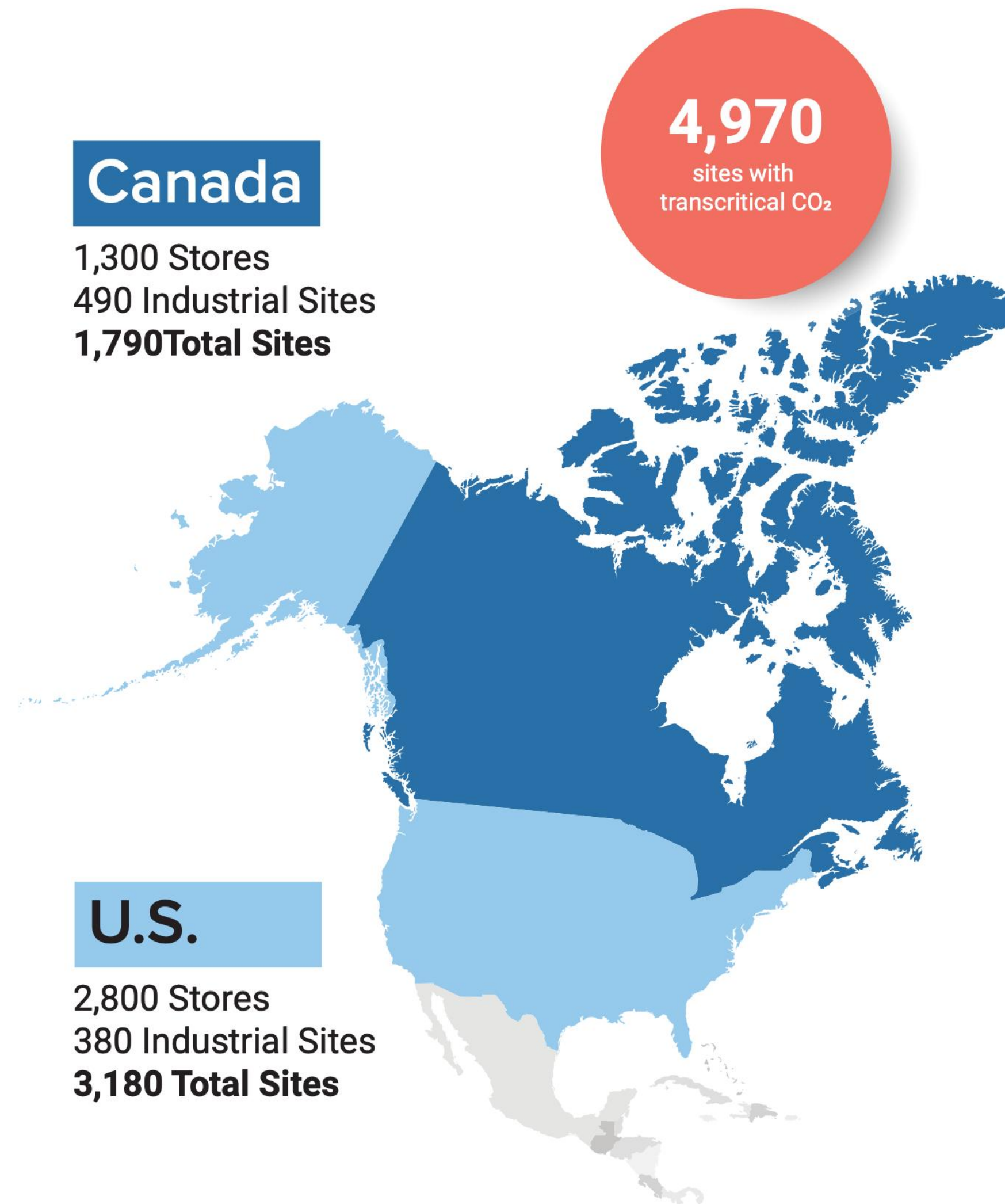
# North America



# Transcritical CO<sub>2</sub> Installations in North America

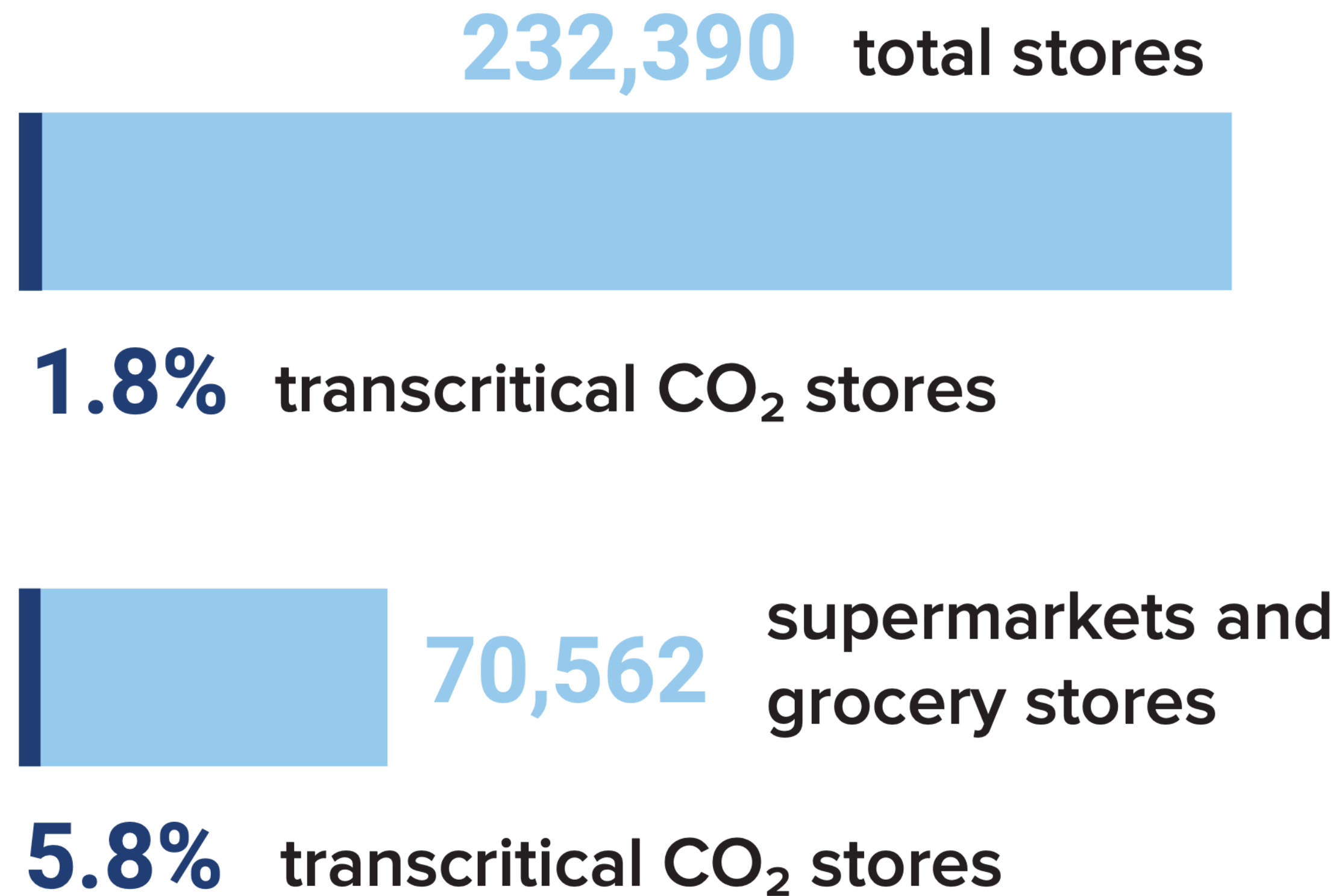
(as of December 2024)

