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Technical appendix

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A4.1 Data

The Chapter aggregated and sorted data from both the conventional and novel CDR voluntary market issuances and retirements from six registries.

Database	Registry Coverage	Time Coverage	Coverage
Berkeley Voluntary Offsets Database v9	American Carbon Registry, Verra, Gold Standard, Climate Action Reserve	January 2022-October 2023*	Offsetting Projects that were "active"= credits issued or retired in either 2022 or 2023.
CDR.fyi	Carbonfuture, non-registered credits (Puro excl.)	January 2022-December 2023	Deliveries from Carbonfuture and the majority of unregistered, presold novel removal credits
Puro	Puro	January 2022-December 2023	Puro CDR Projects that were "active"= credits issued or retired in either 2022 or 2023

Berkeley

- Includes ARB compliance offsets as these are also project based mitigation investments, including removals.
- As Berkeley Version 8 only contained data until 1 November 2023. The additional final months of 2023 were manual extraction of the issuances and retirements from the registries of Verra, Gold Standard, American Carbon Registry and Climate Action Reserve. The entire database was then cross-checked with the manual extractions to add any missing data.

CDR.fyi

- Includes novel CDR data from public sources (e.g. press releases), supplier and purchaser reports, marketplace reports and registry data (Puro and CSI). CDR.fyi tracks binding purchases of novel CDR (MOU/LOIs are excluded), as well as deliveries. Deliveries mean carbon removed and is not necessarily the same thing as retired tonnes.

Puro.earth:

- Retirements are included for novel CDR methods (Biochar) within CDR.fyi's database
- Retirements were additionally extracted for wooden building elements projects from public issuances

- Issuances for all projects manually extracted from Puro.earth's public list of projects

A4.2 Methods

The Chapter devised its own classification for methodologies according to the following rubrics.

Methodology Categories	Description	Example Project Categories
Emission Reduction	Emissions reduction activities from observed baseline.	Renewable Energy, Cookstoves
Avoided Emissions	Emissions avoidance activities from counterfactual.	Avoided Grassland Conversion, Avoided Forest Conversion
Mixed (Mainly Avoided)	Allows for the generation of both avoidance and CDR credits, with the project type typically generating avoided emissions.	Some forms of Improved Forest Management, Sustainable Agriculture
Mixed (Mainly CDR)	Allows for the generation of both avoidance and CDR credits, with the project type typically generating avoided emissions.	Sustainable Grassland Management
Conventional CDR	CDR from land-based management of carbon stocks.	Afforestation and Reforestation, some forms of Improved Forest Management
Novel CDR	CDR from technology-based management of carbon stocks.	Biochar, DAC

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
CDM	AR-AM0014	Afforestation and reforestation of degraded mangrove habitats --- Version 3.0	Removal	Active	Conventional CDR	Afforestation and Reforestation
ARB		ARB Compliance Offset Protocol: U.S. Forest Projects	Mixed	Active	Mixed (Mainly Avoided)	Improved Forest Management
CAR		Soil Enrichment Protocol	Mixed	Active	Mixed (Mainly Avoided)	Sustainable Agriculture

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
ACR		Improved Forest Management (IFM) on non federal U.S. Forestlands	Mixed	Active	Mixed (Mainly Avoided)	Improved Forest Management
ACR		Improved Forest Management (IFM) on U.S. Timberlands	Mixed	Active	Mixed (Mainly Avoided)	Improved Forest Management
ACR		Reduction in Emissions from the Recycling of Transformer Oil	Emissions Reduction	Active	Emissions Reduction	Oil Recycling
Verra	VM003	Methodology for Improved Forest Management through Extension of Rotation Age, v1.3	Mixed	Active	Mixed (Mainly Avoided)	Improved Forest Management
Verra	VM004	Methodology for Conservation Projects that Avoid Planned Land Use Conversion in Peat Swamp Forests, v1.0	Mixed	Inactive since January 23 2023	Mixed (Mainly Avoided)	REDD+
Verra	VM006	Carbon Accounting for Mosaic and Landscape-scale REDD Projects, v2.2	Mixed	Active	Mixed (Mainly Avoided)	REDD+
Verra	VM007	REDD+ Methodology Framework (REDD-MF)	Mixed	Active	Mixed (Mainly Avoided)	REDD+
Verra	VM009	Methodology for Avoided Ecosystem Conversion	Avoided Emissions	Inactive since 27	Avoided Emissions	Wetlands

