

Specialty Chemicals

Refrigerant Gases – Is it time to be cautiously optimistic?

Sector Report

Fluorochemicals

November 23, 2023

NIFTY 50: 19,812

The refrigerant gas markets have taken a new shape after the entry of a new player in United Arab Emirates (UAE) with a capacity of 36,000 tpa for R32 (plans to expand it further for R134a and R125). This capacity has come on stream in Q1FY24, and we have seen huge imports from this capacity in the U.S. over the past few months, partially replacing Chinese imports (~2,300 tons in three months – Jul-23 to Sep-23 vs. overall imports in the U.S. in CY22 at ~5,000 tons from all countries). This capacity is a JV between IGas Holdings (IGas) in U.S. and Juhua Group in China; IGas has the fourth-highest quota in U.S. after Honeywell, Chemours, and Arkema. We believe this capacity will largely serve U.S. markets first, depending on the quota available and balance gases will be sold in the Gulf/European market. Thus, in our view, Indian players will shift more towards Gulf/domestic markets for their new capacity additions (~20,000 tpa of R32) and compete with/replace Chinese imports, reducing the pricing benefit they were getting in U.S. over FY22-23.

New capacity addition in UAE for R32

This new capacity is owned by IGas in a JV with Juhua Group in China. The capacity for R32 is 36,000 tpa with further plans to expand it for R134a and R125. The company is importing methylene dichloride (MDC) and Hydrofluoric Acid (HF) from China and manufacturing refrigerant gases in UAE (the plant is running at full capacity). IGas has the fourth-highest quota allocation (~10% of the overall quota in U.S., larger than some of the domestic manufacturers) to sell refrigerant gases in the U.S. In our view, this capacity has been set up with the purpose of serving the U.S. market, surpassing the anti-dumping duty (ADD) on Chinese refrigerant gases and serving the growing markets in the Middle East (further IGas is selling in European markets as well).

New capacity addition in the U.S. for HFO-1233zd

Last year, Arkema announced the start-up of HFO-1233zd production at its partner's site – Aofan in China (5,000tpa), and the construction of a new line at its Calvert City plant in the U.S. (15,000tpa to retrofit its R134a plant, which was shut down). This is largely to meet the rising demand for low GWP refrigerant gases and will come on stream by CY23-end or early CY24. NFIL has a production capacity of ~10,000tpa under a contract with Honeywell, as this HFO is still under application patent. With Arkema plant going live in H1CY24, we expect significant supply additions in HFO-1233zd.

Phase-down in HFCs in the U.S. starting Jan-24

We have seen a significant jump in refrigerant gas prices over FY22-23, particularly in the U.S. on (a) stocking by dealers to utilize their quota before the first major phase down in HFC consumption/production in the U.S. starting Jan-24, (b) surge in raw-material prices; and (c) higher cost curve for imported refrigerant gases in the U.S. due to ADD on China. However, in FY24, prices are tapering off partially due to the slowdown in demand (as most buyers have finished their CY23 quota) and normalization of raw-material prices. Indian demand is relatively stable but is characterized by Chinese dumping impacting the realizations in FY24. We believe Indian companies will have to strategize on optimizing between volumes and price and turn cautious on the refrigerant gas business. We maintain BUY on SRF and Anupam, HOLD on NFIL, and SELL on GFL.

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Rating, Target Price and Valuation

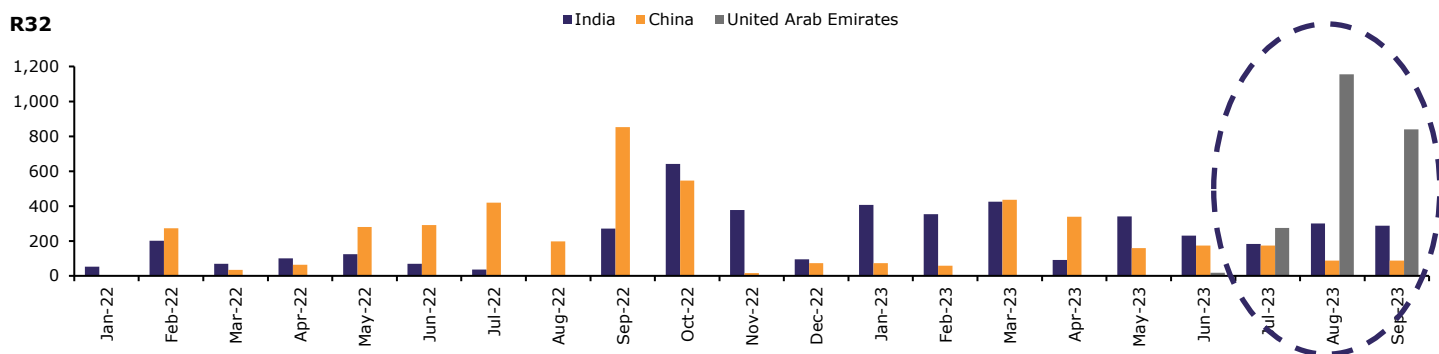
	Rating	CMP (Rs)	TP (Rs)	Upside (%)	P/E (x)		EV/EBITDA (x)	
					FY25	FY26	FY25	FY26
SRF	BUY	2,333	2,700	16	32.2	24.5	18.4	15.1
Anupam Rasayan	BUY	938	1,070	14	32.9	22.4	19.4	14.2
Navin Fluorine	HOLD	3,610	3,850	7	29.6	26.9	20.7	18.0
Gujarat Fluorochemicals	SELL	2,785	2,200	(21)	34.3	29.6	22.4	19.4