5000 sites in 2024





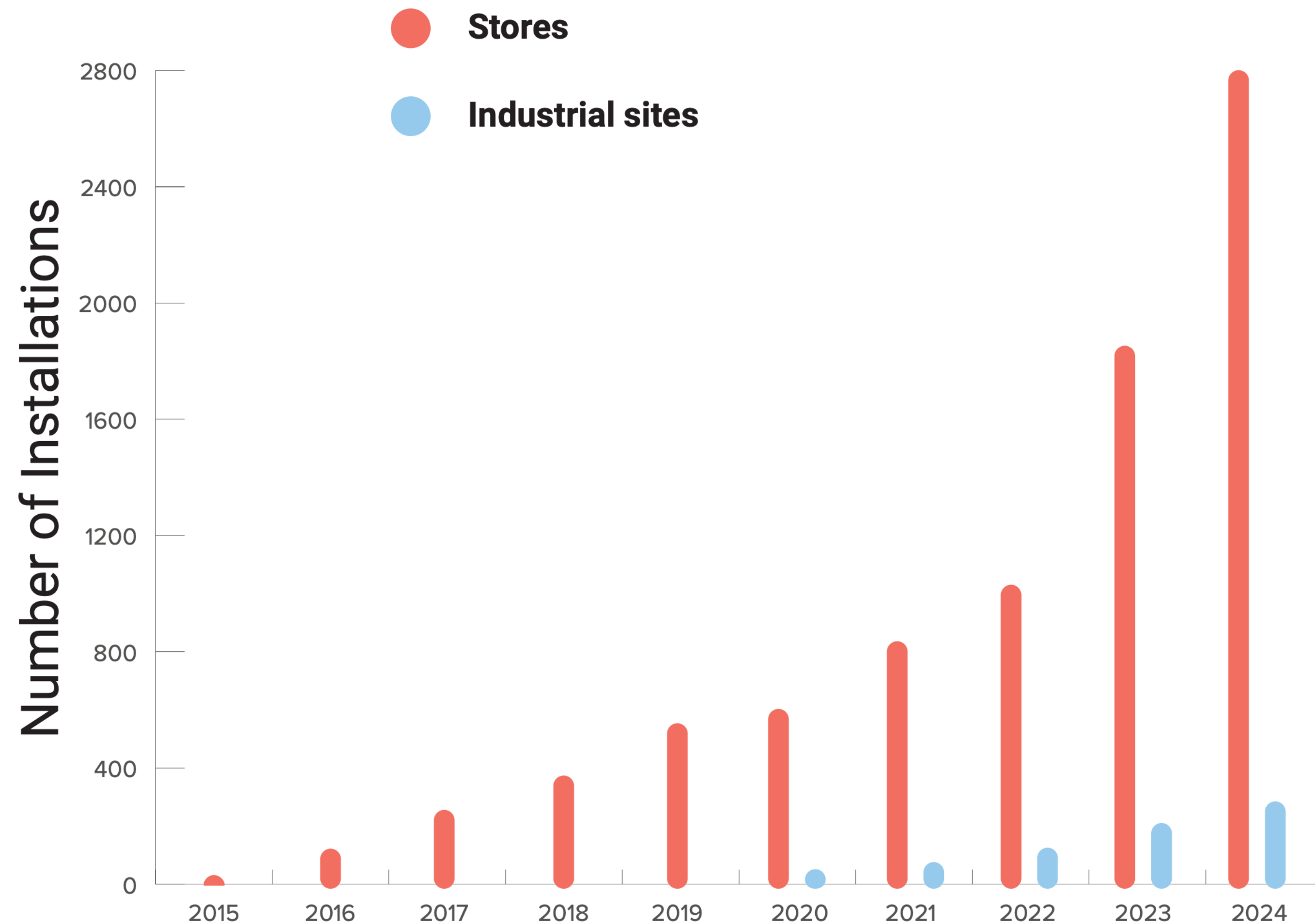
# Transcritical CO<sub>2</sub> Commercial Refrigeration Market Penetration in North America





# Transcritical CO<sub>2</sub> Installation Growth in the U.S.

(stores and industrial sites)

