

January 17, 2016,

Mr. Richard Corey  
Executive Officer  
California Air Resources  
1001 I Street  
Sacramento, CA 95814

**Re: UTC Comments on California Air Resources Board Revised Short-Lived  
Climate Pollutant (SLCP) Reduction Strategy**

United Technologies Corporation (UTC) welcomes this opportunity to comment on the Proposed Short-Lived Climate Pollutant Reduction Strategy released in November 2016.

UTC submits comments on behalf of Carrier. Carrier is the founder of the modern HVAC industry and operates across the globe. Our range of products includes unitary residential and commercial products and services, refrigeration products, transport refrigeration products, as well as air and water cooled chillers.

We commend ARB for supporting strong, national and international actions to reduce HFC emissions and your willingness to give the Montreal Protocol amendment a chance to be finalized. This is truly a global problem that will require actions by every country if our efforts to reduce greenhouse gas emissions are to succeed.

While we are supportive of a global phase-down we do not believe that sector specific bans are the right approach to reduce greenhouse gas emissions. An HFC phase-down allows the industry flexibility in how best to reduce the impact of refrigerant emissions while maintaining or increasing energy efficiency to reduce emissions of carbon dioxide (CO<sub>2</sub>) from power plants.

We supported the U.S. Environmental Protection Agency (EPA) when it proposed to extend the provisions of Section 608 of the Clean Air Act (CAA) to hydrofluorocarbons (HFCs). We also supported ARB when it strengthened its regulations on the management of high GWP refrigerants several years ago. At the international level, we embraced efforts to phase down HFCs under the Montreal Protocol. We see the agreement reached in Kigali, Rwanda, last October as a major policy step forward in the global effort to reduce greenhouse gas emissions.

Carrier supports a concerted global effort to avoid significant future growth in greenhouse gas emissions associated with the use of HFCs, but believes the transition must be made in a manner that allows the industry to select the best refrigerants that have the largest impact in overall emissions while maintaining its ability to supply essential air-conditioning and refrigeration equipment to the residents of California.

We support the concept of incentives to help in the transition as outlined in the proposal. In the past this has been effective to help in efficiency changes. We would encourage you to go beyond just a focus on incentives GWP reductions and consider the complete GWP emissions. For example, trying to replace refrigerants in existing equipment reduce some emissions but it may result in capacity and efficiency losses as well as issues with product reliability and safety. A better approach is to develop incentives to replace old equipment with new equipment with lower GWP refrigerants.

We also support the efforts of California in reducing the leaks of existing equipment and more effort in this area can result in further reductions in GWP. This could also include incentives and programs to reclaim and recycle refrigerants.

Last year, we cautioned ARB against the implementation of the HFC provisions contained in the Short Lived Climate Pollutants Reduction Strategy. We noted that federal requirements and international agreements provide the most effective way to reduce emissions of high GWP refrigerants. Our position has not changed. We strongly believe that a uniform federal mandate is more desirable and effective than a state-by-state effort which could lead to inconsistent requirements between regions and added costs of compliance being passed to consumers.

Several years ago, the HVACR industry committed to an orderly transition to lower GWP refrigerants. This commitment is even stronger today. Industry has spent and continue to spend considerable resources researching alternative refrigerants and developing lower GWP technologies. The industry is also committed to the U.S. implementation of the Montreal Protocol amendment on HFCs. Consequently, we urge ARB to consider the points raised below before finalizing its strategy on HFCs.

### **Transitioning to Lower GWP Refrigerants Will Take Time**

Carrier appreciates ARB further evaluation of the GWP limit of 150 for commercial refrigeration equipment and 750 for air conditioning products and their effective dates. As previously noted, industry has been researching alternative refrigerants for several years, and while viable alternatives have been identified, it will take several years before these refrigerants could be safely used in equipment.

Most of the alternative refrigerants being considered are flammable. This presents unique challenges to the industry as products must be completely redesigned to safely use these refrigerants. The use of flammable refrigerants in air conditioning and refrigeration products increases the complexity because it requires the update of

product and equipment room safety standards which then need to be included in state building codes.

Our industry has mobilized to accelerate the update of these safety codes and companies are dedicating personnel and significant funding for research to ensure these standards are updated in a timely manner. Our industry association, AHRI, is leading a research program that will provide risk assessment and mitigation methods to allow these refrigerants to be used safely in air conditioning and refrigeration equipment. ASHRAE, the Department of Energy (DOE) and ARB have joined AHRI in funding this research program.

