Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning, and Other End-Uses.

Application for a Variance from the requirements of California Code of Regulations, Title 17, sections 95374 and 95375.

NOTE: This application contains "trade secret" information within the meaning of 17 CCR §7924.510(f)

Note: the requirements for a variance application are listed in California Code of Regulations, Title 17, section 95378, Use of this application template is optional.

A. Name of applicant: Vertiv

Ownership status (e.g., parent, subsidiary): Parent

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B. Please describe your business activity or product description.

Vertiv was launched as a stand-alone business in 2016, focused on designing, building and servicing mission-critical technologies. Among our product lines are Liebert® power and thermal management equipment for Information Technology ("IT"). Liebert started manufacturing computer room air conditioning ("CRAC") units in 1965 to cool early, room-sized mainframe computers. From this beginning, we have developed a full range of thermal management systems and related equipment for IT systems. Our products are specifically designed for precision cooling in IT environments and include room cooling, in-row cooling, rack cooling, evaporative free cooling, free cooling chillers and thermal control and monitoring. Vertiv produces CRAC and air conditioning equipment utilized in data centers and Information Technology Equipment Facilities ("ITEF"), ranging in size from a computer closet that calls for one ton of cooling, to large hyperscale data centers requiring hundreds of tons of cooling.

C. Please describe your relationship to the product.

Vertiv is a manufacturer of CRAC, data center and ITEF cooling equipment.

D. List the specific section(s) of the regulation from which a variance is being requested.

We believe it is possible that CRAC, data center and ITEF cooling equipment manufactured by Vertiv could be considered by the California Air Resources Board ("CARB") to fall within the Final Regulation Order amending title 17, Division 3, Chapter 1, Subchapter 10 Climate Change, Article 4 on the basis of amendments made to those provisions in late 2021. Specifically, CARB amended the §95373 definition of "Air-Conditioning (AC) Equipment to include "computer room and data center cooling." In addition, amendments to §95374(c) regarding "Other air-conditioning (new) equipment, residential and non-residential" provide for an effective date of January 1, 2025 for a prohibition on refrigerants with a global warming potential ("GWP") of 750 in the described end use. To the extent that CRAC, data center and ITEF equipment manufactured by Vertiv are considered by CARB to fall within the above-described prohibition in 17 CCR § 95374(c), Table 3 for "Other air conditioning (new) equipment," Vertiv seeks a variance from the prohibition on refrigerants with a GWP of 750 or greater for certain models of such equipment, as specified in more detail below.

E. Provide an explanation and description of the reasons for seeking a variance.

(1) *Part and components to accommodate sub-750 GWP refrigerants were not first made available in our highly specialized product categories for CRAC, data center and ITEF*.

Vertiv relies on multiple equipment manufacturers to supply components of our CRAC, data center and ITEF systems. But these same manufacturers also supplied other end users who were also in the process of addressing new state limitations on HFCs (some similar to those imposed in California) as well as new American Innovation and Manufacturing Act (AIM Act) requirements promulgated in the Technology Transitions Rule which affect multiple "end uses" of HFCs. 88 Fed. Reg. 73,098 (Oct. 24, 2023).

Although CRAC, data centers and ITEF are an important component of our nation's economic, health care and public safety systems, such systems are in the aggregate a relatively small part of the overall business of large component manufacturers. ITEF equipment accounts for less than 4 percent of new refrigerant charge in air conditioning systems nationwide. Given this relatively small market share for major component suppliers, there were substantial delays in developing a full suite of low-GWP components optimized for use within CRAC, data center and ITEF equipment end uses. Following multiple actions by EPA, California and other states to address HFCs under various authorities within a relatively short time frame, component suppliers tended to prioritize investment in the redesign of product for their largest customers and markets. And while we have worked closely with our suppliers, necessary low-GWP components for CRAC, data centers and ITEF facilities were not made available to Vertiv for its full product line in quick order.

It is important to understand that CRAC, data center and ITEF units are subject to extreme demands in terms of performance and reliability given that this equipment must support near

continuous 24/7/365 operations. Only very limited downtime is allowed for CRAC, data center and ITEF. The allowable amount of "downtime" in these end uses ranges from a low of [redacted] Systems supplied by Vertiv for these end uses must be able to support such demanding performance standards.

Vertiv must receive CSA Group or UL third party certification to ensure that every piece of our equipment meets applicable safety standards (i.e., UL-60335-2-40). But while the recent Annex to this standard has been printed, it has not been fully incorporated into the required certification process. Our component suppliers must also address their own safety standards, for example, UL 60335-2-34 for affecting motor-compressors. Other components, such as safety shut off valves and refrigerant leak detection systems, are also subject to standards. This process, at a fundamental level, takes time and it is not something that Vertiv as a company has ever had the authority or ability to control.

