

Impact of Refrigerants: Fact Sheet #1 (V.1.1.)

Real GWP: 20 years vs.100 years

Refrigerant	Type	Composition	GWP 100 years	"Real" GWP 20 years
R404A	HFC	44% R125 / 4% R134a / 52% R143a	4,200	6,600
R22	HCFC	100% R22	1,780	5,310
R407A	HFC	20% R32 / 40% R125 / 50% R134a	2,100	4,500
R410A	HFC	50% R125 / 50% R32	2,100	4,400
R407C	HFC	23% R32 / 25% R125 / 52% R134a	1,700	4,100
R134a	HFC	100% R134a	1,360	3,810
R448A (Solstice N40)	HFC/ HFO	26% R32 / 26% R125 / 21% R134a / 7% R1234ze / 20% R1234yf	1,400	3,100
R449A (Opteon XP40)	HFC/ HFO	24,3% R32 / 24,7% R125 / 25,7% R134a / 25,3% R1234yf	1,400	3,100
R449C (Opteon XP20)	HFC/ HFO	20% R32 / 20% R125 / 29% R134a / 31% R1234yf	1,200	2,900
R32	HFC	100% R32	704	2,530
R452B (Opteon XL55)	HFC/ HFO	67% R32 / 7% R125 / 26% R1234yf	710	2,100
R513A (Opteon XP10)	HFC/ HFO	44% R134a / 56% R1234yf	600	1,700
R454B	HFC/ HFO	68.9% R32 / 31.1% R1234yf	490	1,700
R450A (Solstice N13)	HFC/ HFO	42% R134a / 58% R1234ze	570	1,600
R744	Natural	CO ₂	1	1
R600a	Natural	Isobutane	<1	<1
R290	Natural	Propane	<1	<1
R1270	Natural	Propylene	<1	<1
R717	Natural	NH ₃	0	0
R718	Natural	H ₂ O	0	0
R729	Natural	Air	0	0

Table 1: The "real" impact of refrigerants on the environment over the next 20 years. Source: UNEP¹

Why Measure GWP over 20 Years Instead of 100?

Why is the 100-year global warming potential (GWP) time frame not recommended? Because we do not have another 100 years to achieve our 2050 climate neutrality and net zero targets – we need to make changes now! The policies decided in next decade is crucial for reaching these targets and limiting the damage to the environment. To take the right decisions, policymakers need to be as informed as possible on the real impact of refrigerants – something that is more accurately reflected in the 20-year GWP metric.

Hydrofluorocarbons (HFCs) and new generation refrigerants such as hydrofluoroolefins (HFOs) and HFO blends are marketed as “climate friendly” because they are not ozone-depleting and have seemingly low GWPs. However, when assessing the real lifetime of these refrigerants, their negative impact on health, safety, and the environment raises concern.

Currently, the GWPs. of refrigerants is usually measured over a period of 100 years with reference to CO₂. This means that CO₂ (R744) is the benchmark at a GWP of 1 and everything else is measured in terms of how much more of an impact it makes on global warming. Nevertheless, considering the relative short lifetime of synthetic refrigerants in the atmosphere, a shorter horizon, such as 20 years, would much better reflect the true effects of these gases on the climate.

For instance, promoted as a “low-GWP” solution, R32 has a GWP₁₀₀ of 704¹. However, this gas has an atmospheric life time of only 5.4 years and when its GWP is measured over 20 years instead, it is almost four times higher at 2,530. Presenting GWP₁₀₀ data instead of more accurate GWP₂₀ data is misleading the public as well as policymakers in terms of which refrigerants are in fact truly climate-friendly and sustainable.

For more information, visit atmosphere.cool



¹UNEP. 2019. 2018 Report of the TOC Refrigeration, A/C and Heat Pumps Assessment Report. Kenya, Ozone Secretariat.