Forest Carbon Partnership Facility

Portfolio Management Update

Twenty Third Meeting of the Carbon Fund (CF23)

June 15, 2021

Outline of Presentation

- Funding
  - Financial contributions and funds available for purchase of ERs
  - LOI/ERPA commitments
- Portfolio Management
  - Carbon Fund portfolio summary
  - ERPA signatures, Update on signed ERPAs
  - Early results from submitted ER Monitoring Reports
  - Monte Carlo simulation
  - ER delivery risk assessment model
  - Summary of different portfolio management models
  - Portfolio Management: Historical Comparisons
  - Decision/Feedback on Use of Uncommitted Funds

FCPF Carbon Fund Contributions to Date

FCPF Carbon Fund
Donor Contributions as of March 31, 2021 (In $ thousands)

Participant Name	Total	Outstanding	FY21	FY20	FY19	FY18	FY17	FY16	FY15	FY14	FY13	FY12	FY11	FY10	FY09
Australia	18,392											5,658	12,735		
BP Technology Ventures	5,000												5,000		
Canada	5,015											5,015			
European Commission	6,709													362	6,347
France	5,114								114				5,000		
Germany	321,295			55,974	57,265	29,616	54,771	13,329	32,108	27,280	6,556	15,443	21,125	3,819	4,009
Norway	297,087			27,166	27,618	12,640		58,352			161,310				10,000
Switzerland	10,796											10,796			
The Nature Conservancy	5,000														5,000
United Kingdom	181,582		71,489	92,153									17,940		
United States of America	18,500						4,500				4,000		10,000		
Committed Funding	**874,492**	**0**	**71,489**	**175,292**	**84,883**	**42,256**	**59,271**	**71,681**	**32,222**	**27,280**	**171,866**	**36,912**	**71,800**	**4,181**	**25,356**

$874.5 million

Carbon Fund Financial Situation: Sources and Uses Summary

Carbon Fund Sources and Uses Summary ($m)	
Sources ($m)	**874.5**
Number of LoIs (#)	**18**
Number of ER Programs expected	15
Uses	
Costs over Fund Lifetime	
Fixed Costs (FY10 to FY26)	25.5
ER Program Costs	66.3
Total Costs	**91.8**
Available for Purchase of ERs	**782.7**
Equiv to tons @ $5 per ton (m)	**156.5**
Average ER Program	**52.2**

Available for purchase of ERs

Carbon Fund Sources and Uses Summary ($m)	
Number of Programs	**15**
Sources ($m)	874.5
Available for Purchase of ERs	782.7
Signed ERPAs (14)	668.8
Sub-total available	*113.9*
Under no objection (1)	52.5
Total Available	***61.4***

LOI & ERPA Commitments

Country	Max LOI volume	ERPA contract volume	ERPA Contract value ($ million)	HFLD	HFLD proportion
Signed ERPAs (14)	*164.8*	*133.8*	*668.8*		
DR Congo	10.0	11.0	55.0	11	
Chile	5.2	5.2	26.0		
Costa Rica	12.0	12.0	60.0		
Cote D'Ivoire	16.5	10.0	50.0		
Dominican Republic	7.5	5.0	25.0		
Fiji	3.6	2.5	12.5		
Ghana	18.5	10.0	50.0		
Indonesia	22.0	22.0	110.0		
Lao PDR	8.4	8.4	42.0		
Madagascar	16.4	10.0	50.0		
Mozambique	8.7	10.0	50.0		
Nepal	14.0	9.0	45.0		
Republic of Congo	11.7	8.4	41.8	8.4	
Vietnam	10.3	10.3	51.5		
Under no-objection (1)	*10.5*	*10.5*	*52.5*		
Guatemala	10.5	10.5	52.5		
TOTAL	**175.3**	**144.3**	**721.3**	**19.4**	**13%**

- **Committed funding = $874.5 million**
- **Committed through contract volumes in signed ERPAs of 133.8 m tons = $668.8 million**

ERPA signatures

Country	Year	No.	ERPA Signature
DR Congo	2018	1	September 21, 2018
Mozambique	2019	3	January 16, 2019
Ghana			June 11, 2019
Chile			December 4, 2019
Fiji	2020	6	July 8, 2020
Vietnam			October 22, 2020
Cote D'Ivoire			October 30, 2020
Indonesia			November 25, 2020
Costa Rica			December 8, 2020
Lao PDR			December 30, 2020
Madagascar	2021	4	February 4, 2021
Nepal			February 24, 2021
Dominican Republic			March 1, 2021
Republic of Congo			April 22, 2021
Guatemala			Expected July 2021

