

A6.4-SB006-AA-A14

Information Note

Draft elements for the recommendation on activities involving removals

Version 01.1



United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. The CMA, at its fourth session, requested the Supervisory Body to elaborate and further develop recommendations on activities involving removals, for consideration and adoption by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement at its fifth session (December 2023). It further requested the Supervisory Body, while developing the recommendations, to consider the views of Parties and admitted observer organizations received in response to its request contained in decision 7/CMA.4, paragraph 19, broader inputs from stakeholders provided in a structured public consultation process¹ and the mandate provided to the Supervisory Body contained in paragraph 24(a)(ix) of RMP.

2. Purpose

2. The purpose of this document is to advance the work to elaborate and further develop draft recommendations, on activities involving removals, including appropriate monitoring, reporting, accounting for removals and crediting periods, addressing reversals, avoidance of leakage, and avoidance of other negative environmental and social impacts, in addition to the activities referred to in chapter V of the RMP (Article 6, paragraph 4, activity cycle)..

3. Current Work

3. This document includes:
 - (a) Text reproduced from the “Recommendations on activities involving removals under the mechanism established under Article 6, paragraph 4, of the Paris Agreement” contained in the annex to the addendum of the Supervisory Body’s annual report to CMA.4 (hereinafter referred to as the SB 003 recommendations).;
 - (b) New proposals based on public inputs received in response to the calls for public inputs, including the call for structured consultation that was opened following SB 005 meeting. In that regard, it should be noted that:
 - (i) New proposals are neither the recommendations of the secretariat nor that of the informal working group on removals but are rather options prepared to facilitate structured discussion by the Supervisory Body. All the options may need further analysis and assessment if the Supervisory Body is disposed to pursue them;
 - (ii) Secretariat synthesised, paraphrased and grouped the information in the submissions for easy readability and flow of information. In that process, despite the best efforts, some relevant information may have been unintentionally omitted or not correctly represented. Also, it was difficult to fit

¹ See decision 7/CMA.4, paragraphs 21 and 22, for the request, contained in document FCCC/PA/CMA/2022/10/Add.2 available at: <https://unfccc.int/documents/626570>.

some information under the prevailing elements and categories. Moreover, due to some submissions being received late and paucity of time, some inputs may not have been considered. Future iterations of this document will take into account these additional inputs. Readers are encouraged to consult the full submissions available at the “Calls for input” web page of the Supervisory Body’s public web site.² to fully understand the background and context in which proposals are made in the submissions. These are also listed under the Appendix of this document.

4. Additionally, all inputs received in response to SB 005 calls for public inputs on removals are summarised in separate documents titled ‘Compilation of inputs received in response to the public consultation on activities involving removals’ (A6.4-SB006-AA-A09).
5. In-text citations in this document through an acronym and a reference number (e.g. ROK,57; HLB,1) are included to enable easy access to original submission. Reference section of this document also includes hyperlinks to the submissions.

Table 1. List of Parties who responded to the call for public input

Submission date	Party	Acronym	Reference number
22/05/2023	Russian Federation	RU	53
09/05/2023	United Kingdom	UK	54
02/05/2023	Papua New Guinea on behalf of Coalition for Rainforest Nations	PN	55
17/04/2023	Norway	NW	56
07/04/2023	Republic of Korea	ROK	57
23/03/2023	Colombia on behalf of Chile, Colombia, Guatemala, Panama, Paraguay, and Peru	CO	58
15/03/2023	European Union on behalf of European Union	EU	59

Table 2 List of stakeholders who responded to the calls for public input

Submission date	Stakeholder	Acronym	Reference number
04/10/22	Hayes Limnology Lab: Ocean alkalinity enhancement using electrolysis	HLB	1
06/10/22	Planetary Technologies: Ocean alkalinity methods	PT	2
10/10/22	GCC: Inputs on Annex 5 to the SB002 annotated agenda	GCC	4
11/10/22	Winrock: ACR & ART input-6.4 removals public comment	ACR	8
11/10/22	Wetlands International: Inputs on removal activities	WI	9
11/10/22	Verdane: Response to UNFCCC Article 6.4 call	VA	10

² See <https://unfccc.int/process-and-meetings/the-paris-agreement/article-64-mechanism/calls-for-input>.

Submission date	Stakeholder	Acronym	Reference number
11/10/22	TREEO: Review Article 6.4 mechanism	TREEO	11
11/10/22	TNC: Removals and REDD-plus	TNC	12
11/10/22	Timber Finance Initiative: Engineered timber as carbon storage	TFI	13
11/10/22	The HBAR Foundation: Response of THF to UNFCCC Calls for Input on A6.4M	HBAR	14
11/10/22	Stockholm-Exergi: Contribution by Stockholm Exergi in response to UNFCCC's Call for input 2022	SE	15
11/10/22	Running Tide: Article 6.4 input for ocean-based carbon removal	RT	17
11/10/22	Perspectives: Input on removal activities under A6.4 Mechanisms	PCR	18
11/10/22	Orsted: Peatlands and BECCS	OD	19
11/10/22	Instituto Acao Verde: Deforestation Double Counting	IAV	22
11/10/22	ICLRC: Response to call for input 2022-Activities involving removals	ICLRC	24
11/10/22	GCCSI: Submission to the A6.4 Supervisory Body Call for Inputs 2022 - SB002-A05	GCCSI	25
11/10/22	Evident C-capsule: Inputs on removal activities	ECP	27
11/10/22	Drax: Response to the A6 consultation	DG	29
11/10/22	DAC Coalition: Recommendations from Direct Air Capture Coalition	DC	30
11/10/22	Climeworks: Response to the documents regarding removals under Article 6.4	CW	31
11/10/22	Clean Air Task Force: CATF Article 6.4 Comments	CAT	32
11/10/22	Cercarbono: Additionality and double counting	CCO	33
11/10/22	Center for Clean Air Policy: CCAP Submission Annex 5 to the SB002	CCAP	34
11/10/22	Carbon Recycling: Contributions to the Information Note document	CR	36
11/10/22	Carbon Finance Labs: UNFCCC Article 6.4 Contribution	CFL	38
11/10/22	Carbon Engineering: Role of DACCS removal activities	CE	39
11/10/22	Carbon Business Council: Inputs on removal activities	CBC	40
11/10/22	CARBFIX: Subsurface mineralization of CO ₂	CF	41
11/10/22	BeZeroCarbon: Consultation response	BZC	43
11/10/22	Bellona: Response to CDR call for input	BF	46

Submission date	Stakeholder	Acronym	Reference number
11/10/22	Arcusa S: Call for input 2022 - activities involving removals under the Article 6.4 Mechanism	SA	47
11/10/22	ALLCOT: Inputs on Land-Based Removals	ALLCOT	48
13/10/22	Center for International Environmental Law: CIEL Submission on Article 6.4 Removals (late submission)	CIEL	50
14/10/22	IETA: Removals input for 6.4SB (late submission)	IETA	51
27/10/22	MDB Working Group comments on the annotated agenda of the third meeting of the Supervisory Body	MDB WG	53
15/03/23	Office of the United Nations High Commissioner for Human Rights (OHCHR) on behalf of The Office of the UN High Commissioner for Human Rights	OHCHR	60
10/04/23	Action Group on Erosion Technology and Concentration (ETC group) on behalf of Action Group on Erosion Technology and Concentration (ETC Group)	ETC	61
21/03/23	Oeko-Institut e.V. Institute for Applied Ecology on behalf of Stockholm Environment Institute, University of Edinburgh and Oeko-Institut	OI	62
17/03/23	Bellona Foundation (BF) on behalf of Bellona Foundation	BF	63
16/03/23	Center for International Environmental Law (CIEL)	CIEL	64
16/03/23	Heinrich Böll Foundation (HBF)	HBL	65
15/03/23	Global Carbon Capture and Storage Institute on behalf of The Global CCS Institute	GCCSI	66
15/03/23	LIFE Education Sustainability Equality (LESE) on behalf of Women and Gender	LESE	67
15/03/23	Carbon Capture and Storage Association (CCSA)	CCSA	68
15/03/23	ActionAid International on behalf of CLARA submission, submitted by ActionAid International	CLARA	69
15/03/23	International Emissions Trading Association (IETA) on behalf of International Emissions Trading Association (IETA)	IETA	70
15/03/23	WWF	WWF	71
15/03/23	Institute for Agriculture and Trade Policy (IATP)	IAP	72
15/03/23	Friends of the Earth International on behalf of Friends of the Earth International	FoE Int	73
15/03/23	Institute for Governance and Sustainable Development (IGSD)	IGSD	74
15/03/23	The University of Texas at Austin	UT	77

Submission date	Stakeholder	Acronym	Reference number
14/03/23	Indigenous Education Network of Turtle Island (IENTI/IEN) on behalf of Indigenous Environmental Network (IEN)	CMW	78
14/03/23	Carbon Market Watch (CMW) on behalf of Carbon Market Watch (CMW)	CMW	78
14/03/23	Plymouth Marine Laboratory (PML)	PML	79
14/03/23	Environmental Defense Fund (EDF) on behalf of Environmental Defense Fund, Conservation International, The Nature Conservancy, Wetlands International, Rare, Ocean Conservancy, Ocean & Climate Platform, National Wildlife Federation	EDF	80
20/04/23	Stockholm Exergi	SE	81
31/03/23	Drax Group	DG	82
27/03/23	Friends of the Earth Germany/ BUND	FoE/BUND	83
22/03/23	Friends of the Earth England, Wales and Northern Ireland	FoE UK	84
17/03/23	Carbon Finance Lab	CFL	85
17/03/23	AirCapture and Denominator	AD	86
17/03/23	IEAGHG	IEAGHG	88
22/05/23	Jack Roberts	JR	89
22/05/23	Jason Demeny	JD	90
22/05/23	Thoralf Gutierrez (Sirona Tech)	TG	91
22/05/23	Richard Edwards (Clo Carbon Cymru)	Clo	92
22/05/23	Paul Halloran (University of Exeter)	UoEx	93
22/05/23	CarbonRun	CR	94
22/05/23	Inplanet GmbH	IP	95
17/03/23	Inplanet GmbH	IP	95
22/05/23	Prof. Ning Zeng (University of Maryland)	UMD	96
22/05/23	Tim Isaksson	TI	97
22/05/23	Planetary Technologies	PT	98
22/05/23	Paolo Piffaretti (Carbonx)	CX	99
22/05/23	David Andersson (ECOERA AB)	ECOERA	100
22/05/23	Adam (Zopeful Climate)	ZC	101
23/05/23	Hanna Ojanen (Carbonculture)	CC	102
22/05/23	Tony S. Hamer (GHG PATS)	PATS	103
23/05/23	Carbon-Based Consulting LLC	CB	104
23/05/23	Carbon Removal India Alliance (CRIIA)	CRIIA	105

Submission date	Stakeholder	Acronym	Reference number
23/5/2023	BlueSkies Minerals Inc.	BS	106
24/05/23	Carbon Business Council	CBC	107
24/05/23	Kaja Voss (Inherit Carbon Solutions AS)	ICS	108
24/05/23	Lead authors of the State of Carbon Dioxide Removal Report	SCDRR	109
24/05/23	Cella	CLLA	110
24/05/23	Stockholm Exergi	SE	111
24/05/23	Plymouth Marine Laboratory	PML	112
24/05/23	Injy Johnstone	IJ	113
24/05/23	OpenAir	OA	114
24/05/23	OXO Earth	OXO	115
26/05/23	Keep Our Sea Chemical Free	KOSCF	116
27/05/23	Marginal Carbon AB	MC	117
24/05/23	Charm Industrial	CI	118
24/05/23	Carbon Finance Labs	CFL	119
24/05/23	Dr. Robert Chris	RC	120
25/05/23	Stockholm Environment Institute; University of Edinburgh; Oeko-Institut	SEI+	121
27/05/23	Linden Trust for Conservation	LTC	122
29/05/23	1PointFive	1.5	123
24/05/23	Seafields	SF	124
24/05/23	Microsoft Inc.	MS	125
24/05/23	Climeworks AG	CW	126
27/05/23	Equatic	EQ	127
28/05/23	IEAGHG	IEAGHG2	128
29/05/23	Business Council for Sustainable Energy	BCSE	129
30/05/23	Business Council for Sustainable Energy	BCSE	129
31/05/23	Running Tide	RT	130
25/05/23	Negative Emissions Platform and other co-signatories	NEP	131
10/06/23	Phil Kithil	PK	132
11/06/23	CCU Alliance	CCU	133
12/06/23	Timber Finance	Tfi	134
25/05/23	Air Capture	AC	135
25/05/23	Mati Carbon Removals	MCR	136
25/05/23	Center for Negative Carbon Emissions	CNCE	137

Submission date	Stakeholder	Acronym	Reference number
25/05/23	CarbonPlan	CP	138
25/05/23	Captura	CC	139
25/05/23	UNDO	UNDO	140
25/05/23	Neustark AG	N-AG	141
25/05/23	44.01	44.01	142
25/05/23	IETA	IETA	143
25/05/23	Carbon Direct.Inc	CD	144
25/05/23	The Doers Club	CRDC	145
25/05/23	Drax Group	DG	146
25/05/23	Carbfix	CX	147
25/05/23	Puro.earth	PE	148
25/05/23	CO2RE Hub	CO2RE	149
25/05/23	Swiss Lenten Fund	SLF	150
25/05/23	Coalition for Negative Emissions	CNE	151
25/05/23	Climate Analytics GmbH	CA	152
25/05/23	Climate Action Platform Africa	CAPA	153
25/05/23	The Bioenergy Association of Finland	BEAF	154
25/05/23	Zero Emissions Platform	ZEP	155
25/05/23	Leefmilieu	LU	156
25/05/23	Carbon Gap	CG	157
25/05/23	Orsted	ORST	158
25/05/23	The Bellona Foundation	BF	159
25/05/23	Fern	FERN	160
25/05/23	Carbon Capture and Storage Association	CCSA	161
25/05/23	Dogwood Alliance	DA	162
25/05/23	CCS+ Initiative	CCSI	163
25/05/23	Stripe Climate & Shopify	SCS	164
25/05/23	Carboniferous	CF	165
25/05/23	National Wildlife Federation	NWF	166
24/05/23	KLIMPO	KLIMPO	167
25/05/23	Direct Air Capture Coalition	DACC	168
25/05/23	Octavia Carbon	OC	169
25/05/23	Aspiration	AN	170
25/05/23	Global CCS Institute	GCCSI	171

Submission date	Stakeholder	Acronym	Reference number
24/05/23	Carbon Capture Inc.	CCI	172
25/05/23	Biofuelwatch	BW	173
25/05/23	Carbon Capture Coalition	CCC	174
25/05/23	Environmental Defense Fund	EDF	175
24/05/23	Paebbl	PBL	176
25/05/23	EFI Foundation	EFIF	177
25/05/23	Recarb	RB	178
25/05/23	World Resources Institute	WRI	179
25/05/23	Clean Air Task Force (CATF)	CATF	180
24/05/23	Edison Electric Institute (EEI)	EEI	181
25/05/23	Ocean Visions	OV	182
25/05/23	John M. Fitzgerald	JF	183
26/05/23	Prof. William R Moomaw (Tufts University)	WRM	184
26/05/23	PD Forum	PD-F	185
25/05/23	CIBOLA Partners	CP	186
25/05/23	Heirloom	HM	187
25/05/23	Perspectives Climate Research GmbH	PERSP	188
25/05/23	Carbon Engineering	CE	189
26/05/23	Boston Consulting Group	BCG	190
25/05/23	Mary S. Boot, Partnership for Policy Integrity and Chad Hansen, John Muir Project	PPI	191
25/05/23	Nasdaq Stockholm	NSQ	192
09/06/23	Michael Hayes	MHS	200
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14/06/23	Seal Research Trust	SRT	202
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15/06/23	Sky Harvest Carbon (Will Clayton)	SHC	205
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16/06/23	Finnwatch	FNW	208
16/06/23	ECOERA	ECOERA	209
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16/06/23	Carbon Business Council	CBC	211

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16/06/23	Rick Berg (Nori.inc)	NORI	212
16/06/23	Thomas Hoffmann (Decarbo Engineering GmbH)	THN	213
16/06/23	Timber Finance	TFI	214
16/06/23	CarbonPool	CPOOL	215
17/06/23	OceanForesters	OF	216
17/06/23	Takachar	TAK	217
18/06/23	Carbo Culture	CCE	218
18/06/23	Rewind.earth	REW	219
18/06/23	Clean Air Tech Limited	CAT	220
18/06/23	Elitelco	ELI	221
18/06/23	Otherlab	OLAB	222
18/06/23	Carbon Click, S.A. de C.V	CCL	223
19/06/23	Arca	ARC	224
19/06/23	AirMiners	AMN	225
19/06/23	Seaweed Generation	SWG	226
19/06/23	Max Planck Institute for Biogeochemistry	MPI	227
19/06/23	Carbon Mineralization Flagship Center	CNF	228
19/06/23	Green East Master Ltd	GEM	229
19/06/23	The Charles Darwin Rescue Plan	CDR	230
19/06/23	International Biochar Initiative	IBI	231
19/06/23	CarbonHemp Blo.Inc	CHB	232
19/06/23	CCS+ Initiative	CCSI	233
19/06/23	Microsoft	MS	234
19/06/23	ecoLocked GmbH	ELG	235
19/06/23	University of Hamburg	UoH	236
19/06/23	German Biochar Association	GBA	237
19/06/23	Omega Terraform	OT	238
19/06/23	Carbon Lockdown Project	CLP	239
19/06/23	Carbofex Oy	CFO	240
19/06/23	Everest Carbon Inc	ECI	241
19/06/23	Dead Battery Depot.ltd	DBD	242
19/06/23	CROPS Carbon International LTD	CROPS	243
19/06/23	Stockholm Exergi	SE	244
19/06/23	Carbonfuture	CFUT	245