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
Verra	VM010	Improved Forest Management: Conversion from Logged to Protected Forest	Mixed	Active	Mixed (Mainly Avoided)	Improved forest management
Verra	VM012	Improved Forest Management in Temperate and Boreal Forests (LtPF), v1.2	Mixed	Active	Mixed (Mainly Avoided)	Improved forest management
Verra	VM015	Avoided Unplanned Deforestation	Avoided Emissions	Active	Avoided Emissions	Avoided deforestation
Verra	VM0017	Adoption of Sustainable Agricultural Land Management	Mixed	Inactive since 31 March 2023	Mixed (Mainly Avoided)	Sustainable Agriculture
Verra	VM0026	Methodology for Sustainable Grassland Management (SGM)	Mixed	Active	Mixed (Mainly CDR)	Sustainable Agriculture
Verra	VM0032	Methodology for the Adoption of Sustainable Grasslands through Adjustment of Fire and Grazing	Mixed	Active	Mixed (Mainly CDR)	Sustainable Agriculture
Verra	VM0033	Methodology For Tidal Wetland And Seagrass Restoration	Mixed	Active	Mixed (Mainly CDR)	Blue carbon
CDM	AR-ACM0001	Afforestation and reforestation of degraded land --- Version 5.2.0	Impermanent Removal	Not Active, replaced by AR-	Conventional CDR	Afforestation and Reforestation

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
CDM	AR-ACM0002	AR-ACM0002: Afforestation or reforestation of degraded land without displacement of pre-project activities --- Version 1.1.0	Impermanent Removal	Not Active, replaced by AR-	Conventional CDR	Afforestation and Reforestation
CDM	AR-ACM0003	Afforestation and reforestation of lands except wetlands --- Version 2.0	Impermanent Removal	Active	Conventional CDR	Afforestation and Reforestation
ACR		Afforestation and Reforestation of Degraded Lands (Forest Carbon Other)	Mixed	Active	Mixed (Mainly CDR)	Afforestation and Reforestation
CDM	AR-AM0005	Afforestation and reforestation project activities implemented for industrial and/or commercial uses --- Version 4.0	Impermanent Removal	Not Active, replaced by AR-	Conventional CDR	Afforestation and Reforestation
CDM	AR-AMS0006	Simplified baseline and monitoring methodology for small-scale silvopastoral - afforestation and reforestation project activities under the clean development mechanism --- Version 1.0	Impermanent Removal	Not active, replaced by	Conventional CDR	Afforestation and Reforestation
CAR	Forestry - MX	Mexico Forest Protocol	Impermanent Removal	Active	Conventional CDR	Improved forest management

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
GS	A/R	Afforestation/ Reforestation GHG Emissions Reduction & Sequestration Methodology	Mixed	Active	Mixed (Mainly CDR)	Afforestation and Reforestation
VS	VM0005	Methodology for Conversion of Low-productive Forest to High-productive Forest, v1.2	Mixed	Active	Mixed (Mainly Avoided)	Improved forest management
Plan Vivo	PV Climate	Plan Vivo Climate	Mixed	Active	Project by Project	Project by Project
CDM	AR-AMS0001	Simplified baseline and monitoring methodologies for small-scale A/R CDM project activities implemented on grasslands or croplands with limited displacement of pre-project activities --- Version 6.0	Impermanent Removal	Not active, replaced by	Conventional CDR	Afforestation and Reforestation
CDM	ACM0001	Flaring or use of landfill gas	Emissions Reduction	Active	Emissions Reduction	Landfill Methane
CDM	ACM0002	Grid-connected electricity generation from renewable sources --- Version 21.0	Emissions Reduction	Active	Emissions Reduction	Renewable Energy
CDM	ACM0003	Partial substitution of fossil fuels in cement or quicklime manufacture	Emissions Reduction	Not Active	Emissions Reduction	Biomass