At bottom, Vertiv must be able to ensure that any and all HFC substitutes, when used in CRAC, data center and ITEF equipment provide for practical, energy-efficient, and safe deployment in the field. These unique demands meant that the phaseout date of January 1, 2025 contained in 17 CCR §95374(c) Table 3 for other air-conditioning (new) equipment was impossible to meet. In order to allow for sufficient time to transition to new, low-GWP refrigerants, a variance that allows for manufacture of CRAC, data center and ITEF equipment (specifically the MM/MT, CR and DM Models) is needed until January 1, 2027. Such a variance, while limited to certain models, would align CARB standards with the deadlines incorporated in EPA's Technology Transitions rule for this subsector. 88 Fed. Reg. 73,098, 73,147-49 (Oct. 24, 2023); 40 C.F.R. § 84.54(a)(11).

Vertiv would note that EPA finalized a compliance date of January 1, 2027 "consistent with a review of the subfactors in subsection (i)(4)(B) [of the AIM Act]." 88 Fed. Reg. at 73,149. These subfactors take into account "technological achievability, commercial demands . . . safety, consumer costs, building codes, appliance efficiency standards, contractor training costs, and other relevant factors." 42 U.S.C. § 7675(i)(4)(B). We believe this comprehensive review, by the expert federal agency in this area, supports our request for a variance of the same length.

(2) *Sufficient time is needed to allow for the development and adoption of codes allowing the use of A2L refrigerants in CRAC, data center and ITEF equipment.*

The second issue occurs with respect to the development and adoption of codes allowing the use of A2L refrigerants. CRAC, data center and ITEF equipment need to be located based on multiple factors that are not or may not be aligned with the rate of adoption of state and local building codes. Applicable standards and codes for A2L refrigerants that can be used in Vertiv's equipment have not yet been widely adopted and/or implemented so as to allow for the safe use of flammable refrigerants.

The UL 60335-2-40 4th Edition product safety standard addresses the use of flammable A2L refrigerants within ITEF and the ASHRAE 15-2022 safety standard now includes Addendum t addressing regulations/requirements for ITEF cooling appliances or data centers installations and system designs. The International Code Council (ICC) has 3-year cycles for incorporating new code changes and the next opportunity for such changes to be adopted will not be until the next code cycle in 2027. Then, following any addition of data center requirements, each state takes time to adopt such code changes.

Therefore, between now and 2027, there is substantial ambiguity with respect to applicable building codes in order to be certain of the safety provisions that will be required to design a data center or ITEF utilizing low-GWP A2L refrigerants. Based on projected code adoption as of submission of this application, the earliest date on which it would be feasible to impose lower GWP limits for all CRAC, data center and ITEF equipment would occur at the end of 2026.

Based on past experience with the state code adoption process nationwide and best industry practices, CARB should not impose GWP limitations on CRAC, data centers and ITEF prior to January 1, 2027. Specifically, the UL 60335-2-40 3rd edition did not allow sufficient charge amounts to allow for the cooling of the high heat loads found in data centers and ITEF. It was not until the UL 60335-2-40 4th edition, which was only just published on December 15, 2022, that ITE cooling applications were addressed separately from other application sectors due to the unique challenges of this application, so the industry has not had time to digest the content of this standard and effectively start implementing these requirements into new designs including newly-invented components paired with the overall system design requirements published on May 31, 2024 contained within Addendum t in ASHRAE 15-2022.

In finalizing a January 1, 2027 manufacturing and importation prohibition for CRAC, data centers and ITEF using refrigerants with a GWP greater than 700 (40 C.F.R. § 84.54(a)(11), EPA recognized both the impact of code updates on product availability but also their effect on other regulatory requirements:

> In particular, the updates to safety standard UL 60335-2-40, allowing sufficiently large charge sizes of A2L refrigerants to be use in [CRAC, data center and ITEF] equipment, were only published in December 2022. Thus, the regulatory evaluations under [the Significant New Alternatives Program], equipment redesign and testing, and updates to building codes that typically follow updates to UL safety standards are all in somewhat early stages. The additional time for compliance provided for this rulemaking [i.e., the January 1, 2027 prohibition on manufacturing and importing CRAC, data center and ITEF equipment using refrigerants with a GWP in excess of 700] will enable updates to the UL standard, and future harmonizing updates to ASHRAE-

15-2022, to be incorporated in these areas, increasing the number of available substitutes for use in this subsector by January 1, 2027. 88 Fed. Reg. at 73,149.