Source: Company, Emkay Research

U.S. R32 imports reflect higher volumes from UAE

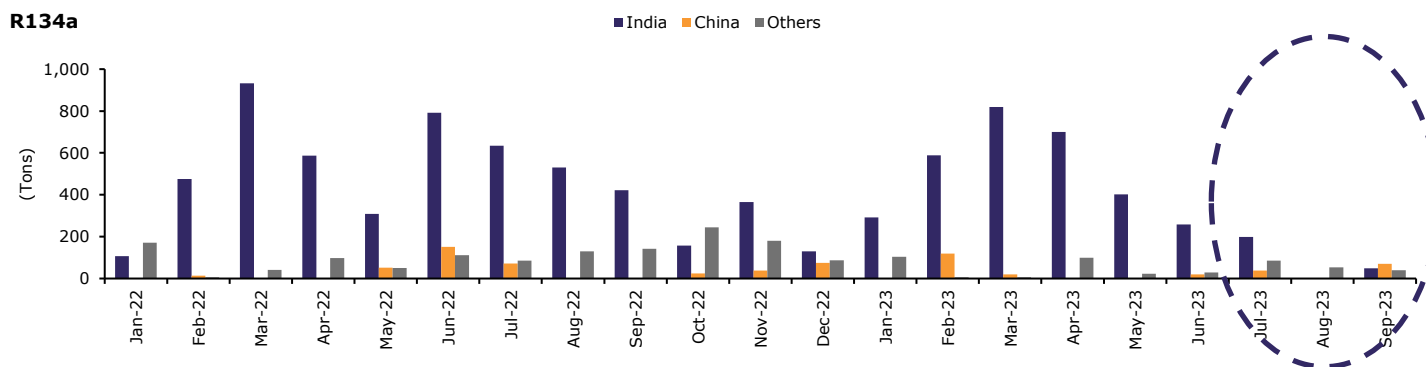
- The size of the U.S. refrigerant gas market is ~2,00,000 tons. Domestic producers are Arkema, Chemours, Koura (Mexichem/Orbia), and Honeywell. Large non-domestic suppliers are SRF and IGas (primarily sourcing Chinese gases) and now UAE. The U.S. imported 5,000 tons of R32, 20,000 tons of R125, and 7,000 tons of R134a in CY22.
- Demand for R32 and R125 is ~35,000 tons, largely being consumed in R410a (as blend) and some external demand in small OEMs for R32 and fire extinguishers for R125. R410a demand is ~60,000 tons, largely being used in residential air conditioners (RACs). Post Jan-25, no new RACs can be built on R410a and, thus, RAC manufacturers will move towards R32 and blend (with HFOs) for new RAC manufacturing, which will increase R32 demand by ~50% (15,000-20,000 tons). This incremental demand will be served by IGas (China and UAE), SRF, and NFIL (total production capacity of ~60,000 tons).
- Demand for R134a is 40,000-45,000 tons and, today, there is only replacement demand in mobile air conditioners (MACs) as OEMs have shifted to HFO-1234yf, starting Jan-18. Arkema has shut down its capacity and other manufacturers will gradually close down depending on the phase-down led quota reduction, creating short-term opportunities for non-U.S. suppliers. H2CY23 sales for both R134a and R125 in terms of volumes have slowed down for Indian manufacturers due to frontloading of quota demand and stocking in H1CY23 before the first major phase-down led cut, starting Jan-24 (refer exhibits below).
- To summarize, R32 demand will grow and R134a/R125 should definitely see demand as well as price correction. Despite demand growth, R32 has compelling capacities in India, China and UAE to serve U.S. markets. R134a will see opportunistic demand when other manufacturers in the U.S. have shut down their plants because of the phase-down, but, as of today, the U.S. largely has only replacement demand. R125 will see the complete phase-down in volumes as well as pricing and once fresh R410a demand stops, very low replacement demand will stay for RACs.

Exhibit 1: U.S. imports of R32 show large volumes from UAE



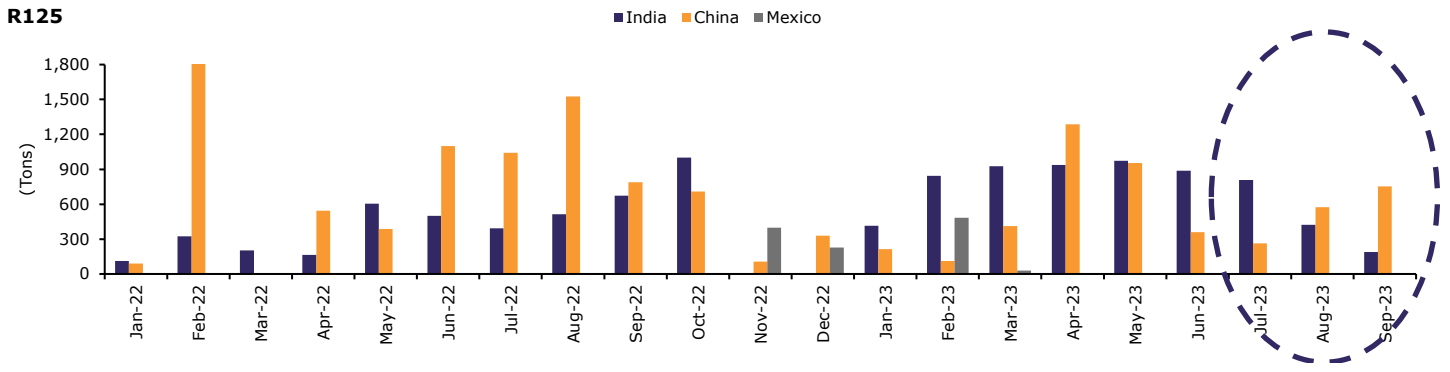
Source: Industry, Emkay Research

Exhibit 2: Declining R134a imports due to frontloading of quota in H1CY23, only replacement demand is there as of today



