VARIANCE APPLICATION TO THE CALIFORNIA AIR RESOURCES BOARD

Respectfully Submitted by Schneider Electric

December 4, 2024

REDACTED VERSION

317-688-0151Prohibitions 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.

A. Name of Applicant: Schneider Electric USA, Inc.

Ownership Status: Publicly held

Address: 1111 Pasquinelli Dr, Westmont, IL 60559

Telephone: (847) 397-2600

E-Mail: dave.larson@se.com

B. Description of Business

Schneider Electric's (SE) precision air conditioning and cooling solutions operates under the brand Uniflair, with its InRow Series. With a focus on data centers, server rooms, and other critical environments, the InRow Series offers a comprehensive range of cooling products designed to ensure optimal temperature and humidity control for sensitive electronic equipment. From precision air conditioners to modular chiller systems, the InRow Series' innovative technologies prioritize energy efficiency, reliability, and scalability, catering to the evolving needs of modern businesses. By delivering precise and reliable cooling solutions, the InRow Series plays a pivotal role in maintaining the operational integrity of mission-critical facilities.

Sustainability is integral to SE business operations and product designs. SE prioritizes sustainability by integrating energy efficiency, eco-design principles, and circular economy concepts into its solutions. SE's commitment to sustainability extends across the entire product lifecycle, from design and manufacturing to end-of-life recycling. By embracing sustainable practices, SE aims to minimize environmental impact, promote resource efficiency, and deliver innovative products that align with the principles of environmental stewardship. This approach not only benefits the planet but also enables SE customers to achieve their sustainability goals while optimizing their operational performance.

SE has topped the World's Most Sustainable Companies for 2024 list by Time Magazine and Statista. This recognition reflects SE's ambitious goals to reduce its own emissions, but also the company's commitment to helping its customers to become more energy efficient and reduce their emissions.

More information about SE's commitment to a climate-positive and socially-equitable world may be found in its 2023 Sustainable Development Report, attached as Attachment A.

C. Relationship to the Product

SE is the OBM (Original Brand Manufacturer) for its family of row-based air conditioning units. SE designs, manufactures, and sells the products in need of a variance.

D. Specific Sections of the Regulation from which a Variance Is Requested

Section 95374(c) – Table 3: End-Use and Prohibited Substances (Air-conditioning Equipment; Other air-conditioning (new) equipment) and related Section 95375 Prohibitions, Exceptions, Registration, Recordkeeping, Reporting, Labeling, and Disclaimer Requirements

E. Reasons for Seeking Variance

This response contains confidential information protected as a trade secret under the California Public Records Act and may not be disclosed to the public pursuant to section 7924.510 of the California Government Code.

SE is seeking a variance for its InRow Series equipment that provides cooling to data centers and other electronic equipment until January 1, 2027. It is impossible for SE to complete its transition prior to that date due to the unavailability of components for substitute refrigerants and the disruptive effects of U.S. sanctions imposed on component suppliers.

These factors delay the engineering redesign work required for InRow Series equipment as well as associated testing and certification. Even with a variance until January 1, 2027, which aligns with federal requirements for data center cooling equipment, SE believes it is likely some models will not be available with low GWP refrigerants until after this date, given the significance and complexity of the effort and the exceptionally high performance standards for cooling equipment in this sector.

1. *Type of Equipment*

The types of equipment in need of a variance are SE's horizontal-flow computer room air conditioners (CRACs), which SE refers to as its InRow Series. The InRow Series is comprised of the following subcategories: RD100, RD200, RD300, RD600, and RH300, with a corresponding number of Base SKUs for each series. These, in turn, comprise multiple models, which then divide further due to customer specification. Altogether, there are 45 distinct models of equipment, each of which must be considered and assessed when affecting a transition in refrigerant. *See also* SE InRow Cooling Catalogue, attached as Attachment B.