Given the relatively recent nature of these changes to code and regulatory requirements related to refrigerants utilized in CRAC, data center and ITEF applications, there is not sufficient time under CARB's existing rules within §95374(c) Table 3 for manufacturers to develop adequate and safe products, rendering compliance with 17 CCR § 95374(c), Table 3 (if applicable) impossible. As per above, the earliest feasible time for compliance with the 750 GWP requirement for CRAC, data center and ITEF facilities that may be considered to constitute "Other air conditioning (new) equipment, residential and non-residential" is January 1, 2027.[1]

F. Identify what type of variance is being requested:

☒ Impossibility (the Applicant exercised best efforts but still was unable to comply with the regulatory requirements of the regulation for reasons beyond his or her control despite exercising foresight to prevent the noncompliance.)

☐ Force Majeure Event (a sudden and unforeseeable event involving a clear danger, demanding action to prevent or mitigate the loss of, or damage to, life, health, property, or essential public services, arising from causes beyond the control of the Applicant, which delays or prevents the performance of any obligation under the regulation, despite the Applicant's best efforts to fulfill the obligation. This includes events where the local government, State of California, or federal government issues a declaration of emergency, such as war, wildfires, floods, hurricanes, tornadoes, earthquakes, volcanic eruptions, and pandemics. This does not include negligent acts or the Applicant's financial inability to perform that is unrelated to an event as defined in this section.)

☐ Both Impossibility and Force Majeure Event

G. If seeking an Impossibility variance please provide clear and convincing evidence demonstrating how all of the following Impossibility variance criteria have been met:

1. A lower risk substitute is not currently or potentially available.

We are currently working on incorporating refrigerants below 750 GWP into our product line, with the anticipation that it will be necessary to design systems [redacted],

[1] As noted above, while Vertiv believes that CARB regulations do not allow sufficient time allowed for compliance with CRAC, data center and ITEF facilities, it is requesting a variance limited to specific model lines: MM/MT, CR and DM Models.

i.e., to accommodate differences as between [redacted]. As noted in Appendices 1 and 2, these developmental projects are not yet completed. But even after the projects are completed (with the support of our components suppliers, *e.g.*, for compressors) completed prototype systems must still be certified by CSA and UL third-party certifying companies. And we project that it will take until January 1, 2027 for full testing/prototyping, obtaining required approvals, setting up and validating product production, and undertaking quality assurance/quality control efforts for Vertiv's [redacted].

In general, [redacted] are potentially available for our CRAC, data center and ITEF equipment: [redacted] "drop in" substitute. Given the physical and chemical characteristics of [redacted], as noted below in answer to question 3, use of [redacted] refrigerant requires a comprehensive redesign of our equipment to address differences in these characteristics as well as to achieve comparable efficiency standards to existing equipment. As between incumbent refrigerants that are used and alternatives, there are differences in molar mass, critical pressure, liquid density and vapor density that must be addressed.

[redacted] refrigerants are also classified as [redacted] in terms of toxicity and flammability. With regard to the latter, use of flammable refrigerants increases the complexity of components needed and requires additional approvals. Additional sensors may also be required to detect any leakages and additional technician training is needed. All of these requirements cannot be addressed within the time period allowed under 17 CCR § 95374(c).

Altogether two main factors – the need for major equipment redesign and testing and the need to [redacted] both with regard to design issues and adoption of update code requirements made it impossible for all equipment that Vertiv manufacturers in the CRAC, data center and ITEF end use to meet the January 1, 2025 prohibition in 17 CCR §95374 (c), Table 3.

2. An exemption will not increase the overall risk to human health or the environment.

Refrigerants utilized in CRAC, data center and ITEF facilities are already subject to 40 C.F.R. Part 82, Subpart F requirements and prohibitions including those requiring safe disposal, proper evacuation of refrigerants, appliance maintenance and leak repair and related certifications. Thus, we would expect minimal emissions during the time that Vertiv equipment is in use and that any difference in GWP as between existing refrigerants and below 750 GWP refrigerants would also be minimal. As opposed to other variances granted by CARB where certain leakage and end of life emissions of equipment subject to the variance may have been presumed, Vertiv does not project a significant increase in carbon dioxide equivalent emissions if CARB approves this variance as submitted.

Data center and ITEF environments are also not publicly-available spaces and have high security. Thus, we do not anticipate any direct exposure to the public in confined spaces from the refrigerants we currently utilize. With regard to the new alternative refrigerants that would be used on or after January 1, 2027, we anticipate that time will be needed to train personnel with regard to any new safety standards surrounding charge sizes, refrigerant monitoring and ventilation strategies but would not anticipate any increase in the overall risk to human health and the environment.