Carbon Fund Portfolio Summary

- Carbon Fund term ends 31 December 2025
- 18 countries have submitted Program Documents (ERPDs) and have been selected unconditionally into the Carbon Fund portfolio
- 14 ERPAs have been signed: total committed $668.8 million
- 1 ERPA under no objection (Guatemala)
- 3 ER Programs cancelled (Mexico, Nicaragua, and Peru)

Update on signed ERPAs

- **DRC**
  - 5 out of 6 ERPA conditions of effectiveness (COE) have been fulfilled
  - Reference level (REL) has been revised and finalized, and consensus reached by CFPs on a way forward. ERPA will need to be amended accordingly when agreed by DRC and CFPs.
  - Final BSP submission is the last pending COE. The BSP will be finalized to take into account the revised reference level.

- **Mozambique**
  - ERPAs became effective in February 2020.
  - ERPAs were amended to include retroactive ERs from May 16, 2018 (date of ERPD unconditional approval by the Carbon Fund)
  - Validation and Verification for the first Reporting Period has been completed
  - Validation and Verification Report Reports were published on the FCPF website in June 2021
  - ER issuance, payment and ER transfer is anticipated to be completed within July 2021
  - GoM is also planning to submit the ER Monitoring Report (ER MR) for the second Reporting Period in August 2021

Update on signed ERPAs (contd.)

- **Ghana**
  - ERPAs became effective in April 2020
  - Upfront advance payment of $1.3 million under the Tranche B ERPA was made in August 2020
  - ER MR for the first Reporting Period was submitted in April 2021
  - Ghana is currently addressing comments raised during the FMT Completeness Check and plans to submit the revised ER MR by end June
  - Validation and Verification will commence once FMT has deemed it ready

- **Chile**
  - ERPA effectiveness deadline was extended to June 4, 2021 to provide additional time to fulfill the remaining two of four COEs.
  - All COEs have now been fulfilled and the notice to the country on ERPA effectiveness is currently being processed
  - Chile is also expected to submit the ER MR for the first Reporting Period by the end of June 2021

Update on signed ERPAs (contd.)

- **Fiji**
  - ERPA was countersigned by Govt. of Fiji in January 2021
  - Given the last cyclones and the impact of Covid-19, the ERPA effectiveness deadline is likely to be extended to provide the government with sufficient time to meet the two COEs
  - Fiji is expected to submit the first Reporting Period ER MR by the end of September 2021

- **Vietnam**
  - Government is continuing its work to fulfill the two COEs
  - Vietnam also submitted the first Reporting Period ER MR and is expected to submit the revised ER MR soon with the anticipation to initiate the Validation and Verification by the end of June
- **Indonesia**
  - Work in progress to fulfill the four COEs
  - The first Reporting Period ER MR is expected by the end of June

Update on signed ERPAs (contd.)

- **Costa Rica**
  - Work in progress to fulfill the four COEs
  - The first Reporting Period ER MR has been submitted and completeness check concluded. Validation and Verification will be initiated in mid-June.
- **Madagascar**
  - Work in progress to fulfill the three COEs
  - GoM is planning to submit the first Reporting Period ER MR in early September 2021
- **Cote D'Ivoire, Lao PDR, Nepal, Dominican Republic, Republic of Congo**
  - Work in progress to fulfill the respective COEs
  - First Reporting Period ER MR for Cote D'Ivoire, Lao, Nepal, and DR are due in 2022 as the first RP ends on December 31, 2021
  - Final BSP is ready to be shared with CFPs
  - As ROC just signed the ERPA, the government is currently focusing on meeting the COEs but also starting the preparation for the first Reporting Period ER MR.

ER MR submissions & Validation Verification - Summary

Country	1st ER MR Submission	Validation and Verification status
Chile	End June 2021	Start date will depend on the level of revisions to the ER MR after completeness check.
Costa Rica	Submitted	To start in mid-June 2021
Fiji	End September 2021	Same as above for Chile
Ghana	Submitted	Anticipated to start in end-June/July 2021
Indonesia	End June 2021	Same as above for Chile
Madagascar	Early September 2021	Same as above for Chile
Mozambique	Available online	Validation & Verification completed
Vietnam	Submitted	Planned to start in mid-June 2021
Cote D'Ivoire, Dominican Republic, Lao PDR, Nepal	Due in 2022	Due in 2022
DR Congo, ROC	To be updated	To be updated