However, even with this unprecedented effort, these safety standards will not be available for use before 2018 and are unlikely to be included in model building codes before 2021. Given that equipment cannot be redesigned before the completion of safety standards and the time it takes to redesign compliant equipment; manufacturers are unlikely to transition product lines to these alternatives until well after 2021.

**Many of the low GWP alternative refrigerants are not EPA SNAP approved**

Moving to lower GWP alternatives will require the use of refrigerants that are not yet approved under the EPA SNAP program in the air conditioning and refrigeration sectors. Therefore, and until such a time when EPA approves them, they cannot be used by manufacturers. EPA's SNAP approval of these refrigerants hinges on the availability of safety codes and standards that properly address their use. As stated above, these safety codes and standards will not be ready until around 2021 at the earliest.

However, certain alternative refrigerants such as R-448A, R-449A and R-449B have been approved by EPA and can be used in retrofit commercial refrigeration applications. These refrigerants have a lower GWP than R-22 and can help the state of California reduce HFC emissions in the short term.

**Minimum energy efficiency standards effective dates must be taken into consideration to avoid multiple equipment redesign**

The energy efficiency of most air conditioners and commercial refrigeration equipment is currently regulated by the Department of Energy (DOE) and/or the California Energy Commission (CEC). These minimum energy efficiency standards are updated on a regular basis and their effective dates must be taken into account to avoid having to redesign products twice in a short period of time to meet the energy efficiency minimums and to accommodate low GWP refrigerants. For example, federal energy conservation standards for residential central air conditioners and heat pumps are on a 6-year schedule and the next minimum efficiencies will become effective in 2023. However, given that the dates of completion and adoption of safety standards is not expected until 2021 at the earliest, new products using flammable refrigerants are unlikely to be available in meaningful quantities by 2023. Manufacturers are more likely to redesign for flammable refrigerants around 2029 when the next round of

minimum efficiencies will be effective. The same is true for a variety of products including commercial air conditioners and commercial refrigeration equipment.

### **Training gaps pose challenges to the safe adoption of flammable refrigerants**

The majority of technicians servicing air-conditioning and refrigeration equipment in the United States have not been trained to service equipment with flammable refrigerants. Prior to placing equipment with flammable refrigerants, a comprehensive standardized training program must be developed and implemented to ensure technician and operator safety. Additionally, service trucks must be modified and equipped to transport flammable refrigerants and include the necessary tools and equipment to ensure safe charging, recovery, and recycling. Manufacturers can only control the training of their own service technicians, whereas, independent service providers also need to adopt best practices and certify employees.

### **Refrigerant Management**

Carrier believes that refrigerant management including reclamation could be a very effective tool in reducing refrigerant emissions. To that end, the EPA published a final rule last September extending provisions of Section 608 of the Clean Air Act to HFCs. We strongly recommend that ARB assess the potential reduction in HFC emissions in California from the final rule. In addition, AHRI and other industry associations launched the Global Refrigerant Management Initiative (GRMI). This effort will identify and explore opportunities to educate the HVACR industry's global supply chain on ways to improve the management of refrigerants to reduce leak and service emissions, and to promote the re-cycling, recovery, reclaiming, and end of life destruction of refrigerants and foam blowing agents. This initiative, once fully operational in a year or two, will help reduce emissions in California.

### **Summary**

Industry is committed to an orderly transition to lower GWP refrigerants governed by the HFC phasedown schedule agreed to under the Montreal Protocol. When finalizing its strategy, we urge ARB to take into consideration the points raised in the letter which can be summarized as follows:

- The required safety standards will not be ready until 2018-2020
- Model building codes will not be ready until 2021-2024
- Manufacturers require about 5 years to design and launch dramatically new and different air conditioning and refrigeration products. Most of these 5 years must occur after safety standards and building codes are finalized.
- Significant service training is unlikely to be completed until 1-2 years after products are commercially available.

UTC-Carrier appreciates the opportunity to provide these comments. If you have any questions regarding this submission, please do not hesitate to contact me.

Carrier HVAC-Americas  
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Regards,

A handwritten signature in black ink that reads "John J. Gibbons". The signature is fluid and cursive, with the first name "John" being the most prominent.

John J. Gibbons  
Executive Director, Regulatory Affairs  
HVAC Americas  
Carrier Corporation  
UTC Climate, Controls & Security

CC: Mr. Chris Nelson, President, HVAC Americas, UTC-Carrier  
CC: Mr. Matt Thornblad, Director, UTC Government Affairs