

As seen in



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System Efficiency

Is More Important Than GWP

Global warming potential, or GWP, is at the heart of the HVACR industry's "green" conversation. Today's operators know all about the pressures they face to lower GWP to reduce environmental impacts.

But how is the impact of GWP being framed? Lower GWP leads to lower carbon emissions. Across the world, operators are relying on this simple equation to make critical business decisions. If you use a lower GWP refrigerant, you can minimize environmental impact. Is it really that simple?

For many busy operators, the answer is "they hope so." Digging deep into system operations to improve efficiency is daunting. But a straightforward directive like "lower your GWP" is simple. And simple solutions are enticing, especially when they are proven to work. Without a doubt, converting to a lower GWP refrigerant can help a business meet its environmental goals. But importantly, it's not the only way to meet those goals. In fact, it's not even the best way.

First, **stopping leaks is critical**. Refrigerant GWP is only harmful to the environment if it leaks. In other words, if it does not leak, a refrigerant's GWP has no environmental impact whatsoever. What matters more—and it matters regardless of leak rate—is energy consumption. For residential systems, [leaks account for as much as 3%](#) of a system's total environmental impact. Indirect emissions from energy consumption account for 97% or more.

Next, **reducing leaks is closely tied to system efficiency**. A leaky system that contains less than a full charge will run less efficiently. Inefficient systems consume more energy, resulting in increased carbon-equivalent emissions. Put simply, the increased efficiency of a low-leak system goes much farther in reducing carbon impact than merely switching to a lower GWP refrigerant.

Third, **the more a refrigeration system leaks, the more energy it consumes**. For a store with a leaky CO₂ system, the indirect emissions will nullify any environmental benefit of the refrigerant's low GWP. CO₂ transcritical systems rely on high pressure, requiring specialized and complicated controls. This added complexity increases the likelihood of system inefficiencies. Coupled with a high leak rate, supermarket CO₂ systems everywhere are positioned to generate outsized carbon impact. You are better off using a conventional system that is easier to operate and maintain.

Fourth, **proper installation is critical for efficiency**. Poorly installed HVACR systems **lose as much as 40%** of their expected efficiency. The climate impact of this poor installation is **double the impact** of a properly installed system that leaked 100% of its refrigerant—regardless of the refrigerant's GWP.

Finally, **leak rates don't magically improve over time**. Without proper attention, leaks can get worse. Addressing them head on and quickly will reduce direct emissions and, more importantly, reduce indirect emissions by way of increased system efficiency.

There is no question that GWP matters and that the industry should be supporting all efforts to invent and test new, lower GWP solutions. However, GWP is not the only piece of the carbon impact equation. Frankly, it's not even the most important piece. Operators should focus on improving system efficiency, including reducing leaks. The environment, the industry, and your wallet will thank you for it.

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