3. The Applicant has used best efforts to anticipate and address the impossibility and any potential noncompliance.

CARB first adopted regulations regarding prohibitions on HFC in refrigeration and foam end-uses at the end of 2018 after regulations promulgated by the U.S. Environmental Protection Agency were remanded based on the court's interpretation of its legal authority to control same.[2] This regulation did not address computer rooms, data centers and/or ITEF as part of the commercial and residential air conditioning sector.[3] Rather, CARB's regulations were directed at retail food refrigeration equipment, vending machines and foams.[4]

CARB subsequently engaged in additional rulemaking to address other end uses of HFCs, apart from those regulated under its 2018 regulations. During 2021, CARB released two versions of modified regulatory text for which comments were accepted through August 18, 2021.[5] During this time, CARB received numerous comments which both supported and opposed various aspects of its modified regulatory text. CARB formally adopted regulations to address Stationary Air-conditioning in 2022; the final order included a definition of "air-conditioning" which is the subject of this variance request.[6]

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[2] Final Regulation Order, Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration and Foam End Uses, Dec. 27, 2018. It should be noted that these regulations adopted the specific EPA Significant New Alternative Program (SNAP) provisions that were the subject of litigation. *Mexichem Fluor, Inc. v. EPA*, 866 F. 3d 451 (D.C. Cir. 2017).

[3] CARB also determined that the regulation did not conflict with relevant codes and standards. Final Statement of Reasons for Rulemaking, Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration and Foam End Use, Dec. 27, 2018 at 29.

[4] 17 CCR 95374, Table 1 (as codified through Final Regulation Order, December 27, 2018).

[5] Second Notice of Public Availability of Modified Text and Availability of Additional Documents and Information 9Second 15-Day Notice), August 3, 2021.

[6] Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning, Other End Uses, January 1, 2022.

Like many other manufacturers, Vertiv followed the course of CARB's rulemaking, but internal planning for compliance was not possible in a meaningful manner until new rules were formally adopted by the Board. Thus, in January 2022, literally within days of the publication of final standards, Vertiv began planning for how it might be able to incorporate lower GWP limits within the range of different products it manufactures that could be affected by the new regulations. Vertiv continued these efforts throughout 2023 and 2024 but to date has been unable, due to circumstances outside of its control, to address the compliance deadlines contained in CARB regulations, [redacted] More detailed information regarding this timeline, the specific equipment affected and other circumstances affecting the ability to incorporate lower GWP refrigerants in individual equipment models is provided below.

Need to Redesign, Test and Produce Multiple Products Relying on Vendors and Supply Chain

Following CARB's adoption of final regulations affecting "computer room and data center cooling" Vertiv undertook a process to identify feasible paths for compliance with new restrictions on the GWP of refrigerants used in its equipment. On January 11, 2022, Vertiv reached out to its VCM chip supplier regarding the possibility of adding [redacted], that is, to update chip in order to be able to support the use of low GWP refrigerants. *See* Appendix 3. This contact resulted in back-and-forth correspondence regarding the type of work (hardware and/or software) that would be needed to be performed. Initial samples were sent to Vertiv in September 2022, but additional work proved necessary and additional refrigerants [redacted] were added; verification of the work to update [redacted] took until March, 2023.

In July and August of 2022, Vertiv initiated projects related to [redacted] and [redacted]) to utilized lower GWP refrigerants, but encountered problems from raw material delays and thus developmental work for these projects continued in 2024 and into early 2025. *See* Appendix 1. In addition, with regard to the [redacted], a change of manufacturing location was necessary, pushing back the launch date until mid-2025. In the case of [redacted], the product needed to be re-designed to match a new manufacturing facility. These conditions changed the design start dates for the [redacted] to August 2023. Following the completion of designs for both systems, target dates for initial production became July 2025 and October 2026. A list of causes for the delays is contained in Appendix 2, but in general, CARB should appreciate that each system relies not only on Vertiv's design and production teams, but also the availability of

similar teams from our suppliers, who may be subject to competing demands from other manufacturers.

Vertiv also needed to address issues related to the use of [redacted] across its product lines. In one instance, Vertiv initiated projects for [redacted] equipment in November 2022, but encountered issues related to [redacted]. These issues consequently pushed back the dates with regard to equipment ordering and production. For [redacted] equipment, delays were encountered with the testing laboratory for the equipment, with respect to copper tube shortages, and additionally with the need to address an incorrect circuit of coil. Consequently, for this equipment, pre-production build was not available until the fall of 2025, meaning that strain gauge testing cannot occur until July 2026.