Series	Base SKUs
RD100	ACRD100
	ACRD101
	ACCD75214
	ACCD75215
	ACCD75216
	ACCD75217
	ACCD75218
	ACCD75219
	ACCD75220
RD200	ACRD200
	ACRD201
	ACFC75210

	ACFC75255
	ACFC75256
	ACFC75257
RD300	ACRD301S
	ACRD301P
	ACCU300
	ACCU300D
	ACCU301
	ACCU301D
	ACCU302
	ACCU302D
RH300	ACRH301S
	ACRH301P
	ACHU300
	ACHU300-L
	ACHU302
	ACHU302-L
RD600	ACRD600
	ACRD600P
	ACRD601

	ACRD601P
	ACRD602
	ACRD602P
	ACCD75228
	ACCD75229
	ACCD75230
	ACCD75231
	ACCD75232
	ACCD75232-C
	ACCD75232-40C
	ACCD75233-C
	ACCD75234
	ACCD75235

The equipment in SE's InRow Series are used for cooling Information Technology (IT) equipment in various applications ranging from small spaces (*e.g.*, network closets) to large computer data centers. The cooling units come in different architectures, including refrigerant, chilled water, and economizer systems, and are intended to maintain optimal temperature and humidity control in critical environments.

See **Figure A**, enclosed with this application, for a more detailed breakdown of the InRow Series models in need of a variance, and **Figure B**, also enclosed, for estimated transition timelines for each InRow Series. Note that each model also includes accessories to accommodate for certain customer specification requirements and other unique challenges.

SE equipment is used in applications that are fundamental to the functioning of modern life. Computer and IT infrastructure must operate without interruption, and even minor glitches or other problems can result in mass disruptions to social and economic systems, including the tech industry in California. The standard to which SE equipment is held by its customers is extremely and exactingly strict, with the engineering, testing, and validation work that goes into a refrigerant transition required to meet the highest possible technical and commercial expectations.

The refrigerant currently used by SE units in need of a variance is R-410A. With a Global Warming Potential (GWP) of 2,088, R-410A may not be used in new equipment manufactured after January 1, 2025, in the category "[o]ther air-conditioning (new) equipment, residential and non-residential," wherein a GWP limit of 750 is specified. 17 CCR § 95374(c).

2. Operating Conditions

Data centers play a vital role across the global economy. They are mission critical facilities with extremely rigorous management and operational profiles. Most data centers are monitored 24-hours a day by trained personnel and have specific protocols to respond immediately to any issues, with some organizations maintaining in-house command centers to maximize operational awareness. This is distinct from the operating conditions of most other air conditioning and refrigeration equipment used in non-critical environments.

Data center cooling equipment rarely leaks refrigerant. Routine preventative maintenance regimes, typically conducted every 90 to 180 days, minimize the possibility of a leak. If a leak does occur, data center operators are notified by an alarm system, and the leak is remedied as rapidly as possible, with many data center operators requiring technicians to be onsite within four hours of a service call. Cooling equipment is monitored across a number of indicators, including power levels, compressor operations, supply air temperature, head pressure, and others, which allow data center operators to detect abnormal conditions virtually in real time.

3. Legal & Regulatory Background

CARB's "other" air-conditioning category is broadly defined, encompassing "any residential or non-residential air-conditioning equipment or air-conditioning system not otherwise defined as 'room air conditioner,' 'wall air conditioner,' 'window air conditioner,' 'packaged terminal air conditioner (PTAC),' 'packaged terminal heat pump (PTHP),' 'portable air conditioner,' 'residential dehumidifier,' or 'variable refrigerant flow (VRF)system.'" 17 CCR § 95373.

Such a definition does not account for the significant differences facing manufacturers transitioning to low GWP substitutes among the many sectors and sub-sectors that fall into this category. For the CRAC equipment manufactured by SE, the U.S. Environmental Protection Agency (EPA) recognized it would not be possible to complete a transition in this sub-sector until January 1, 2027. *See* Phasedown of Hydrofluorocarbons: Restrictions on the Use of Certain Hydrofluorocarbons Under the American Innovation and Manufacturing Act of 2020, 88 Fed. Reg. 73090 (Oct. 24, 2023) (TT Rule). *See also* 40 CFR §§ 84.54(a)(11), 84.54(c)(13).