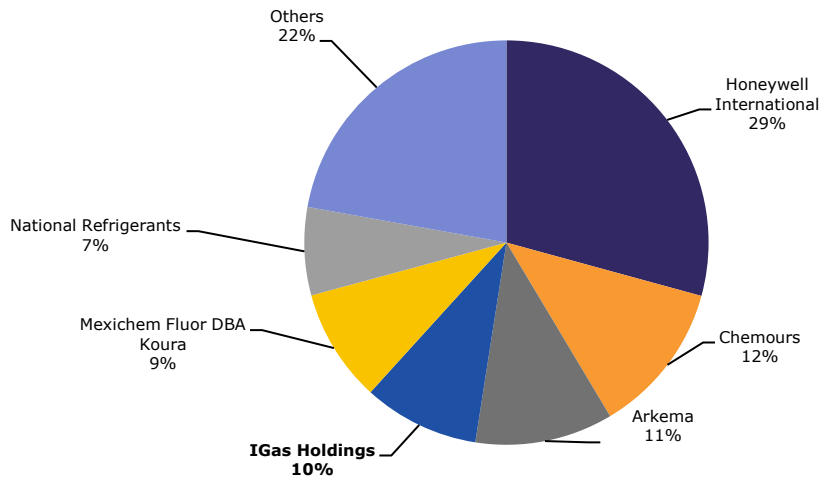
Source: Industry, Emkay Research

Exhibit 3: High GWP R125 to gradually deplete after the first major phase-down starting Jan-24; very low replacement demand will persist



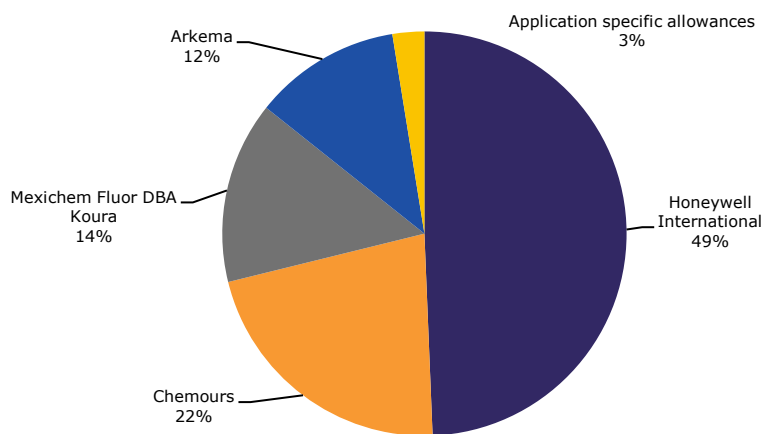
Source: Industry, Emkay Research

Exhibit 4: Refrigerant gas consumption allowances in the U.S. in CY24 – 282 MMTEVe*



Source: Industry, Emkay Research, *MMTEVe – Million Metric Tons Exchange Value Equivalent

Exhibit 5: Refrigerant gas production allowances U.S. CY24 – 229 MMTEVe*



Source: Industry, Emkay Research, *MMTEVe – Million Metric Tons Exchange Value Equivalent

Phase-out plan, as per The Montreal Protocol

Background

The Montreal Protocol on substances that deplete the ozone layer is the landmark multilateral environmental agreement that regulates the production and consumption of nearly 100 man-made chemicals referred to as ozone-depleting substances (ODS). When released into the atmosphere, such chemicals damage the stratospheric ozone layer, which is the Earth’s shield that protects humans and the environment from harmful levels of ultraviolet radiation from the sun. Adopted on 16-Sep-1987, the Protocol is to date one of the rare treaties to have achieved universal ratification.

HFCs are anthropogenic fluorinated chemicals that have no known natural source. HFCs are used in the same applications in which ODS have historically been used, such as refrigeration and air conditioning, foam-blowing agents, solvents, aerosols, and fire suppression. HFCs are potent GHGs with 100-year GWPs (a measure of the relative climatic impact of a GHG) that can be hundreds to thousands of times more potent than carbon dioxide (CO₂).

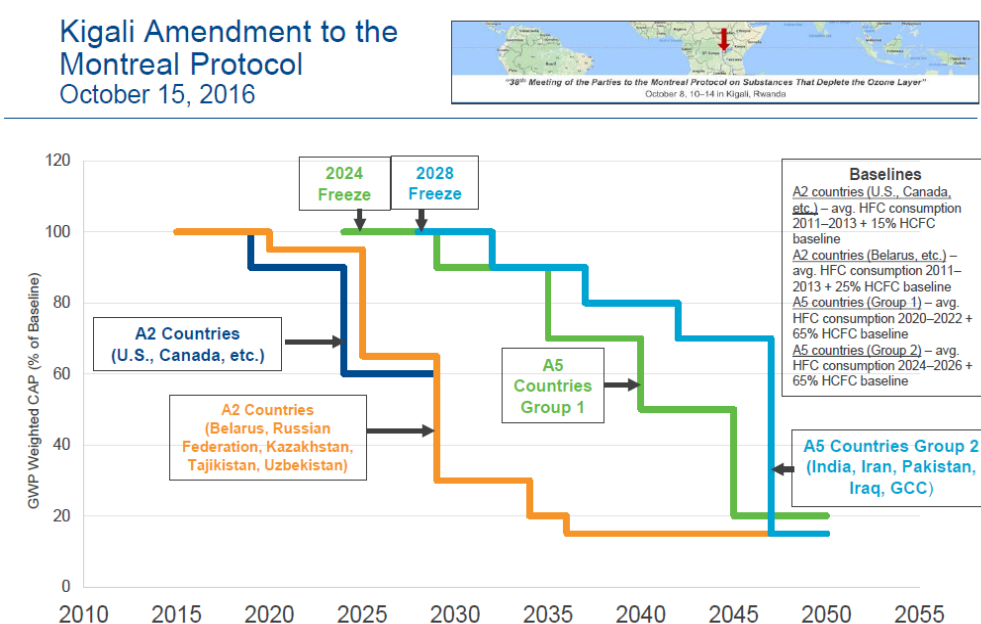
The Protocol

The international phase-down for production and consumption of HFCs was accelerated by the Kigali Amendment to the Montreal Protocol in Oct-16. All countries have committed to legally binding targets, which mandate gradual reductions in HFC consumption and production, starting from 2019 for developed countries and from 2024 for developing countries. HFC reductions are measured based on overall CO₂ emissions/impact, as HFCs have widely differing GWPs. As per the amendment:

- Developed countries will begin phasing down from CY19 (consumption has already frozen from CY15), completing the reduction by CY36 (85% from the baseline).
- Developing countries (Article A5 group 1) will begin and end the phase-down later, allowing more time for alternative technology to mature in their markets. Most of these countries, including China, will freeze the level of HFC consumption in CY24, begin phasing down in CY29, and complete the process by CY45 (80% from the baseline).
- Other countries (Article A5 group 2), including India and the Middle East, will freeze consumption from CY28, begin reducing from CY32, and complete the phase-down by CY47 (80% from the baseline).