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19/06/23	C-Capsule	CCAP	246
19/06/23	Captura	CC	247
19/06/23	44.01	44.01	248
19/06/23	XPRIZE	XPZ	249
19/06/23	Skyrenu Technologies	STECH	250
19/06/23	Carbuna AG	CAG	251
19/06/23	The Bellona Foundation	BF	252
19/06/23	Noya PBC	NPBC	253
19/06/23	Equatic	EQ	254
19/06/23	IATA and Airbus	IATA	255
19/06/23	Rivotto	RTTO	256
19/06/23	U.S. Biochar Coalition	USBC	257
19/06/23	FEWCOOP SA	FEWCOOP	258
19/06/23	Cella Mineral Storage, Inc	CLLA	259
19/06/23	Rethinking Removals Doers Club	RRDC	260
19/06/23	Eyob Tenkir Shikur	ETS	261
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19/06/23	Black Bull Biochar (BBB)	BBB	264
19/06/23	DEMOCritUS	DEMO	265
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19/06/23	Octavia Carbon	OC	268
19/06/23	Carbon Gap	CG	269
19/06/23	John M. Fitzgerald	JMF	270
19/06/23	Drax Group Plc	DG	271
19/06/23	ARCTECH USA	AU	272
19/06/23	Mati Carbon Removals	MCR	273
19/06/23	Direct Air Capture Coalition	DACC	274
19/06/23	Grantham Research Institute on Climate Change and the Environment at the London School of Economics and Political Science	GRI/LSE	275
19/06/23	Sitos Group, Inc	SGI	276
19/06/23	Crown Monkey	CM	277
19/06/23	Jim Ransom	JR	278

Submission date	Stakeholder	Acronym	Reference number
19/06/23	Terra	TERRA	279
19/06/23	The European Biochar Industry Consortium	EBIC	280
19/06/23	Inventive Resources, Inc	IRI	281
19/06/23	STX	STX	282
20/06/23	HBAR Foundation	HBAR	283
20/06/23	Inversion Point Technologies Ltd	IPT	284
20/06/23	Oeko-Institut, Greenhouse Gas Management Institute, Stockholm Environment Institute, University of Edinburgh Business School, Infrac, Carbon Limits, and Calyx Global	OI	285
20/06/23	remove	ROVE	286
20/06/23	Carbon Capture and Storage Association	CCSA	287
20/06/23	Running Tide	RT	288
20/06/23	ActionAid International	AAI	289
20/06/23	Carbon Recycling	CRCY	290
20/06/23	Planboo	PBOO	291
20/06/23	Spark Climate Solutions	SCL	292
20/06/23	From the Ground Up	FGU	293
20/06/23	TecnoFiltro SCS	TFSCS	294
20/06/23	Planetary Technologies	PT	295
20/06/23	Levitree, Inc	LVI	296
20/06/23	Partanna	PNNA	297
20/06/23	Earth's Blue Aura	EBA	298
20/06/23	Greg H. Rau	GHR	299
20/06/23	Daniel Schwaag	DS	300
20/06/23	JPMorgan Chase & Co	JPM	301
20/06/23	Climeworks	CWORKS	302
20/06/23	International Coordinating Council of Aerospace Industries Associations	ICCAIA	303
21/06/23	Ted Christie-Miller (BeZERO)	BEZERO	304
21/06/23	Sylvera	SYRA	305
22/06/23	Pachama	PACHA	306
22/06/23	Conservation International	CI	307
23/06/23	Carbon Market Watch	CMW	308
24/06/23	Austrian Biomass Carbonisation Society	ABCS	309
25/06/23	PYREG GmbH	PYREG	310

Submission date	Stakeholder	Acronym	Reference number
26/06/23	IETA	IETA	311
23/06/23	Climate Analytics	CA	312
27/06/23	south pole	SP	313
29/06/23	Global CCS Institute	GCCSI	314
19/06/23	Carbon Capture Machine	CCM	315

4. Subsequent work and timelines

6. Further work will be carried out to develop draft recommendations based on the guidance that will be received from the Supervisory Body.

5. Recommendations to the Supervisory Body

7. The Supervisory Body may wish to consider this document and provide guidance for further work.

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1. Procedural background

1. The Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA), by its decision 3/CMA.3 “Rules, modalities and procedures for the mechanism established by Article 6, paragraph 4, of the Paris Agreement”, paragraph 6(c), requested the Supervisory Body of the mechanism established by Article 6, paragraph 4, of the Paris Agreement (Article 6.4 mechanism), to elaborate and further develop, on the basis of the rules, modalities and procedures of the Article 6.4 mechanism, recommendations on activities involving removals, including appropriate monitoring, reporting, accounting for removals and crediting periods, addressing reversals, avoidance of leakage, and avoidance of other negative environmental and social impacts, in addition to the activities referred to in chapter V of the annex (Article 6, paragraph 4, activity cycle), to be considered at its fourth session (November 2022).¹
2. In response to this request, the Supervisory Body agreed on the recommendations on activities involving removals under the Article 6.4 mechanism contained in the annex to the addendum of its annual report to CMA.4.
3. The CMA, by decision 7/CMA.4, paragraph 19, invited Parties and admitted observer organizations to submit, via the submission portal, by 15 March 2023, their views on activities involving removals and requested the Supervisory Body to consider the views of Parties and observers in elaborating and further developing recommendations on activities involving removals, while taking into account the mandate provided to the Supervisory Body contained in paragraph 24(a)(ix) of the rules, modalities and procedures, and considering broader inputs from stakeholders provided in a structured public consultation process.
4. At its fourth meeting (7–10 March 2023), the Supervisory Body requested the secretariat to prepare an updated version of the document “Information note: Activities involving removals under the Article 6.4 mechanism”, taking into account the guidance and questions contained in annex 2 to the SB 004 meeting report² and the views of Parties and observers submitted in response to the call for submissions pursuant to decision 7/CMA.4, paragraph 19.
5. At its fifth meeting (31 May 2023 – 03 June 2023), the Supervisory Body considered the information notes “Removal activities under the Article 6.4 mechanism”³ and “Summary of the views submitted by Parties and observers on activities involving removals”⁴ and agreed to launch a call for structured public consultation based on the information note

¹ Document FCCC/PA/CMA/2021/10/Add.1 available at: <https://unfccc.int/documents/460950>.

² Annex 2 of the SB 004 meeting report titled “Information note: Guidance and questions for further work on removals (v.01.0) is available at: <https://unfccc.int/sites/default/files/resource/a64-sb004-a02.pdf>.

³ Annex 9 to the annotations of the SB 005 meeting, available at <https://unfccc.int/sites/default/files/resource/a64-sb005-aa-a09.pdf>.

⁴ Annex 10 to the annotations of the SB 005 meeting, available at <https://unfccc.int/sites/default/files/resource/a64-sb005-aa-a10v1.pdf>.

“Guidance and questions for further work on removals”,⁵ to be open from 5 to 19 June 2023.

2. Purpose

6. The purpose of this document is to advance the work to elaborate and further develop draft recommendations, on the basis of the RMP, on activities involving removals.
7. The Supervisory Body notes that the elements of recommendations reflected herein are considered for application to activities involving removals in general and do not, at this time, include detailed requirements for specific types of activities involving removals, such as land-based and engineering-based activities unless noted. In order to develop detailed requirements, more work will need to be undertaken by the Supervisory Body, including specific work areas where indicated.
8. The following conforms to the outline of relevant guidance and questions contained in annex 2 to the SB 004 meeting report. While every effort has been made to accurately reflect and summarize stakeholder inputs regarding those elements, these elements are non-exhaustive and should be read in combination with the summary of submissions pertaining to each topic in (A6.4-SB006-AA-A09).

3. Definitions

3.1. SB 003 Recommendation extract

9. For the purpose of these recommendations, “removals” are processes or outcomes of processes to remove greenhouse gases from the atmosphere through anthropogenic activities and durably store them in geological, terrestrial or ocean reservoirs, or in products.

3.2. Key issues

10. Should “removals” be defined “for the purpose of this guidance”? SB 003 defined terms by their function in substantive guidance; the literature-derived definition of removals could be misunderstood as indicating the eligibility of specific categories. SB 004 had discussed the below:
 - (a) Single definition—of “removals”:
 - (i) As processes and outcomes {SB 004 draft};
 - (ii) Removals as outcomes {only};
 - (iii) With/out examples of storage {SB 004 draft employs examples};
 - (b) Additional definitions needed?
 - (c) No definition.

⁵ Annex 2 of the SB 005 meeting report, available at: <https://unfccc.int/sites/default/files/resource/a64-sb005-a02.pdf>.

3.3. New Proposals

11. Removals as processes (including removal activities) and outcomes.
12. Definition refers to removal process or activity e.g. [IPCC AR6: various] [SE, 15] [ECP, 27] [CO, 58] [OA, 114] [CBC 107] [NPBC, 253] [OAIR, 210] [IEAGHG, 267] [CBC, 211] [SGI,276] [NC, 206] [CC, 247] [SCL, 292] [EU, 59] [AC, 135] [SCS, 164] [SCDR, 109] [GHR, 299] [OI, 285] [CWORKS, 302] [SE, 244]⁶
13. Definition refers to removals as outcomes e.g. [IETA, 311; noting definition in IPCC SR1.5] [XPZ, 249]⁶
14. Anthropogenic activities removing CO₂ from the atmosphere and durably storing it in geological, terrestrial, or ocean reservoirs, or in products. It includes existing and potential anthropogenic enhancement of biological, geochemical or chemical CO₂ sinks, but excludes natural CO₂ uptake not directly caused by human activities. [IPCC Working Group III contribution to the Sixth Assessment Report Technical Summary]
15. The withdrawal of greenhouse gases (GHGs) from the atmosphere as a result of deliberate human activities. These include enhancing biological sinks of CO₂ and using chemical engineering to achieve long-term removal and storage. Carbon capture and storage (CCS), which alone does not remove CO₂ from the atmosphere, can help reduce atmospheric CO₂ from industrial and energy-related sources if it is combined with bioenergy production (BECCS), or if CO₂ is captured from the air directly and stored (DACCS). [IPCC AR6 WGIII Report Glossary]
16. Anthropogenic activities removing carbon dioxide (CO₂) from the atmosphere and durably storing it in geological, terrestrial, or ocean reservoirs, or in products. It includes existing and potential anthropogenic enhancement of biological or geochemical CO₂ sinks and direct air carbon dioxide capture and storage (DACCS), but excludes natural CO₂ uptake not directly caused by human activities.⁷ [IPCC AR6 WGIII Report Glossary]
17. Compared to the definition used in the IPCC Special Report on 1.5 degrees and the IPCC Working Group III Annex 1: Glossary, the definition outlined above has replaced “direct air capture” with a technology-neutral reference to “chemical CO₂ sinks”.
18. For the purpose of these recommendations, IPCC definitions of “removals” are applied e.g. [SE, 15] [ECP, 27] [CO, 58] [OA, 114] [CBC 107] [NPBC, 253] [OAIR, 210] [IEAGHG, 267] [CBC, 211] [SGI,276] [NC, 206].⁶

⁶ References to submissions under this section 3.3 is not a complete listing. While an attempt was made to include as many references as possible, some might have been left out unintentionally.

⁷ IPCC AR6 WGIII Report Glossary p 1,796 includes the following note: In the 2006 IPCC Guidelines for National GHG Inventories (IPCC 2006), which are used in reporting of emissions to the UNFCCC, ‘anthropogenic’ land-related GHG fluxes are defined as all those occurring on ‘managed land’, i.e. ‘where human interventions and practices have been applied to perform production, ecological or social functions’. However, some removals (e.g. removals associated with CO₂ fertilisation and N deposition) are not considered as ‘anthropogenic’, or are referred to as ‘indirect’ anthropogenic effects, in some of the scientific literature assessed in this report. As a consequence, the land-related net GHG emission estimates from global models included in this report are not necessarily directly comparable with LULUCF estimates in national GHG Inventories.

19. Removals are anthropogenic activities removing carbon dioxide (CO₂) from the atmosphere or ocean and durably storing it in geological, terrestrial, or ocean reservoirs, or in products. [CC, 247]
20. IETA agrees with the following definition from the IPCC SR1.5, namely that carbon dioxide removals (CDR) refer to “anthropogenic activities removing CO₂ from the atmosphere and durably storing it in geological, terrestrial, or ocean reservoirs, or in products. It includes existing and potential anthropogenic enhancement of biological, geochemical or chemical CO₂ sinks, but excludes natural CO₂ uptake not directly caused by human activities.” We suggest that the Article 6.4 mechanism focus on outcomes of removal activities. [IETA, 311]
21. Removals are processes or outcome of processes via anthropogenic activities to reduce atmospheric levels from greenhouse gasses (GHGs) already emitted, inclusive of any activities necessary in order to ensure that the “removed” greenhouse gas is kept from re-entering the atmosphere and reversing the removal, for example via durable storage in geological, terrestrial, or ocean reservoirs, or in products. [SCL, 292]
22. For the purpose of these recommendations, “removals” are activities that (a) increase the natural uptake of carbon in biogenic reservoirs; (b) accomplish long-term storage of carbon in geological or other non-biogenic reservoirs. [EU, 59; also see below: “Types of removals activities”]
23. Removals are activities that measurably and demonstrably reduce atmospheric carbon dioxide concentration while avoiding social and economic harm, encompassing a wide range of approaches that meet a broad set of criteria such as attaining Technology Readiness Levels (TRL) based on an expert assessment (e.g. as provided in State of CDR report) e.g. [AC, 135] [SCS, 164] [SCDR, 109]
24. Carbon dioxide removal (CDR) refers to human activities that 1) remove carbon dioxide (CO₂) from the atmosphere or 2) remove CO₂ from natural emissions to the atmosphere (such as from soils, certain regions of the ocean and geologic reservoirs) and 3) durably sequester from the atmosphere the removed CO₂ or products thereof for a climate-relevant period of time. [GHR, 299]
25. Greenhouse gas removal enhancement are anthropogenic activities that cause an increase in removals exceeding any increase in emissions caused by the activity. [OI, 285]
26. Removals are defined based on “storage permanence” or “ongoing monitoring” and “an active anthropogenic intervention”. [CWORKS, 302]
27. CDR shall be considered a functional outcome, rather than an enumerated set of activities or processes: Any process, regardless of pathway, which results in a net reduction of CO₂ concentrations in the atmosphere shall be considered carbon dioxide removal. Net carbon dioxide removals shall be established by a comprehensive, cradle-to-grave life cycle analysis. [XPZ, 249]
- 28. Scope of greenhouse gas removals.**
29. Definition refers to carbon dioxide removal (CDRs) or ‘Greenhouse Gas Removals’ (GGRs) e.g. [UK, 54] [PTV, 18] [JF, 183] [IPT, 284] [GRI/LSE, 275]

30. Definition refers to atmospheric / carbon / dioxide / concentration / CDR e.g. [IETA, 70] [BF, 46] [WI, 9] [IETA, 311] [EU, 59] [CC, 247] [AC, 135] [SCS, 164] [SCDR, 109] [GHR, 299] [XPZ, 249] [OLAB, 222] [CW, 31] [CBC, 107] [SE, 244] [CCAP, 246] [ZEP, 263]
31. Definition refers to all relevant / atmospheric GHGs / concentration e.g. [OI, 285] [SCL, 292] [AMN, 225] [CMW, 308] [GRI/LSE, 275]
32. Removals are a measure to lower the concentration of CO₂ in the atmosphere. [SE, 244]
- 33. Types of removals activities.**
34. The definition of removals should be technology neutral, neutral regarding whether removed GHGs are stored or destroyed, {and} avoid prescribing specific durations for storage. [OI, 285]
35. Removals are defined in a scientific perspective and should be technology neutral. [KITA, 262]
36. For the purpose of these recommendations, “removals” are activities that:
- (a) Increase the natural uptake of carbon in biogenic reservoirs: This may include living biomass, dead organic matter, soil organic carbon and harvested wood products (IPCC pools). It may involve different types of activities, such as afforestation/reforestation or restoration of degraded ecosystems;
 - (b) Accomplish long-term storage of carbon in geological or other non-biogenic reservoirs: This may include, inter alia, direct air capture and storage (DACCS), bioenergy carbon capture and storage (BECCS), storage of carbon in products or enhanced weathering. [EU, 59]
37. Marine or ocean-based geoengineering are not included in IPCC definition on account of moratoria in place under other treaty processes. [CA, 152]
38. IPCC definitions include enhancement of terrestrial- and ocean-based sinks through anthropogenic interventions such as forest management, afforestation and reforestation, coastal wetland restoration, and soil-carbon sequestration. [CATF, 32]
39. CDR includes enhancement of natural biological, geochemical or physical CO₂ sinks, the creation of artificial removal and sequestration methods, or some combination of the preceding. CDR excludes 1) natural CO₂ uptake not directly caused by human activities, and 2) removal of CO₂ directly from an anthropogenic CO₂ source emitting to the atmosphere. [GHR, 299]
40. Nature based carbon removal might be those approaches that store carbon in living ecosystems, including ocean and soil carbon, food production, and so forth, thereby specifically including co-benefits of natural habitat and biodiversity restoration. [OLAB, 222]
- 41. Contextual considerations and relevant provisions.**
42. Key criteria for high-quality CDR include additionality, durability, net-negativity, verification, and equity and community engagement. [CBC, 107]
43. Removals... should take into account how each removals technology relates to leakage, permanence, social impacts, governance impacts, and changes to biodiversity [KITA, 262]