In the TT Rule, as compared to the proposal, EPA created a new category for data centers, data servers, and other electronic equipment, saying:

> In the proposed rule, EPA included data centers and data servers in the description of applications that the Agency considers to be IPR. In this final rule, EPA is creating a separate subsector for data centers, information technology equipment facilities (ITEF), and computer room cooling equipment which includes appliances used for large scale cooling of server farms, ITEF, computer rooms, data centers, data servers, communication rooms, and other spaces dedicated to maintaining the operating temperature of electronic technologies.

88 Fed. Reg., at 73142.

SE supported EPA's decision to push back the transition date for this sub-sector in the TT Rule to January 1, 2027, but notes that even this deadline may not be feasible in light of the significant delays facing SE due to unavailability of low GWP components, exacerbations of those delays due to the imposition of U.S. sanctions on a foreign supplier, and the resultant impacts these factors have on redesign, testing, and certification processes, as described more fully below.

4. Background on SE's Transition Process

SE began working on identifying, analyzing, and testing possible substitute refrigerants for its InRow Series in 2021, following the enactment of *The American Innovation and Manufacturing Act of 2020* (AIM Act) 42 U.S.C. § 7675.

There are no drop-in substitutes for R-410A in CRAC units. Natural refrigerants were ruled out after assessing the level of design expertise needed and questions about service capabilities and customer acceptance. This left refrigerants classified as A2L for mild flammability, which would require significant design changes to accommodate (i) increased flammability and toxicity risks, (ii) cost and energy efficiency tradeoffs, (iii) minimal to non-existent component availability, and (iv) uncertainty as to field technician training and readiness.

Challenges for A2Ls such as increased flammability and toxicity and trade-offs in cost, efficiency, and availability made the transition complex and required substantial engineering redesign and related work. For example, SE had to build new psychometric chambers suitable for A2L refrigerants to comply with applicable UL Solutions testing and certification requirements. This construction of SE's "A2L Lab" and the hiring of engineering personnel to support the transition was coordinated with the expected availability of [redacted].

The A2L Lab is fundamental to SE's refrigerant transition. New test chambers with sensing and ventilation systems were required because of the flammability of A2L refrigerants. Moreover, UL Standard 60335-2-40 leak testing must be done in a lab that is capable of handling a large amount of leakage in a short period of time.

Per **Figure A**, SE ultimately settled on R-32 (GWP = 675) as its primary choice for the lower cooling capacity RD100 line and R-454B (GWP = 466) for the higher cooling capacity units in the InRow Series, *i.e.*, RD200, RD300, RD600, and RH300. SE based these decisions on a range of criteria, including technical feasibility, sustainability, schedule, and performance impact.

SE expected the redesign of each InRow Series to take approximately [redacted], as illustrated in **Figure B**. SE considers [redacted] per InRow Series to be highly ambitious. As previously stated, the complexity of these transitions and the distinctiveness of each InRow Series and their many models imposed a significant burden on SE's engineering resources, which are primarily intended and equipped to serve SE's regular engineering needs and customer requests. Adding extensive refrigerant transition work represented a major undertaking for the company.

5. *RD100 Transition to R-32*

The transition to R-32 for SE's RD100 line consumed the vast majority of its engineering resources during the 2022-2024 period, with most of 2021 devoted to substitute identification and evaluation. Following a market launch of the RD100 line with R-32 prior to 2025, SE had been planning to transition the other InRow series product lines to R-454B.

At the beginning of 2024, SE was on track to transition to R-32 in its RD100 line by June 2024. SE took pride in the fact it would be the first CRAC manufacturer to offer a low GWP refrigerant for this type of equipment.

Then on May 1, 2024, the U.S. Department of State announced sanctions against SE's [redacted] vendor, the [redacted]. The sanctions were imposed pursuant to Executive Order 14024, as amended, which authorizes sanctions with respect to specified harmful foreign activities of the Government of the Russian Federation. *See* Executive Order 14114, which served as the basis for these sanctions, attached as Attachment C.