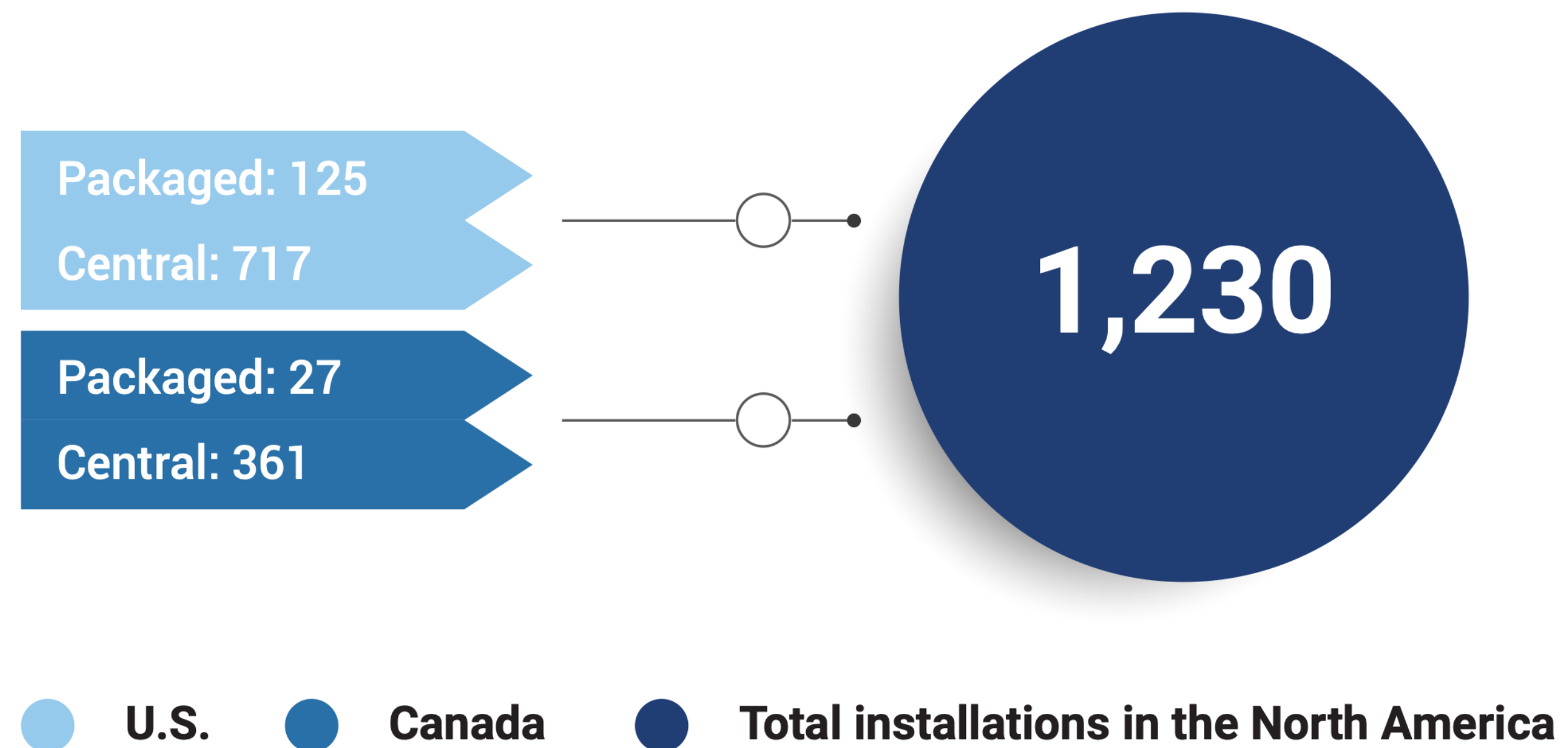


Note: Prior to 2020, most installations were at stores.



# Installations of Low-Charge Ammonia Systems in North America

(industrial sites as of December 2024)







# **EMERGING NEW APPLICATIONS**

## **新兴应用**



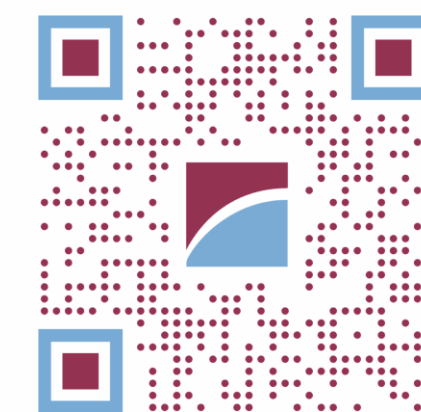


# Fast adoption of Natural Refrigerants in HPs

## 自然工质在热泵领域快速发展

**Natural Refrigerants** are ready, safe, efficient and viable in most if not all Heat Pump applications:

- ✓ **Residential air-to-water HPs** (R744 & R290) - 12+ million
