ATMOsphere x FGN FUTURE GREEN NOW

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_2O	0	**0**
R729	Natural	Air	0	**0**

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

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 CO_2. This means that CO_2 (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 704[1]. 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

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