Based on the Kigali Amendment, phase-down in developed countries will start from 2019 and for developing countries from 2024

Exhibit 6: Phase down, as per the Kigali Amendment to The Montreal Protocol



Ref: conf.montreal-protocol.org/meeting/mop/mop-28/crps/English/mop-28-crp10_e.docx

Global Agreement on HFC Phase-Down Reached by 197 Countries of the World, in Kigali, Rwanda, on October 15, 2016

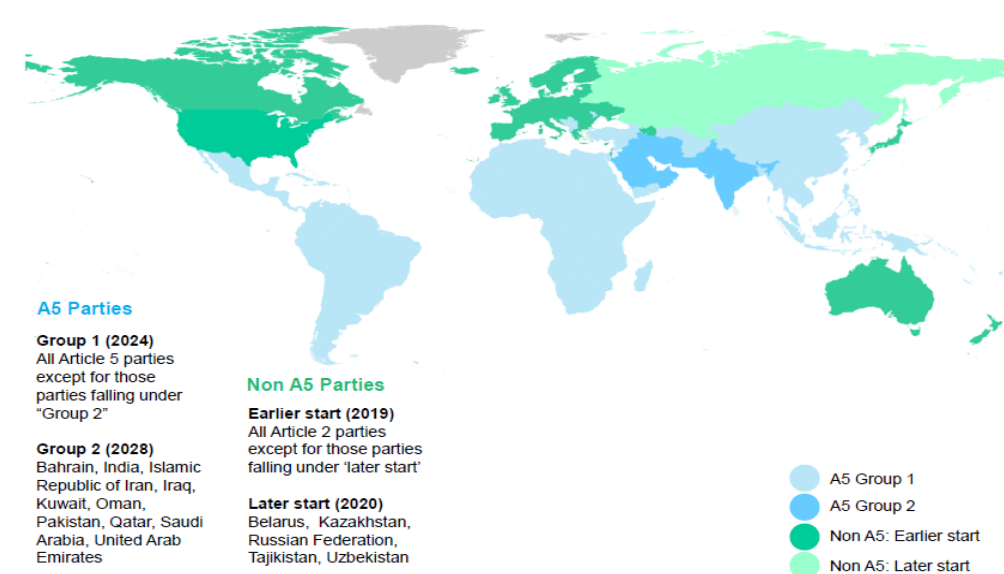
Source: Industry, Emkay Research

Exhibit 7: HFC phase-down schedule under the Kigali Amendment

	Non-A5 (developed countries)	A5 (developing countries) Group 1	A5 (developing countries) Group 2
Baseline HFC component	2011-2013 (average consumption)	2020-2022 (average consumption)	2024-2026 (average consumption)
Baseline HCFC component	15% of baseline	65% of baseline	65% of baseline
Freeze	-	2024	2028
1st step	2019 - 10%	2029 - 10%	2032 - 10%
2nd step	2024 - 40%	2035 - 30%	2037 - 20%
3rd step	2029 - 70%	2040 - 50%	2042 - 30%
4th step	2034 - 80%	-	-
Plateau	2036 - 85%	2045 - 80%	2047 - 85%
Notes	Belarus, Russian Federation, Kazakhstan, Tajikistan, Uzbekistan, 25% HCFC component and 1st two steps are later: 5% in 2020, 35% in 2025	Article 5 countries not part of Group 2	GCC (Saudi Arabia, Kuwait, United Arab Emirates, Qatar, Bahrain, Oman), India, Iran, Iraq, Pakistan

Source: Industry, Emkay Research

Exhibit 8: Countries phasing out ref gas – Birds-eye view



Source: Industry, Emkay Research

The Act in Europe

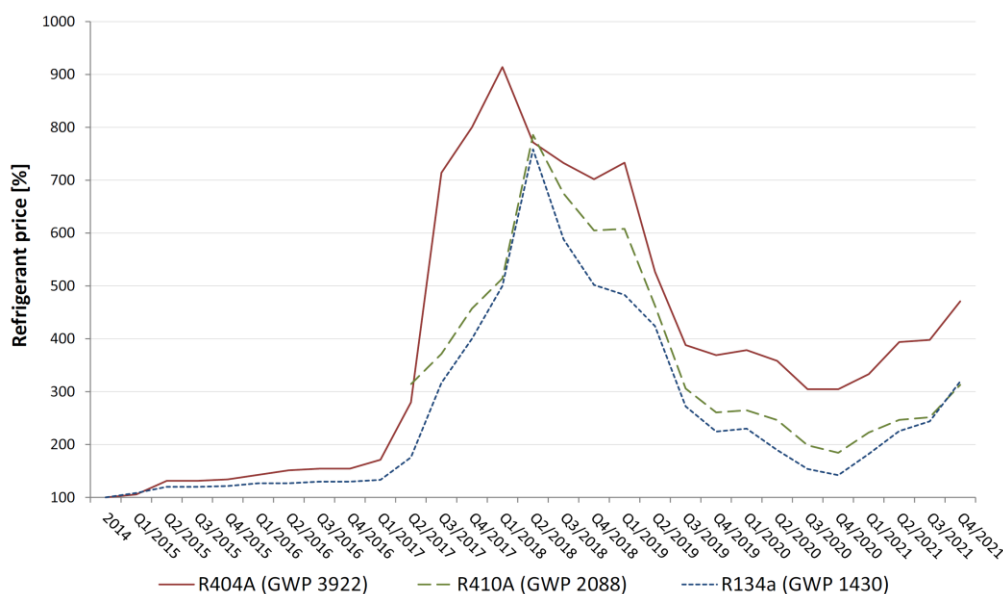
F-Gas regulation in the EU has put in place the HFC phase-down schedule, from 2015 to 2030, by means of a quota system and sectorial bans on high GWP refrigerants. F-Gas regulation was the first to phase down HFCs in line with The Montreal Protocol. The regulation made its targets of CO₂ emissions and phase-down much more aggressive after the Kigali Amendment.