Early results from Reporting Period 1 ER Monitoring Reports

- Among submitted ER MRs (including Mozambique) – RP1 ERs showing positive results
  - total approximate RP1 monitored ERs stands at 17.4 million tons, representing 41% of the combined contract volume of these ERPAs.
- ER MRs (other than Mozambique) are yet to be published and will be verified by a Validation and Verification Body
- Positive numbers in the early ER MRs could indicate potential availability of Additional ERs for Call Options in the future

FCPF Carbon Fund

Monte Carlo simulation

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Monte Carlo Simulation

- Performs risk analysis by building models of possible results by substituting a range of values—a probability distribution—for any factor that has inherent uncertainty
- Then calculates results over and over, each time using a different set of random values from the probability functions
- As the portfolio develops the FMT is using increasingly accurate values and narrower ranges of uncertainty

Today's Programs:

Estimated Reference Levels and Program Effective-ness

	Unit: [million tCO2e/year]	HFLD Adjustment (% of total emissions)	Emissions	Removals	Effectiveness (% estimate, indicative)
Final ER-PD	Chile		12.6	-12.4	7%
	Congo, Dem Rep	5.6 (13%)	43.5	-1.4	18%
	Congo Rep	5.4 (72%)	7.5	0.0	35%
	Costa Rica		9.3	-5.2	12%
	Cote d'Ivoire		9.7	-0.1	58%
	Dominican Rep		3.8	-3.1	22%
	Fiji		3.6	-2.0	12%
	Ghana		45.2	-0.1	6%
	Guatemala		15.3	-2.2	20%
	Indonesia		68.4	0.0	25%
	Lao PDR		10.5	-2.0	26%
	Madagascar		11.5	-0.1	34%
	Mozambique		6.5	0.0	38%
	Nepal		1.6	-0.7	98%
	Vietnam		10.9	-6.3	24%
	Total	***12.9 (4%)***	***259.9***	***-35.6***	

Key variables that affect the eventual ER Volume in the Carbon Fund portfolio

1. Updates to Reference Level (RL) estimates
   - RL is more carefully estimated for the ER-PD and sometimes later (e.g., using updated emission factors or different satellite data)

2. Program Effectiveness *(percentage change in rate of emissions or removals during program implementation)*
   - ER-PDs have more details on implementation design and hence effectiveness

3. Quality of Measurement *(statistical uncertainty associated with measured emission reductions)*
   - Improved measurement (e.g., better data) lowers uncertainty
   - Uncertainty (confidence in estimates) used for conservativeness factors (ER discount)

4. Share of Total ERs offered to the Carbon Fund
   - Countries may choose to retain a certain portion of ERs for sale to other buyers or may not be able to transfer title

Key variables that affect the eventual ER Volume in the Carbon Fund portfolio (cont.)

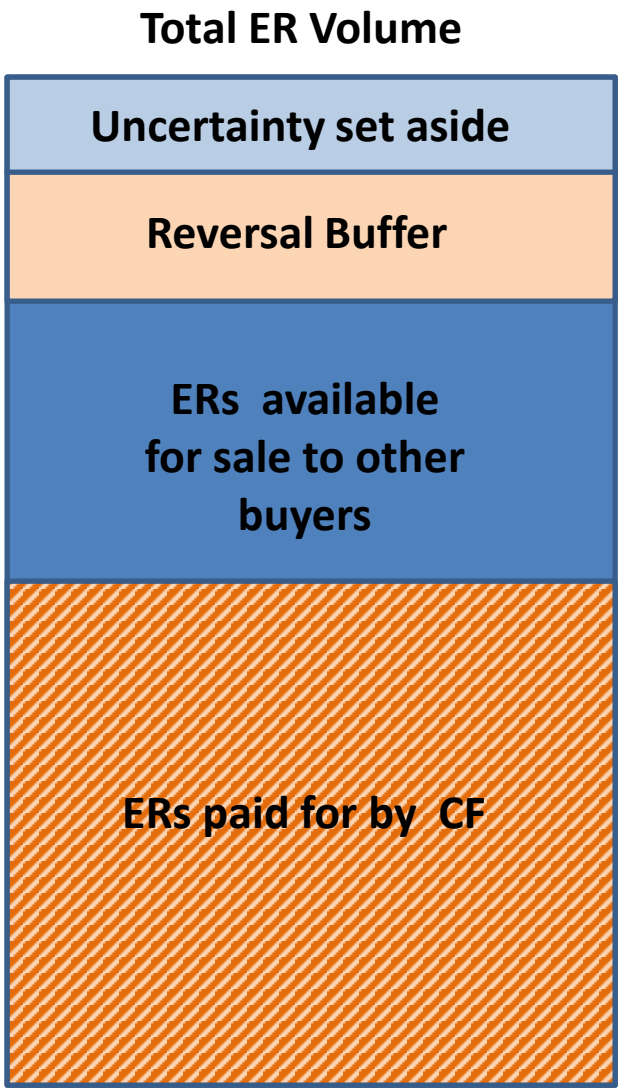
4. Risk of Reversals *(disturbance events lead to emissions that impact ERs paid for by the Carbon Fund)*
   - Risk is assessed during verification
   - Risk of reversal can be mitigated (through program design) and managed (a reversal buffer)
   - A portion of ERs (10-40%) is set-aside in a Reversal Buffer account (and only released if reversal risk is reduced)