The supply of necessary components for our redesigned equipment has also been a constant issue. For example, new safety shutoff valves became necessary for the utilization of A2L refrigerants. This, in turn, required approval by UL and compliance with several requirements, including that the safety valve default to closure in the event of a power outage. Dialogue as between Vertiv and the valve supplier continued for over a year (January 2024 to February 2025) with regard to what valves could be utilized and what additional testing would be required for UL approval resulting in a delay of the launch of this product. *See* Appendix 4.

As explained in other parts of this application, even after adequate testing can be completed regarding the utilization of new refrigerants, there is also time required for scaling up from a pre-production build to full production runs as well as additional time imbedded in the need to ship new equipment to distributors and end-users. Altogether, the difficulty of planning compliance across multiple product lines, the need to address deadlines for multiple vendors, some unavailability of equipment, the need to test and verify testing results, set-up and engage in pre-production runs across our complete product line[7] pushed back and made compliance for [redacted] impossible until the end of 2026.[8] The combination of individual issues with the supply of parts, the engineering, testing and related certification for compliance with UL codes and the internal allocation of resources for this development and manufacturing work make January 1, 2027 the earliest feasible timeframe for compliance.

Impact of Safety Codes

[7] *See* Appendix 6 for list of products implicated and Vertiv's nomenclature for these product types.

[8] As shown in Appendix 5 calculations, more progress has been made with regard to the DA, DS/VS and PX models.

Vertiv, like other manufacturers, must comply with safety codes for its equipment to ensure protection of the public. In this regard, it must be noted that historically, ITEF was "covered" under safety and energy efficiency standards related to comfort cooling. But given the evolution of ITEF equipment (to handle high heat loads, to utilize higher refrigerant charges and to handle much higher airflows when compared with comfort cooling) new safety standards were developed. These standards were not formally published and approved until December 15, 2022. The new standards (UL 60335-2-40 edition 4) defined ITEF as a unique cooling application with specific safety requirements. In doing so, UL included the following explanation:

> The updated requirements are mandatory for all new certifications of these products by UL Solutions, effective Jan. 1, 2025. Because the previous Standard for these products, UL 1995, the Standard for Heating and Cooling Equipment, does not address refrigerants other than class A1, UL 1995 is no longer being maintained and will not be used for new certifications after Jan. 1, 2025. Products certified to UL 1995 before this date may be allowed to have continuing certification until Jan. 1, 2028.[9]

While Vertiv closely followed the development of new UL standards, Vertiv needed to be reasonably assured of the final content of new standards in order to make investments to build equipment that would comply with such standards. This external factor additionally impacted the timeline under which Vertiv could move to pre-production and full production of equipment utilizing lower-GWP refrigerants.

As one example of the nexus between product development and UL codes, new safety shutoff valves became necessary for the utilization of A2L refrigerants. This, in turn, required approval by UL and compliance with several requirements, including that the safety valve default to closure in the event of a power outage. Thus, *after* the safety codes were finalized in December 2022, new components that were certified to comply with such standards were necessary. We have documented a continuing dialogue as between Vertiv and a [redacted] for new A2L-compliance valves. *See* Appendix 4. We would note that this back-and-forth between Veritiv and its component supplier continued for over a year (from January 2024 to February 2025) with regard to what valves could be utilized and what additional testing would be required for UL approval resulting in a delay of the launch of this product. This is an example of "real world" issues encountered by Vertiv in attempting to reconfigure its product lines to comply with new low-GWP standards implicating the use of A2L refrigerants.

[9] *See*: *Updated Requirements for Refrigerant Detection Systems | UL Solutions*

Current Efforts

Vertiv has been working across its product line to develop and test products that will be able to utilize refrigerants with GWP below 700. The chart included with this application in Appendix 1 lists 9 product categories in the computer room, data center and ITEF sector (by product line and project name) and the current status of our efforts to complete performance and other testing. We also list causes of delay and key remaining activities. As is evident from the different stages represented in the chart, the challenges for completing the redesign, manufacture, testing and verification varies depending on the product involved.