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
ACR	Advanced	Emission Reduction Measurement and Monitoring Methodology for use of certified reclaimed HFC Refrigerants and advanced refrigeration systems	Emissions Reduction	Active	Emissions Reduction	Advanced Refrigerants
CDM	ACM0006	Electricity and heat generation from biomass --- Version 16.0	Emissions Reduction	Active	Emissions Reduction	Biomass
CDM	ACM0018	Electricity generation from biomass in power-only plants	Emissions Reduction	Active	Emissions Reduction	Biomass
CDM	ACM0010	Consolidated methodology for GHG emission reductions from manure management systems --- Version 3.0	Emissions Reduction	Not active	Emissions Reduction	Manure Methane Digester
CDM	ACM0022	Alternative waste treatment processes	Emissions Reduction	Active	Emissions Reduction	Biomass
CDM	ACM0009	Fuel switching from coal or petroleum fuel to natural gas	Emissions Reduction	Active	Emissions Reduction	Fuel Switching
ACR			Emissions Reduction	Active	Emissions Reduction	Landfill Methane
CDM	ACM0016	Mass Rapid Transit Projects	Emissions Reduction	Active	Emissions Reduction	Manure Methane Digester
CDM	ACM0014	Treatment of wastewater	Emissions Reduction	Active	Emissions Reduction	Methane Recovery in Wastewater
CDM	ACM0008	Abatement of methane from coal mines	Emissions Reduction	Active	Emissions Reduction	Mine Methane Capture

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
CDM	ACM0011	Fuel switching from coal and/or petroleum fuels to natural gas in existing power plants for electricity generation	Emissions Reduction	Active	Emissions Reduction	Natural Gas Electricity Generation
CDM	ACM0012	Waste energy recovery	Emissions Reduction	Active	Emissions Reduction	Waste Heat Recovery
CDM	AM0014	Natural gas-based package cogeneration --- Version 4.0	Emissions Reduction	Not Active	Emissions Reduction	Methane Recovery in Wastewater
CDM	AM0009	Recovery and utilization of gas from oil fields that would otherwise be flared or vented	Emissions Reduction	Active	Emissions Reduction	Fuel Switching
CDM	AM0019	Renewable energy projects replacing part of the electricity production of one single fossil fuel fired power plant that stands alone or supplies to a grid, excluding biomass projects	Emissions Reduction	Active	Emissions Reduction	Solar - Distributed
CDM	AM0023	Leak detection and repair in gas production, processing, transmission, storage and distribution systems and in refinery facilities	Emissions Reduction	Active	Emissions Reduction	Leak Detection & Repair in Gas Systems
CDM	AM0025	Alternative waste treatment processes	Emissions Reduction	Active	Emissions Reduction	Waste Incineration

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
CDM	AM0029	Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas	Emissions Reduction	Not Active	Emissions Reduction	Natural Gas Electricity Generation
CDM	AM0026	Methodology for zero-emissions grid-connected electricity generation from renewable sources in Chile or in countries with merit order based dispatch grid	Emissions Reduction	Active	Emissions Reduction	Hydropower
CDM	AM0036	Use of biomass in heat generation equipment --- Version 7.0	Emissions Reduction	Active	Emissions Reduction	Biomass
CDM	AM0072	Fossil Fuel Displacement by Geothermal Resources for Space Heating	Emissions Reduction	Active	Emissions Reduction	Geothermal
CDM	AM0080	Mitigation of greenhouse gases emissions with treatment of wastewater in aerobic wastewater treatment plants	Emissions Reduction	Active	Emissions Reduction	Methane Recovery in Wastewater
CDM	AMS-I.A.	Electricity generation by the user	Emissions Reduction	Active	Emissions Reduction	Solar Lighting
CDM	AMS-I.B.	Mechanical energy for the user with or without electrical energy	Emissions Reduction	Active	Emissions Reduction	Improved Irrigation Management