44. Removals are defined based on notions of permanence/durability, additionality, leakage, as well as co-benefits independent of any specific pathways. [PT, 295]
45. Removals are a measure to lower the concentration of CO₂ in the atmosphere. [SE, 244] A permanent removal is a measure where, based on scientific consensus, the likelihood of reversal is very close to zero if industry best-practices are applied. A non-permanent removal is a postponed emission. [SE, 244]
46. Non CO₂ project emissions shall be considered in the definition of removals. [PML, 112]
47. Removals are defined as the process that effectively subtracts carbon dioxide from the atmosphere, resulting in the extraction of carbon from the atmosphere for a period of 100 years or longer such that the risk of reversal or Event of Carbon Default (EOCD) is minimised to the greatest extent possible. Removals should not be considered exclusively as a pathway towards storage, but also as an avenue to make use of captured carbon in a manner that continues to keep it out of the atmosphere in the long term. [CCAP, 246]
48. Removals are defined based on the principles that CO₂ is physically removed from the atmosphere, the removed CO₂ is stored out of the atmosphere in a manner intended to be permanent, upstream and downstream greenhouse gas emissions associated with the removal and storage process are comprehensively estimated and included in the emission balance and the total quantity of atmospheric CO₂ removed and permanently stored is greater than the total quantity of CO₂ emitted to the atmosphere. [ZEP, 263]
49. Carbon removals is the intentional movement of carbon from the fast carbon cycle to the slow carbon cycle, where the total fast carbon removed exceeds the total slow carbon emitted within a given project boundary. [RT, 288]

4. Requirements

50. Activities involving removals under the Article 6.4 mechanism shall meet the requirements contained in sections 4.1 to 4.7 below, in addition to the requirements contained in the annex to decision 3/CMA.3 “Rules, modalities and procedures for the mechanism established by Article 6, paragraph 4, of the Paris Agreement”, and any further relevant decisions of the CMA.

4.1. Monitoring

4.1.1. SB 003 Recommendation extract

51. Activity participants shall monitor removals through quantification and estimation based on an appropriate combination of field measurements, remote sensing, measurement through instrumentation, and/or modelling.
52. Calculation of removals shall be stated with the associated uncertainties, and these uncertainties shall be within the limits to be specified in the methodologies applied.
53. If the uncertainty of calculation of removals exceed the specified limits, the calculated values shall be adjusted in a conservative manner.
54. Calculation of removals may employ conservative default values that allow flexibility in monitoring.

55. In order to address the risk of reversals and to ensure full compensation of reversals if they occur, monitoring shall also be conducted after the end of the last crediting period of activities involving removals in accordance with the methodological provisions to be developed by the Supervisory Body.

4.1.2. Key Issues

56. SB 004 discussed that Monitoring should cover:
- (a) Quantification and estimation and their basis;
 - (b) Statement of uncertainties and limits of methodologies;
 - (c) Exceeding uncertainty limit requires adjustment in a conservative manner;
 - (d) Flexibility in monitoring via conservative default values;
 - (e) Monitoring after end of crediting period per provisions.

4.1.3. New Proposals

4.1.3.1. Quantification and estimation and their basis

57. Methodologies should ensure robust monitoring by:
- (a) Requiring the establishment of an operation and management plan for activity monitoring that addresses the assignment of responsibilities of various parties and the operational process of monitoring;
 - (b) Specifying the monitoring approach(es) for all parameters needed for the quantification of emission reductions or removals;
 - (c) Ensuring that the approaches related to the use of measurements, sampling, data from third parties (e.g. studies, statistics, satellite data), or default values are robust, statistically representative, or conservative;
 - (d) Ensuring that the choice of the approaches, data, measurement methods, or default values appropriately addresses uncertainty and leads to a conservative estimate of emission reductions or removals;
 - (e) Requiring appropriate quality assurance and quality control measures, such as cross-checking the monitoring results with other sources of data;
 - (f) Requiring a plan or procedure for conservative treatment and deduction of emission reductions or removals in case of unexpected interruption or errors in monitoring equipment or procedures;
 - (g) Alternative monitoring approaches may be used when the mitigation activity is in conflict zones or is inaccessible, or during periods of a pandemic. [OI, 285]
58. Monitoring Reporting and Verification (MRV) systems have the potential to improve over time as new scientific knowledge becomes available and administrative capacity is developed. There should be a defined process for incorporating such improvements. This may include scheduled reviews and revisions requiring updates to procedures, for example every five years. Measurement methods should be the subject of continuing

- research in the interim with the ambition to reduce the margin of uncertainty. This will be especially relevant where uncertainties are largest. This includes biogenic sinks, biochar, enhanced weathering and marine sinks. [BF, 252]
59. The principles for monitoring include accuracy, completeness, consistency, transparency, etc, in line with the IPCC guidelines and guidance. [ECP, 27]
 60. Clear differentiations between reductions and removals, noting the different (but complementary) roles the two mitigation approaches have to fulfil should be done. [CWORKS, 302]
 61. Robust monitoring, reporting, and verification (MRV) tools in establishing trust and credibility in carbon dioxide removal (CDR) processes as well as the dire need for improved digitisation & automatisation to speed up certification is important. This combination of third-party standards and scalable, accurate digital MRV facilitates a robust process for ensuring trust in engineered CDR activities. [CFUT, 245]
 62. Data required for the issuance of carbon removal certificates should be limited to measurable and verifiable data of the CDR event of activity itself. Monitoring of co-factors including environmental and social safeguards, contribution to SDGs, monitoring of reversal events should be periodic. [CW, 126]
 63. Field measurements are important, especially at the beginning and at the end of the monitoring period to capture the totality of C stock changes, and that these estimations should be verified. [ECP, 27]
 64. The core elements to consider when identifying the applicable monitoring and reporting scope should be based on the type of removal activity. Core elements to consider to be able to determine an appropriate monitoring and reporting scope include:
 - (a) How actual carbon removal occurs (e.g. tree growth for reforestation);
 - (b) The conditions for making the removal permanent (e.g. proof of soil application for biochar);
 - (c) Factors affecting removal permanence (e.g. soil conditions such as temperature for biochar or tree survival rate for reforestation activities);
 - (d) Factors affecting net carbon removals of the activity (e.g. taking into account any emissions that might result from the removal activity itself being performed). Considering these elements, and how they can be most effectively and efficiently measured, should guide in the identification of the applicable scope for monitoring and reporting. [STX, 282]
 65. Monitoring requirements for geological storage should rely wherever possible on existing regulatory regimes, where such regimes meet agreed minimum requirements, to avoid a complex layered structure of domestic legal and Article 6.4 requirements e.g. [IETA, 51] [ZEP, 263] [CCSA, 287]
 66. Whilst the CDM can act as a useful precedent, Article 6.4 and carbon markets more broadly must evolve beyond in-person and manual audits where possible. Increasingly, digital technologies are being used to streamline data collection and processing for MRV processes. The remote verification of data can fast-track issuance of tradeable carbon

- assets, significantly reducing payment cycles for project developers and increasing their share of value generation, instead of verifiers or auditors. [CBC, 40]
67. Combining the use of a professional digital tool for monitoring with satellite images can help the project developers avoid the high costs that should be allocated to DOEs. The verification events can also take place but they will be less expensive and less detailed as the digital tool can simplify and shorten the process of verification. [HBAR, 14]
 68. Whilst manual data collection and in-person surveys will continue to play a key role, particularly for nature-based removals, their importance should not be assumed for engineered removals and seen as a benchmark for quality where a greater role for automated data collection through IoT, mobile technology and online applications is envisaged. [WI, 9]
 69. Technology-enabled continuous monitoring (i.e. digital MRV/ dMRV) wherever possible to ensure that the real climate impact of removal activities (including temporary removals) is evaluated and tracked over time with high accuracy is recommended. [GRI/LSE, 275]
 70. All methodologies eligible under the Mechanism should require the use of best available DLT-enabled dMRV, including transparent, auditable field measurements in combination with remote-sensing, IoT, and satellite data, with audit trails linked to decentralized identifiers for corresponding actors that issue verifiable credentials and verifiable presentations linked to tokenized climate assets, interoperable across climate account systems. [HBAR, 283]
 71. The SB should (1) require that CDR methodologies newly developed for the Article 6.4 Mechanism be digitally native; (2) undertake to digitize, in a reasonable time or for Article 6.4 purposes, all existing libraries of analog methodologies in use or owned by the UNFCCC using best available technology (BAT); and (3) to release a technical support document enabling carbon registries and CDR project developers interested in participating in Mechanism activities to convert eligible CDR methodologies in the VCM from analog to digital format, along with guidance on any/all upgrades necessary to align with Mechanism requirements. [HBAR, 283]
 72. Some approaches require special considerations in MRV, so the requirements should be flexible enough to encourage all legitimate technologies. For example, monitoring of carbon stocks would be impractical for the Ocean Alkalinity Enhancement pathway, which shows great promise. [TREEO, 11]

4.1.3.1.1. General aspects of quantification and estimation

73. High quality monitoring, reporting, and verification (MRV) is the key deliverable for any carbon removal project and essential for building trust in carbon markets. The Carbon Business Council recently published an Issue Brief outlining the key criteria for high-quality MRV. [CBC, 211]
74. SB should take steps to engage with the EU Carbon Removal Certification Framework process, the work of the U.S. Department of Energy Office of Fossil Energy and Carbon Management, Japan's Joint Crediting Mechanism, and other key global public sector efforts (multilateral and bilateral) to create and advance a cohesive MRV framework across carbon markets – and avoid a fragmented, patchwork outcome that will be difficult for all stakeholders to navigate. [CBC, 211]

75. The storage of CO₂ in geological reservoirs is regulated by the CO₂ Storage Directive (CCS Directive⁶) in European Union Member States, Iceland, Norway and Liechtenstein (European Economic Area, EEA), and by the 2010 CO₂ Storage Regulations in the UK⁷, which establish a legal framework for the safe geological storage of CO₂. Both storage legal frameworks include provisions for site selection and characterisation which are designed to minimise the risk of leakage, conditions for permitting, as well as monitoring and reporting requirements to verify storage, including remediation obligations in case of reversals. [ZEP, 263]
76. Monitoring should include the possibility that Ocean Alkalinity, and perhaps other approaches in the future, will be best verified through modeling, indirect measurement, or other approaches as determined by the best scientific consensus at the time. [ALLCOT, 48]
77. MRV approach involving measuring changes in the chemical composition of samples before and after the carbonation process makes it possible to quantify the amount of CO₂ sequestered in the form of carbonates. [STECH, 250]
78. Measurement of CO₂ removed should be accurate to the tonne. Proof of sequestration and measurement should be provided at issuance of the carbon credit. [REW, 219]
79. Requirements of the recommendations do not include reporting on activities themselves. They address only reporting on Monitoring. However, all certification procedures include reporting on implementation and requirements to the project documentation. [TREEO, 11]
80. Build on the past successes in centralising the provision of dMRV (e.g. by Global Forest Watch), which can achieve economies of scale and increase overall environmental activities. [GRI/LSE, 275]
81. By creating “tiered” ongoing monitoring requirements based on the expected stability of the carbon storage, the Supervisory Body can ensure that projects focus on (and invest in) the areas most likely to impede long-term storage and climate benefit; as an example, ongoing monitoring requirements for a reforestation project may help to proactively reduce wildfire risk factors in the area where the project is conducted. On the flip side, lowering ongoing monitoring requirements for a low reversal risk approach such as Ocean Alkalinity Enhancement can allow the project to focus on (and invest in) reducing quantification uncertainties in the calculation of removals. [RT, 288]
82. The Supervisory Body should consider the impacts the timing of verification might have on the financing of projects. Requirements for verification that may delay verification may also delay when a project receives compensation for CDR and impacts the financing of the project. The project proponent should have some ability to verify more frequently or earlier than recommended if they carry the cost of verification as the verification schedule heavily dictates the business model. This is especially true for emerging technologies that are still working through the hurdles of scaling where the production of carbon stock may initially be slower than expected. [CW, 31]

4.1.3.2. Statement of uncertainties and limits of methodologies

83. Given the inevitable uncertainties, conservative parameter values should always be used to reduce the risk of removals being overestimated, and thus give greater confidence that certified removals have actually occurred. For example, it may be prudent to estimate a

probability distribution of the amount of carbon held in a sink, then assume a percentile of the distribution rather than the mean or median value. [BF, 252]

84. To ensure defined timeframes and related procedures for monitoring and reporting of removals is sufficient to ensure integrity in the ex-post carbon calculations as well as feasible to perform one should consider the distinctive characteristics of removal activities. These characteristics, for example, should include the timeline of implementation, carbon absorption over time, risks of reversals and potential need for re-evaluating the baseline over time. [STX, 282]

4.1.3.3. Exceeding uncertainty limit requires adjustment in a conservative manner

85. Applying conservative default factors to address uncertainty assumes that the estimate of uncertainty reflects systematic errors. However, almost always, the estimation of uncertainty mostly reflects random errors, i.e. normal variation of C stocks due to inherent natural conditions. This variability is usually mid-high for land-based removals and this is normal. Activity proponents shall follow IPCC Aguidelines and guidance to reduce any systematic error in the estimation of C stocks at times 1 and 0, and to report uncertainties, without the need for adjusting the final removals estimate based on uncertainty. This would result in a loss of accuracy and create an artificial reduction of eligible A6.4 removals. Rather, the estimation of C stocks shall be technically assessed to ensure there is no bias in the estimates. [ECP, 27] [ALLCOT, 48]

4.1.3.4. Flexibility in monitoring via conservative default values

86. Default factors to account for measurement uncertainty need to ensure that the environmental integrity of the resultant credits remains high, and that approaches support robust accounting against NDCs. [IETA, 51]
87. Adopting conservative default parameters (that tend to underestimate actual removals), which can be over-ridden by measured values for an individual sink is recommended. For example, in the earlier Australian Carbon Pricing Mechanism 3, high default parameters were used for assumed emissions of methane from coal mines. In many cases emitters could benefit from measuring actual emissions and being charged on this basis, rather than the default. This led to more widespread measurement of methane emissions. [BF, 252]

4.1.3.5. Monitoring after end of crediting period per provisions

88. Exact monitoring requirements will vary across different carbon capture and sequestration technologies and the frequency of monitoring reports might decrease over time if the risk of reversal decreases, but some form of monitoring and reporting should always be required unless and until a sequestration provider can demonstrate permanent carbon disposal/removal. [44.01, 248]
89. The monitoring period should begin with the initial capture of CO₂, continue through its storage and sequestration, and only finish if/when the CDR provider can demonstrate that it is no longer possible for the CO₂ to be re-released back into the atmosphere, for example after CO₂ has been mineralised. [44.01, 248]
90. Monitoring must be continuous during the monitoring period. Some form of monitoring mechanism is required which is able to identify removals on short notice. All monitoring data for reversals should be made public in near real-time by all projects. [SE, 244]

91. On the frequency of monitoring, we propose that two “full” measurements are conducted encompassing the full crediting period. “Simplified” monitoring, i.e. remotely-sensed forest cover should be allowed within the crediting period to ensure permanence and to understand if corrective actions are needed. In case the activity proponent seeks to verify removals before the conclusion of the crediting period, then a second “full” measurement should be conducted to estimate C stock changes and, from this, removals. [ECP, 27]
92. It is also not commonplace to require permanence monitoring beyond the project term/end date. We suggest broader stakeholder comment is sought prior to prescribing such approaches. [OD, 19]
93. Both frameworks (CCS Directive, UK CO₂ Storage Regulations) require operators to carry out monitoring based on an approved monitoring plan which is updated every 5 years “to take account of changes to the assessed risk of leakage, changes to the assessed risks to the environment and human health, new scientific knowledge, and improvements in best available technology”. Operators are also required to report to competent authorities at least once a year. The frameworks also specify a minimum period of 20 years before all legal obligations relating to monitoring and corrective measures can be transferred to competent authorities. [ZEP, 263]
94. Timeframes and related procedures for monitoring and reporting should be designed in line with the logic of the European CCS directive for activities involving geological storage. [CWORKS, 302]
95. If the permanence of a removal activity is dependent on human intervention or management (e.g. the perpetual maintenance of a particular practice), the monitoring period should run at least as long as these activities—and the removals they provide—are required. If monitoring stops, the removed CO₂ should be assumed to be re-emitted to the atmosphere and treated in the same way as a reversal. [BF, 252]
96. All types of monitoring and reporting should be at least annual as this is similar to any company reporting their activities as part of regulation. The simplified annual report would be used in the years where a full monitoring report is not available. [KITA, 262]
97. For land-based credits, the end of the monitoring period represents the opening of an entirely new chapter for the concerned land area. No third party takes responsibility for continued monitoring and anything can happen. A nature-based removal must therefore always be considered reversed at the end of the monitoring period. The monitoring period for land-based approaches should thus correspond to the time-frame the project is committed to keep the land as a removal. [SE, 244]
98. For permanent removals (BECCS/DACCS) as well as generically for CCS, the permanence is confirmed by the scientific consensus and the fact that the CO₂ is sent permanently from the biosphere/atmosphere to the geosphere. During the Monitoring period, reversals should be monitored and addressed according the applicable jurisdiction as well as counted as an emission by the storage company. At the end of the Monitoring period, there should be a transfer of responsibility to the host nation. If there is a reversal after the transfer of responsibility, the host nation should count the reversal as an emission and take measures according the applicable jurisdiction. [SE, 244]
99. Mechanism methodologies shall require that all removal activities monitor the achieved carbon stocks through their quantification using field measurements or remote-sensing, or a combination of both. This would allow for innovations associated with higher frequency

more transparent means of monitoring for events of default and carbon performance. This would also allow for better predictive modelling of effective performance of new innovative ways of sequestering or capturing carbon for varying durations with varying performance expectations. [CFL, 38]

4.2. Reporting

4.2.1. SB 003 Recommendation extract

100. Activity participants shall prepare monitoring reports after monitoring operations and summarize the calculated amount of removals resulting from the monitoring.