The sanctions prevented SE from obtaining [redacted] for its RD100 units using R-32. These [redacted] are integral components of the cooling unit's [redacted] design and [redacted]

[redacted]. Without these [redacted], the cooling system is not able to operate.

The lack of these components forced SE to freeze all activities related to the manufacture and launch of the InRow RD100 series. This presents is an insurmountable barrier for SE's refrigerant transition. It is impossible for SE to proceed to market with its RD100 units using R-32 until SE can redesign the RD100 series so it can utilize an alternative [redacted].

SE is currently in the process of redesigning the RD100 series. SE expects to complete this redesign process, procure alternative [redacted], and enter the market by the middle of 2025, assuming no other disruptions or delays. While SE is expediting the redesign effort, it most likely will take just under a year to substitute the [redacted] because the revised design must be fully tested and verified prior to releasing in mission critical IT applications.

This redesign and testing effort includes searching for and selecting a suitable alternate supplier, obtaining samples and qualifying acceptance, revising the mechanical and electrical design, validating system performance, repeating the agency and safety tests, updating documentation and training materials, building prototypes, and restoring the supply chain to restart full production.

6. RD200, RD300, RD600, and RH300 Transition to R-454B

Transitioning the remaining InRow series and models to R-454B has been primarily delayed by the lack of suitable [redacted], as illustrated in **Figure B**. As stated above, SE cannot commit sufficient engineering resources to transition its remaining InRow Series equipment until it completes the RD100 transition. But even when the RD100 transition is complete, SE's pace depends on the availability of key components compatible with R-454B, none of which are available from SE suppliers that meet its specifications and standards, including compressors, heat exchangers, VFDs, and leak detection sensors, among others.

SE has been working closely with [redacted] suppliers to understand their roadmaps and requested the development and release of suitable [redacted] models be expedited. In mid-2024, [redacted] released models of components SE deems compatible. SE would already have commenced the transition process for the RD300 series by the third quarter of 2024 were it not for the imposition of sanctions and the attendant delays to its RD100 transition.

7. New Transition Timeline

As noted above, please refer to **Figure B** for an illustration of SE's estimated transition timeline for its InRow Series. Note that while SE is working as expeditiously as possible to meet or even exceed these estimates, there remains significant risk of delays or other unexpected issues given the technical and commercial sophistication and complexity of each process. SE therefore is requesting a variance for all InRow Series equipment until January 1, 2027, to ensure a sufficient margin in the event it encounters other delays.

Moreover, also as noted above, even with a variance until January 1, 2027, SE may not complete transitions for all InRow Series equipment. As discussed more fully in the response to Question M, delays in refrigerant transitions are not in SE's commercial or technical interests. SE considers timely completion of the transition of the entirety of the InRow Series to be among its highest priorities and is taking all appropriate steps to ensure it occurs in the most expeditious manner possible. However, SE's transition is subject to various factors not entirely within its control, such as component availability and viability.

Notwithstanding the foregoing, SE wishes to note it is actively working to redesign all its R-410A InRow units to use a low GWP refrigerant as quickly as possible (as shown in Figure B). Given the constraints and challenges outlined in this application, only a portion of the redesign projects are expected to be completed prior to January 1, 2027. Only InRow units using a low GWP refrigerant will be made available in California after this deadline, and non-compliant units will be withdrawn from the California market by this deadline. SE will reintroduce to the California market InRow units that have transitioned as soon as they are ready.

F. Type of Variance Requested

Schneider Electric seeks a variance for reasons of impossibility – *i.e.*, Schneider Electric exercised best efforts but still was unable to comply with the regulatory requirements for reasons beyond its control despite exercising foresight to prevent the noncompliance.

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

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

SE believes any such impacts can be minimized, if not avoided, by offsetting its emissions through the purchase of carbon offsets, as discussed more fully below in Question P.