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
CDM	AMS-I.C	Thermal energy production with or without electricity	Emissions Reduction	Active	Emissions Reduction	Biomass
CDM	AMS-I.D.	Grid connected renewable electricity generation	Emissions Reduction	Active	Emissions Reduction	Wind
CDM	AMS-I.E.	Switch from non-renewable biomass for thermal applications by the user	Emissions Reduction	Active	Emissions Reduction	Biomass
CDM	AMS-I.F.	Renewable electricity generation for captive use and mini-grid	Emissions Reduction	Active	Emissions Reduction	Renewable electricity
CDM	AMS-I.I.	Biogas/ biomass thermal applications for households/ small users	Emissions Reduction	Active	Emissions Reduction	Biodigesters
CDM	AMS-I.L.	Electrification of rural communities using renewable energy	Emissions Reduction	Active	Emissions Reduction	Hydropower
CDM	AMS-II.C.	Demand-side energy efficiency activities for specific technologies	Emissions Reduction	Active	Emissions Reduction	Biomass
CDM	AMS-II.E.	Energy efficiency and fuel switching measures for buildings	Emissions Reduction	Active	Emissions Reduction	Energy Efficiency
CDM	AMS-II.J.	Demand-side activities for efficient lighting technologies	Emissions Reduction	Not Active	Emissions Reduction	Lighting

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
CDM	AMS-III. AJ.	Recovery and recycling of materials from solid wastes	Emissions Reduction	Active	Emissions Reduction	Waste Recycling
CDM	AMS-III. AR.	Substituting fossil fuel based lighting with LED lighting systems	Emissions Reduction	Active	Emissions Reduction	Solar Lighting
CDM	AMS-III. AU	Methane emission reduction by adjusted water management practice in rice cultivation	Emissions Reduction	Active	Emissions Reduction	Clean Water
CDM	AMS-III. AV.	Low greenhouse gas emitting safe drinking water production systems	Emissions Reduction	Active	Emissions Reduction	Drinking Water
CDM	AMS-II.B.	Supply side energy efficiency improvements – generation	Emissions Reduction	Active	Emissions Reduction	Energy Efficiency
CDM	AMS-II.D.	Energy efficiency and fuel switching measures for industrial facilities	Emissions Reduction	Active	Emissions Reduction	Energy efficiency and fuel switching measures
CDM	AMS-II.F.	Energy efficiency and fuel switching measures for agricultural facilities and activities	Emissions Reduction	Active	Emissions Reduction	Composting
CDM	AMS-III. AO	Methane recovery through controlled anaerobic digestion	Emissions Reduction	Active	Emissions Reduction	Methane

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
CDM	AMS-III-AR	Substituting fossil fuel based lighting with LED lighting systems	Emissions Reduction	Active	Emissions Reduction	Energy Efficiency
CDM	AMS-III.BG	Emission reduction through sustainable charcoal production and consumption	Emissions Reduction	Active	Emissions Reduction	Cookstoves
CDM	AMS.III.H	Methane recovery in wastewater treatment	Emissions Reduction	Active	Emissions Reduction	Methane
CDM	AMS-II.G.	Energy efficiency measures in thermal applications of non-renewable biomass	Emissions Reduction	Active	Emissions Reduction	Cookstoves
CDM	AMS-III.Q.	Waste Energy Recovery (gas/heat/pressure) Projects	Emissions Reduction	Active	Emissions Reduction	Industrial
CDM	AMS-II.H.	Energy efficiency measures through centralization of utility provisions of an industrial facility	Emissions Reduction	Active	Emissions Reduction	Energy Efficiency
CDM	AMS-III.R	Methane recovery in agricultural activities at household/small farm level	Emissions Reduction	Active	Emissions Reduction	Biodigesters

