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Comment Received From: Amy Chiang Submitted On: 1/11/2018 Docket Number: 16-EPIC-01

Comments from Honeywell International Inc

Additional submitted attachment is included below.



Fluorine Products 115 Tabor Rd Morris Plains, NJ 07950 www.honeywell.com

January 11, 2018

Mr. Bradley Meister California Energy Commission 1516 Ninth Street Sacramento, CA 95814

Via online submission to the 16-EPIC-01 EPIC Ideas Exchange Docket

Re: Comments from Honeywell International Inc. in Response to the Heating, Ventilation, and Air Conditioning (HVAC) Research & Development Workshop Held on December 21, 2017

Dear Mr. Meister,

Honeywell International Inc. (Honeywell) provides these comments in response to the California Energy Commission's (CEC) December 21, 2017 Heating, Ventilation, and Air Conditioning (HVAC) Research & Development Workshop. We appreciate the opportunity to provide additional input into CEC's consideration of future research needs related to next generation HVAC equipment.

Honeywell is a global leader in providing energy efficient technologies and innovations that can help the world solve its energy and environmental challenges. Our Fluorine Products business is a recognized leading innovator in the development of environmentally preferable fluorocarbons for use as refrigerants, foam blowing agents, solvents, propellants, and other uses. Since the 1990s, we have helped businesses replace ozone-depleting substances in these applications with alternatives that are more energy efficient and have less impact on the stratospheric ozone layer and global climate change.

The December 21 workshop contained a significant amount of discussion on the possibility of wider adoption of heat pump technology. Honeywell supports broader use of heat pumps where appropriate, as an efficient and potentially lower-carbon alternative¹ to natural gas furnaces and other heating options.

We appreciate CEC's interest in ways to reduce greenhouse gas emissions from HVAC equipment caused by the use of high-global-warming-potential (GWP) refrigerants. Leakage of refrigerants in stationary air-conditioning equipment accounts for a significant portion of hydrofluorocarbon (HFC) emissions—24% of total HFC emissions in California in 2013, as noted in the workshop.

¹ The carbon emissions associated with heat pump use will vary based on the source of electricity generation powering the equipment. California's ambitious renewable energy policies improve the environmental benefits of potential increased heat pump adoption.

Honeywell strongly supports technology-neutral incentives that can help equipment manufacturers and users transition away from high-GWP refrigerants. Honeywell has developed and continues to develop a range of efficient reduced-GWP options and is willing to support additional research and development projects in this area.

Today there are low-GWP options commercially available for stationary refrigeration and air-conditioning applications, but many of the alternatives present significant safety considerations or efficiency or cost issues.

As shown in the table below, Honeywell has developed, and continues to develop, a number of solutions for HVAC (and refrigeration) equipment that improve energy efficiency, are lower-GWP, and are non-flammable.

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Application/End- Use	Refrigerant currently used	Honeywell Solutions ¹
Chiller – Low Pressure	R-123 (GWP = 77)	Solstice [®] zd (R-1233zd) - GWP = 1
Chiller – Medium Pressure	R-134a (GWP = 1430)	Solstice ze ² (R-1234ze) - GWP < 1 Solstice N13 (R-450A) - GWP = 604 Solstice 515A (R-515A) - GWP = 392
Chiller – High Pressure	R-410A (GWP=2088)	New non-flammable blend ³ with GWP < 750
Residential A/C - Unitary	R-410A (GWP=2088)	New non-flammable blend with GWP < 750
VRF	R-410A (GWP=2088)	New non-flammable blend with GWP < 750
Supermarket Refrigeration	R-404A (GWP=3922)	Solstice N40 (R-448A) – GWP 1387 R-407F – GWP 1824

¹Solution selected based on system design and current refrigerant used; other refrigerant blends also available to meet specific customer needs

²A2L solution

²Product under development

Thank you for the opportunity to provide additional comment. Please do not hesistate to contact Amy Chiang at amy.chiang@honeywell.com for more information.

Sincerely,

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Chris LaPietra **Global Business Director** Stationary Refrigerants Honeywell International Inc.