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

Yes, as described more fully in the response to Question E, SE has used its best efforts, starting its transition efforts in 2021 and actively working on redesigning products and addressing the many challenges the transition has presented. In particular, the sanctions were entirely unexpected and completely beyond SE's control. The timing of the sanctions in mid-2024 made it impossible for SE to release the RD100 with R-32 prior to the applicable transition date for the "other" air conditioning category in CARB's HFC regulations.

SE has strong working relationships with its [redacted] suppliers and has been working to influence their A2L [redacted] roadmaps since 2021. SE searched for other [redacted] suppliers that could meet the technical, agency, supply chain, and market requirements but was not able to find a suitable alternative.

H. [Omitted; Not seeking Force Majeure event variance]

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.

The following materials are attached to this application:

- **Figure A** describes SE's InRow Series, including relevant technical specifications, number of models (excluding sub-models for customer specifications), and substitute refrigerant selection. **TRADE SECRET PROTECTED**
- **Figure B** describes SE's estimated transition timeline for its InRow Series, including timelines for testing and projected component availability. **TRADE SECRET PROTECTED**
- **Attachment A** – SE 2023 Sustainable Development Report
- **Attachment B** – SE InRow Cooling Catalogue
- **Attachment C** – Executive Order 14114, pursuant to sanctions announced on May 1, 2024

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

Please refer to the responses to Questions E and G, which provide this information in detail.

K. Length of Variance Requested

SE respectfully requests a variance until January 1, 2027.

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:

Please refer to the responses to Questions E and G and relevant attachments, including in particular **Figure B**.

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:

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The inability to sell InRow Series equipment in California in 2025 and 2026 will directly impact the SE cooling business and indirectly impact the other hardware, software, and service offers SE sells into the data center market. This creates significant risk of disruptions in the tech industry in California and in the services provided by data centers throughout the global economy.

In addition to the direct and immediate negative impact on InRow series and models, it will also negatively impact SE's other product lines. One of the major reasons customers select SE as their data center hardware, software, and service provider is SE's ability to deliver a complete data center infrastructure solution, inclusive of InRow cooling.

[redacted]

[redacted]

[redacted]

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).

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1. Description and Justification of Methodology and Calculations

SE has calculated the direct GHG emissions resulting from refrigerant leaks of HFCs, with all calculations based on the average lifetime of the equipment. The total lifetime emissions include the annual leak rate and emissions at end-of-life.

a. <u>Formulas</u>

(Annual leak rate) = (Qty Systems) x (Refrigerant Charge) x (Annual leak rate) x (GWP rating) x (System life)

(End-of-life emissions) = (Qty Systems) x (Refrigerant Charge) x (End-of-life leak rate) x (GWP rating)

(Total lifetime emission) = (Annual leak rate) + (End-of-life emissions)

b. Quantity of Systems

The forecasted sales volumes for each InRow series are based on [redacted] software. This software uses actual historical sales, known orders, seasonal trends and several other variables to develop accurate demand forecasts for each InRow model.

c. System Refrigerant Charge

The total refrigerant charge for each system includes the volume of the indoor unit, heat rejection unit, and line set connecting the two. [redacted], for this calculation, we have assumed the maximum [redacted] which will result in the largest refrigerant charge (worst case).

The total quantity of systems to be sold over the variance period and maximum system refrigerant charge by InRow series is summarized below.

		California Sales, System Qty		
Series	**Max* System Refrigerant Charge (lbs)**	**2025**	**2026**	**Total**
RD100	[redacted]	[redacted]	[redacted]	[redacted]
RD200	[redacted]	[redacted]	[redacted]	[redacted]
RD300	[redacted]	[redacted]	[redacted]	[redacted]
RD600	[redacted]	[redacted]	[redacted]	[redacted]
RH300	[redacted]	[redacted]	[redacted]	[redacted]

*Max Charge = (indoor unit) + (maximum line set) + (outdoor unit)

"System" includes indoor unit, line set and outdoor unit.

[redacted]

[redacted]

d. Leak Rate

The annual and end-of-life leak rates were sourced from CARB's published inventory leak rates for non-residential air conditioners. An excerpt of the leaks rates table is shown below.

