Summary of Changes

ACR METHODOLOGY: *Advanced Refrigeration Systems*

VERSION: 2.1 to 3.0

The following is a summary of the significant changes from version 2.1 of ACR's Methodology for the *Advanced Refrigeration Systems* published in August 2021 to version 3.0 posted for public comment on August 2 and published on November 1, 2024.

TOPIC	REVISION	SECTION
UPDATE TO METHODOLOGY STRUCTURE	Updated the Methodology to align with ACR's latest structure and format for methodologies.	N/A
UPDATES TO PERFORMANCE STANDARD	• Updated the performance standard for U.S.-based projects using market penetration rates for ultra-low-GWP refrigerants published in the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022, Annex 3, Part A, Table A-113. "Ultra-low-GWP refrigerant" is defined by methodology as any refrigerant that is deemed acceptable under the U.S. Environmental Protection Agency's Significant New Alternatives Policy (SNAP) program, has a global warming potential (GWP)<15 and zero ozone-depletion potential (ODP), and is used in a new, additional, or replacement advanced refrigeration system project. • Updated the performance standard for Canada- and Mexico-based projects using market penetration rates for ultra-low-GWP refrigerants published in the ATMOsphere report, Natural Refrigerants: State of the Industry, 2023 Edition; Environment and Climate Change Canada's National Inventory Report, 1990–2022: Greenhouse Gas Sources and Sinks in Canada (2024); and Mexico's most recent GHG emissions inventory (Gobierno de Mexico, Secretaría de Medio Ambiente y Recursos Naturales. e Instituto Nacional de Ecología y Cambio Climático; Mexico: Inventario	Section 3.2

	Nacional De Emisiones De Gases Y Compuestos De Effecto Invernadero, 1990-2019; 2022).	
UPDATES TO ELIGIBILITY CONDITIONS	• Based on the latest U.S. GHG Inventory data, the use of propane as an ultra-low-GWP refrigerant in the small retail food segment of the Stand-Alone Commercial Refrigeration application demonstrates a penetration rate that is no longer sufficiently low for ACR to determine that such project activities are not common practice in the U.S. and they have been removed from the eligible Advanced Refrigeration System applications. Penetration rates for particular equipment types and/or ultra-low-GWP refrigerant market adoption in Canada and Mexico demonstrate that that the use of ultra-low-GWP refrigerants in all applications (Large Commercial Refrigeration, Remote Condensing Units, and Stand-Alone Commercial Equipment including small retail food) remains uncommon, and therefore all applications remain eligible under the Methodology. • Clarified that, for Stand-Alone Commercial Refrigeration equipment that has a project location in the U.S., Canada, or Mexico, but which is deployed in Canada or Mexico, eligibility is based on the deployment location of the equipment, not on the project location.	Chapter 2 and Table 1
CLARIFICATIONS TO ELIGIBILITY CONDITIONS	• Clarified eligibility conditions to codify the eligibility of retrofits of existing Large Commercial Refrigeration systems at existing facilities to use lower-GWP refrigerants and manufacture and sale of new Stand-Alone Commercial Refrigeration equipment that is charged and sealed at the manufacturing facility with ultra-low-GWP refrigerant(s). “Lower-GWP refrigerant” is defined in the Methodology as any SNAP-acceptable substitute refrigerant with a GWP <1300 and zero ODP that is used in a retrofit advanced refrigeration system project. A threshold of GWP<1300 was chosen for retrofit system refrigerants because it allows for the use of lower-GWP refrigerants that were designed to replace the most used refrigerants	Chapter 2 and Table 1

	(especially R-404A, R-507, and R-22) in the Large Commercial Refrigeration application. • Clarified commercial refrigeration applications eligible under this methodology, such as including cold storage in the Large Commercial Refrigeration application because it is a subset of commercial refrigeration per U.S. EPA definition and further detailing the food processing and dispensing equipment description. • Clarified the requirements for the management of refrigerants from decomissioned or retrofitted refrigeration systems, which must be recovered and managed in accordance with applicable rules and regulations of the relevant country. Canada, Mexico, and the U.S. have national laws and regulations that govern management of recovered refrigerants. These mandates, as well as any relevant state or provincial rules and regulations, must be followed when projects replace or retrofit existing refrigeration systems. • Clarified the requirements for management of parts from replaced Large Commercial Refrigeration systems and Remote Condensing Units, which must be scrapped, and the requirements for replaced equipment in the Stand-Alone Commercial Refrigeration category to be destoyed, decommissioned, or disposed of.	
CLARIFICATION TO PHYSICAL BOUNDARY	Incorporated requirements from the ACR Standard v8.0 requiring Project Proponents implementing project activities that result in GHG emissions reductions being generated within the geographic boundary of more than one country to independently quantify GHG emission reductions and/or removals achieved within each country and register them as separate projects. This facilitates appropriate accounting of post-2020 emission reductions and host country authorizations for use under the Paris Agreement.	Section 4.1