101. Monitoring reports shall contain:

- (a) A description of the monitoring operations and methods used, and the resulting calculated removals along with the associated uncertainties in the calculation;
- (b) Field data, including remotely sensed data, or if the data set is too voluminous, a summary of the data and an indication of how the complete data set may be accessed;
- (c) Records and logs of observed events that could potentially lead to the reversal of removals as well as a summary of any reversal notifications that were submitted during the monitoring period;
- (d) Estimates of any reversals that occurred during each monitoring period;
- (e) Information on how any reversals that occurred were addressed in accordance with requirements to be developed by the Supervisory Body;
- (f) Information on how the environmental and social impacts were assessed and addressed by applying robust environmental and social safeguards, following provisions to be developed by the Supervisory Body;
- (g) Information on how the activity involving removals is fostering sustainable development, following provisions to be developed by the Supervisory Body.

102. If the purpose of the monitoring is to ensure and demonstrate the continued existence of removals, simplified monitoring and reporting may be allowed, subject to provisions to be developed by the Supervisory Body.

103. Initial and subsequent monitoring shall be carried out, and the associated monitoring reports submitted, within maximum time frames to be specified by the Supervisory Body. Monitoring and reporting may also be required within a specified period of time following an observed event that could potentially lead to a reversal, in accordance with provisions to be developed by the Supervisory Body.

4.2.2. Key Issues

104. SB 004 had discussed the below:

105. Report preparation should summarize results of monitoring reversals.

106. Monitoring report contents should include: {inter alia: Sub-list from paragraph 3.2.12}

- (a) Operations, methods, results;
 - (b) Data sets and summary data exceptions;
 - (c) Records and logs, including potential reversal events and notifications;
 - (d) Estimates of occurred reversal(s);
 - (e) How reversal(s) addressed;
 - (f) How environmental, social impacts assessed & safeguards applied, per provisions;
 - (g) How SD fostered, per provision.
107. Simplified monitoring for non-verification events per provisions.
108. Maximum timeframes TBD by 6.4SB Specified for, e.g.:
- (a) Initial monitoring;
 - (b) Subsequent monitoring;
 - (c) Report submissions;
 - (d) If event observed that could potentially lead to a reversal {"may also be required"};
- Specified timeframe(s):
- (e) Maximum timeframe = X year(s);
 - (f) Minimum timeframe = X time(s) within each crediting period (SB 004 discussion).

4.2.3. New Proposals

109. A quarterly report covering all operational data may be published to ensure data transparency [MHS, 200]. Reporting should be done at least annually. [KITA, 262]
110. Simplified annual reporting could be applied for certain types of projects for which monitoring and reporting is more difficult, such as nature-based solutions, for the years which a full monitoring report is not made available. [KITA, 262]
111. Reversal events may be reported in two separate reports: an early incident report issued immediately following the event and a full investigation and corrective actions report within a month of the incident. [KITA, 262]
112. Technology-enabled continuous monitoring (i.e. digital MRV/ dMRV) to ensure that the real climate impact of removal activities (including temporary removals) is evaluated and tracked over time with high accuracy is recommended. For nature-based solutions (NbS) dMRV monitoring should be mandatory. For activity types not amenable to automatic monitoring, monitoring reports should be submitted on a schedule sufficient to capture variation in ecological dynamics and maintain overall integrity. The Supervisory Body may develop risk-based reporting protocols for removals with higher reversibility risk or low MRV certainty. [GRI/LSE, 275]
113. DMRV (Digital MRV) is a software solution or service capable of data collection, processing, analysis, or synthesis for any MRV application, including project development,

validation, verification, and registration. DMRV platforms may use remote sensing techniques, machine learning or artificial intelligence algorithms, mobile device applications, smart sensors, and other digital technologies. [PACHA, 306]

114. Timeframes should be tailored to the category and type of removal activity taking into account country context such as lack of availability of land sector inventories. [CA, 312]
115. For land based activities and other project activities such as DACCS and BECCS, the first monitoring report should be within 5 years. For activities such as biochar and in some cases of CCUS (CCUS such as production of concrete using CO₂ could have sectoral scope of manufacturing industry and/or construction) it could be within 2-3 years of project registration. Subsequent monitoring - monitoring report ideally should be submitted at least once every 5 years. [SP, 313]
116. An event leading to potential reversal (e.g. forest fire in case of forestry project or atmospheric leakage of CO₂ from reservoir in case of DACCS project) should be notified with 90 – 120 days, evaluation of such event should be submitted within 6 months of the notification. [SP, 313]
117. Simplified reporting for DACCS and BECCS should be done once every 5 years post crediting period to ensure no reversal has occurred. This could end when there is sufficient data to support that CO₂ plume is stable and reservoir is stable. For land based activities such as forestry, it may continue till 100 years to conclusively report about no reversals. [SP, 313]

4.3. Accounting for removals

4.3.1. SB 003 Recommendation extract

118. Removals to be credited shall be those in excess of the baseline while deducting any activity and leakage emissions.
119. Any carbon pools and greenhouse gases may be optionally excluded from accounting if such exclusion results in a more conservative calculation of net removals.
120. If an activity involving removals also results in emission reductions, relevant guidance shall be applied through a relevant methodology or a combination of methodologies applicable to the activity in accordance with the provisions to be developed by the Supervisory Body.

4.3.2. Key Issues

121. SB 004 discussed that following issues should be considered:
 - (a) Credited removals exceed baseline while deducting for emissions and leakage;
 - (b) Exclusion of pools if results in more conservative calculation of net removals;
 - (c) Activities also involving reductions: Guidance applied via methodology(ies) per provisions.

4.3.3. New Proposals

122. The core elements to consider when accounting for carbon removals include how its permanence can be ensured, potential leakage risks to consider and the need for re-

evaluation of the baseline over time. These elements differ across removal activity categories due to, for example, the specifics of the conditions of carbon removal and its permanence as well as leakage risks. [STX, 282]

123. Accounting will need to include Lifecycle emissions and their scope for each project activity to be accounted and Paris aligned baselines as per RMP paras 33 and 36. [CA, 312]
124. The 6.4 Supervisory Body will need to ensure that any baseline approaches for the land sector, that are based on actual or historical emissions, are adjusted downwards to ensure alignment with paragraph 33, which requires alignment to the long-term goals of the Paris Agreement. The guidelines should indicate how these elements are to be assessed, including rules for accounting across multiple sectors and for different feedstocks. [CA, 312]
125. While most standards guarantee a permanence in the credit for 100 years, periods of "at least several centuries" may be considered in line with the recommendations of the European Union rather than an arbitrary period of 1000 years. [NC, 206]
126. Where it is relevant, mechanism methodologies should differentiate between reductions and removals in the equations included. In case of BECCS only fraction of biomass that is demonstrated to be sustainable biomass is eligible as removals. [SP, 313]
127. A6.4 registry may provide an optional label for A6.4ERs that are classified as removals, calling them as A6.4 CDR/A6.4 RR. [SP, 313]
128. We suggest that surrender of 6.4ERs equal to the amount of reversals is a good model, for both landbased and engineering-based removals, please refer to CCS CDM M&Ps in Decision 10/CMP.7. [IEAGHG, 267]
129. The accounting framework should prioritise measures that address reversals on a tonne-for-tonne basis rather than a tonne-year basis. This recognizes the importance of ensuring that the carbon benefit generated by the removal activity is permanent. [CG, 269]

4.4. Crediting period

4.4.1. SB 003 Recommendation extract

130. At renewal of crediting period, activities involving removals shall apply the latest version of the applicable methodology.

4.4.2. Key Issues

131. Crediting period—Apply latest applicable version of methodology(ies) (SB 004 discussion).

4.4.3. New Proposals

132. The length of the crediting period should be project type specific. When using historical baselines, the time between historical baselines and the start of the crediting period should be minimal. [SYRA, 305]
133. The crediting period should reflect the duration of a carbon removal activity (i.e. how long the CO₂ will remain sequestered). For permanent removal, this period should last forever, once permanent carbon removal has been demonstrated and verified. For temporary or

- reversible sequestration, the crediting period would need to be renewed periodically in line with monitoring data confirming the CO₂ was still sequestered. [44.01, 248]
134. The monitoring period should exceed the crediting period to avoid non-permanent activities. The monitoring period should determine whether reversals were detected and can, thus, be addressed. [CCSI, 233]
135. At renewal of crediting period, activities involving removals shall apply the latest version of the applicable methodology. New versions of methodologies should highlight and explain any changes from previous versions of applicable methodologies to provide visibility for all stakeholders, implications for monitoring and measurement, and how the project is adapting to respond to real-world learnings. [SE, 244]
136. For long-term CDR in managed forest, each pool (forest growth, forestry operations, industrial wood, construction timber, biochar production and soil stocking) should have its own crediting period. [RBI, 204]
137. Eligible removals issued under an applicable methodology should represent the best available science at that time. However removal activities that have been “issued” are not required to retroactively update methodology. [RT,288]
138. The crediting period will be perpetual. Credits are issued when there is a physical removal from the atmosphere and not before. The monitoring will need to continue in perpetuity, credits need to be monitored in perpetuity to remain valid because they need to be permanent. [BF, 252]
139. A renewable crediting period of 15 years may be used. [DG, 271]

4.5. Addressing reversals

4.5.1. SB 003 Recommendation extract

140. Activity participants shall minimize the risk of non-permanence of removals over multiple nationally determined contribution implementation periods and, where reversals occur, ensure that these are addressed in full, following requirements to be developed by the Supervisory Body.

4.5.2. Key Issues

141. Reversals—Minimize risk over multiple NDC periods and address in full per provisions Accounting for permanence:
- (a) Permanence period:
 - (i) Duration: [<40] [40] [50] [60] [100] [>100] years;
 - (ii) General period applies to all removals activities;
 - (iii) Activity type-specific durations;
 - (b) Accounting and crediting approach.
142. Credits issued for removals achieved and verified since the previous verification per general guidance for accounting for removals:

- (a) And discounting for crediting period shorter than permanence period;
 - (b) No discounting.
143. Measures to address reversals
- (a) Permanence buffer
 - (i) Allocation of buffer credits: based on:
 - a. Activity risk rating {if yes: procedures, template for up-front risk assessment; whether ex ante rating is fixed or periodically reassessed + updated; whether rate calculation takes account of permanence period discount—option above}
 - b. Default rate applicable to all activities {if yes: determine default %}
 - (b) Buffer design:
 - (i) Activity-specific buffer;
 - (ii) Buffer pools contributions from all removals activities;
 - (iii) Option to (instead/also) purchase, contribute credits from other activities.
144. Reversal compensation and buffer management procedures:
- (a) For intentional vs unintentional reversals;
 - (b) If activity's buffer cancellations exceed contributions;
 - (c) For replenishment;
 - (d) For un-tapped buffer credits {Return to proponent? Cancel?};
 - (e) Commercial insurance {standalone option or to complement buffer; if yes, needs procedures for insurers: standard for + accreditation by SB, and for guarantee statements};
 - (f) Direct replacement guarantee {standalone option or to complement buffer; if yes, needs procedures for guarantor: standard for + accreditation by SB, and for guarantee statements};
 - (g) None—covered by issuance deductions based on permanence and crediting period {extended application of accounting and crediting discount option, above} (SB 004 discussion).

4.5.3. New Proposals

4.5.3.1. Permanence period

145. A permanence period of 50 years should be applied. [GCC, 4]
146. Credible standards require projects and programs to report on reversals. At least one carbon standard (Verra) is developing a long-term monitoring system to detect reversals

- for 50 to 100 years after the carbon project/program has ceased to operate, and to compensate the atmosphere accordingly. [EDF, 80]
147. We agree that it will be important to specify a minimum duration of storage; we typically have seen 100 years as achieving this goal rather than 200 to 300 years, but support any of them. [BCG, 190]
148. While national governments must ultimately decide for how long they can impose an enforceable obligation on activity proponents to fully compensate for reversals, we would urge the adoption of longer time frames, e.g. 100 years after the year when the emission reductions or removals occurred. This is because, from a private investment perspective, an obligation to compensate for reversals for 100 years approximates an indefinite commitment. [OI, 285]
149. Carbon dioxide must be sequestered durably for at least 100 years (noting that sequestration in long-lived products is acceptable, and reversals within 100 years must be estimated and accounted for. [XPZ, 249]
150. Noting the adherence to GWP at a 100-year timescale, we believe that minimum storage duration should not be 200 to 300 years, but rather 100 years. [ECP, 27]
151. The four options presented for permanence (40, 50, 60 or 100 years) are all far too short. A minimal climate-relevant timescale for storage from permanent CDR is at least two to three centuries. [CMW, 78]

4.5.3.2. Risks of reversals

152. The risks of reversals may be:
- (a) “Natural, unintentional” due to natural occurrences or disturbances such as forest fires or weather events that could potentially release stored carbon back into the atmosphere; or
 - (b) “Natural, intentional” due to human actions that intentionally interfere with natural carbon removal methods, such as deforestation or land-use changes; or
 - (c) “Unnatural, unintentional” due to a technological failure or accident that leads to unintentional carbon release; or
 - (d) “Unnatural, intentional” due to deliberate human actions, like the misuse of removed carbon, for instance, using carbon captured for long-term storage as a fuel source.
153. Activity participants shall show that the above risks have been minimised (e.g. by diversifying removal methods, promoting ecosystem resilience through adaptive management, and ensuring that removal projects are strategically located to minimise exposure to these disturbances, maintaining rigorous safety protocols, regular equipment checks, and backup systems in engineered removal facilities, guidelines on acceptable uses of captured carbon have been established and regularly audited. [CCAP, 246]
154. Treatment of uncancelled buffer ERs, including after the end of the last crediting period of the contributing activity should be made refundable to award project proponents and incentivize safe operations. [CWORKS, 302]