- ✓ **Residential air-to-air HPs** (R290) - 1+ million
- ✓ **Mobile Air-Conditioning HPs** (R744 & R290) - 1+ million
- ✓ **HPs for Air-Conditioning of Trains and Busses** (R744 & R290)
- ✓ **R290 Commercial chiller / HPs** (up to 400kW )
- ✓ **R744 Commercial & Industrial HPs** (20kW to 50MW)
- ✓ **Ammonia Industrial HPs** (10+ MW)







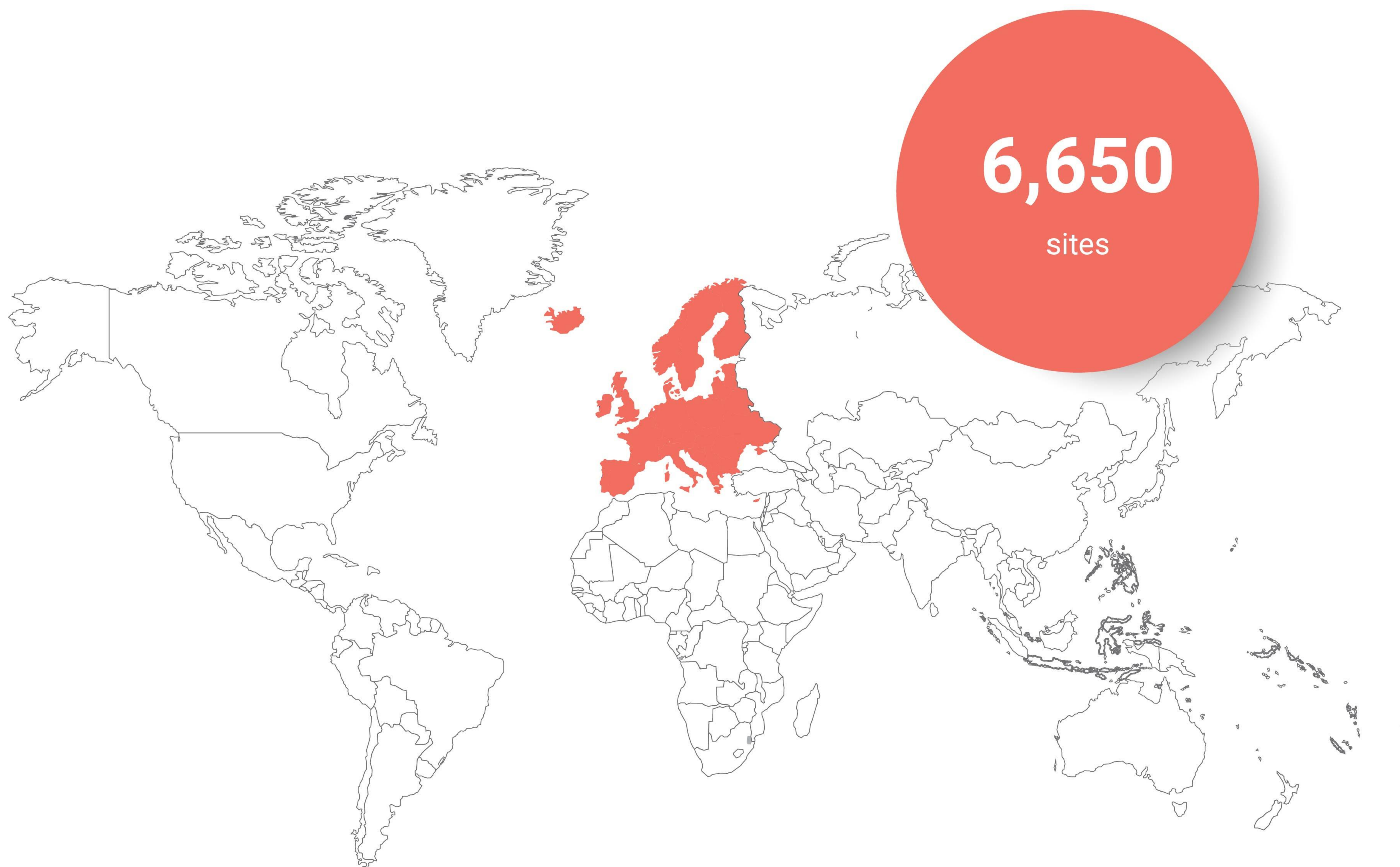
# Hydrocarbon Chiller Installations in Europe