Exhibit 9: F-Gas regulations for the HFC phase-down schedule

Year	HFC Phase-Down Schedule*
2015	100%
2016-17	93%
2018-20	63%
2021-23	45%
2024-26	31%
2027-29	24%
2030	21%

Source: Industry, Emkay Research; Note: *% of the baseline, which is the average of 2009-12

F-Gas regulations have phased down HFCs, ahead of the Kigali amendment

Exhibit 10: Price impact in Europe, pre and post the 2018 phase-down in HFCs

Source: Industry, Emkay Research

Pricing impact in the EU

- European Commission's report in 2020 confirms the strict factual connection between measures targeting refrigerant gases and their prices. Following the economic law of demand and supply, the higher ambition in the EU phase-down scheme of HFCs would automatically trigger higher prices of these substances.
- Prices of high GWP HFCs spiked in 2017, reaching peaks of 6 to 13 times higher than their 2014 baseline price, as reported by EU-based companies. This can be connected to the steep reduction that was introduced during the period, i.e. a reduction of 30 percentage points, from 93% to 63%, of the allowed quotas in the EU market.
- Following this trend, the additional reduction from 63% to 45% in 2021 also exerted upward pressure on HFC prices. As the reduction of allowable quantities comes into force in terms of CO₂e, HFCs with a higher GWP will find it harder to access the market.
- Moreover, quotas will need to be used to purchase a reduced bucket of available substances, and the higher the GWP of a substance, the more the cost.
- In Apr-22, the European Commission presented the revision of the original F-Gas legislation to fine-tune it to the ambitious climate goals enshrined in the EU's body of legislation with the EU Climate Law, where a more stringent phase-down schedule was proposed.
- Post this, compared with the baseline in 2014, R134a and R410A prices are now 2-5 times higher, and R404A prices are 3-13 times higher, depending on the supply-chain level. Compared with Chinese producer prices, the selling prices of European producers are almost 4 times higher for R134a.

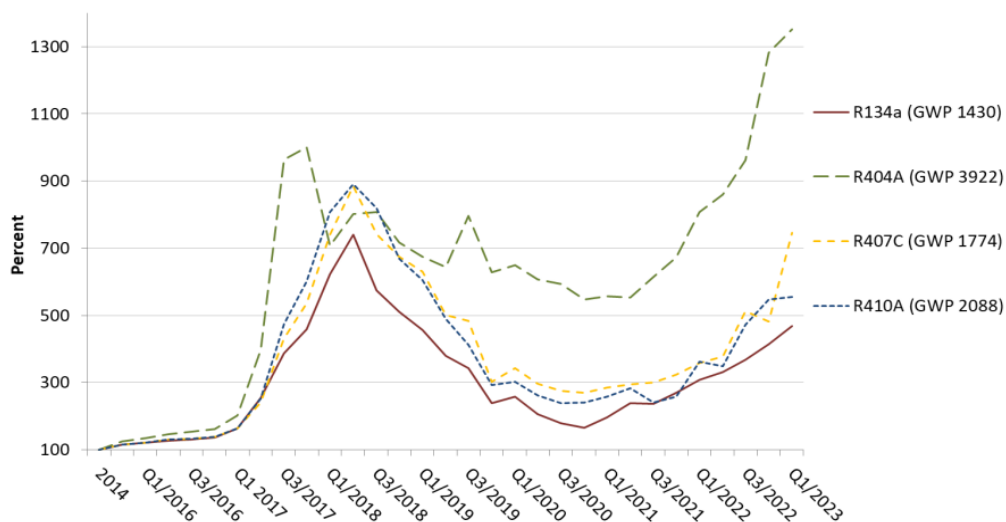
Volume impact in EU

- The EEA's 2021 report on fluorinated substances underlines that EU production of fluorinated substances, HFCs included, has constantly decreased since 2007 – a likely effect of the bloc's regulation on these substances. From almost 60,000 tons produced in 2007, European producers manufactured less than 20,000 tons in 2020, equaling roughly 40mn tons CO₂e.
- This number can be compared with the number of fluorinated substances imported into the European Union: around 80,000 tons of f-gases, including more than 60,000 tons of HFCs, were imported in 2020, with China being the first exporter, injecting almost 40,000 tons of HFCs into the EU market.
- China, therefore, supplied around 66% of the HFCs imported into the European market, with the U.S. – the second largest supplier – accounting for only ~10,000 tons. This data, in comparison with the decrease in European production, shows that Chinese suppliers already provide the majority of HFCs to the European Union.