155. Risks of reversals can be minimised through contractual permanence measures such as:
- (a) Commitment periods for projects in human relevant timeframes;
 - (b) Combination of modelling and field testing. [BEZERO, 304]
156. Carbon stored in biospheric reservoirs as a result of either CO₂ emission reductions (e.g. avoiding emissions from forests or soils) or removals (e.g. absorbing CO₂ in newly planted forests or restored soils) should either be maintained indefinitely or, at some later point in time, substituted with permanent mitigation (e.g. in the form of fossil fuel emission reductions or removals with permanent geological storage). Ultimately, national governments shall bear responsibility for addressing reversals and ensuring permanence such that the costs governments bear in maintaining permanence are internalized by market actors. This requires devolving responsibility for addressing reversals to market actors in ways that are robust and enforceable over (very) long time periods, and/or require market actors to replace temporary carbon storage with permanent mitigation in a timely manner. [OI, 285]
157. For long-term CDR in managed forest, timeframe for addressing reversals should apply for each pool (forest growth, forestry operations, industrial wood, construction timber, biochar production and soil stocking) and attached to the crediting and monitoring period. To avoid loss the discount of credits should be at least equal to the variation coefficient, or estimated error. [RBI, 204]
158. Durably storing means, all available evidence, such as data, analysis and history matching, indicates that the injected carbon dioxide will be completely and permanently stored such that, under the proposed or actual conditions of use, no significant risk of seepage or risk to human health or the environment exists. [CW, 31]
159. The European Commission proposal for a Regulation establishing a Union certification framework for carbon removals defines “permanent carbon storage” as “a carbon removal activity that, under normal circumstances and using appropriate management practices, stores atmospheric or biogenic carbon for several centuries, including bioenergy with carbon capture and storage and direct air carbon capture and storage”. [ZEP, 263]
160. The EU’s carbon removal certification framework lists two principles for permanence: certainty in quantification and corresponding liability regime/ insurance mechanism to address reversal. [CCE, 218]
161. Taking into account existing regulations (e.g. CCS Directive (EEA) and the 2010 CO₂ Storage Regulations (UK)), activity participants should be required to have an approved corrective measures plan to be implemented in case of leakages, surrendering emission allowances equivalent to leaked emissions. Liability frameworks for other types of carbon removal activities shall be comparable to one in place for geological storage. Activity participants shall remain liable for leakages for the minimum period of 20 years, after which the responsibilities of monitoring and corrective measures are transferred to the national authorities. [ZEP, 263]
162. In the event of a reversal, the following aspects need to be addressed:
- (a) Audit and Verification: Post-reversal, an exhaustive audit and verification process including assessing the reasons behind the reversal and scrutinizing potential risks

- associated with the CDR technology in use, taking into account factors such as the type and context of utilization shall be done;
- (b) Adjustment of Risk Mitigation Measures: Mitigation strategies may need to be re-evaluated and adapted as needed to prevent further reversals. Depending on the specific CDR method, this might involve improving control measures, storage conditions, or handling procedures to ensure compliance with prescribed methodologies;
 - (c) Re-Education and Training: Education and training programs should be revisited to help personnel better understand the reasons behind the reversal and to prevent similar future instances. This could be particularly necessary if the reversal was due to improper handling or usage of the technology;
 - (d) Regulation Compliance: The project's adherence to local and international regulations shall be reassessed;
 - (e) Stakeholder Engagement: Stakeholders need to be informed about the reasons behind the reversal, the corrective measures taken, and the strategies put in place to avoid similar incidents in the future;
 - (f) Project Continuity and Financial Stability should be assessed to ensure its continuity Repeated Reversals if the project experiences multiple instances of carbon reversal, it may indicate fundamental issues with the technology or its implementation; [CCAP, 246]
163. In the event of a physical reversal, the credit should become void and need to be remediated or replaced by a new credit. Liability mechanisms can ensure removal permanence via the obligation to perpetually monitor and manage high-risk carbon sinks and rectify any reversals should they occur. [CG, 269]
164. Risk buffers are important as a hedge against uncertainty, but they should not be used to justify considering the remaining credits which are not assigned to the buffer pool to be “permanent”. Buffer pools are an effective tool for the party liable in the event of a reversal to self-insure, but ultimately all reversals need to be remediated with replacement removal and storage. Where buffer pools are established, this should be on an ex-post basis, focusing on monitoring stored carbon rather than predicting reversals. An insurance policy could be used where monitoring takes place to ensure that carbon remains stored, such as on an annual basis. Moreover, in order to ensure that insurance policies meet climate needs, replacement removal activities must take place where a reversal has occurred, rather than a financial replacement. [CG, 269]
165. Removal of methane or other more powerful climate forcing agents, either near source or ambient, as a back-up for CO₂ removal reversals and performance bonds that can be liquidated to pay for that service may be specified. [JMF, 270]
166. The use of buffers is not a requirement for projects with geological storage because of the negligible risk of reversal. [DG, 271]
167. Activity proponents should consider, measure, and address all risk categories of non-permanence, including internal risk (i.e. project risk such as management or financial risk), external risk (e.g. political risk) and natural risks (fires, pests, droughts, etc.). Quantification of those risks should be based on the latest available. [CMW, 308]

168. Risks of reversals differ for different types of mitigation activities and best practices include:
- (a) The risk assessment should follow a pre-defined methodology, taking into account the likelihood and significance of risks of reversals, the measures taken by project owners to manage these risks and their capacity to do so;
 - (b) The application of the risk assessment should be validated by a designated operational entity;
 - (c) The risk assessment should be used to exclude from eligibility projects with a significant unaddressed reversal risk;
 - (d) The mitigation activity proponents should be required to update the risk assessment in case of reversals;
 - (e) The mitigation activity proponents should be required to have legal titles to the land and/or relevant carbon reservoirs on the land (e.g. timber rights), or legally binding agreements should require the mitigation activity proponent's consent to undertake any measures that may lead to intentional reversals. [OI,285].
169. The Supervisory Body may require the use of legal covenants or agreements (e.g. conservation easements, trusteeships) that restrict or prevent land management practices that would result in reversals (whether by the mitigation activity proponent or other parties), or the Supervisory Body may establish provisions that the existence of these measures leads to a lower specific risk assessment. [OI,285].
170. While national governments may impose an enforceable obligation on activity proponents to fully compensate for reversals adoption of longer time frames, e.g. 100 years after the year when the emission reductions or removals occurred is recommended as shorter time horizons are more likely to result in inefficient pricing. [OI, 285]
171. Note that multiple regulatory carbon crediting programs in Canada, the United States, and Australia have adopted a requirement (or option, in the case of Australia) for 100-year carbon storage commitments. This timeframe constitutes the current best practice among existing carbon crediting programs. [OI, 285]
172. The appropriate timeframe, risks and how to address them depend on the technology. In the case of timber construction, it is a project completed after 1 to 5 years that creates a one-time storage and should be handled with a non-permanence risk buffer or emission reduction offset. Potential risks include non-completion of the project demolition of the building within 100 years from construction without reuse of materials and natural disasters. Furthermore, the regions, locations, and legal conditions have to be considered in the permanence analysis. [TFI, 214]
173. Where the risk of reversal is high, a payment should be made annually in tonne-year currency as long as no reversal occurs. [REW, 219]
174. Some reversals are avoidable (e.g. land being converted for other uses, or being over-harvested), while others are beyond human control (e.g. natural disasters and changing climates) and should be minimised. Risk assessment should be conducted at the activity-level because reversal risks are very dependent on the project type, the location and other activity-specific features. It should be conducted by the project proponent during the registration of the project and reviewed by a third-party entity with a confirmed knowledge

of the subject and re-confirmed/reviewed by a third party in each verification report published after each monitoring report released by the project proponent. [SYRA, 305]

175. Assessments should be specific to activities rather than a sectoral or broad categorical assessment of risk. A host country should be informed of the amount of credits that have been transferred and the risk profile associated with that quantity of credits. Insurance, diversification, and other risk management measures should be applied by host countries. Assessment should be conducted by qualified experts in the activity to assess risk, with protections in place to avoid conflicts of interest. Once quantified, these risks should be assessed through actuarial techniques, and the management of risks should be addressed through the range of available risk management approaches. [CI, 307]
176. The level of risks of reversals assessment should be activity-specific. The identification of risks should take place prior to certification/accreditation and be updated regularly. Activity proponents should be responsible for risk assessment, subject to the approval of competent authorities. In the event of reversal, ER credits must be cancelled, up to the amount of the net reversal, and the necessary adjustments must be made in national registries. [ZEP, 263]
177. All types of risks or reversals can be identified, assessed, and minimized via insurance products, for which risk assessments should be done at the activity level and at least annually. Completion of the risk assessment(s) is the responsibility of the insurer. [KITA, 262]

4.5.3.3. Role of third-party actors including insurance

178. The implementation of buffer pools is a type of risk pooling instrument. [IETA, 311]
179. Insurance by third parties could potentially provide a similar risk pooling service, however to date, insurance providers have offered policies to underwrite credit non-delivery risk on registered project activities, but to the best of our knowledge have not systematically offered policies that underwrite the risk of carbon reversals from carbon sinks and reservoirs of registered project activities (e.g. against the loss of stored carbon from forests or geological stores). Such approaches were previously considered for forestation activities (so-called "iCERs"), which did not achieve widespread support among Parties (e.g. at COP6-bis). They may be complex instruments that could be tied to other forms of insurance products relating to carbon reservoirs (e.g. forest fire risk; geological well risks) that require specialist knowledge to define and elaborate on. However, as such approaches mature and the number of providers who can showcase well-functioning insurance products expand, the SB might reassess their potential. [IETA, 311]
180. Other forms of insurance or guarantees (commercial, sovereign, or otherwise) also be effective in addressing risks of reversals. However, for these instruments to be effective, they would need to meet the same essential criteria as buffer reserves, i.e. clear assignment of primary liability for reversals to market actors, clearly defined risk obligations over discretely defined time horizons, and the avoidance of any moral hazard. Sovereign guarantees, in particular, could be valuable as a backstop to cover reversal liabilities where it is not possible to enforce obligations on private market actors (e.g. if an actor ceases to exist or goes out of business), but should not be the primary means to address reversals because of the moral hazard this would create. [OI, 285]

181. Another approach for addressing reversals in full would be to implement temporary crediting (as was adopted for A/R projects under the Clean Development Mechanism). The effectiveness of temporary crediting approaches depends on the enforceability of credit replacement obligations on the part of buyers. Temporary crediting approaches could also, in principle, be combined with buffer reserves or other insurance mechanisms to cover residual risks where replacement obligations are not enforceable. [OI, 285]
182. Mandatory in-kind insurance ensures that any reversals are immediately compensated for with replacement carbon removals and credit holder remains responsible for the removals to remain sequestered. It also resolves the crediting time component that arises from the uncertainties about the permanence of removal by placing higher insurance charges for higher reversal risks. Key features are listed below:
- (a) It is feasible as losses are measurable, accidental, large losses are possible, and premiums are affordable, just as in other insurable products;
 - (b) Any reversals are immediately compensated for with a new removal from the insurance pool, which allows a removal to be credited indefinitely, thus eliminating the need to regulate permanence;
 - (c) It is affordable and holds the credit holder liable for as long as it holds the credit; a short (annual) contract to allow new information and changes to be reflected in the insurance price;
 - (d) Improves transparency of credit price due to information requirements for insurance;
 - (e) Only modest changes are needed to existing insurance regulations. [CPOOL, 215]
183. Insurance of reversal should be made a requirement. [REW, 219]
184. Insurance / guarantees for replacement would be similar to the letter of credit process (when a bank guarantees the risk of default of a company or of another bank). This will need new actors on the market to be involved: insurers and banks. [SYRA, 305]
185. Insurance mechanisms are designed to incorporate information about the statistical risks to an asset, using actuarial techniques. Insurance is one way to guarantee that the liability for any reversal will be addressed in full, and the insurance industry has established ways of assessing risks and developing insurance tools to account for them. Parties may even require proof of insurance as a precondition for authorization of transacting credits, as a way to minimize their own liabilities. [CI, 307]
186. A combination of buffer and insurance products may be considered to cover the reversal risk in totality to enhance the financial resilience of existing buffer schemes, enable high-quality new buffer schemes, increase market liquidity, and build trust. [KITA, 262]
187. Insurance for carbon credits, independent of the buffer, can provide a creditworthy financial wrapper; a smoothing strategy to help manage downside risk of unexpected failure (where actual losses are higher than those modelled); confidence that investors (i.e. carbon buyers) will receive expected returns; and certainty of contractual expectation for underlying asset owners (i.e. carbon sellers). In implementing such an approach, following may be considered:

- (a) The level of buffer pool contributions: insured projects may be allowed to have lower buffer contributions;
 - (b) Intentional reversals should be compensated for by the entity that initiated the reversal;
 - (c) The treatment of uncanceled buffer ERs: {for geologically sequestered removal projects, the American Carbon Registry accounts for reversals after the end crediting period: 'Reversals post-Project Term are compensated as outlined in the legally binding Risk Mitigation Covenant, filed in the real property records of each county, parish, and other governmental subdivision that maintains real property records, which prohibits any intentional reversal unless there is advance compensation to ACR.' Analogous to a decommissioning fund of a nuclear power plant, an organization could take on the responsibility of the fund and the management of the remaining buffer pool credits};
 - (d) ERs cancelled for reversal compensation should be tagged as such in a registry. For transparency, the registry could provide specific information such as the project, the reversal event and if intentional or unintentional, the size of the reversal, the date of the reversal;
 - (e) Insurance could play a role if buffer cancellations exceed contributions by managing downside risk of unexpected failure (where actual losses are higher than those modelled). [KITA, 262]
188. Insurance related to reversals should cover not only the cost of re-sequestering any escaped CO₂ but also any potential environmental and safety impacts. This may require a mix of insurance products, for example a buffer pool of carbon credits to address potential reversals combined with a standard insurance product to compensate local communities and/or governments for ecological damage. [44.01, 248]
189. Where alternative reversal mitigation options are applied (such as the replacement of credits from another project), from where projects and vintages credits are sourced from should be declared. If other insurance mechanisms are utilised, transparency regarding the sources of insurance and how such mechanisms would be applied in the case of a reversal are necessary. [BEZERO, 304]

4.5.3.4. Reversal risks buffer (pooled or activity-specific)

4.5.3.4.1. Buffer pool approaches.

190. Buffer pools do not constitute a robust way of guaranteeing the permanent storage of carbon in a sink. At best, they can strengthen the credibility of guaranteeing storage for a medium duration of time, if properly constituted and managed. It is not credible to expect buffer pools to be operated for more than a few decades, as there are many factors (political, economic, etc.) that could lead to the discontinuation of the buffer pool management. "Monitoring and compensation" approaches that rely on buffer pools and claim to guarantee the durability of storage for 100 years or more are simply not credible from an institutional point of view. In addition, buffer pools can only be used to compensate for reversals if these reversals are observed. They are therefore inherently limited by the monitoring period tied to the projects that are covered by the buffer pool. If the Supervisory Body chooses to rely on buffer pools to address reversals, these should be clearly

- communicated as a medium-term risk-mitigation strategy, and not as a long-term durability guarantee. [CMW, 308]
191. Buffer pools have been implemented to address risks of reversals for removal activities in several independent crediting standards as well as during the CDM (for projects involving carbon geostorage). The risk assessments should be developed before the registration of the project by activity proponents, updated over time, and carefully reviewed by third-party designated operational entities (DOEs) to ensure contributions to the buffer pool are adequate. The level at which the buffer contribution should be determined requires further consideration. It may be possible to set the buffer contribution at:
- (a) The mechanism level (probably to be avoided give the wide variation in durability between sinks and reservoir types);
 - (b) The level of specific type of sink and reservoir; or
 - (c) The level of specific activities. [IETA, 311]
192. Buffer pools should also consider, rather than duplicate existing domestic regulations that require collateral for addressing reversals. IETA has developed a set of principles to govern the development of tradable reductions and removals through the High-Level Criteria for Carbon Geostorage Activities. IETA recommends that the SB further deliberates on the potential of similar “regulatory safeguards” approaches to be applied to other types of sinks and reservoirs. IETA feels that there is an urgent need for a more wide-ranging discussion of how the risks and rewards associated with removal activities be effectively balanced across project developers, host countries and buyers, cognisant of the need to maintain environmental integrity of the Paris Agreement and to avoid moral hazards. [IETA, 311]
193. A non-permanence risk buffer, whether pooled or specific to an activity, would serve as a safeguard against the risk of carbon reemission. The adoption of an insurance model, where registrants can contract with insurance bodies (commercial or sovereign) to provide independent risk management services against the risk of Event of Carbon Default (EOCD). This would act as a guarantee for replacement of removals where reversals occur. Such an insurance account should be regularly monitored by the Article 6.4 SB, ensuring effective risk management and adding an extra layer of security against non-permanence. [CCAP, 246]
194. Non-permanence risk buffer (pooled or activity-specific) is a common approach to address risks of reversals. As with any insurance mechanism, buffer reserves can only be effective if it is clear who bears the primary liability for addressing reversals when they occur (i.e. who is being insured, which should be either the primary seller or the buyer of credits); for how long they bear this liability; and what the level of risk is for reversals over the time period being insured. Furthermore, as with any insurance mechanism, it is not possible to insure against risk where doing so creates a moral hazard. Buffer reserves may be effectively deployed to insure against stochastic risks like natural disturbances, for example, but are not a robust way to insure against intentional reversals, such as might occur if a landowner decides to back out of a reforestation project and clear the land for development instead. In such cases, the landowner must bear the liability to replace any carbon that is lost with an equivalent quantity of alternative mitigation, without recourse to buffer reserve credits. To be effective, governments and/or crediting programs must have the willingness and means to enforce this liability. For further detail related to establishing

robust non-permanence risk buffers, please consider the criteria identified in Section 3.2 of the rating methodology developed by the Carbon Credit Quality Initiative: <https://carboncreditquality.org/methodology.html>. [OI, 285]