(as of December 2024)

**30+ leading manufacturers in  
Europe**

**欧洲30多家领先制造商**

ATMOsphere estimates there were 6,650 industrial sites with hydrocarbon-based (propane, iso-butane, propylene) chillers in Europe as of December 2024







# Commercial Propane Chillers & HPs

## 商用丙烷冷水机组和热泵





One of the success stories of Natural Refrigerants in Japan

Japan has done it. Europe, China, Australia, the US and rest of the world can too.

Some key figures:

- ✓ **10+ million CO<sub>2</sub> heat pumps for domestic hot water (Eco Cute) sold in Japan since 2004**
- ✓ **Annual sales 400,000 - 600,000 units**
- ✓ **10,000+ commercial CO<sub>2</sub> HPs (up to 80kW)**





# ISH 2025 NatRefs (r)evolution



## ISH 2025: Daikin Adds CO<sub>2</sub> to VRF Range

📅 March 24, 2025

The Japanese manufacturer showcased its new CO<sub>2</sub> VRV system at the ISH 2025 trade show in Frankfurt.



## ISH 2025: Daikin Expands R290 Portfolio as Part of 'Flexible' Refrigerant Strategy

📅 April 2, 2025

The Japanese manufacturer highlights its multi-refrigerant approach amid evolving European regulations and market challenges.



## ISH 2025: Rhoss Offers 4-Pipe R290 Air-to-Water Heat Pumps

📅 March 26, 2025

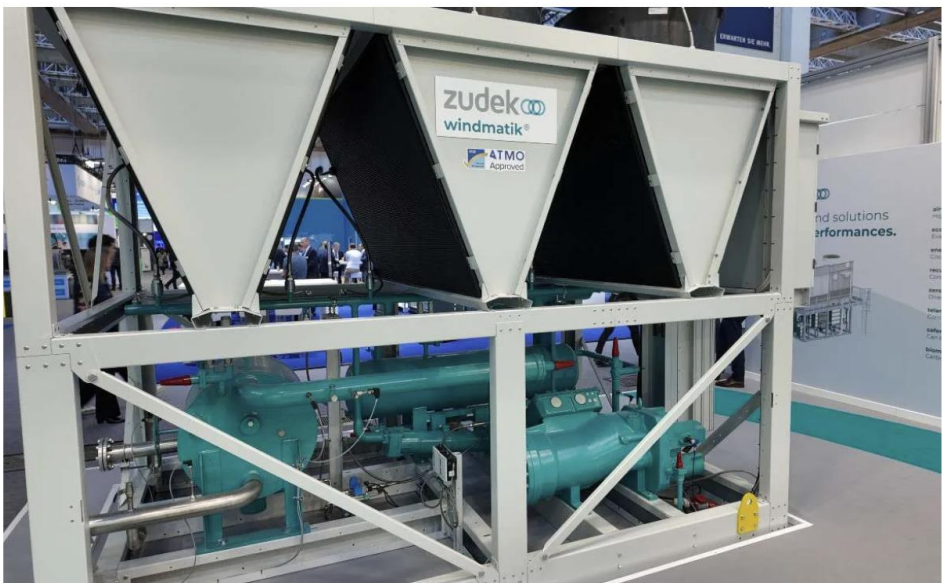
The new units include the 50-160kW UniPACK-P and the 20-25kW MidiPACK-PI, providing simultaneous heating and cooling.