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
CDM	AMS-III.Y	Methane avoidance through separation of solids from wastewater or manure treatment systems	Emissions Reduction	Active	Emissions Reduction	Solid Waste Separation
CDM	AMS-III.Z	Fuel Switch, process improvement and energy efficiency in brick manufacture	Emissions Reduction	Active	Emissions Reduction	Brick
ARB		ARB Compliance Offset Protocol: Capturing and Destroying Methane from Manure Management Systems	Emissions Reduction	Active	Emissions Reduction	Methane Management from Agriculture
ARB		ARB Compliance Offset Protocol: Destruction of U.S. Ozone Depleting Substances Banks	Emissions Reduction	Active	Emissions Reduction	Ozone Depleting Substances Recovery & Destruction
ARB		ARB Compliance Offset Protocol: Mine Methane Capture Projects	Emissions Reduction	Active	Emissions Reduction	Mine Methane Capture
CAR		CAR Adipic Acid Production Protocol	Emissions Reduction	Active	Emissions Reduction	Chemical Processes
CAR		CAR Article 5 Ozone Depleting Substances Protocol	Emissions Reduction	Active	Emissions Reduction	Ozone Depleting Substances Recovery & Destruction

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
CAR		CAR Mexico Landfill Protocol	Emissions Reduction	Active	Emissions Reduction	Landfill Methane
CAR		CAR Mexico Livestock Protocol	Emissions Reduction	Active	Emissions Reduction	Manure Methane Digester
CAR		CAR Nitric Acid Production Protocol	Emissions Reduction	Active	Emissions Reduction	Chemical Processes
CAR		CAR Organic Waste Digestion Protocol	Emissions Reduction	Active	Emissions Reduction	Waste
CAR		CAR U.S. Landfill Protocol	Emissions Reduction	Active	Emissions Reduction	Landfill Methane
CAR		CAR U.S. Livestock Protocol	Emissions Reduction	Active	Emissions Reduction	Manure Methane Digester
ACR		Certified Reclaimed HFC Refrigerants, Propellants, and Fire Suppressants	Emissions Reduction	Active	Emissions Reduction	Chemical Processes
CAR		Climate Action Reserve Landfill Project Protocol	Emissions Reduction	Active	Emissions Reduction	Landfill Methane
ACR		Destruction of Ozone Depleting Substances (ODS) and High-Global Warming Potential (GWP) Foam	Emissions Reduction	Active	Emissions Reduction	Ozone Depleting Substances Recovery & Destruction
ACR		Emission Reductions from Enhanced Oil Recovery	Emissions Reduction	Active	Emissions Reduction	Carbon Capture & Enhanced Oil Recovery
ACR		Emissions Reductions though Anti-Idling Technologies	Emissions Reduction	Active	Emissions Reduction	

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
GS		GS Advanced Hull Coatings v2.	Emissions Reduction	Active	Emissions Reduction	
GS		GS Alternative Ignition Coal Fires v1.	Emissions Reduction	Active	Emissions Reduction	Cookstoves
GS		GS Baseline and Monitoring Methodology Biodigester v1.	Emissions Reduction	Not Active	Emissions Reduction	Biodigesters
GS		GS Methodology for emission reductions from safe drinking water supply	Emissions Reduction	Active	Emissions Reduction	Drinking Water
GS		GS Methodology for Improved Cook stoves and Kitchen Regimes v1.	Emissions Reduction	Active	Emissions Reduction	Cookstoves
GS		GS Methodology for Improved Cook stoves and Kitchen Regimes v2.	Emissions Reduction	Active	Emissions Reduction	Cookstoves
GS		GS MS Simplified Methodology for Efficient Cookstoves v1.	Emissions Reduction	Active	Emissions Reduction	Cookstoves
GS		GS Revised Methodology for Manure Management Systems and MSW v1.	Emissions Reduction	Active	Emissions Reduction	Manure Methane Digester
GS		GS SS Ecologically Sound Fuel Switch to Biomass v1.	Emissions Reduction	Active	Emissions Reduction	Biomass