CLARIFICATION TO GHG SOURCES	Clarified terms and added justification/explanation for inclusion in or exclusion from quantification of emission reductions.	Section 4.3 and Table 3
UPDATES TO BASELINE DETERMINATION	• Updated content in Tables 7 and 8 with default baseline GWP values to be applied in quantification of baseline emissions for new, additional, and replacement commercial refrigeration systems. These GWP values are provided for new Stand-Alone Commercial Refrigeration equipment in all jurisdictions through 2024 (Table 7) and for new, additional, and replacement Large Commercial Refrigeration Systems and Remote Condensing Units for all jurisdictions through 2025 (Table 8).	Section 5.3 and Tables 7 and 8
	• Added Tables 9, 10, and 11 with default baseline GWP values to be applied in quantification of baseline emissions for new, additional, and replacement commercial refrigeration systems for the year 2025 and beyond. U.S. EPA finalized a rule, Phasedown of Hydrofluorocarbons: Restrictions on the Use of Certain Hydrofluorocarbons under Subsection (i) of the American Innovation and Manufacturing Act of 2020, on October 5, 2023 to restrict use of certain hydrofluorocarbon (HFC) refrigerants. This rule sets GWP limits for refrigerants that can be used in new refrigeration equipment. Based on the restrictions set by this rule, Table 9 provides baseline GWPs by year for new Stand-Alone Commercial Refrigeration (refrigerated food processing and dispensing) equipment manufactured and deployed in the U.S. or imported into the U.S. Table 10 provides baseline GWPs as limited by the EPA rule, by year, for new, additional, and replacement Large Commercial Refrigeration and Remote Condensing unit for 2026 and beyond. Table 11 provides baseline GWPs for projects based in Canada and Mexico for 2025 and beyond. Because the EPA Phasedown Rule has complicated applicability based on whether and when the equipment is manufactured, imported, or exported, and because equipment can be	Section 5.3 and Tables 9, 10, and 11

	manufactured in one country and shipped to another, details about which baseline GWP shall be applied in each year and each manufacturing, import, or export situation are added to the Methodology. • Updated the annual amortized emission rates for eligible applications based on first-fill, annual, and disposal emission rates published in the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022, Annex 3, Part A, Table A-113. A maximum annual leak rate for systems previously utilizing HFCs is added starting in 2026 (due to an emission limit from U.S. EPA's Phasedown of Hydrofluorocarbons: Management of Certain Hydrofluorocarbons and Substitutes under Subsection (h) of the American Innovation and Manufacturing Act), and a maximum annual leak rate for systems previously utilizing ozone-depleting substance refrigerants was added, effective immediately (per Section 82.157 Appliance maintenance and leak repair of U.S. Code of Federal Regulation 40, Part 82, Subpart F). The annual amortized emission rates are weighted by market penetration rates for different refrigerants. The amortization period is the lifetime of equipment. • Updated refrigerant charge size for Remote Condensing Units and added charge sizes for Stand-Alone Commercial Refrigeration equipment.	Section 5.2 and Table 6 Section 5.1 and Table 5
CLARIFICATIONS TO QUANTIFICATION	• Clarified equations to appropriately represent the Crediting Period rather than a particular year. • Clarified equation terms for consistency.	Chapter 6 and Eq. 1-3
UPDATE TO MONITORING AND DATA COLLECTION REQUIREMENTS	• Added requirements for documentation of the scrapping of parts from replaced Large Commercial Refrigeration systems and Remote Condensing Units, and requirements for documentation that replaced equipment in the Stand-Alone Commercial Refrigeration category was destroyed, decommissioned, or disposed of. • Updated requirements for projects that retrofit existing refrigeration systems with an advanced	Chapter 7 Section 7.1

	refrigeration system to use the previous five years of operational records to calculate an average annual leak rate, which then must be used to calculate an annual amortized emission rate. Previous versions of this methodology required use of data from two years prior to the operation of the lower-GWP refrigeration system. However, based on ACR experience with projects to date, it is not uncommon to have to rely on more than two previous years' worth of recharge data to ensure accuracy of the calculated annual refrigerant leak rate. Using five previous years' worth of data will allow use of more recharges to establish a more representative historical average leak rate. An equation was also added specifying how the amortized annual emission rate shall be calculated for retrofit projects.	
UPDATE TO VALIDATION AND VERIFICATION REQUIREMENTS	Updated requirements for Project Proponents with multiple projects at the same facility ("Site") to require an in-person site visit by a VVB be conducted, at minimum, every five project Reporting Periods or five years, whichever is earlier. For projects with a Site not previously validated, an in-person site visit by the VVB is required during project verification.	Chapter 8
UPDATES AND CLARIFICATIONS OF DEFINITIONS	• Added definitions for appliance, blast chiller, blast freezer, cold storage warehouse, commercial freezer, commercial refrigerator, deli case refrigerator, door angle, end-of-life emissions, end-use or end-use category, food prep table, fully operational, higher-temperature side of cascade system, horizontal open freezer, horizontal open refrigerator, lower-GWP refrigerant, medium-temperature unit, ozone-depletion potential, ozone-depleting substance, refrigerated food processing and dispensing equipment, remote condensing unit, retail food refrigeration, retrofit or retrofit project, small retail food, ton or refrigeration, ultra-low-GWP refrigerant, vertical closed freezer, vertical closed refrigerator, vertical open refrigerator.	Chapter 10

	• Removed definitions already found in the ACR Standard or no longer used in the Methodology. • Clarified other definitions.	
UPDATE TO REFERENCES	Updated references to align with sources used in this version of the Methodology.	Appendix A