Ref gas pricing to be cyclic, based on phase-down schedules

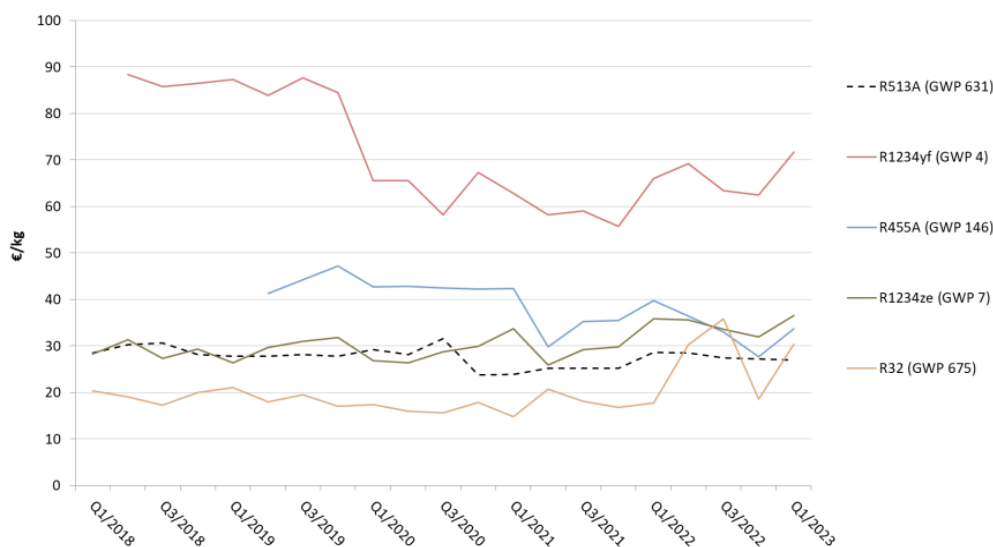
Europe largely imports Chinese refrigerant gases

Exhibit 11: Price impact on HFCs in Europe post the accelerated phase-down proposed in 2022



Source: Industry, Emkay Research

Exhibit 12: Price impact on HFOs/low GWP HFCs in Europe post the accelerated phase-down proposed in 2022



Source: Industry, Emkay Research

The Act in the U.S.

The American Innovation and Manufacturing (AIM) Act

- Consistent with the Kigali Amendment to The Montreal Protocol, the U.S. AIM Act has authorized the Environmental Protection Agency (EPA) to phase down the production and consumption of HFCs in the U.S. by 85% of the baseline by CY36.
- This phase-down will be done in stages, and CY24 will see the first major cut – from 90% to 60% of the baseline in consumption and production, followed by a second major cut down to 30% of the baseline in CY29 and finally to 15% of the baseline by CY36.
- Currently, the consumption allowance is ~270MMTEVe (Million Metric Tons of Exchange Value equivalent), which is 90% of the baseline and will get cut to ~180MMTEVe in CY24 (60% of the baseline).
- Companies that use HFCs in one of following five applications listed in the AIM Act will receive application-specific allowances: 1) A propellant in metered dose inhalers, 2) Defense sprays, 3) Structural composite preformed polyurethane foam for marine use and trailer use, 4) The etching of semiconductor material or wafers and the cleaning of chemical vapor deposition chambers within the semiconductor manufacturing sector, and 5) Onboard aerospace fire suppression.

U.S. to see its first major phase-down in CY24

Exhibit 13: The HFC phase-down schedule, as per the AIM Act in the U.S.

Year	Share of consumption and production from baseline	Est. consumption and production cap (MMTEVe*)
Proposed Baseline		Consumption: 299 Production: 375
2022-23	90%	Consumption: 269.1 Production: 337.5
2024-28	60%	Consumption: 179.4 Production: 225
2029-33	30%	Consumption: 89.7 Production: 112.5
2034-35	20%	Consumption: 59.8 Production: 75
2036 & after	15%	Consumption: 44.9 Production: 56.3

Source: Industry, Emkay Research, Note: *baselines are expressed in million metric tons of exchange value equivalent (MMTEVe) and calculated as the average of 2011-2019

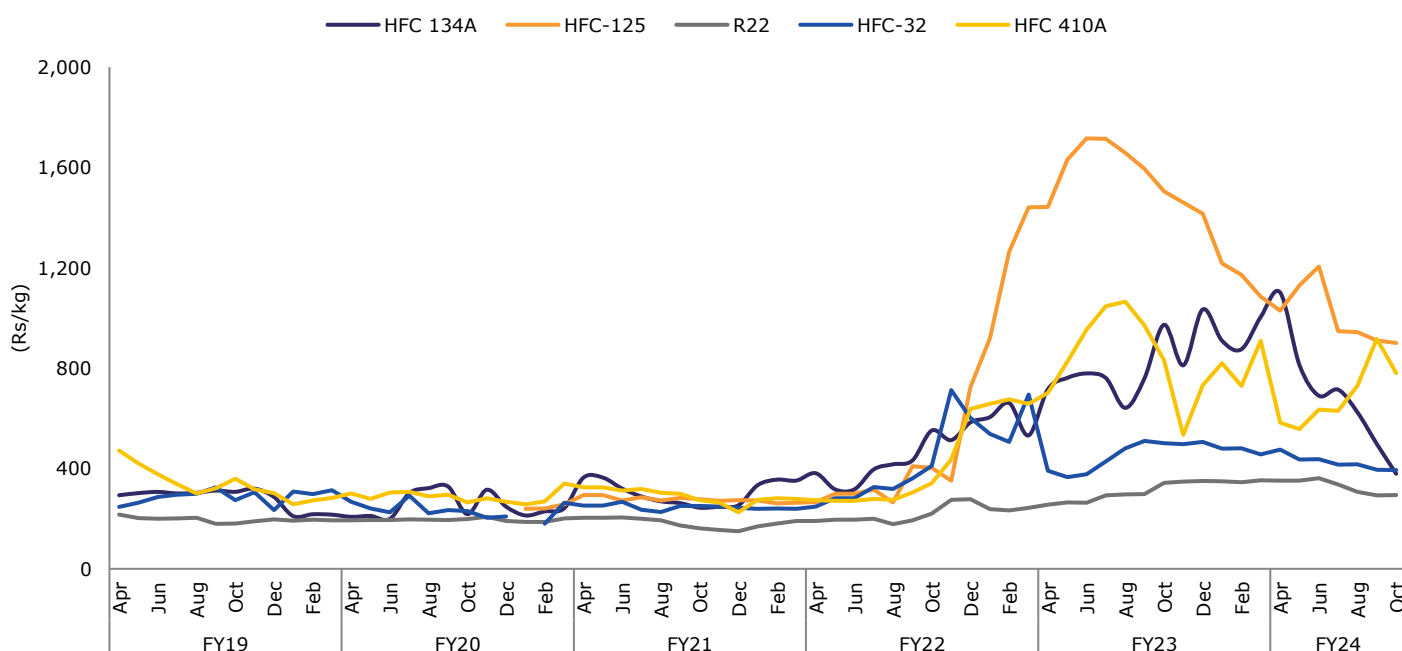
Pricing impact in the U.S.:

- We have observed a similar uptrend in pricing (2-6x) in the U.S. in 2022-23, as observed in Europe in 2016-17 before the first major cut-down. However, these prices were further aggravated by the cyclical uptick in raw-material costs in 2022-23, when prices of chloromethanes were up 2-3x and prices of HF were up 3-4x on an increase in fluorspar and sulfuric acid prices.
- This holds true when quotas need to be used to purchase a reduced bucket of available substances, and the higher the GWP of a substance, the more the cost. Companies in the U.S. might aspire to stock their HFC requirements just before the first major cut-down, which has lifted demand and put upward pressure on prices.
- Prices have started normalizing now, with increased GWP gases seeing a higher decline in prices; this is again in sync with the decline in raw-material costs and the possible reduction in demand for HFCs, as most companies might have stocked their requirements.
- We believe similar pricing trends will be observed in other geographies as well, primarily impacted by the phase-down schedule, domestic inventory, and GWP of the gas.

Refrigerant	GWP
R22	1,810
R32	675
R125	2,800
R134A	1,430
R410A	2,088
HFO1234yf	4
HFO1234ze	6

Source: Industry, Emkay Research

Exhibit 14: Price impact on HCFCs/HFCs in the U.S. before the 2024 phase-out



Source: Industry, Emkay Research

U.S. anti-dumping duty (ADD) on Chinese refrigerant imports

Chinese ADD to keep prices elevated in the U.S.

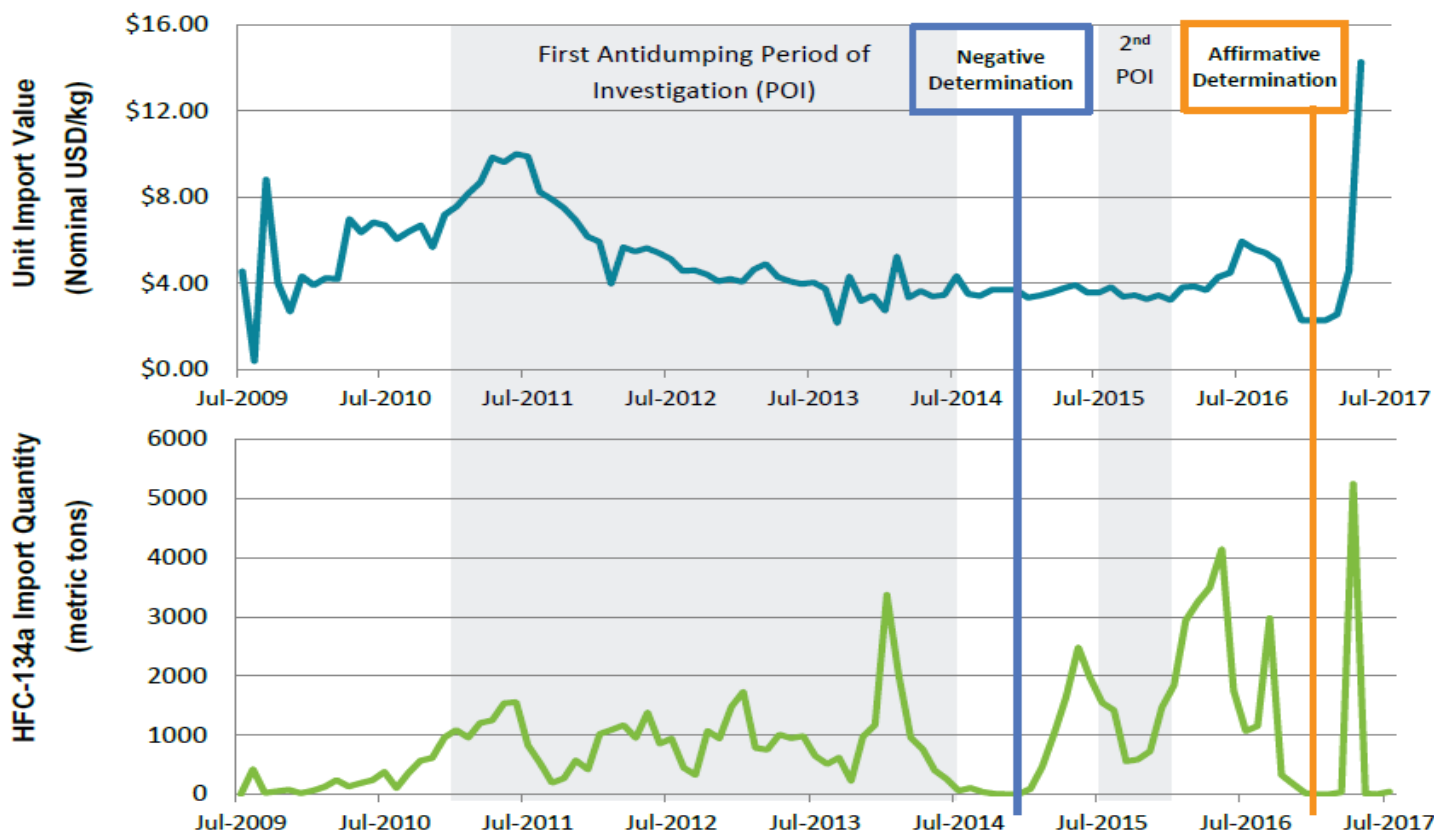
In 2016, an antidumping lawsuit was brought by U.S. refrigerant manufacturers against importers of Chinese HFC blends and blend components. The U.S. International Trade Commission (US ITC) found that the U.S. refrigerant industry was materially injured by Chinese imports of HFC blends and ruled out an ADD of 216% on blends imported from China (now under review).