195. Buffer pool approaches to removals are inadequate in cases where potential reversals include emissions of 100% of stored CO₂-equivalent – in such cases, buffer pools must equal 100% of issued credits, unless the accounting methodology explicitly accounts for temporary storage, in which case no buffer pool is necessary because emissions are also credited. In contexts in which there are limited physical potential for reversals (e.g. some carbon sequestration in the built environment, most geological storage technologies), buffer pools should equal the expected value of future reversals (evaluated conservatively at some confidence interval of the distribution of possible future values, rather than the mean). As an alternative to the buffer pool approach, full liability for reversals could be located with either the credit issuer/project proponent or the buyer. In principle, the liability for reversal risk could rest with either the buyer of credits (buyer-liability) or the seller of credits (seller-liability). In the latter case the host country, in effect, would assume the leakage risk. However, experience of afforestation and reforestation projects under the Clean Development Mechanism shows that a buyer-liability regime may substantially reduce demand for carbon credits generated from relevant activities. [GRI, 275]
196. Insurance schemes may offer an alternative to buffer pools. This could include shared responsibility whereby selling platforms have initial liability, but this is underpinned by government-backed carbon insurance schemes that sellers must procure. There is precedent for this in the UK government's FloodRE reinsurance scheme, which ensures flood insurance is available in high-risk areas that may be classed as uninsurable (Mercer and Burke, 2023). [GRI/LSE, 275]
197. While risk buffers help to mitigate against the risk of reversal, our view is that they fall short of providing adequate system-wide insurance of all the risks posed in their current design. Project-specific risk assessments vary considerably - for example standardisation and robust assessments of all natural, internal and external risks are required:
 - (a) Project-specific risk assessments typically support the identification and mitigation of key risks. However, recent data indicates that even such best-practice measures may have resulted in under-resourced buffer pools. For example, natural risks, such as fires, have led to the California Air Resources Board's buffer pool to indicate that 95% of the credits deposited to insure against fire risk have already been depleted;
 - (b) Disclosure and information risk. We find significant gaps in disclosure of these reports in the VCM: 74% (25 out of 34) of NBS projects with a BeZero Carbon Rating present at least one risk of reversals report (NPRR) although only 3 projects present NPRR for all the vintages (9%). [BEZERO, 304]

4.5.3.4.2. Buffer pool management

198. Methods for determining the level and composition of any buffer pool need to take account of both uncorrelated risks applying to a single project or small groups of projects, for example local legislative changes, and correlated or systemic risks, for example large scale forest dieback or widespread increases in forest fires, including as those risk change over time. Risk assessment must account for climate change and not be based only on

- historical data. Buffers also need to take account of uncertainties in MRV. Any uncanceled buffer should be retained against the risk of future reversals. [BF, 252]
199. Buffer contributions should be reflecting the overall risk profile of activities. {For activities involving geological sequestration, previous work under the CDM should be taken into account. For activities involving geological sequestration, the Article 6.4 mechanism should seek alignment with national requirements for the permitting of injections. Relevant legislations are e.g. in place in the US (EPA UIC class VI wells) or Europe (CCS Directive):
- (a) Risks of reversals assessment should be conducted at activity level;
 - (b) Risk assessment(s) should be conducted upfront, following a reversal event, and upon each renewal of the crediting period;
 - (c) Entity(ies) responsible for risk assessment(s), e.g. activity proponent, 6.4SB. actuary. The 6.4SB is encouraged to define activity specific risk assessments included within methodologies. Activity proponents should thereby become required to undergo the risk assessment in case they want to be issuing A6.4ER. [CWORKS, 302]
200. Methods for determining the level of buffer pool contributions should be science-based and allow for periodic updates. Composition of buffer pool, including in relation to ER vintages and contributing activity types or categories Buffer pools should be designed activity specific. [CWORKS, 302]
201. Intentional reversals, such as the deliberate mishandling of carbon, and unintentional reversals, like a forest fire, each bring unique challenges to risk management and should be treated accordingly in terms of buffer pool contributions and mitigation strategies. [CCAP, 246]
202. In order to ascertain the extent of contributions towards the buffer pool, it is imperative to understand the inherent risks of reversals of the removal activities. Composition of buffer pool, including in relation to ER vintages and contributing activity types or categories should be noted. The buffer pool's composition should be reflective of the various types of removal activities and the corresponding risks of reversals. [CCAP, 246]
203. Buffer pool allocations should be based on scientific assessment and empirical evidence of reversals for different forms of sinks. For geological storage, if there are obligations under law to address reversal emissions, then there should be no need for further measures. After the Monitoring period, only host nation obligations and reporting and accounting should apply. The notion of intentional reversals is immaterial for geological storage. Significant intentional reversal would result in loss of license to operate under credible jurisdictions and methodologies, which is a strong enough incentive not to make a distinction. [SE, 244]
204. For a project with short implementation period, such as timber construction (i.e. product-based), activity-specific non-permanence risk buffer is the right choice. [TFI, 214]
205. Buffer pools are typically only used for NBS projects, which have a more material risk of reversal than TBS. However, with the development of CDR projects with geological storage and their exposure to losses risks, there is room to further investigate a percentage risk buffer based on the ground formation or the project location with a timeline threshold (i.e. less than 200 years. etc.). If the reversal exceeds the carbon project's

contributions to the buffer pool or the project is terminated, the liability of the project should vary. In this instance, buffer pools need to be complemented with other measures (for example, purchasing carbon credits from other projects). The buffer pool approach already exists for NBS so it's the most common and easiest to put in place for CDR; only deep-in analysis of the ground in combination with permanence timeline sequestration is required. [SYRA, 305]

206. The implementation of the approaches should consider the following:
- (a) Methods for determining the level of buffer pool contributions:
 - (i) The level of buffer pools should be determined based on the risk of reversal for a specific project and the measures in place to overcome this risk;
 - (ii) The overall risk of reversals should be based on both natural and anthropogenic risks;
 - (iii) Different parameters should be used per project type, for example: NBS CDR projects: risk of droughts and wildfires; TBS CDR projects: the geological formation, the depth of the CO₂ injection and how the CO₂ is injected (liquid, gas or solid);
 - (b) Composition of buffer pool: for NBS CDR projects, the buffer pool needs to be evaluated at each vintage and the relevant ERs stored on an account for potential reversal risk later;
 - (c) Only unintentional reversals should be eligible for the release of ERs from the buffer pool. Intentional reversals should be cancelled from the total number of ERs issued by the project (over-crediting risk). Anthropogenic reversals that happen repeatedly, should be penalised severely and even conclude in the termination of the project;
 - (d) Specifications for ERs that cancelled for compensate for reversals, including in relation to ER vintages and contributing activity types or categories. Ideally, reversals should be compensated with ERs from the same project type. If not possible, the ERs used to compensate should align as much as possible with the project ERs. Project type, vintages and location are the most relevant aspects to align;
 - (e) In case 100% of the buffer pool gets cancelled, an alternative way of compensating for the reversals should be defined. For example, the purchase and use of credits from a similar project. In this situation, the buffer pool needs to be reassessed for the next crediting period. The objective is to avoid the buffer pool to be fully used up again. [SYRA, 305]
207. Adequately sized buffer pools tend to effectively address the risk of reversals, by withholding an amount of credits from being traded and setting them aside to form a “buffer pool” which is later used when a reversal occurs. In many cases, the amount withheld is not based on any actuarial assessment of the risk of reversal and it can vary. However, to be most efficient, the percentages of credits allocated to the buffer should match the actuarial risk of reversal for all activities covered by the buffer. The allocation should then take into account how reversals are detected, quantified, and reported. [CI, 307]

208. A high level of transparency regarding how percentages applied for natural, internal and external risks are reached is required. Any cap placed on the maximum level of risk allowable should be disclosed/highlighted in the risk assessment documentation. Similarly, where the approach required a minimum risk buffer allocation in cases where projects assess low risk, this or the lack of a minimum allocation should be specified. Any project documentation detailing how risk buffer allocations are calculated be made publicly available. This allows a greater level of disclosure that brings greater indication that project risks are mitigated appropriately. [BEZERO, 304]

4.6. Avoidance of leakage

4.6.1. SB 003 Recommendation extract

209. Activity participants shall minimize the risk of leakage and adjust for any remaining leakage in calculations of net removals following relevant provisions to be developed by the Supervisory Body.

4.6.2. Key Issues

210. Leakage Avoidance—Minimize leakage and adjust for any remaining per provisions (SB 004 discussion)

4.6.3. New Proposals

211. Mechanism methodologies shall consider the following principles to avoid leakage:

- (a) Mechanism methodologies shall consider all potential sources of leakage associated with the type of mitigation activities and not limit the consideration to a particular boundary (i.e. not be limited to national boundaries); [CMW, 308] [OI, 285]
- (b) All material sources of leakage shall be included in the quantification of emission reductions or removals, except where the omission of leakage sources is conservative; [OI, 285]
- (c) The estimation of leakage emissions shall be robust and conservative in light of the uncertainties, taking into account the choice of assumptions, models, parameters, data sources, measurement methods, and other factors; [OI, 285]
- (d) The consideration of leakage sources shall include, where relevant: upstream or downstream emissions; emission increases due to direct or indirect shifting of activities, services or products; and ecological leakage (e.g. mitigation activities affecting emissions in nearby areas that are hydrologically connected); [OI, 285]
- (e) Mechanism methodologies shall establish requirements to minimize any material sources of leakage (e.g. through requirements that avoid leakage); [OI, 285]
- (f) Any material remaining leakage shall be estimated and deducted in the quantification of emission reductions or removals. [OI, 285]

4.7. Avoidance of other negative environmental and social impacts

4.7.1. SB 003 Recommendation extract

212. Activity participants shall minimize and, where possible, avoid negative environmental and social impacts of an activity involving removals, including impacts on biodiversity, land and soils, ecosystem health, human health, food security, local livelihoods, and the rights of indigenous peoples, following requirements to be developed by the Supervisory Body while acknowledging that the enforcement of environmental and social protection laws is a national prerogative of the host Party.

4.7.2. Key Issues

213. At COP27, stakeholders questioned, e.g. optional nature of impact avoidance, key elements missing from possible impacts list, national prerogative caveat and its basis.

214. Minimize and, where possible, avoid per provisions including possible impacts on:

- (a) Biodiversity;
- (b) Land and soils;
- (c) Ecosystem health;
- (d) Human health;
- (e) Food security;
- (f) Local livelihoods;
- (g) The rights of the indigenous peoples;

while acknowledging that enforcement of E&S protection laws is a national prerogative (SB 004 discussion).

4.7.3. New Proposals

215. The Supervisory Body shall establish [specific requirements] [a check list of the minimum requirements] for environmental and social safeguards that must be considered by activity proponents in identifying, monitoring and mitigating potential negative environmental and social impacts]. [EU, 59] { the input contains a hierarchical list of requirements}.

216. The Supervisory Body may develop a non-eligible list of activities involving removal activities which do not fulfil the requirements for environmental and social impacts (e.g. short-term rotation monoculture plantations). [EU, 59]

217. In addition to general requirements contained in “Article 6.4 mechanism activity standard”, each mechanism methodology may, taking into account specificities of different removal activity categories or types, develop and include additional requirements for robust environmental and social safeguards. [PACHA, 306]

218. All removal activities are not homogenous or equal as some removal activities do pose harm and risk to human health—especially women’s health and wellbeing—and the environment, as well as violate international or domestic laws, including international

- human rights commitments. A positive list and/or a negative list on removal activities should be developed specifically for Article 6.4 mechanism. [LESE, 67]
219. The negative list shall comprise removal activities with unproven and high-risk technologies, and could result in negative environmental and social impacts and violations of human rights, including Indigenous Peoples' rights. [LESE, 67]
220. Depending on the circumstances, jurisdiction, or activity type, the extent to which activities should actively monitor and report on demonstrable social and environmental co-benefits – rather than merely avoiding harms – may also merit consideration. [CCSA, 287]
221. Methodologies should include a monitoring system to measure the avoidance of other negative environmental and social impacts over time and the actions to maximize social welfare throughout the activity implementation. [CFL, 38]
222. An independent body to investigate grievances flagged by peoples and communities negatively affected by carbon crediting projects, and the right of stakeholders such as civil society organisations to appeal decisions of the Supervisory Body should be established. [CG, 269]
223. While the independent grievance redress mechanism will not help avoid negative environmental and social risks, it can play a role in providing remedy if those risks are not avoided and harm occurs. [AAI, 289]
224. The draft recommendations on removals presented by the Supervisory Body to the CMA at COP27 included worrying language related to the avoidance of negative environmental and social risks. This paragraph introduced a caveat on national prerogatives that could undermine both the Supervisory Body's ability to set rules and also the integrity of the Paris Agreement by allowing activities that harm the environment or people from being approved if a country says that it does not enforce a specific environmental or social protection. [CIEL, 50]
225. The CMA requested the SB to "further develop" recommendations on avoidance of other negative environmental and social impacts (para 6(c), decision 3/CMA.3). What we observe is a repetition of the same provisions. This is insufficient and not conducive to sustainable development. We believe that a completely different approach needs to be developed to address environmental and social safeguards. We believe the role of LCIPs should be radically different and play a major role in the design, implementation and monitoring of A6.4 removal activities. [PERSP, 18]
226. We propose that it is insufficient to "minimize impacts, if possible". Further, Local Communities and Indigenous Peoples (LCIPs) should not simply be consulted, but take ownership of A6.4 activities in a larger framework of local sustainable development. [ALLCOT, 48]
227. SB should move away from the traditional concept of "consultation with stakeholders" to requiring "full engagement with LCIPs". "Not only is this a moral and ethical imperative, but it is also strategic to promote sustainability" of land-base removals. Working with local and indigenous organizations must be based on the principles of partnership, program ownership, long-term commitment, flexibility and a multiplicity of actions and solutions. Unless the SB builds these elements into the mechanism there will be an extremely high risk of affecting LCIPs through "green- or land- grabbing". [CCAP, 34]

228. Whilst acknowledging that the enforcement of environmental and social protection laws is a national prerogative of the host Party, it is important to ensure that all activities under the Article 6 Mechanism are aligned with international principles on environmental and social considerations. If a country or region does not have specific guidelines or processes, an impact evaluation before project initiation may be a feasible option. Such evaluation should be verified by a third-party assessor and may lead to the modification or rejection of the project. [IETA, 51]
229. The International Association for Impact Assessment begins its description of Social Impact Assessment with the following: 1. The goal of impact assessment is to bring about a more ecologically, socio-culturally and economically sustainable and equitable environment. Impact assessment, therefore, promotes community development and empowerment, builds capacity, and develops social capital (social networks and trust). 2. The focus of concern of SIA is a proactive stance to development and better development outcomes, not just the identification or amelioration of negative or unintended outcomes. Assisting communities and other stakeholders to identify development goals, and ensuring that positive outcomes are maximized, can be more important than minimizing harm from negative impacts. [JMF, 270]
230. To address this, the SB may draw from the Information Note (paras 178-195). Additionally, we would like to propose the following principles to the SB when improving this section. {the input contains a total of 46 principles/criteria to be applied}. [CCAP, 34]
231. It is recommended to build on the approaches developed in the VCM and REDD+ national programs for how to address these risks. The working group should consider whether i) certain existing methodologies, e.g. CCBs, could be suggested as an accepted approach/methodology to deal with environmental and social risk, and ii) whether it may recommend a list of risks/safeguards (following the REDD+ Cancun safeguards approach) that all removal methodologies would need to address and iii) explore how the requirement for addressing social and environmental risk in removal projects could interoperate with Safeguard Information Systems that countries are developing for REDD+. These approaches require more study – it is advisable for the SB to continue working on the matter of social impacts and safeguards throughout 2023. [IETA, 51]
232. The avoidance of negative environmental and social impacts should consider the full value chain, not just within the operations of the activity, with the same activity boundary as mentioned in the previous point. [SE, 15]

5. References

5.1. Stakeholder inputs

Table 3 Parties that responded to the call for public input

Submission date	Party	Acronym	Reference number	Document URL
22/05/2023	Russian Federation	RU	53	https://shorturl.at/houY5
09/05/2023	United Kingdom	UK	54	https://shorturl.at/cquDS
02/05/2023	Papua New Guinea on behalf of Coalition for Rainforest Nations	PN	55	https://shorturl.at/pACH3

Submission date	Party	Acronym	Reference number	Document URL
17/04/2023	Norway	NW	56	https://shorturl.at/hjVY0
07/04/2023	Republic of Korea	ROK	57	https://shorturl.at/nMZ24
23/03/2023	Colombia on behalf of Chile, Colombia, Guatemala, Panama, Paraguay, and Peru	CO	58	https://shorturl.at/jwW03
15/03/2023	European Union on behalf of European Union	EU	59	https://shorturl.at/gEY25