It must be emphasized that the steps identified in the charts provided in Appendices 1 and 2 are specific to "first article" units, the units that are developed and "bespoke" manufactured ***before*** production units are made for sale to the public. The activities are performed on such units in order to get all required safety certifications. After these certifications, long-term strain gauge testing is performed to ensure that vibrations of a unit in full operation over its useful life are acceptable, *e.g.*, that a unit has the best piping assembly for production units. Thus, the first chart in Appendix 1 does not represent a situation where production starts immediately, only a situation where a first article unit has been completed and tested such that production of commercial units is possible. The second chart in Appendix 2 provides more granular information regarding when projects were started, our current target production dates and remaining work that we project needs to be completed, along with associated dates. But again, the target production dates in Appendix 2 should be understood to be "first article" estimated dates and do not represent dates for scale up and commercial production of such units.

It also must be emphasized that because we produce multiple products for the CRAC, data center and ITEF sector, we have limited resources, *e.g*, engineering personnel, laboratories, test bays, testing/measuring equipment. This means, at a practical level, that we are constantly moving around pre-production schedules for individual units based on available resources. We must also allocate these same resources to the development of future technologies. These competing demands mean that our estimate to move products from initial conception, to first article units, to production units, to scaled-up production supported by multiple vendors across our product line is approximately 2 years even while it could be theoretically possible for a single product to move through all the pre-production steps in as little as 6 months time. Vertiv prioritized the development of certain product lines over others resulting in the reintroduction of compliant products into California in a staggered manner and the final release of the [redacted] impossible until the end of 2026. As a

general matter and in our experience, "theory" many times does not meet the reality of fully testing new products and thereafter fine-tuning and operating our manufacturing equipment.

Finally, the charts provided in Appendices 1 and 2 do not account for vendor-specific issues which can arise with regard to each product (*e.g.*, delays or backlogs at third party suppliers) or the effect of broader supply chain disruptions. Therefore again, when we look at the production impacts across our entire product line, but "zero in" on the [redacted] addressed in this variance application, we believe that 1 1/4 years represents our best, good faith estimate of when all of our CRAC, data center and ITEF products can be fully redesigned to accommodate sub-700 GWP refrigerants. Meanwhile, Vertiv has stopped shipment of all high GWP products into California and will start shipment of low GWP products, in staggered releases, as they have been successfully converted to low GWP refrigerants, complete testing, and are finalized for sale.

H. If seeking a Force Majeure Event variance please provide clear and convincing evidence demonstrating how all of the following Force Majeure variance criteria has been met:

1. Non-compliance is due to a Force Majeure event.

2. The Applicant has used best efforts to anticipate and address any force majeure event and any potential noncompliance, including minimizing any adverse effects of the greenhouse gas emissions related to noncompliance.

I. Please attach supporting documentation for attributing noncompliance to Impossibility or a Force Majeure Event. Supporting documentation must be written in English. Please list the supporting documentation that is attached to this application.

See Appendices 1, 2, 3 and 4.

J. Provide a description of all efforts made to timely fulfill the requirements of the section(s) from which a variance is being requested.

See our answer to question G.3. above and Appendices 1, 2, 3 and 4. Vertiv has been actively developing products for 9 different categories that will utilize refrigerants with a GWP below 750. This has required not only a substantial monetary investment, but also the devotion of substantial staff resources, including in management and supervision, procurement of parts from numerous vendors, and investments in engineering and manufacturing capabilities.

K. Please provide the length of the variance requested as well as the earliest date when compliance will be achieved.

This request is for an extension of any applicable January 1, 2025 compliance date to allow for sale of Vertiv [redacted] through December 31, 2026. Because development efforts are still being undertaken in order to comply with CARB standards across all of our product lines, we are unable to project whether any of the specific units within these product categories will be through all phases of development and be able to be shipped to the California market prior to December 31, 2026.

We have included an overview of our current development work (Appendices 1 and 2 While this represents our best estimate regarding the timeframes needed up through launch, our past experience with regard to low-GWP refrigerants has been one of delay in completing different tasks, including due to the availability of parts from our vendors. And any one delay can substantially impact the date of actual sales release and launch. A specific example of such delay occurred with regard to obtaining appropriate chips for testing new equipment (as recounted in the emails exchanges included in Appendix 3). In that case, the delay (and subsequent roll-back of related schedules) extended approximately 15 months.

Thus, Vertiv believes that a variance period of approximately 1 1/4 years (until December 31, 2026) for the [redacted] (recognizing the necessary period of public comment and consideration of this request by CARB) is appropriate. Should individual products become available at an earlier date, Vertiv can commit to notifying CARB once sub-750 GWP products are capable of being manufactured and supplied for the California market.