## ISH 2025: HVAC Manufacturer Menerga Showcases Prototype Air-Handling Unit with CO<sub>2</sub> Heat Pump

📅 March 20, 2025

The unit dehumidifies swimming pools and can produce domestic hot water with outlet temperatures of up to 65°C.



## ISH 2025: Zudek Showcases New Air-Cooled Ammonia Chiller for Commercial HVAC Applications

📅 April 8, 2025

The roof-mounted unit offers an outlet temperature range from -8 to 12°C, with cooling capacities ranging from 300kW to 1MW.



## ISH 2025: Enerblue Introduces Extended Five-Year Warranty for Natural Refrigerant Portfolio

📅 April 3, 2025

The Italian manufacturer offers a wide range of R290 and CO<sub>2</sub> heat pump and chiller units for commercial and industrial applications.



## ISH 2025: Gebwell Releases Ground-Source-Water-to-Water Propane Heat Pump to Europe

📅 April 24, 2025

The Finnish manufacturer offers 40 and 120kW models, with the ability to combine up to 12 units in cascade for up to 1.4MW capacities.



## ISH 2025: Skadec Debuts Compact Reversible R290 Heat Pump for Commercial and Industrial Applications

📅 April 15, 2025

With a propane charge of less than 2.5kg, the new unit provides a heating capacity of 87kW with an outlet temperature of up to 75°C.





### 27MW Ammonia Installation Becomes the Largest Heat Pump System in the Netherlands

📅 February 26, 2025

Four R717 HicaHP units from Sabroe recover residual heat from Utrecht's wastewater treatment plant for the region's district heating network.



### SCM Frigo Installs 6MW Transcritical CO<sub>2</sub> System in Ecuadorian Shrimp Processing Facility

📅 April 1, 2025

'CO<sub>2</sub> is a high-efficiency and sustainable alternative to traditional refrigerants in industrial refrigeration,' the company said.





**'First-of-its-Kind' 4MW Pentane Heat Pump Installed at Belgian Sugar Factory**

📅 March 19, 2025

The heat pump will use waste industrial heat to generate steam at temperatures of up to 160°C for the facility's sugar refining process.



