ENGINEERING TOMORROW

Danfoss
11655 Crossroads Circle
Baltimore, MD 21220

November 6, 2017

California Air Resources Board
Research Division
1001 I Street
Sacramento, CA
95814

Attn: Glenn Gallagher; Pamela Gupta

Re: CARB proposal for reducing high-global warming potential (GWP) refrigerant emissions from stationary refrigeration and air-conditioning equipment and adopt into state regulations, with appropriate modifications, the U.S. Environmental Protection Agency's (U.S. EPA) Significant New Alternatives Policy (SNAP) Rule provisions as they relate to prohibitions on certain HFCs

Danfoss is pleased to have the opportunity to again comment on the California Air Resources Board's revised proposed Short-Lived Climate Pollutant (SLCP) Reduction regulations.

As a leading manufacturer of controls, compressors, heat exchangers, sensors, valves and variable frequency drives utilized in high efficiency residential and commercial refrigeration and air-conditioning applications, Danfoss has a vital interest in the proposed California regulations. We enable customers who manufacture such equipment to enhance the efficiency and performance of their products while using refrigerants that are not harmful to the environment. Danfoss has sixteen factories and approximately 3500 employees in North America and has over 50 years of experience with these applications. Products with Danfoss components are used extensively in California. We operate in approximately 100 countries with over 25,000 employees

worldwide. This experience provides insight into technologies and best practices from markets around the world.

Danfoss has been a global leader in the transition to low-GWP refrigerants, both natural and fluorinated. In the refrigeration sector, we are a leader in the use of CO_2 refrigeration systems worldwide. We also have experience with propane as a refrigerant for stand-alone refrigeration equipment. We are working to qualify our components for use with a wide variety of low-GWP HFCs, HFOs and natural refrigerants.

Danfoss applauds California's plans to reduce the emissions of high-GWP refrigerants in the state. As a first step, we think it is reasonable to adopt the US EPA SNAP Rules 20 and 21. These rules will create certainty in the California market. Danfoss is prepared to deliver refrigeration and chiller components that use a variety of low-GWP refrigerants.

Beyond SNAP, CARB has proposed a more sweeping set of rules to ban high-GWP equipment and servicing refrigerants. We think that further restrictions beyond SNAP 20 and 21 are warranted, but we have several concerns about the timing of such regulations.

In particular, we think that the proposed 2021 prohibition date for new stationary air-conditioners and chillers (with GWPs over 750 and 150, respectively) is problematic due to several uncertainties. Building codes will need to accommodate A2L's to allow for high pressure refrigerants. These code changes may not be ready in time to inform the necessary equipment redesign, test, certifications and to plan for 2021 market introduction of new equipment. In addition, low and medium pressure A1 solutions have not yet been developed. To ensure technologies are available, CARB should consider separate GWP thresholds for larger and for smaller chillers. We recommend that CARB moves deliberately in these areas, to give time for code changes to be introduced to the model codes and then adopted in California.

Regarding the 2020 restrictions on the import and sales of high-GWP refrigerants of 2500 or more, we think that a comprehensive strategy to reduce leakage rates and encourage reclaim and recycling needs to be included in CARB's analyses.

Regarding the 2024 restrictions on import and sales of high-GWP refrigerants of 1500 or more, this will, for example, eliminate the servicing of R410A systems that were installed

as recently as three years previous. It is doubtful that drop-in refrigerants to replace R410A will be available.

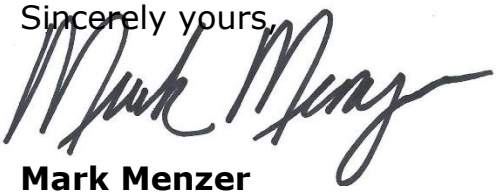
Without a massive effort, there will a lack of trained installation and service personal to work with systems using A2L and A3 refrigerants. California should act now to work with tech schools to develop curricula that address the systems and refrigerants that California is envisioning for installation only about 37 months from now.

We are, of course, concerned about a patchwork of different refrigerant phasedown dates among the states. We urge California to work with its partners in the US Climate Alliance to encourage them to adopt uniform regulations in those states where they might choose to regulate refrigerant emissions.

Finally, we again encourage California to provide financial incentives, perhaps under the cap and trade program, to early adopters of low-GWP equipment. Danfoss has been successful in bringing these technologies to Europe and elsewhere, but until the market for these technologies in California matures, they are likely to have a price premium. Incentives could help speed the penetration of low GWP technologies faster than they would on their own.

Thank you for considering our comments. We would appreciate the opportunity to meet with CARB to discuss these comments and the opportunities we see for California's HVACR users.

Sincerely yours,



Mark Menzer

Director of Public Affairs

markmenzer@danfoss.com

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