OPERATIONS MANAGEMENT GUIDE TO

The R-22 Refrigerant Phase Out

Tips and considerations for building owners, managers and facility personnel to implement a budget-minded, efficient and environmentally conscious R-22 phase out.

Evergreen Air Conditioning

Refrigerant is a vital component of any machine that provides cooling from new ultra high efficiency units to legacy chillers. Refrigerant chemicals transfer heat out of your store – cooling customers and employees in the summer and with heat pumps, reversing outdoor heat to indoor air. Refrigerants have been an important component to HVAC equipment and over the years, manufacturers have worked to make these chemicals cleaner and safer for the environment. One of the most significant changes for HVAC professionals, building owners and facility managers is the EPA R-22 phase out.

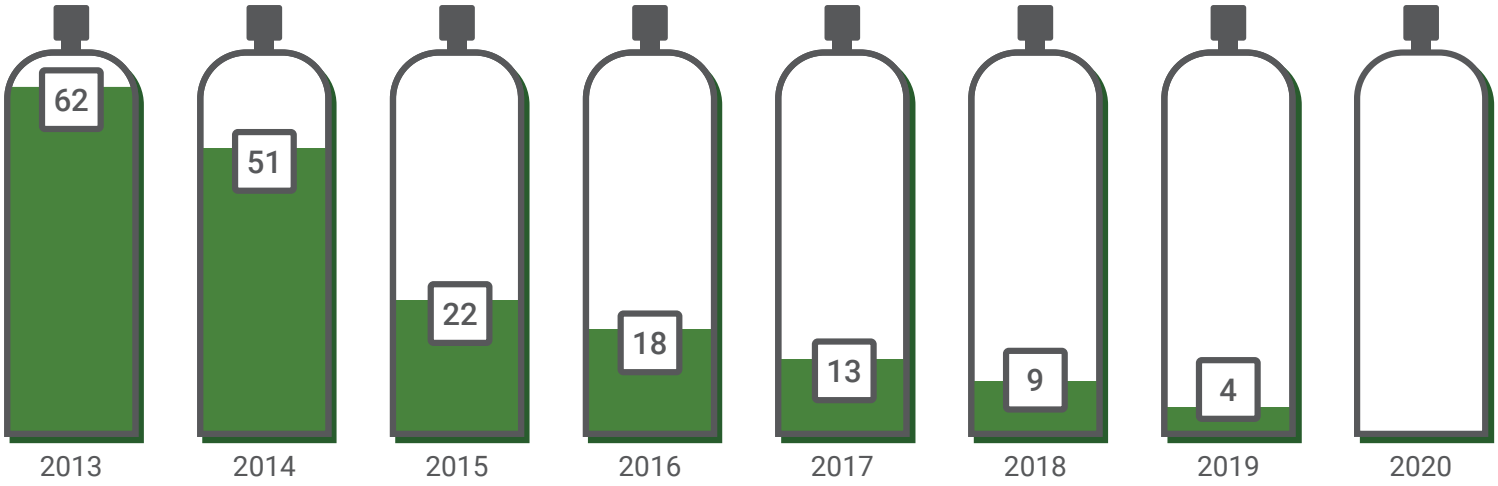
In 1987, researchers concluded that chemical compounds in widely used refrigerants are a major source of destruction to the lower atmosphere of our planet. Research has shown that once these compounds reach the stratosphere, the sun's ultraviolet rays break down the compound and release chlorine. The resulting damage depletes the ozone layer that protects organisms on Earth from harmful UV rays.

The **Environmental Protection Agency** (EPA) raised concerns about R-22 and for more than two decades has worked with manufacturers to eliminate the refrigerant through the use of alternative products or upgraded HVAC systems. The gradual phasing out of R-22 is nearly complete and by 2020, will be virtually impossible to obtain.

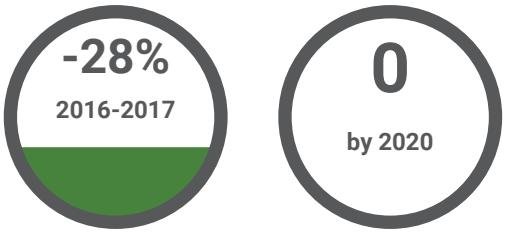
R-22 Phase Out – What You Need To Know:

1. The U.S. EPA has tried to reduce the use of R-22 by imposing strict quotas on its production.
2. Since 2010, the EPA has also banned the sale of new air conditioning units containing R-22 and has encouraged the recycling of the gas from old machines so it will not be released.
3. It is imperative that property owners, managers and facilities personnel work with a knowledgeable HVAC professional to develop a strategy and plan to retrofit, renew or upgrade systems to comply with the R-22 phase out.