L. Provide a compliance plan which describes in detail how, if a variance is granted, compliance will be achieved as expeditiously as possible including all of the following:

(i) The method by which compliance will be achieved

Vertiv will continue to work with its vendors to utilize lower-GWP refrigerants in its equipment as expeditiously as possible as well as to obtain any necessary regulatory approvals. As per above, Vertiv projects that acceptable lower-GWP refrigerants will be able to be integrated into newly manufactured CRAC, data centers and ITEF by January 1, 2027. It is not possible, as of the date of this application, to project a date earlier than January 1, 2027 for utilization of sub-750 GWP refrigerants across all of Vertiv's product offerings, particularly the [redacted] which are the subject of this variance request.

(ii) Milestone dates

See Appendices 1 and 2.

(iii) Milestone achievements

See Appendices 1 and 2.

M. Provide a description of the damage or harm that will result to the Applicant from immediate compliance with the regulatory requirements, including if compliance would result in an extraordinary economic hardship, such as closure of the entire facility or loss of a large portion or the revenue:

Vertiv projected sales into California total [redacted]. Imposing a January 1, 2025 date prohibiting sale of CRAC, data center and ITEF equipment into the state utilizing refrigerants with a GWP above 750 would result in a loss in sales of this amount for 2025 and an equivalent amount in 2026, resulting in total economic harm of over [redacted]. This loss will only be mitigated to the extent that we are able to introduce low GWP models into California, for some product lines, prior to the end of 2026.

N. If applying for an Impossibility variance please provide quantification of current Greenhouse Gas (GHG) emissions resulting from normal business-as-usual operations as it directly relates to the continued use of any substance in end-uses listed in Table 1, section 95374 (a); Table 2, section 95374 (b); Table 3, section 95374 (c); or Table 4, section 95374 (d). This includes quantification of the direct GHG emissions resulting from refrigerant leaks or HFC emissions and indirect GHG emissions resulting from energy use (where applicable), with all calculations, based on the average lifetime of the equipment or product that will continue to use prohibited substances. Applicant must include all calculations used to calculate GHG emissions estimates, including emission factors (i.e., charge size as defined in section 95373, leak rate as defined in *40 C.F.R. Part 82.152*, and refrigerant used over the average lifetime of the equipment, system, or product). Please see the bottom of this application template for an example calculation.

** Please refer to Appendix 5 for GHG calculations. **

O. Provide a description of any negative impacts to human health or the environment that may result from the granting of a variance.

We believe that a variance of approximately 1 1/4 years allowing the use of higher GWP refrigerants in the identified equipment models will result in negligible impacts to human health or the environment. With regard to direct impacts on human health, computer room, data center and ITEF facilities are often unoccupied spaces. Servicing of equipment occurs by trained technicians, limiting any exposure to refrigerants. Per the calculations below in section P, there is the potential for an

impact on human health and the environment through the continued use of refrigerants with GWP values above 750 GWP, but we propose to fully offset the incremental GHG emissions on a CO2e basis.

P. Provide a mitigation plan that demonstrates how you will reduce excess GHG emissions to a level equal to or below what would have been emitted had you been in compliance and how you will mitigate any negative impacts to human health or the environment. You must include all calculationsused to calculate GHG emission estimates including emission factors (i.e., charge size as defined in section 95373, leak rate as defined in *40 C.F.R. Part 82.152*, and refrigerant used over the average lifetime of the equipment, system, or product). This may include an analysis of prohibited substances, efforts to reduce leaks or venting of prohibited substances, and options to recycle or destroy high-Global Warming Potential refrigerants.

Calculation of Emissions/Purchase of Offsets:

Vertiv will purchase emission offsets to address the continued use of higher-GWP refrigerants during 2025 and 2026 for the [redacted]. Vertiv has calculated the amount of credits based on the differential as between the GWP of the refrigerant used in a system installed after January 1, 2025 versus the GWP of the alternative refrigerant that Vertiv is developing for such systems (but is not yet available). For example, Vertiv calculated the difference in GWP on a CO2e basis as between [redacted]. Next, Vertiv multiplied the differential in GWP by the specific charge size for the equipment. To calculate the differential in emissions as between these two systems, Vertiv then utilized an average annual leak (loss) rate of 10% and 7% depending on the type of unit and an average loss rate at end-of-life of 56% and 20% (depending on the type of unit). We derived these values from CARB's Staff Report: Initial Statement of Reasons for Proposed Amendments to the Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Chillers, Aerosols-Propellants, and Foam End-Uses Regulation, October 20, 2020 at 94 . All of these calculations are contained in Appendix 5 of this application.