System Type	Baseline Refrigerant	Baseline GWP (100-year, AR4)	Lifetime (Years)	Average Charge Size (lbs.)	Average Annual Leak Rate (%)	Average End-of-Life Leak Rate (%)
Non-residential AC (≥ 65k to <135,000k BTU/hr)	R-410A	2,088	20	25	10.0%	56.0%
Non-residential AC (≥ 135,000k BTU/hr)	R-410A	2,088	20	60	7.0%	20.0%

An average annual leak rate of 10.0% and average end of life leak rate of 56.0% was used for the RD200 series.

An average annual leak rate of 7.0% and average end of life leak rate of 20.0% was used for the RD100, RD300, RD600, and RH300 series.

e. Refrigerant Global Warming Potential (GWP) Rating

The following GWP values were used in the calculation:

R-410A: 2088

R-32: 675

R-454B: 466

f. System Lifespan

All InRow systems have a 10 year lifespan.

2. *Total Emissions Per Variance Period*

The total emissions of the current InRow systems over the requested variance period using R-410A is 10,407.1 tons of CO_2e.

Over the same time period, with RD100 systems using R-32 and the remaining InRow systems using R454B, the total emissions are 2,339.1 tons of CO_2e.

SE will purchase carbon credits to offset the emissions between systems using R-410A and R-32 & R-454B over the variance period.

(Carbon Offset) = (R-410A emissions) – (R-32 & R-454B emissions)

(8,068.0 tons of CO_2e) = (10,407.1 tons of CO_2e) – (2,339.1 tons of CO_2e)

The offsets to be purchased are 8,068.0 tons of CO_2e.

[redacted]

3. *Refrigerant Emission Calculations by InRow Series*

Each row in the following table shows the detailed emissions calculations following the formulas shown above. The calculations for each InRow series are shown in their respective columns to account for different System Quantities, Refrigerant Charge and Refrigerant Type.

InRow Series	**RD100**	**RD200**	**RD300**	**RD600**	**RH300**
Max System Refrigerant Charge, lbs	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Leak Rate, annual	7.0%	10.0%	7.0%	7.0%	7.0%
Leak Rate, End-of-Life (EOL)	20.0%	56.0%	20.0%	20.0%	20.0%
System Life Span, years	10	10	10	10	10
Emittance Over Lifetime, lbs / system *(System Refrigerant Charge x Annual Leak Rate x Life Span)*	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Emittance at EOL, lbs / system *(System Refrigerant Charge x EOL Leak Rate)*	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Total Lifetime Emittance, lbs / system *(Emittance over Lifetime + Emittance at EOL)*	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total lifetime Emittance, kg / system *(lbs. x 0.4535924 kg)*	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Current R-410A InRow Systems					
Refrigerant Type	R-410A	R-410A	R-410A	R-410A	R-410A
Refrigerant GWP	2088	2088	2088	2088	2088
CO2 Equivalent / System, tons CO2e / system *(Total Lifetime Emittance, kg x GWP)*	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Systems over Variance Period, qty	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Tons CO2 Equivalent / variance period *(CO2 Equivalent / System) x (Total Systems over variance period)*	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total CO2 Equivalent / variance period, tons of CO2e	10,407.1				
Tons CO2 Equivalent / year (CO2 Equivalent / variance period) / (~2 years)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total CO2 Equivalent / year, tons of CO2e	5,203.6				
Future R-32 & R-454B InRow Systems					
Refrigerant Type	R-32	R-454B	R-454B	R-454B	R-454B
Refrigerant GWP	675	466	466	466	466
CO2 Equivalent / System, tons CO2e / system *(Total Lifetime Emittance, kg x GWP)*	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Systems over Variance Period, qty	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Tons CO2 Equivalent / variance period *(CO2 Equivalent / System) x (Total Systems over variance period)*	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total CO2 Equivalent / variance period, tons of CO2e	**2,339.1**				
Tons CO2 Equivalent / year (CO2 Equivalent / variance period) / (~2 years)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total CO2 Equivalent / year, tons of CO2e	1,169.6				

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

SE acknowledges the negative impacts to human health and environment of the emissions of HFCs and other greenhouse gases. However SE believes any such impacts can be minimized, if not avoided completely, by offsetting its emissions through the purchase of carbon offsets, as discussed more fully below in Question P.