EPA Regulated R-22 Consumption Allowances:



R-22 — Millions lbs



Key Points

- 28% reduction in R-22 consumption allowances from 2016 to 2017
- Declining consumption allowances each year
- Zero consumption allowances starting in 2020

Options For Consideration:

Option For Consideration	Application	Important Factors
Retain & Manage Existing Systems	Systems that are not serving critical functions, are in good condition, and / or have a strong lifespan remaining. Reasonable access to R-22 despite production reductions.	• Equipment • Condition of each commercial property • Capacity of commercial properties • Geographic locations • Urgency • Cost of energy • Lease term • Increase in efficiency of new equipment • Decrease in efficiency with drop in refrigerant
Retrofit Existing Systems	Systems where retrofit offers a cost efficient short- term solution, that are in good condition and have strong lifespan remaining.	
Upgrade Systems	Larger and complex systems that are old, in poor condition, and whose function, heat load or occupancy has changed since the original design and installation.	

Key Risks:

Since 2014, it has become increasingly more expensive to acquire R-22 refrigerant due to scarcity and inflated costs. Current prices can depend on a commercial HVAC representative's negotiations with suppliers and quantity available/purchased. Depending on age and status of current HVAC equipment, here are a few key risks that building owners, managers and facilities personnel may face during the R-22 phase out.

- Scarcity of R-22 refrigerant resulting in high maintenance costs when purchase is required
- Impending unavailability of R-22 refrigerant
- Business disruptions due to downtime of failed equipment not able to be repaired and/or re-charged

Important Considerations For Building Owners, Managers and Facilities Personnel:

There are many factors that should be considered when developing a strategy to implement the R-22 phase-out. Developing a strategy with the help of a knowledgeable HVAC facilities management partner will likely produce a more efficient, budget-conscious outcome that will put downtime and long-term savings at the forefront of your plan.

These are the important factors / questions that should be discussed with your HVAC repair and management partner:

- What impact will the transition plan make on business interruptions? For example, does the transition plan put you at risk of occupied space being without air conditioning for an extended period? Consider the time it will take to repair or obtain new air conditioning — leaving spaces temporarily unsuitable for occupancy, or unable to serve their critical functions.
- Have you considered a **life-cycle assessment** and determined the best choices for new equipment?
- Have you allowed enough time for professional engineering design and documentation to be discussed and implemented?
- Have you allowed sufficient time for the procurement process and equipment delivery lead time?
- Have you considered the cost of utilities and rebate incentives? When upgrading the new equipment is almost always more efficient.

Engineering a Streamlined & Efficient System Upgrade:

Retrofitting or “renewing” systems with alternatives to R-22 may be a viable option for some properties. However, there are several reasons why these solutions may not be the best decision. The reasons can vary from the cost or unavailability of alternative refrigerants, cost of energy, to deferred repairs that may cause you to look at replacing the equipment instead of retrofitting.

Changes that could greatly affect your selection of new equipment include:

- Use of data-driven technology to assess heat load and aid lifecycle planning and **energy management**
- Building design changes or modifications such as window film, improved roof insulation as a result of a reroof, and most importantly lighting upgrades (LED retrofit perhaps?) may result in a reduced heat load – permitting the installation of lower capacity systems
- Construction modifications that would require capacity upgrade to ensure a comfortable indoor environment – e.g. rooms added, areas demolished, layout altered, space function alterations, walls added or removed, etc.
- Occupancy volume changes – more or less people in the same space means different loads on HVAC units
- Technological changes in the types of equipment available – some system configurations may change due to advances in equipment design and capabilities
- Changes to building code (think title 24 in California for example)

Next Steps:

1. **Take Action:** The R-22 phase out process does not need to be a painful one. Consider your options and start discussions with HVAC experts who can help you make the best decisions for your facilities. Get started now to put a plan into place that complies with EPA regulations.
2. **Understand Refrigerant Options:** Your choice of refrigerant will likely affect your system's capacity, temperature glide and operating pressures, etc. Work with your HVAC management partner to research options, manufacturers, and more.
3. **Allow Enough Time:** You don't want to feel pressured to make a decision because you did not allow for enough time. Understand the time it takes to transition or upgrade a system. Plan for the time it will take for scheduling, conversions and putting the necessary resources into place.

With the R-22 phase out well underway and the impending extinction date in the near future, it is essential that building owners, managers and facilities personnel take action by working alongside a knowledgeable HVAC repair, maintenance and management professional to ensure a seamless transition.

To learn more about the R-22 phase out and explore options to improve your HVAC efficiencies, contact the experts at Evergreen Air Conditioning.

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