Vertiv believes that the actual annual leak rate of the systems it will supply to California will be substantially below a 10 or 7% annual leak (loss) rate. From an engineering perspective, we would anticipate annual leak rates closer to 1% and therefore, we believe that this calculation methodology represents an extremely conservative method of forecasting any additional emissions associated with the granting of a variance. For purposes of the analysis and given the utilization of a substantially higher annual leak rate, Vertiv would propose the average lifetime in years of the equipment proposed would be 12.5 years. This average lifetime is based on Vertiv's 10 year projected lifetime for equipment where the company does not engage Vertiv to service the equipment. In cases where a customer engages Vertiv to service the equipment, the lifetime of equipment is 15 years. On a percentage basis, approximately 20% of Vertiv customers opt for servicing by Vertiv. Utilizing this 20% rate, it is possible

to calculate an 11 year lifetime for our equipment on an average basis. But in order to include a substantial degree of conservatism in this estimate, however, Vertiv proposes to use the mean number of years for equipment with and without service contracts, yielding 12.5 years. This calculation is reflected in Appendix 5.

Other Mitigation Efforts:

As indicated above, we believe that the actual leak rate of new equipment supplied to the California market will be approximately 1%. Here it is important to note that Vertiv supplies services, such as Vertiv™ Life™ Services, that provide real-time data allowing for response to any anomalies. In addition, we offer service contracts for our equipment to provide both regular and proactive maintenance. We believe these services can substantially reduce the risk of operational issues which could result or contribute to refrigerant leaks.

Q. Provide a detailed explanation of efforts that may be implemented to curtail noncompliance in lieu of obtaining a variance

As Vertiv understands the end-use and prohibited substances contained in §95374(c) Table 3, other air-conditioning (new) equipment with refrigerants having a GWP of 750 or higher are prohibited as of January 1, 2025. Pursuant to 17 CCR §95372, these prohibitions apply to any person who "sells, leases, rents, installs, uses or otherwise enters into commerce, in the State of California, any product, equipment, material or substances in the end uses list in . . . Table 3, section 95374(c)." 17 CCR §95372.

To the extent these prohibitions apply to Vertiv on January 1, 2025 and thereafter, Vertiv of course would endeavor not to engage in any prohibited activity within the State of California. As noted above, however, we project that this would result in a total of $33 million in lost sales in California as well as potential disruption to our customers in the state of California.

R. By signing below, you (the Applicant) certify under penalty of perjury that you are a Responsible Official with full authority to submit the application and implement any provision of an Executive Order, and that all information provided is true and accurate to the best of your knowledge, after conducting due diligence. (Applications without this certification will be automatically denied.)

September 11, 2025

_____ _____

John Niemann
Senior Vice President
Global Thermal Management

Date

S. Submit your application and documentation relating to the variance to CARB at the following email address:

HFCREDUCTION@ARB.CA.GOV

T. Any Applicant submitting information to the Executive Officer You may claim information as "confidential" by clearly identifying it as "confidential." Any claim of confidentiality must be based on your belief that the information marked as confidential is either trade secret or otherwise exempt from public disclosure under the California Public Records Act (*Government Code, section 6250 et seq*.). All such requests for confidentiality shall be handled in accordance with the procedures specified in *California Code of Regulations, title 17, sections 91000 to 91022*.

APPENDIX 1


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APPENDIX 2


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APPENDIX 3


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APPENDIX 4


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APPENDIX 5

	Vertiv Model	[redacted]	[redacted]	[redacted]
	Average System Refrigerant Charge (lbs)	[redacted]	[redacted]	[redacted]
	Leak Rate (Non-Residential AC)	7%	10%	10%
	System Life Span (years)	12.5	12.5	12.5
	EOL (Non-Residential AC)	20%	56%	56%
	Emittance over Lifetime (lbs)	[redacted]	[redacted]	[redacted]
	Emittance at EOL (lbs)	[redacted]	[redacted]	[redacted]
	Total Emittance (lbs)	[redacted]	[redacted]	[redacted]
	Convert (lbs to kg)	[redacted]	[redacted]	[redacted]
	# of units for Variance Duration	[redacted]	[redacted]	[redacted]
Current	Refrigerant Type	R-410A	R-410A	R-410A
	GWP-100 Value	2088	2088	2088
	CO2 MTCO2e/system	[redacted]	[redacted]	[redacted]
	Total CO/ Variance Period	[redacted]	[redacted]	[redacted]
Future	Refrigerant Type	R-32	R-32	R-32
	GWP-100 Value	675	675	675
	CO2 MTCO2e/system	[redacted]	[redacted]	[redacted]
	Total MTCO2e/ Variance Period	[redacted]	[redacted]	[redacted]
	Difference of Total MTCO2e for Variance Period	[redacted]	[redacted]	[redacted]

Grand Total MTCO2e
1,275

APPENDIX 6


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