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 calculations used 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.

SE will purchase a quantity of carbon offsets equal to **8,068.0 CO_2-equivalent tons** for the variance period from a reputable offset provider upon granting of the variance within 90 days of being granted a variance.

SE will seek to procure carbon offsets from A-Gas US, Inc., as described below. SE selected this option because of the connection to refrigerant emissions and A-Gas' reputation and credibility in providing carbon offsets. Additionally, a prior variance approved by CARB, for SMC Corporation, purchased carbon offsets from A-Gas for the mitigation plan. The information provided below has been reviewed and approved by A-Gas.

In the event SE is not able to procure carbon offsets from A-Gas US, Inc., SE will procure offsets of a comparable nature and quality from an alternative source.

1. Background Information

A-Gas US Inc's Voluntary Emission Reduction Project, A-Gas V16, involves the recovery and reclamation of AHRI 700 certified HFC refrigerants to service/re-charge existing and newly manufactured refrigeration and air conditioning equipment in the US. The benefit of using reclaimed HFCs is that it avoids production of newly produced high GWP HFCs and subsequent GHG emissions when these newly produced refrigerants leak to atmosphere.

The HFCs recovered and reclaimed in the carbon credit project include R-134a, R-404a, R-407a, R407c, and R-410a. These HFCs were reclaimed to industry specification standards at the A-Gas

EPA certified reclamation facilities located in Rhome, Texas. All applicable laws and regulations were followed throughout this project.

2. Project Purpose and Objective

The purpose of this project is to avoid the production of virgin HFC refrigerants and subsequent GHG emissions by implementing the recovery, reclamation, and the reuse of used HFC refrigerants thereby resulting in emission reductions due to lower overall aggregate HFC emissions compared to the baseline condition.

3. Project Registry

The A-Gas V16 carbon credit project is registered with ACR. ACR is a world-leading carbon credit registry and is recognized globally for pioneering work in the field of carbon markets. ACR is an Offset Project Registry for the California Cap and Trade Program through its Compliance Offset Program. Additionally, ACR has been approved by the United Nations International Civil Aviation Organization to provide carbon credits under the aviation sector's Carbon Offsetting and Reduction Scheme for International Aviation. Finally, ACR has also been approved under the Integrity Council for the Voluntary Carbon Market (ICVCM) program to provide carbon credits with the "Core Carbon Principles" (CCP) designation. This CCP designation is a mark of quality in the verified carbon market and may only be provided by programs that achieve a rigorous set of quality standards developed by the ICVCM.

4. Project Vintage

A-Gas V16 is a recent project with carbon credits issued by ACR in 2023.

5. Project Methodology

The A-Gas V16 project applied ACR's Methodology for the Quantification, Monitoring, Reporting and Verification of Greenhouse Gas Emissions Reductions and Removals from Certified Reclaimed HFC Refrigerants, Propellants, and Fire Suppressants.

6. Project Verification

As with all ACR projects, the project was audited by an independent, accredited 3rd party (TUV SUD) to meet all requirements of the ACR program and ACR methodology as well as international best practice GHG accounting principles for carbon credit projects. A copy of the verification report for the project is available upon request to A-Gas.

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

Given the circumstances, SE lacks any other means to avoid noncompliance other than ceasing to do business in California for up to two years. This would have significantly adverse consequences for SE and similarly disruptive, if not calamitous, consequences for SE customers in California, which operate data centers and other computer-related facilities that underpin the state's technology sector.

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.)

Dave Larson　　　　　　　　December 4, 2024

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Dave Larson, Product Line Manager - InRow cooling　　　　Date

Schneider Electric USA

Application submitted via email to: HFCREDUCTION@ARB.CA.GOV