5. Length of the ERPA Term
   - Carbon Fund until 2025

6. Portfolio attrition

Carbon Accounting

Calculation of Emission Reductions (ERs)



- Subtract the reported and verified emissions and removals from RL
- Set aside number of ERs to reflect the level of uncertainty associated with the estimation of ERs (percentage of ER Volume)
- Set-aside number of ERs in CF Buffer to deal with risk of Reversals
- CF will buy percentage of the ER Volume
- Remaining ERs can be sold to other buyers

Monte Carlo-Based Portfolio Simulations

First, set variables …

Portfolio Variable	Chile	Congo, Dem Rep of	Congo, Rep of	Costa Rica	Cote d'Ivoire	Dominican Republic	Fiji	Ghana	Guatemala	Indonesia	Lao, PDR of	Madagascar	Mozambique	Nepal	Vietnam
Change relative to RL	+/-5%														
Program effectiveness	5-15%	10-30%	20-40%	10-25%	25-65%	10-20%	10-45%	5-20%	10-20%	20-40%	20-30%	20-40%	30-70%	30-90%	20-30%
Uncertainty Buffer set-aside	8%	8%	8%	0%	4%	9%	4%	15%	15%	4%	11%	8%	4%	12%	4%
Reversal Buffer set-aside	21%	20%	23%	13%	23%	15%	26%	20%	23%	26%	23%	28%	30%	11%	21%
Share offered to Carbon Fund	80%	46%	69%	95%	44%	90%	67%	79%	90%	51%	77%	65%	92%	72%	56%
ERPA Term	6.00	4.92	5.00	7.00	4.17	3.84	5.48	5.56	5.00	5.54	6.00	4.78	6.63	6.53	6.92
LOI drop rate	0%	0%	0%	0%	0%	0%	0%	0%	15%	0%	0%	0%	0%	0%	0%

… and examine the outcome!

ER-PD Version	[million tCO_2e]	Net emission reductions	ER Volume in CF portfolio			Buffer	
		< historical*	Average*	Max	Min	Uncertainty*	Reversal*
Oct-16	Chile	14.9	**8.6**	*14.7*	*4.0*	1.2	2.3
May-16	Congo, Dem Rep of	43.2	**23.9**	*34.2*	*14.4*	5.7	6.0
Dec-17	Congo, Rep of	11.1	**18.7**	*21.3*	*16.3*	3.0	5.6
Jul-17	Costa Rica	17.7	**13.6**	*21.2*	*6.5*	0.0	2.0
Apr-19	Cote d'Ivoire	18.4	**6.0**	*8.9*	*3.0*	0.7	1.8
Jun-19	Dominican Republic	3.9	**2.7**	*4.0*	*1.4*	0.4	0.5
Jun-19	Fiji	8.5	**4.1**	*6.8*	*1.6*	0.3	1.4
Apr-17	Ghana	31.4	**16.9**	*32.2*	*2.2*	4.7	4.2
May-19	Guatemala	13.0	**6.9**	*10.4*	*3.5*	2.0	2.1
May-19	Indonesia	104.0	**37.5**	*59.0*	*16.8*	4.2	13.2
May-18	Lao, PDR of	18.6	**9.8**	*12.7*	*6.9*	2.1	2.9
May-18	Madagascar	16.5	**7.2**	*10.4*	*4.0*	1.3	2.8
Apr-18	Mozambique	21.4	**11.1**	*16.3*	*5.7*	0.9	4.7
May-18	Nepal	8.7	**4.9**	*7.2*	*2.4*	1.0	0.6
Jan-18	Vietnam	29.5	**12.6**	*16.4*	*8.6*	1.2	3.3

Aggregate Simulated Portfolio at CF22

ER-PD Version	*[million tCO_2e]*	Net emission reductions	ER Volume in CF portfolio			Buffer	
		< historical*	Average*	Max	Min	Uncertainty*	Reversal*
	Total	360.9	**184.3**	*275.9*	*97.2*	*28.6*	*53.4*