**Vicinity Energy to Install 35MW Ammonia Heat Pump in Boston-Area Facility**

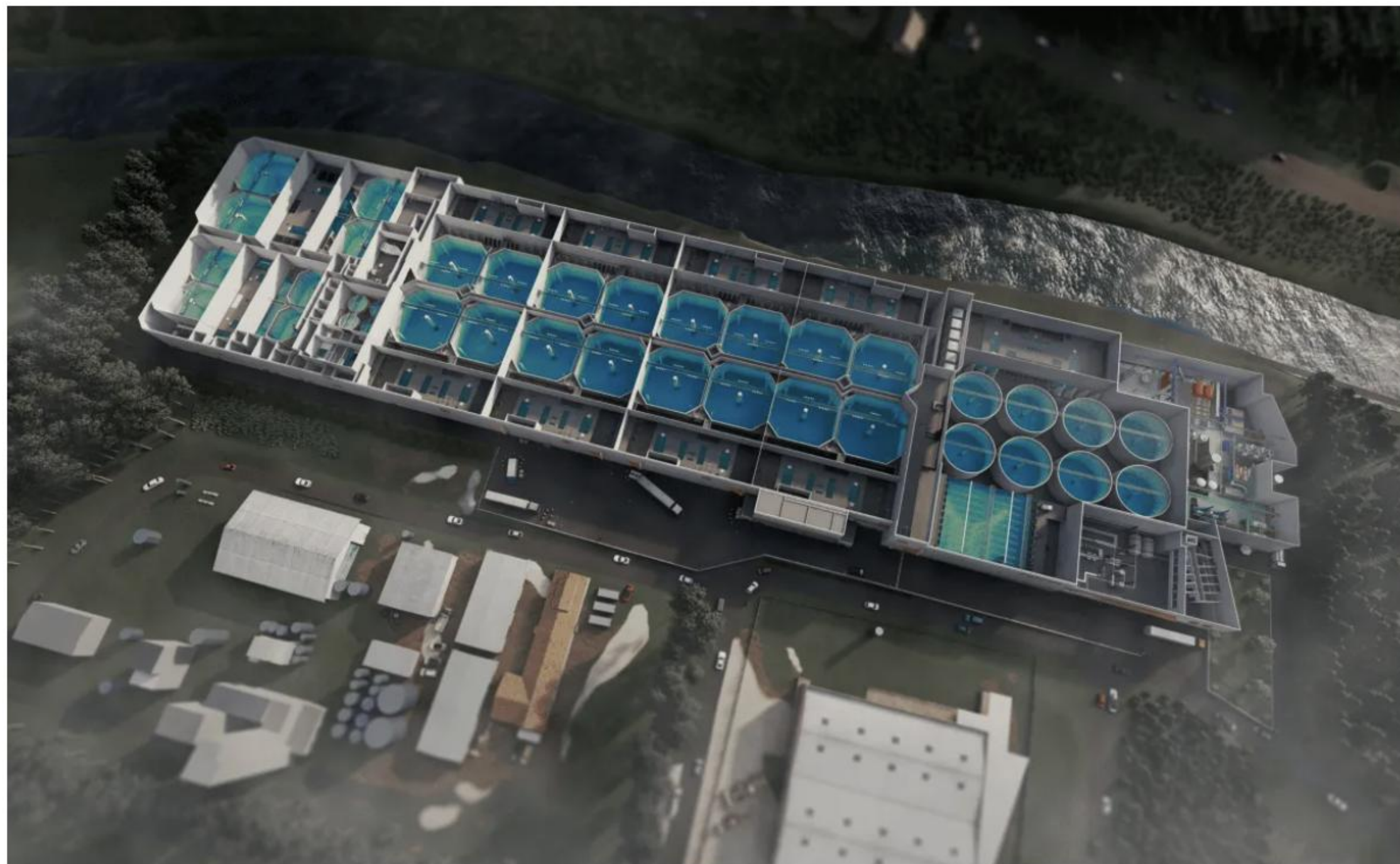
📅 April 9, 2025

The MAN industrial-scale heat pump supports the U.S. district energy provider's decarbonization program.



# Milestone Projects with Natural Refrigerants

## 天然制冷剂应用里程碑项目



### An Advansor Transcritical CO<sub>2</sub> Rack and Chiller Provide Cooling and Freezing at Record-Breaking Trout Farm

📅 March 14, 2025

The SteelXL rack and chiller module provides 360kW of cooling capacity and 170kW of freezing capacity.



### New Furniture Store in Switzerland, Using Secon R290 Heat Pumps

📅 March 14, 2025

The more efficient 400kW water-to-water unit carries the primary heating/cooling load, with a 260KW air-to-water unit providing backup.



## Real impact of HFOs / TFA / EU PFAS Regulation HFO / TFA / EU PFAS的实际影响

The poster has a blue background with a white and orange circular logo in the top left corner. The text is in white and yellow. A photo of Prof. Michael Kauffeld is on the right side.

**PFAS FREE COOLING HEATING**

Online event 14th Feb. 1pm CET

### PFAS: a growing concern for the HVAC&R industry

Join us for this online event to gain a comprehensive overview of the latest insights on PFAS, TFA and how they are connected to heating and cooling

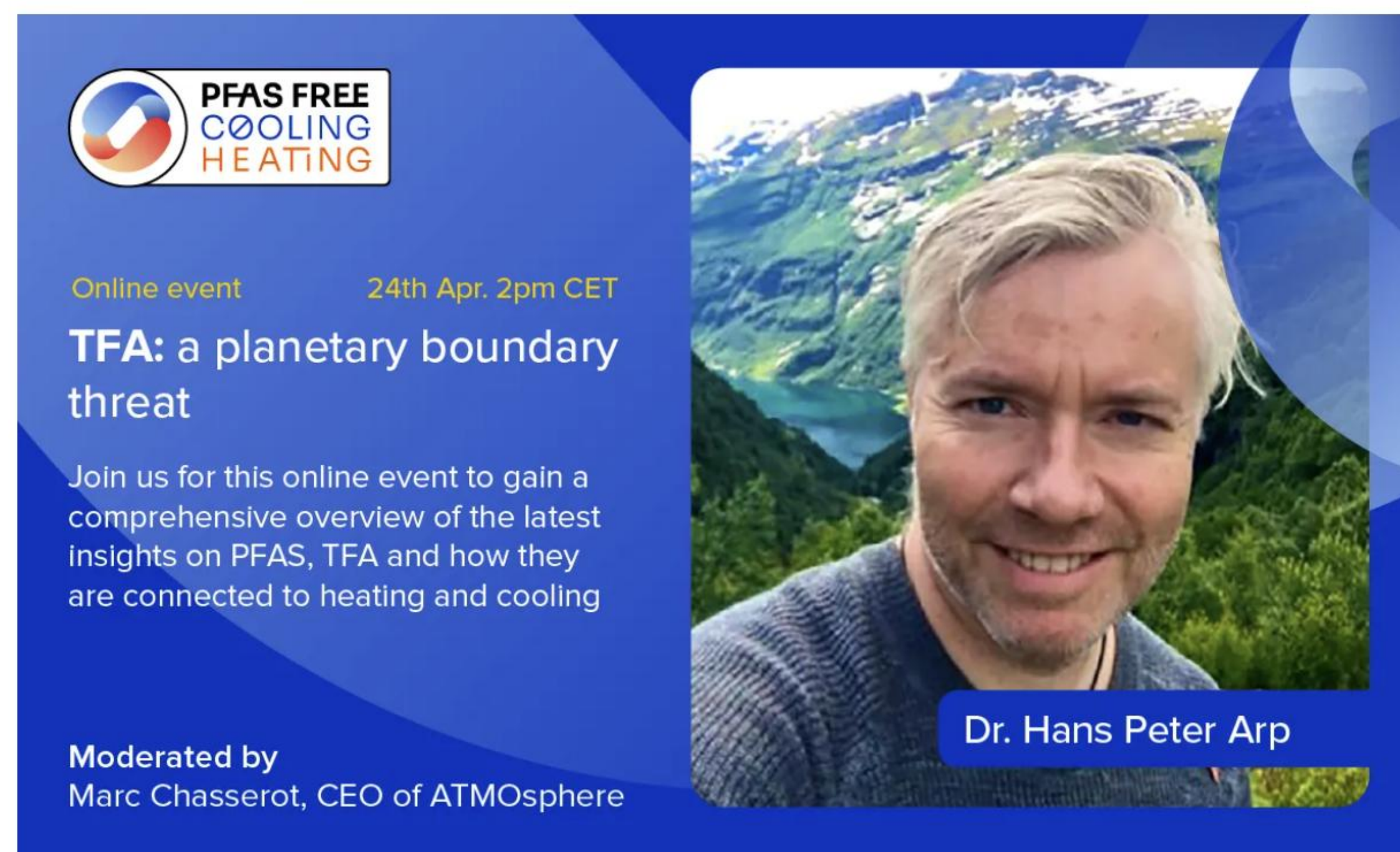
Moderated by  
Marc Chasserot, CEO of ATMOsphere