Table 4 Stakeholders that responded to the call for public input

Submission date	Stakeholder	Acronym	Reference number	Document URL
04/10/22	Hayes Limnology Lab: Ocean alkalinity enhancement using electrolysis	HLB	1	https://bit.ly/40Cu7kx
06/10/22	Planetary Technologies: Ocean alkalinity methods	PT	2	https://bit.ly/3XadYQB
04/10/22	Hayes Limnology Lab: Ocean alkalinity enhancement using electrolysis	HLB	1	https://bit.ly/40Cu7kx
06/10/22	Planetary Technologies: Ocean alkalinity methods	PT	2	https://bit.ly/3XadYQB
10/10/22	GCC: Inputs on Annex 5 to the SB002 annotated agenda	GCC	4	https://bit.ly/40HbE6A
11/10/22	Winrock: ACR & ART input-6.4 removals public comment	ACR	8	https://bit.ly/3K9v0vp
11/10/22	Wetlands International: Inputs on removal activities	WI	9	https://bit.ly/3YC8IMe
11/10/22	Verdane: Response to UNFCCC Article 6.4 call	VA	10	https://bit.ly/3x4BoMw
11/10/22	TREEO: Review Article 6.4 mechanism	TREEO	11	https://bit.ly/40xawCi
11/10/22	TNC: Removals and REDD-plus	TNC	12	https://bit.ly/3I9SmzB
11/10/22	Timber Finance Initiative: Engineered timber as carbon storage	TFI	13	https://bit.ly/3DNo7vp

Submission date	Stakeholder	Acronym	Reference number	Document URL
11/10/22	The HBAR Foundation: Response of THF to UNFCCC Calls for Input on A6.4M	HBAR	14	https://bit.ly/3x7rvxO
11/10/22	Stockholm-Exergi: Contribution by Stockholm Exergi in response to UNFCCC's Call for input 2022	SE	15	https://bit.ly/3la9zsk
11/10/22	Running Tide: Article 6.4 input for ocean-based carbon removal	RT	17	https://bit.ly/40yUYy5
11/10/22	Perspectives: Input on removal activities under A6.4 Mechanisms	PERSP	18	https://bit.ly/3DSjYXr
11/10/22	Orsted: Peatlands and BECCS	OD	19	https://bit.ly/3l5SFeC
11/10/22	Instituto Acao Verde: Deforestation Double Counting	IAV	22	https://bit.ly/3x6y6lF
11/10/22	ICLRC: Response to call for input 2022-Activities involving removals	ICLRC	24	https://bit.ly/3YEn49r
11/10/22	GCCSI: Submission to the A6.4 Supervisory Body Call for Inputs 2022 - SB002-A05	GCCSI	25	https://bit.ly/3x5deRV
11/10/22	Evident C-capsule: Inputs on removal activities	ECP	27	https://bit.ly/3lh4aa6
11/10/22	Drax: Response to the A6 consultation	DG	29	https://bit.ly/3ljxZH0
11/10/22	DAC Coalition: Recommendations from Direct Air Capture Coalition	DC	30	https://bit.ly/3RKAs9E
11/10/22	Climeworks: Response to the documents regarding removals under Article 6.4	CW	31	https://bit.ly/40CC4Gp
11/10/22	Clean Air Task Force: CATF Article 6.4 Comments	CAT	32	https://bit.ly/3JVyAsH
11/10/22	Cercarbono: Additionality and double counting	CCO	33	https://bit.ly/3DRdqrO

Submission date	Stakeholder	Acronym	Reference number	Document URL
11/10/22	Center for Clean Air Policy: CCAP Submission Annex 5 to the SB002	CCAP	34	https://bit.ly/40JszFp
11/10/22	Carbon Recycling: Contributions to the Information Note document	CR	36	https://bit.ly/3lgnITE
11/10/22	Carbon Finance Labs: UNFCCC Article 6.4 Contribution	CFL	38	https://bit.ly/3HI8yq5
11/10/22	Carbon Engineering: Role of DACCS removal activities	CE	39	https://bit.ly/3YCZzNZ
11/10/22	Carbon Business Council: Inputs on removal activities	CBC	40	https://bit.ly/3x5DD27
11/10/22	CARBFIX: Subsurface mineralization of CO ₂	CF	41	https://bit.ly/3ln9Mjj
11/10/22	BeZeroCarbon: Consultation response	BZC	43	https://bit.ly/3lh7QZs
11/10/22	Bellona: Response to CDR call for input	BF	46	https://bit.ly/3Xl8hPz
11/10/22	Arcusa S: Call for input 2022 - activities involving removals under the Article 6.4 Mechanism	SA	47	https://bit.ly/3XjZ4XQ
11/10/22	ALLCOT: Inputs on Land-Based Removals	ALLCOT	48	https://bit.ly/3xbZcxS
13/10/22	Center for International Environmental Law: CIEL Submission on Article 6.4 Removals (late submission)	CIEL	50	https://bit.ly/3ljtzjA
14/10/22	IETA: Removals input for 6.4SB (late submission)	IETA	51	https://bit.ly/40GSsG8
27/10/22	MDB Working Group comments on the annotated agenda of the third meeting of the Supervisory Body	MDB WG	53	https://bit.ly/3NorLBk

Submission date	Stakeholder	Acronym	Reference number	Document URL
15/03/23	Office of the United Nations High Commissioner for Human Rights (OHCHR) on behalf of The Office of the UN High Commissioner for Human Rights	OHCHR	60	https://shorturl.at/axJPT
10/04/23	Action Group on Erosion Technology and Concentration (ETC group) on behalf of Action Group on Erosion Technology and Concentration (ETC Group)	ETC	61	https://shorturl.at/bezFJ
21/03/23	Oeko-Institut e.V. Institute for Applied Ecology on behalf of Stockholm Environment Institute, University of Edinburgh and Oeko-Institut	OI	62	https://shorturl.at/ciuB7
17/03/23	Bellona Foundation (BF) on behalf of Bellona Foundation	BF	63	https://shorturl.at/girL5
16/03/23	Center for International Environmental Law (CIEL)	CIEL	64	https://shorturl.at/xCVZ5
16/03/23	Heinrich Böll Foundation (HBF)	HBL	65	https://shorturl.at/hFU09
15/03/23	Global Carbon Capture and Storage Institute on behalf of The Global CCS Institute	GCCSI	66	https://shorturl.at/fozV2
15/03/23	LIFE Education Sustainability Equality (LESE) on behalf of Women and Gender	LESE	67	https://shorturl.at/aezSW
15/03/23	Carbon Capture and Storage Association (CCSA)	CCSA	68	https://shorturl.at/RWY57
15/03/23	ActionAid International on behalf of CLARA submission, submitted by ActionAid International	CLARA	69	https://shorturl.at/wFL15

Submission date	Stakeholder	Acronym	Reference number	Document URL
15/03/23	International Emissions Trading Association (IETA) on behalf of International Emissions Trading Association (IETA)	IETA	70	https://shorturl.at/coIX5
15/03/23	WWF	WWF	71	https://shorturl.at/sFRUZ
15/03/23	Institute for Agriculture and Trade Policy (IATP)	IAP	72	https://shorturl.at/aqy27
15/03/23	Friends of the Earth International on behalf of Friends of the Earth International	FoE Int	73	https://rb.gy/fwzn4
15/03/23	Institute for Governance and Sustainable Development (IGSD)	IGSD	74	https://rb.gy/rliin
15/03/23	The University of Texas at Austin	UT	77	https://rb.gy/18qiq
14/03/23	Indigenous Education Network of Turtle Island (IENTI/IEN) on behalf of Indigenous Environmental Network (IEN)	CMW	78	https://rb.gy/03i3m
14/03/23	Carbon Market Watch (CMW) on behalf of Carbon Market Watch (CMW)	CMW	78	https://rb.gy/p2aah
14/03/23	Plymouth Marine Laboratory (PML)	PML	79	https://rb.gy/2kwcr
14/03/23	Environmental Defense Fund (EDF) on behalf of Environmental Defense Fund, Conservation International, The Nature Conservancy, Wetlands International, Rare, Ocean Conservancy, Ocean & Climate Platform, National Wildlife Federation	EDF	80	https://bit.ly/3MU9hHd
20/04/23	Stockholm Exergi	SE	81	https://bit.ly/3NdOa43
31/03/23	Drax Group	DG	82	https://bit.ly/43HiyJJ

Submission date	Stakeholder	Acronym	Reference number	Document URL
27/03/23	Friends of the Earth Germany/ BUND	FoE/BUND	83	https://bit.ly/45QmfyE
22/03/23	Friends of the Earth England, Wales and Northern Ireland	FoE UK	84	https://bit.ly/43Ei3js
17/03/23	Carbon Finance Lab	CFL	85	https://bit.ly/43los3x
17/03/23	AirCapture and Denominator	AD	86	https://bit.ly/3NaOjp6
17/03/23	IEAGHG	IEAGHG	88	https://bit.ly/3OVS1Er
22/05/23	Jack Roberts	JR	89	https://shorturl.at/mqvLU
22/05/23	Jason Demeny	JD	90	https://shorturl.at/cgrJU
22/05/23	Thoralf Gutierrez (Sirona Tech)	TG	91	https://shorturl.at/gv036
22/05/23	Richard Edwards (Clo Carbon Cymru)	Clo	92	https://shorturl.at/moLUZ
22/05/23	Paul Halloran (University of Exeter)	UoEx	93	https://shorturl.at/kwKPT
22/05/23	CarbonRun	CR	94	https://shorturl.at/cST15
22/05/23	Inplanet GmbH	IP	95	https://shorturl.at/xKW89
22/05/23	Prof. Ning Zeng (University of Maryland)	UMD	96	https://shorturl.at/aoMQS
22/05/23	Tim Isaksson	TI	97	https://shorturl.at/cdfTY
22/05/23	Planetary Technologies	PT	98	https://shorturl.at/fyFM3
22/05/23	Paolo Piffaretti (Carbonx)	CX	99	https://shorturl.at/dHRV5
22/05/23	David Andersson (ECOERA AB)	ECOERA	100	https://shorturl.at/xyzDO
22/05/23	Adam (Zopeful Climate)	ZC	101	https://shorturl.at/svZ05
23/05/23	Hanna Ojanen (Carbonculture)	CC	102	https://shorturl.at/efBKL
22/5/2023	Tony S. Hamer (GHG PATS)	PATS	103	https://shorturl.at/ehzN3
23/05/23	Carbon-Based Consulting LLC	CB	104	https://shorturl.at/guLX1
23/05/23	Carbon Removal India Alliance (CRIIA)	CRIIA	105	https://shorturl.at/ntxFS
23/5/2023	BlueSkies Minerals Inc.	BS	106	https://shorturl.at/cyER8
24/05/23	Carbon Business Council	CBC	107	https://shorturl.at/FRW15

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24/05/23	Kaja Voss (Inherit Carbon Solutions AS)	ICS	108	https://shorturl.at/jnL47
24/05/23	Lead authors of the State of Carbon Dioxide Removal Report	SCDRR	109	https://shorturl.at/aDEH1
24/05/23	Cella	CLLA	110	https://shorturl.at/fwIV5
24/05/23	Stockholm Exergi	SE	111	https://shorturl.at/aezDH
24/05/23	Plymouth Marine Laboratory	PML	112	https://shorturl.at/ilV46
24/05/23	Injy Johnstone	IJ	113	https://shorturl.at/tvyU6
24/05/23	OpenAir	OA	114	https://shorturl.at/dgACL
24/05/23	OXO Earth	OXO	115	https://shorturl.at/aqrS5
26/05/23	Keep Our Sea Chemical Free	KOSCF	116	https://shorturl.at/KW458
27/05/23	Marginal Carbon AB	MC	117	https://shorturl.at/hjGR7
24/05/23	Charm Industrial	CI	118	https://shorturl.at/iBFN0
24/05/23	Carbon Finance Labs	CFL	119	https://shorturl.at/eggFK
24/05/23	Dr. Robert Chris	RC	120	https://shorturl.at/gIL7
25/05/23	Stockholm Environment Institute; University of Edinburgh; Oeko-Institut	SEI+	121	https://shorturl.at/aqwU6
27/05/23	Linden Trust for Conservation	LTC	122	https://shorturl.at/eOQV0
28/05/23	Linden Trust for Conservation	LTC	122	https://shorturl.at/eOQV0
25/05/23	1PointFive	1.5	123	https://shorturl.at/guxA4
24/05/23	Seafields	SF	124	https://shorturl.at/tuS04
24/05/23	Microsoft Inc.	MS	125	https://shorturl.at/bsGOV
24/05/23	Climeworks AG	CW	126	https://shorturl.at/nBKS_Y
27/05/23	Equatic	EQ	127	https://shorturl.at/bINW_Y
28/05/23	IEAGHG	IEAGHG2	128	https://shorturl.at/vwP49
25/05/23	Business Council for Sustainable Energy	BCSE	129	https://shorturl.at/bitEP
25/05/23	Running Tide	RT	130	https://shorturl.at/lrRY8

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25/05/23	Negative Emissions Platform and other co-signatories	NEP	131	https://shorturl.at/HNRWZ
25/05/23	Phil Kithil	PK	132	https://shorturl.at/bzFN2
25/05/23	CCU Alliance	CCU	133	https://shorturl.at/iwKPW
25/05/23	Timber Finance	Tfi	134	https://shorturl.at/lwIJP
25/05/23	Air Capture	AC	135	https://shorturl.at/wFGU6
25/05/23	Mati Carbon Removals	MCR	136	https://shorturl.at/enogI
20/05/23	Center for Negative Carbon Emissions	CNCE	137	https://shorturl.at/efoKU
25/05/23	CarbonPlan	CP	138	https://shorturl.at/cuHMU
14/05/23	Captura	CC	139	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Captura.pdf
25/05/23	UNDO	UNDO	140	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_UNDO.pdf
25/05/23	Neustark AG	N-AG	141	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_NeustarkAG.pdf
25/05/23	44.01	44.01	142	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_4401.pdf
25/05/23	IETA	IETA	143	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_International%20Emissions%20Trading%20Association%20%28IETA%29.pdf
25/05/23	Carbon Direct.Inc	CD	144	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Carbon%20Direct%20Inc.pdf
25/05/23	The Doers Club	CRDC	145	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Doers%20Club.pdf

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25/05/23	Drax Group	DG	146	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Drax%20Group.pdf
25/05/23	Carbfix	CX	147	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Carbfix.pdf
25/05/23	Puro.earth	PE	148	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Puro%20Earth.pdf
25/05/23	CO2RE Hub	CO2RE	149	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_CO2RE%20Hub%20.pdf
25/05/23	Swiss Lenten Fund	SLF	150	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_SwissLenten_Fund.pdf
25/05/23	Coalition for Negative Emissions	CNE	151	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Coalition%20for%20Negative%20Emissions.pdf
25/05/23	Climate Analytics GmbH	CA	152	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Climate%20Analytics%20gGmbH.pdf
25/05/23	Climate Action Platform Africa	CAPA	153	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Climate%20Action%20Platform%20Africa.pdf
25/05/23	The Bioenergy Association of Finland	BEAF	154	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Bioenergy%20Association%20of%20Finland.pdf
25/05/23	Zero Emissions Platform	ZEP	155	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Zero%20Emissions%20Platform.pdf

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25/05/23	Leefmilieu	LU	156	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Leefmilieu.pdf
25/05/23	Carbon Gap	CG	157	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_CarbonGap.pdf
25/05/23	Orsted	ORST	158	https://unfccc.int/sites/default/files/resource/SB005-call_for_input_%C3%98rsted.pdf
25/05/23	The Bellona Foundation	BF	159	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_The%20Bellona%20Foundation.pdf
25/05/23	Fern	FERN	160	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Fern.pdf
25/05/23	Carbon Capture and Storage Association	CCSA	161	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Carbon%20Capture%20and%20Storage%20Association.pdf
25/05/23	Dogwood Alliance	DA	162	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_DogWood%20Alliance%20.pdf
25/05/23	CCS+ Initiative	CCSI	163	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_CCS%2B%20Initiative.pdf
25/05/23	Stripe Climate & Shopify	SCS	164	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Stripe%20Climate%20%26%20Shopify.pdf
25/05/23	Carboniferous	CF	165	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Carboniferous.pdf

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25/05/23	National Wildlife Federation	NWF	166	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_National%20Wildlife%20Federation.pdf
24/05/23	KLIMPO	KLIMPO	167	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_KLIMPO.pdf
25/05/23	Direct Air Capture Coalition	DACC	168	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Direct%20Air%20Capture%20Coalition.pdf
25/05/23	Octavia Carbon	OC	169	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Octavia%20Carbon.pdf
25/05/23	Aspiration	AN	170	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Aspiration.pdf
25/05/23	Global CCS Institute	GCCSI	171	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Global%20CCS%20Institute.pdf
24/05/23	Carbon Capture Inc.	CCI	172	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_CarbonCapture%20Inc.pdf
25/05/23	Biofuelwatch	BW	173	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Biofuelwatch.pdf
25/05/23	Carbon Capture Coalition	CCC	174	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Carbon%20Capture%20Coalition.pdf
25/05/23	Environmental Defense Fund	EDF	175	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Environmental%20Defense%20Fund.pdf

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24/05/23	Paebbl	PBL	176	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Paebbl.pdf
25/05/23	EFI Foundation	EFIF	177	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_EFI%20Foundation.pdf
25/05/23	Recarb	RB	178	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_EFI%20Foundation.pdf
25/05/23	World Resources Institute	WRI	179	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_World%20Resources%20Institute.pdf
25/05/23	Clean Air Task Force (CATF)	CATF	180	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_CleanAirTaskForceCATF.pdf
24/05/23	Edison Electric Institute (EEI)	EEI	181	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Edison%20Electric%20Institute%20%28EEI%29.pdf
25/05/23	Ocean Visions	OV	182	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Ocean%20Visions.pdf
25/05/23	John M. Fitzgerald	JF	183	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_JohnMFitzgerald.pdf
26/05/23	Prof. William R Moomaw (Tufts University)	WRM	184	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Prof%20William%20R%20Moomaw%20Tufts%20University.pdf
26/05/23	PD Forum	PD-F	185	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_PD%20Forum.pdf