Following this judgement, the U.S. has imposed ADD on HFC imports from China a number of times:

- In Apr-17, ADD of 167% was imposed on R134a imported from China (now under review).
- In Jan-21, ADD of 221% was imposed on Chinese R32 (will be applied for the next five years).
- In Mar-22, ADD of 278% was imposed on Chinese R125 (will be applied for the next five years).

The U.S. has also taken severe measures to stop the circumvention of ADD on HFCs. In Jun-19, it affirmatively determined the circumvention of ADD on HFC blends via unfinished R32/R125 blend, which has led to independent ADD on both products. However, Chinese companies started selling unfinished blends like R410b, which is a 45:55 blend of R32:R125.

Exhibit 15: Unit values and quantities for U.S. imports of HFC-134a from China from July-09 to July-17



Source: Industry; Note: The vertical lines represent the dates of final decisions issued by the U.S. International Trade Commission in the two antidumping lawsuits concerning HFC-134a imports from China

Chinese circumvention for ADD

In Jul-23, The U.S. Department of Commerce initiated anti-circumvention inquiries to determine whether imports of Chinese HFCs are circumventing the 2016 ADD order on HFC blends. Importers have, more recently, begun importing blends, such as R410B and various 'custom' blends that do not have any commercially approved use. After importation, these unapproved HFC refrigerant blends are simply re-blended into one of the products covered by the ADD order.

China's circumvention of unfinished blends under review

These requests were triggered by the staggering 340% increase in the volume of R410B imports originating in China or blended in Turkey from Chinese components. In fact, imports of R410B in 2022 exceeded U.S. imports of all other HFC blends. Such imports can be re-blended at a fraction of the cost of manufacturing HFCs. For example, R410B is easily re-blended into R410A, which can then be sold in the U.S. market.

India has also imposed ADD on HFC imports from China

- In Jul-16, India imposed an ADD of USD1.22/kg on R134a imported from China; however, on expiry of the five-year ADD term, the government decided to revoke the ADD on R134a in a notice issued on Jan-22.
- In Sep-21, India implemented an ADD of USD1.55-2.25/kg on Chinese HFC blends.
- In Dec-21, India imposed an ADD of USD1.17 to Rs1.52/kg on R32.

Exhibit 16: HFOs to be replaced with HFCs

HFO Products	Blend of	Replacement of	Uses
R1234yf	NA	R134a	Automobile ACs
R1234ze	NA	R134a	Chillers; Commercial AC
R1233zd	NA	R123	Low pressure centrifugal chillers, foam blowing agent
R450A	R134a (+) R1234ze	R134a	Heat pumps, air-cooled and water-cooled chillers, district heating and cooling, vending machines and beverage dispensers
R448A	R32 (+) R125 (+) R134a (+) R1234ze (+) R1234yf	R22 & R404a	Commercial Refrigeration
R454B	R32 (+) R1234yf	R410a	Reversible chillers and heat pump applications
R515B	R1234ze (+) R227ea	R134a / R227ea / R124	Chillers, heat pumps and high-ambient AC systems
R513A	R134a (+) R1234yf	R134a	Commercial and industrial chillers, flooded and/or centrifugal chillers
R452B	R32 (+) R125 (+) R1234yf	R410a	Direct expansion chillers, high-pressure heat pumps, split AC units, commercial packaged systems
R452A	R32 (+) R125 (+) R1234yf	R404a & R507	Commercial and industrial refrigerators, condensing units, plug-ins and transport refrigeration
R455A	R32 (+) R744 (+) R1234yf	R404a / R290 / R22 / R407c	Plug-ins, condensing units, foodservice, water loop

Source: Industry, Emkay Research

SRF

RECOMMENDATION HISTORY - DETAILS

Date	Closing Price (INR)	TP (INR)	Rating	Analyst
30-Oct-23	2,181	2,700	Buy	Meet Vora
15-Oct-23	2,255	2,700	Buy	Meet Vora

Source: Company, Emkay Research

RECOMMENDATION HISTORY - TREND



Source: Bloomberg, Company, Emkay Research

ANUPAM RASAYAN

RECOMMENDATION HISTORY - DETAILS

Date	Closing Price (INR)	TP (INR)	Rating	Analyst
07-Nov-23	923	1,070	Buy	Meet Vora
15-Oct-23	884	1,050	Buy	Meet Vora

Source: Company, Emkay Research

RECOMMENDATION HISTORY - TREND



Source: Bloomberg, Company, Emkay Research

NAVIN FLUORINE

RECOMMENDATION HISTORY - DETAILS

Date	Closing Price (INR)	TP (INR)	Rating	Analyst
31-Oct-23	3,438	3,850	Hold	Meet Vora
15-Oct-23	3,692	4,050	Hold	Meet Vora

Source: Company, Emkay Research

RECOMMENDATION HISTORY - TREND



Source: Bloomberg, Company, Emkay Research

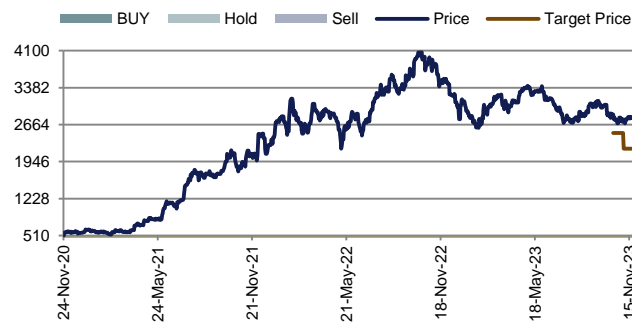
GUJARAT FLUOROCHEMICALS

RECOMMENDATION HISTORY - DETAILS

Date	Closing Price (INR)	TP (INR)	Rating	Analyst
04-Nov-23	2,765	2,200	Sell	Meet Vora
15-Oct-23	2,861	2,500	Sell	Meet Vora

Source: Company, Emkay Research

RECOMMENDATION HISTORY - TREND



Source: Bloomberg, Company, Emkay Research

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