

Danfoss

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January 17, 2017

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

Dear Mr. Corey,

Danfoss is pleased to have the opportunity to comment on the California Air Resources Board's revised proposed Short-Lived Climate Pollutant (SLCP) Reduction Strategy as issued in November 2016.

As a leading manufacturer of controls, compressors, heat exchangers, sensors, valves and variable frequency drives utilized in high efficiency commercial refrigeration and air-conditioning applications, Danfoss has a vital interest in this strategy. 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 twelve facilities and approximately 3000 employees in North America and has over 50 years of experience with these applications. 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 CO₂ 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 ambitious plans to reduce the emissions of high GWP refrigerant in the state. We believe that the November 2016 report is an improvement on the previous draft of April 2016.

California can become a model for the successful phasedown of HFCs and other high-GWP refrigerants. However, to do so in a cost-effective fashion for the people of California will require

the State to be harmonized with global and national phasedown schedules. Otherwise, equipment manufacturers will have to supply California-only models, at great additional expense to California end-users.

We will limit our comments to the Recommended Actions detailed in the report:

Incentive programs - Incentivizing users to move away from their older, less efficient, more leak-prone, high-GWP systems is the most effective way of reducing HFC emissions in the short term. Relying only on normal market forces to retire old equipment means that high-GWP refrigerants will continue to be used for at least 15 years and in many cases much longer. However, the \$5 million that we understand California is intending for these incentives will be insufficient to have much benefit. We estimate that the difference in up-front costs between a CO₂-based system and an HFC system for a 40,000 square foot supermarket can be as high as \$150,000. Providing incentives to make up for the cost premium for even only a quarter of California's 3,753 reported supermarkets (Nielsen, "Supermarket Locations by State," 2015) would require \$140 million. We suggest that at least \$30 million is needed to prime this market, increase the familiarity of designers, installers and users with CO₂ systems and to bring the cost of these installations to parity with today's systems.

Regarding a Phasedown in Supply of HFC's we agree that a California-specific HFC phasedown should not be necessary. We strongly advise California to be consistent with the federal phasedown schedule, assuming that the schedule agreed to in the Kigali amendment continues to be honored by the EPA.

We agree that the Prohibition on the Sale of New Refrigerants with Very- high GWP's is a prudent measure and can yield some excellent short-term results.

With regard to High-GWP Refrigerant Prohibitions in New Stationary Systems, again we ask California to follow the federal phasedown date.

In addition, we are pleased to note that CARB has recognized the importance of equipment efficiency in reducing the emissions of greenhouse gases. Even with California's renewable energy portfolio, indirect emissions of CO₂ due to electric generation still dwarf the contribution of leaked refrigerants. We hope that California will consider the time it will take to develop efficient equipment using new refrigerants before banning current refrigerants.

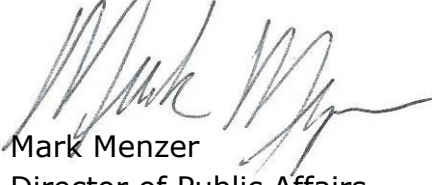
Finally, we cannot over-emphasize the need for safety standards and codes to be available before the mandate of low GWP, high efficiency equipment which are likely to use flammable refrigerants in many cases. The research on flammable refrigerants, supported by CARB and which has only recently begun, may uncover issues with the installation of flammables that

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could still need to be addressed. Building codes that address the safety of flammable refrigerants are not likely to be in place for several years: 2021 or very likely later. We urge California to consider this before instituting mandates.

Thank you for considering our comments as California moves to approve its SLCP Reduction Strategy.

Sincerely yours,

A handwritten signature in dark ink, appearing to read 'Mark Menzer', with a long horizontal flourish extending to the right.

Mark Menzer
Director of Public Affairs