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25/05/23	CIBOLA Partners	CP	186	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_CIBOLA%20PARTNERS%20v2.pdf
25/05/23	Heirloom	HM	187	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Heirloom.pdf
25/05/23	Perspectives Climate Research GmbH	PERSP	188	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Perspectives%20Climate%20Research.pdf
25/05/23	Carbon Engineering	CE	189	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Carbon%20Engineering.pdf
26/05/23	Boston Consulting Group	BCG	190	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Boston%20Consulting%20Group.pdf
25/05/23	Mary S. Boot, Partnership for Policy Integrity and Chad Hansen, John Muir Project	PPI	191	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Mary_Booth_ChadHansen.pdf
25/05/23	Nasdaq Stockholm	NSQ	192	https://unfccc.int/sites/default/files/resource/SB005_call_for_input_Nasdaq%20Inc..pdf
09/06/23	Michael Hayes	MHS	200	https://unfccc.int/sites/default/files/resource/MichaelHayes.pdf
12/06/23	Blueskiesminerals.inc	BSM	201	https://unfccc.int/sites/default/files/resource/BlueSkiesMinerals.pdf
14/06/23	Seal Research Trust	SRT	202	https://unfccc.int/sites/default/files/resource/SealResearchTrust.pdf
15/06/23	CarbonRun	CR	203	https://unfccc.int/sites/default/files/resource/CarbonRun.pdf

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15/06/23	Roberto Rochadelli (fupef)	RBI	204	https://unfccc.int/sites/default/files/resource/RobertoRochadelli.pdf
15/06/23	Sky Harvest Carbon (Will Clayton)	SHC	205	https://unfccc.int/sites/default/files/resource/Sky_Harvest_Carbon.pdf
15/06/23	NovoCarbo	NC	206	https://unfccc.int/sites/default/files/resource/Novocarbo.pdf
15/06/23	Capture6	CAP	207	https://unfccc.int/sites/default/files/resource/Capture6.pdf
16/06/23	Finnwatch	FNW	208	https://unfccc.int/sites/default/files/resource/Finnwatch.pdf
16/06/23	ECOERA	ECOERA	209	https://unfccc.int/sites/default/files/resource/ECOERA.pdf
16/06/23	OpenAir	OAIR	210	https://unfccc.int/sites/default/files/resource/OpenAir.pdf
16/06/23	Carbon Business Council	CBC	211	https://unfccc.int/sites/default/files/resource/CarbonBusinessCouncil.pdf
16/06/23	Rick Berg (Nori.inc)	NORI	212	https://unfccc.int/sites/default/files/resource/NoriInc.pdf
16/06/23	Thomas Hoffmann (Decarbo Engineering GmbH)	THN	213	https://unfccc.int/sites/default/files/resource/DecarboEngineering.pdf
16/06/23	Timber Finance	TFI	214	https://unfccc.int/sites/default/files/resource/TimberFinance.pdf
16/06/23	CarbonPool	CPOOL	215	https://unfccc.int/sites/default/files/resource/CarbonPool.pdf
17/06/23	OceanForesters	OF	216	https://unfccc.int/sites/default/files/resource/OceanForesters.pdf
17/06/23	Takachar	TAK	217	https://unfccc.int/sites/default/files/resource/Takachar.pdf
18/06/23	Carbo Culture	CCE	218	https://unfccc.int/sites/default/files/resource/CarboCulture.pdf
18/06/23	Rewind.earth	REW	219	https://unfccc.int/sites/default/files/resource/Rewindearth.pdf

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18/06/23	Clean Air Tech Limited	CAT	220	https://unfccc.int/sites/default/files/resource/CleanAirTech.pdf
18/06/23	Elitelco	ELI	221	https://unfccc.int/sites/default/files/resource/Elitelco.pdf
18/06/23	Otherlab	OLAB	222	https://unfccc.int/sites/default/files/resource/Otherlab.pdf
18/06/23	Carbon Click, S.A. de C.V	CCL	223	https://unfccc.int/sites/default/files/resource/CarbonClick.pdf
19/06/23	Arca	ARC	224	https://unfccc.int/sites/default/files/resource/Arca.pdf
19/06/23	AirMiners	AMN	225	https://unfccc.int/sites/default/files/resource/AirMiners.pdf
19/06/23	Seaweed Generation	SWG	226	https://unfccc.int/sites/default/files/resource/SeaweedGeneration.pdf
19/06/23	Max Planck Institute for Biogeochemistry	MPI	227	https://unfccc.int/sites/default/files/resource/MaxPlanckInstitute.pdf
19/06/23	Carbon Mineralization Flagship Center	CNF	228	https://unfccc.int/sites/default/files/resource/CarbonMineralizationCenter.pdf
19/06/23	Green East Master Ltd	GEM	229	https://unfccc.int/sites/default/files/resource/GreenEastMaster%2C.pdf
19/06/23	The Charles Darwin Rescue Plan	CDR	230	https://unfccc.int/sites/default/files/resource/CharlesDarwinRescuePlan.pdf
19/06/23	International Biochar Initiative	IBI	231	https://unfccc.int/sites/default/files/resource/InternationalBiocharInitiative.pdf
19/06/23	CarbonHemp Blo.Inc	CHB	232	https://unfccc.int/sites/default/files/resource/CarbonHempBlockchain.pdf
19/06/23	CCS+ Initiative	CCSI	233	https://unfccc.int/sites/default/files/resource/CCS%2BInitiative.pdf
19/06/23	Microsoft	MS	234	https://unfccc.int/sites/default/files/resource/Microsoft.pdf

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19/06/23	ecoLocked GmbH	ELG	235	https://unfccc.int/sites/default/files/resource/EcoLocked.pdf
19/06/23	University of Hamburg	UoH	236	https://unfccc.int/sites/default/files/resource/UniversityHamburg.pdf
19/06/23	German Biochar Association	GBA	237	https://unfccc.int/sites/default/files/resource/GermanBiocharAssociation.pdf
19/06/23	Omega Terraform	OT	238	https://unfccc.int/sites/default/files/resource/OmegaTerraform.pdf
19/06/23	Carbon Lockdown Project	CLP	239	https://unfccc.int/sites/default/files/resource/CarbonLockdownProject.pdf
19/06/23	Carbofex Oy	CFO	240	https://shorturl.at/ghkV5
19/06/23	Everest Carbon Inc	ECI	241	https://shorturl.at/eBES3
19/06/23	Dead Battery Depot.ltd	DBD	242	https://shorturl.at/erGT2
19/06/23	CROPS Carbon International LTD	CROPS	243	https://shorturl.at/qGMRV
19/06/23	Stockholm Exergi	SE	244	https://shorturl.at/aeCMY
19/06/23	Carbonfuture	CFUT	245	https://shorturl.at/uMOQT
19/06/23	C-Capsule	CCAP	246	https://shorturl.at/luJK3
19/06/23	Captura	CC	247	https://shorturl.at/cKS28
19/06/23	44.01	44.01	248	https://shorturl.at/qBQW3
19/06/23	XPRIZE	XPZ	249	https://shorturl.at/dpPS1
19/06/23	Skyrenu Technologies	STECH	250	https://shorturl.at/dALNU
19/06/23	Carbuna AG	CAG	251	
19/06/23	The Bellona Foundation	BF	252	https://shorturl.at/dmrCF
19/06/23	Noya PBC	NPBC	253	https://shorturl.at/dvHV8
19/06/23	Equatic	EQ	254	https://shorturl.at/xV078
19/06/23	IATA and Airbus	IATA	255	https://shorturl.at/avwNP
19/06/23	Rivotto	RTTO	256	https://shorturl.at/avxV7
19/06/23	U.S. Biochar Coalition	USBC	257	https://shorturl.at/adIGL

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19/06/23	FEWCOOP SA	FEWCOOP	258	https://shorturl.at/eqHK4
19/06/23	Cella Mineral Storage, Inc	CLLA	259	https://shorturl.at/hnBUV
19/06/23	Rethinking Removals Doers Club	RRDC	260	https://shorturl.at/uIVY9
19/06/23	Eyob Tenkir Shikur	ETS	261	https://shorturl.at/iCOY2
19/06/23	Kita	KITA	262	https://shorturl.at/pqxK7
19/06/23	The Zero Emissions Platform	ZEP	263	https://unfccc.int/sites/default/files/resource/Kita.pdf
19/06/23	Black Bull Biochar (BBB)	BBB	264	https://unfccc.int/sites/default/files/resource/ZeroEmissionsPlatform.pdf
19/06/23	DEMOcritUS	DEMO	265	https://unfccc.int/sites/default/files/resource/BlackBullBiochar.pdf
19/06/23	RedCarbon	RC	266	https://unfccc.int/sites/default/files/resource/RedCarbon.pdf
19/06/23	IEAGHG	IEAGHG	267	https://unfccc.int/sites/default/files/resource/IEAGHG.pdf
19/06/23	Octavia Carbon	OC	268	https://unfccc.int/sites/default/files/resource/OctaviaCarbon.pdf
19/06/23	Carbon Gap	CG	269	https://unfccc.int/sites/default/files/resource/CarbonGap.pdf
19/06/23	John M. Fitzgerald	JMF	270	https://unfccc.int/sites/default/files/resource/JohnM_Fitzgerald.pdf
19/06/23	Drax Group Plc	DG	271	https://unfccc.int/sites/default/files/resource/DraxCorporateLimited.pdf
19/06/23	ARCTECH USA	AU	272	https://unfccc.int/sites/default/files/resource/ARCTECH.pdf
19/06/23	Mati Carbon Removals	MCR	273	https://unfccc.int/sites/default/files/resource/MatiCarbonRemovals.pdf
19/06/23	Direct Air Capture Coalition	DACC	274	https://unfccc.int/sites/default/files/resource/DirectAirCaptureCoalition.pdf

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19/06/23	Grantham Research Institute on Climate Change and the Environment at the London School of Economics and Political Science	GRI/LSE	275	https://unfccc.int/sites/default/files/resource/GranthamResearchInstituteonClimateChangeandtheEnvironment.pdf
19/06/23	Sitos Group, Inc	SGI	276	https://unfccc.int/sites/default/files/resource/SitosGroup.pdf
19/06/23	Crown Monkey	CM	277	https://unfccc.int/sites/default/files/resource/CrownMonkey.pdf
19/06/23	Jim Ransom	JR	278	https://unfccc.int/sites/default/files/resource/Jim_Ransom_TeamIOB.pdf
19/06/23	Terra	TERRA	279	https://unfccc.int/sites/default/files/resource/Terra.pdf
19/06/23	The European Biochar Industry Consortium	EBIC	280	https://unfccc.int/sites/default/files/resource/EuropeanBiocharIndustryConsortium.pdf
19/06/23	Inventive Resources, Inc	IRI	281	https://unfccc.int/sites/default/files/resource/InventiveResources.pdf
19/06/23	STX	STX	282	https://unfccc.int/sites/default/files/resource/STX.pdf
20/06/23	HBAR Foundation	HBAR	283	https://unfccc.int/sites/default/files/resource/HBAR_Foundation.pdf
20/06/23	Inversion Point Technologies Ltd	IPT	284	https://unfccc.int/sites/default/files/resource/InversionPointTechnologies.pdf
20/06/23	Oeko-Institut, Greenhouse Gas Management Institute, Stockholm Environment Institute, University of Edinburgh Business School, Infrac, Carbon Limits, and Calyx Global	OI	285	https://unfccc.int/sites/default/files/resource/Oeko-Institut_GGMI_SEI.pdf
20/06/23	remove	ROVE	286	https://unfccc.int/sites/default/files/resource/remove.pdf

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20/06/23	Carbon Capture and Storage Association	CCSA	287	https://unfccc.int/sites/default/files/resource/CarbonCapture_StorageAssociation.pdf
20/06/23	Running Tide	RT	288	https://unfccc.int/sites/default/files/resource/RunningTide.pdf
20/06/23	ActionAid International	AAI	289	https://unfccc.int/sites/default/files/resource/ClimateLandAmbitionandRightsAlliance.pdf
20/06/23	Carbon Recycling	CRCY	290	https://unfccc.int/sites/default/files/resource/Carbon_Recycling.pdf
20/06/23	Planboo	PBOO	291	https://unfccc.int/sites/default/files/resource/Planboo.pdf
20/06/23	Spark Climate Solutions	SCL	292	https://unfccc.int/sites/default/files/resource/SparkClimateSolutions.pdf
20/06/23	From the Ground Up	FGU	293	https://unfccc.int/sites/default/files/resource/FromTheGroundUp.pdf
20/06/23	TecnoFiltro SCS	TFSCS	294	https://unfccc.int/sites/default/files/resource/TecnoFiltro%20SCS.pdf
20/06/23	Planetary Technologies	PT	295	https://unfccc.int/sites/default/files/resource/Planetary_Technologies_Kelland.pdf
20/06/23	Levitree, Inc	LVI	296	https://unfccc.int/sites/default/files/resource/Levitree.pdf
20/06/23	Partanna	PNNA	297	https://unfccc.int/sites/default/files/resource/Partanna.pdf
20/06/23	Earth's Blue Aura	EBA	298	https://unfccc.int/sites/default/files/resource/EBA.pdf
20/06/23	Greg H. Rau	GHR	299	https://unfccc.int/sites/default/files/resource/Planetary_Technologies_Rau.pdf
20/06/23	Daniel Schwaag	DS	300	https://unfccc.int/sites/default/files/resource/Made_of_Air.pdf
20/06/23	JPMorgan Chase & Co	JPM	301	https://unfccc.int/sites/default/files/resource/JPMorgan_Chase.pdf

Submission date	Stakeholder	Acronym	Reference number	Document URL
20/06/23	Climeworks	CWORKS	302	https://shorturl.at/fxRV7
20/06/23	International Coordinating Council of Aerospace Industries Associations	ICCAIA	303	https://shorturl.at/cAQ37
21/06/23	Ted Christie-Miller (BeZERO)	BEZERO	304	https://shorturl.at/ilG12
21/06/23	Sylvera	SYRA	305	https://unfccc.int/sites/default/files/resource/Sylvera.pdf
22/06/23	Pachama	PACHA	306	https://unfccc.int/sites/default/files/resource/Pachama.pdf
22/06/23	Conservation International	CI	307	https://unfccc.int/sites/default/files/resource/ConservationInternational.pdf
23/06/23	Carbon Market Watch	CMW	308	https://shorturl.at/quG36
24/06/23	Austrian Biomass Carbonisation Society	ABCS	309	https://shorturl.at/xPWY2
25/06/23	PYREG GmbH	PYREG	310	https://shorturl.at/uLLV6
26/06/23	IETA	IETA	311	https://shorturl.at/kuwCY
23/06/23	Climate Analytics	CA	312	https://shorturl.at/klLTU
27/06/23	south pole	SP	313	https://shorturl.at/yEF69
29/06/23	Global CCS Institute	GCCSI	314	https://shorturl.at/dZ479
19/06/23	Carbon Capture Machine	CCM	315	https://shorturl.at/cfrT1

Document information

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Related documents:

4 July 2023	A6.4-SB006-AA-A09- Information note: Compilation of public inputs received on removals (version 01.0)
3 June 2023	A6.4-SB005-A02 – Information note: Guidance and questions for further work on removals (version 02.0)
17 May 2023	A6.4-SB005-AA-A09 – Information note: Removal activities under the Article 6.4 mechanism (version 04.0)
17 May 2023	A6.4-SB005-AA-A10 – Information note: Summary of the views submitted by Parties and observers on activities involving removals (version 01.0)
10 March 2023	A6.4-SB004-A02 - Information note: Guidance and questions for further work on removals (v.01.0)
28 February 2023	A6.4-SB004-AA-A04 - <i>Information note</i> : Removal activities under the Article 6.4 mechanism (version 3.0)
07 November 2022	A6.4-SB003-A03 - <i>Recommendation</i> : Activities involving removals under the Article 6.4 mechanism (version 1.0)
25 October 2022	A6.4-SB003-AA-A03 - <i>Draft recommendation</i> : Removal activities under the Article 6.4 mechanism (version 2.0) A6.4-SB003-AA-A04 - <i>Information note</i> : Removal activities under the Article 6.4 mechanism (version 2.0)
15 September 2022	A6.4-SB002-AA-A05 - <i>Draft recommendation</i> : Requirements for the development and assessment of mechanism methodologies pertaining to activities involving removals (version 1.0) A6.4-SB002-AA-A06 - <i>Information note</i> : Removal activities under the Article 6.4 mechanism (version 1.0)
08 July 2022	A6.4-SB001-AA-A05 - <i>Concept note</i> : Removal activities under the Article 6.4 Mechanism (version 1.0)