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
GS	GS TPDDTEC	Technologies and Practices to Displace Decentralized Thermal Energy Consumption v1-4	Emissions Reduction	Active v 4.0	Emissions Reduction	Cookstoves
GS		GS Water Access and WASH Methodology v1.	Emissions Reduction	Active	Emissions Reduction	Water
GS		Other/Not Disclosed	Emissions Reduction	Active	Emissions Reduction	
ACR		Transition to Advanced Formulation Blowing Agents in Foam Manufacturing and Use	Emissions Reduction	Active	Emissions Reduction	HFC Replacement in Foam Production
ACR		Use of Certified Reclaimed HFC Refrigerants	Emissions Reduction	Active	Emissions Reduction	Advanced Refrigerants
Verra	VM0014	Interception and Destruction of Fugitive Methane from Coal Bed Methane (CBM) Seeps	Emissions Reduction	Active	Emissions Reduction	Mine Methane Capture
Verra	VM0016	Recovery and Destruction of Ozone-Depleting Substances (ODS) from Products	Emissions Reduction	Active	Emissions Reduction	Ozone Depleting Substances Recovery & Destruction
Verra	VM0018	Energy Efficiency and Solid Waste Diversion Activities within a Sustainable Community	Emissions Reduction	Active	Emissions Reduction	Energy Efficiency

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
Verra	VM0025	Campus Clean Energy and Energy Efficiency, v1.0	Emissions Reduction	Active	Emissions Reduction	University Campus Emission Reductions
Verra	VM0038	Methodology for Electric Vehicle Charging Systems	Emissions Reduction	Active	Emissions Reduction	Electric Vehicles & Charging
Verra	VM0041	Methodology for the Reduction of Enteric Methane Emissions from Ruminants through the Use of Feed Ingredients	Emissions Reduction	Active	Emissions Reduction	Feed Additives
Verra	VM0043	Methodology for CO2 Utilization in Concrete Production	Mixed	Active	Mixed (Mainly CDR)	Carbon Capture in Cement
Verra	VMD0038	Campus Clean Energy Efficiency Campus-Wide Module	Emissions Reduction	Active	Emissions Reduction	Electric Vehicles & Charging
Verra	VMR0002	Revisions to ACM0008 to Include Methane Capture and Destruction from Abandoned Coal Mines	Emissions Reduction	Active	Emissions Reduction	Mine Methane Capture
Verra	VMR0003	Revisions to AMS-III.Y to Include Use of Organic Bedding Material	Emissions Reduction	Active	Emissions Reduction	Solid Waste Handling
Verra	VMR0006	Energy Efficiency and Fuel Switch Measures in Thermal Applications	Emissions Reduction	Active	Emissions Reduction	Cookstoves
CDM	AM0001		Emissions Reduction	Active	Emissions Reduction	HFC23 Destruction