**Prof. Michael Kauffeld**

**In Online Event, the Coalition for PFAS-Free Cooling & Heating Details Why the HVAC&R Industry Should Be Concerned About PFAS, HFOs and TFA**

📅 February 24, 2025

The event featured a presentation from professor Michael Kauffeld about PFAS in HVAC&R equipment and the threat posed by TFA.

The poster has a blue background with a white and orange circular logo in the top left corner. The text is in white and yellow. A photo of Dr. Hans Peter Arp is on the right side.

**PFAS FREE COOLING HEATING**

Online event 24th Apr. 2pm CET

### TFA: a planetary boundary threat

Join us for this online event to gain a comprehensive overview of the latest insights on PFAS, TFA and how they are connected to heating and cooling

Moderated by  
Marc Chasserot, CEO of ATMOsphere

**Dr. Hans Peter Arp**

**Coalition for PFAS-Free Cooling & Heating Event to Examine TFA as a Growing Environmental Threat**

📅 April 15, 2025

The online event, taking place April 24, is the second in a three-part series hosted by the Coalition.



# **ATMO** sphere **Thank you for listening**



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recognizing the best in  
class for natural refrigerants



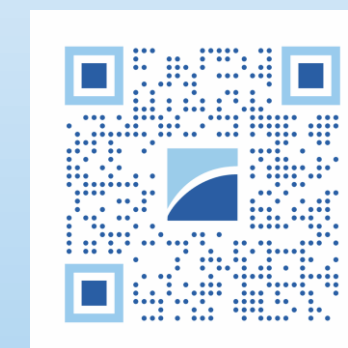
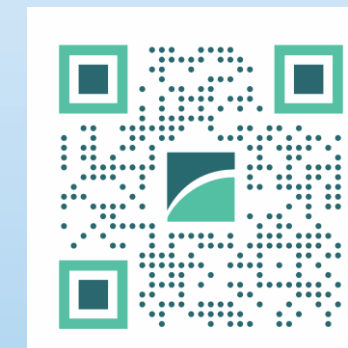
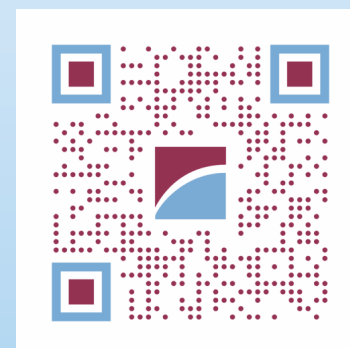
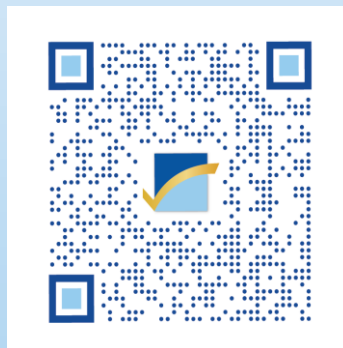
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via exclusive in-person  
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Understand the latest  
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