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
CDM	AM0034	Catalytic reduction of N2O inside the ammonia burner of nitric acid plants	Emissions Reduction	Not Active, replaced by	Emissions Reduction	Chemical industry
CDM	AM0065	Replacement of SF6 with alternate cover gas in the magnesium industry	Emissions Reduction	Active	Emissions Reduction	SF6 Replacement
CDM	AM0073	GHG emission reductions through multi-site manure collection and treatment in a central plant	Emissions Reduction	Active	Emissions Reduction	Manure Methane Digester
CDM	AMS-III.H.	Methane recovery in wastewater treatment	Emissions Reduction	Active	Emissions Reduction	Methane Recovery in Wastewater
CDM	AMS-IL.	Electrification of rural communities using renewable energy	Emissions Reduction	Active	Emissions Reduction	Solar - Distributed
CDM	AMS-III. BM	Lightweight two and three wheeled personal transportation	Emissions Reduction	Active	Emissions Reduction	Bicycles
CDM	AMS-III.D.	Methane recovery in animal manure management systems	Emissions Reduction	Active	Emissions Reduction	Manure Methane Digester
CDM	AMS-III.F.	Avoidance of methane emissions through controlled biological treatment of biomass	Emissions Reduction	Active	Emissions Reduction	Bundled Compost Production and Soil Application
CDM	AMS-III.G.	Landfill methane recovery	Emissions Reduction	Active	Emissions Reduction	Landfill Methane

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
CDM	AR-AM0003	Afforestation and reforestation of degraded land through tree planting, assisted natural regeneration and control of animal grazing	Impermanent Removal	Not active, replaced by AR-	Conventional CDR	Afforestation/ Reforestation
CDM	AR-AMS0005	Simplified baseline and monitoring methodology for small-scale afforestation and reforestation project activities under the clean development mechanism implemented on lands having low inherent potential to support living biomass	Impermanent Removal	Not active, replaced by AR-	Conventional CDR	Afforestation/ Reforestation
CAR		Capturing and Destroying Methane from Coal and Trona Mines in North America	Emissions Reduction	Unclear	Emissions Reduction	Mine Methane Capture
CAR		Nitrogen Management Protocol	Emissions Reduction	Active	Emissions Reduction	Nitrogen Management
CAR		ECY Compliance Offset Protocol: Ozone Depleting Substances Projects	Emissions Reduction	Active	Emissions Reduction	Ozone Depleting Substances Recovery & Destruction

Source	Code	Title	Methodology Type	Status	SOCDR Classification	Project Type
CAR		Emission Reductions through Truck Stop Electrification	Emissions Reduction	Unclear	Emissions Reduction	Truck Stop Electrification
Verra	VM0003	Methodology for Improved Forest Management through Extension of Rotation Age	Emissions Reduction	Active	Emissions Reduction	Improved Forest Management
Verra	VM0008		Emissions Reduction	Active	Emissions Reduction	
Verra	VM0017	Adoption of Sustainable Agricultural Land Management	Mixed	Inactive since 31 March 2023	Mixed (Mainly Avoided)	Sustainable Agriculture

Buyer Analysis

For buyers on the VCM at large market reports and public articles were used to gauge information on VCM buyers (Ecosystem Marketplace, MSCI/Trove), which merged purchasing data from different sources, e.g. public retirements, CDP data, etc.

For the assessment of buyers of novel CDR, the list of buyers from CDR.fyi was enhanced with information on buyers' backgrounds in terms of sector (as per SBTi) and industry (as per NetZero Tracker). A combination of internet research and cross-references with existing sources (e.g. SBTi / NZT) to determine the respective sector and industry per unique buyer.

A4.3 Caveats and Limitations

The presence of mixed methodologies means there is considerable uncertainty pertaining to the precise volume of removals on the VCM.

Presently, the serialised attributes of an individual carbon credit do not disclose its atmospheric contribution as avoidance, reduction or removal. Attribution on a methodological basis resolves this quandary for most carbon credits. However, the presence of mixed methodologies means that exact quantification of removal deployment is impossible. While some project design descriptions and reporting for projects do disclose exact volumes, this is not true for all. Our classification framework seeks to strike a balance between adding more detail than a 'mixed' category, and being able to classify projects consistently irrespective of the differing qualities and availability of their underlying documentation. This is beginning to change, and so more precise estimates may be more

available in future.