* Average of 1000 randomly generated portfolios

FCPF Carbon Fund

ER delivery risk assessment model

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ER delivery risk assessment model

- Projects expected ER delivery for each program, considered in light of its ERPA purchase (or likely ERPA purchase)
- Can inform ERPA contracting, business planning and portfolio management
- Builds on the WB's Systematic Operations Risk-rating Tool (SORT) tool
- SORT risk categories are unpacked in order to consider the contributing factors in each category explicitly:
  - Makes it possible to compute probabilities
  - Allows issues that are contributing to high risk ratings to be systematically tracked and addressed

ER delivery risk assessment model – cont'd

- Development process relied on FMT/World Bank team of experts and included:
  - Identifying the major causes and sources of ER delivery, in alignment with SORT
  - Establishing interdependencies among the factors and their impact on the ER delivery through various causal chains
  - Quantifying those dependencies in terms of probability estimates elicited from team of experts
  - Testing, calibrating and validating the model
- **Model can learn from data; over time, parameters could be adjusted based on evidence and lessons learned**
- **Model still relatively new; but should be useful for portfolio management now that almost all ERPAs are signed**

ER delivery risk assessment model – cont'd

SORT risk categories and unpacked ER delivery risk assessment factors:

1. Political and governance
2. Macroeconomic
3. Sector strategies and policies:
   - Government ownership
   - Relevant sectoral policies, including those outside of the forest sector
   - Land tenure
4. Technical design of project or program:
   - Addresses the drivers of deforestation/degradation/land use change
   - Prioritizes proposed program activities from the available strategic options
   - Incorporates appropriate incentives tailored to different types of stakeholders
   - Proposed approaches are sufficiently diverse
   - Resources are flexible enough
   - Program costs have been appropriately identified
   - Proposed program activities have a track record of being effective
   - Program design reflects capacity of stakeholders involved in implementation

ER delivery risk assessment model – cont'd

SORT risk categories and unpacked ER delivery risk assessment factors:

5. Institutional capacity for implementation and sustainability:
    - Capacity of coordinating entity and stakeholders involved in implementation
    - Program complexity
    - Monitoring, reporting and verification (MRV)
    - Monitoring and evaluation
6. Fiduciary:
    - Secured financing
7. Environment and social
8. Stakeholders

Hypothetical scenarios

1. **"High risk" program (#1 in table):**
   - Low-income country with poor political and macroeconomic stability
   - Likely that environmental/anthropogenic events could affect program implementation
   - Program design generally adequate, with a few challenging elements
   - Despite a few favorable conditions, generally challenging environment for implementation, with capacity and financing being significant issues
2. **"Medium risk" program (#2 in table):**
   - Middle-income country with good political and macroeconomic stability
   - Unlikely that environmental/anthropogenic events could affect program implementation
   - Strong program design, well tailored to country circumstances
   - Good enabling environment for implementation, high capacity and adequate financing

Program Name	Program ERs	Risk Factor (% delivery)	Risk-Adjusted Program ERs	Expected ERPA Delivery		
				ERPA Contracted ERs	*Expected ERPA Delivery*	*% ERPA Delivery*
Program #1 (high risk)	20,000	15%	3,000	6,000	3,000	50%
Program #2 (medium risk)	14,400	35%	5,040	10,000	5,040	50%
TOTAL	34,400		8,040	16,000	8,040	50%

FCPF Carbon Fund preliminary ER delivery risk assessment

- Preliminary estimates:
  - Indicates net program ERs (after deduction of buffers) from current portfolio of 240 million (over $1.20 billion @ $5 per ton)
  - Risk factor (% delivery) of between **50% and 79%** across programs
  - Results in a portfolio delivery of around **153 million** risk-adjusted ERs over ERPA periods (**$765 million** @ $5 per ton)
    - ER estimates based on:
      - Latest versions of ERPDs
      - Contracted volumes and expected contract volumes
      - Mexico, Nicaragua and Peru have been taken out of the assessment.

FCPF Carbon Fund preliminary ER delivery risk assessment

- ER delivery risk assessment tool:
  - Generates a risk discount factor (%) based on a program's *specific* risk assessment at a certain point in time
  - Discount factor is applied to ER volume in ERPD (or best available estimate), after adjusting for the uncertainty and reversal buffer
  - Over time as ERPAs are signed and first Monitoring Reports are submitted, and as program risk is assessed better, tool expected to provide most relevant ER delivery data

Carbon Fund:
Portfolio Management: Summary

- Available for purchase of ERs: approximately $782.7 million
- Assuming $5 per ton
- Monte Carlo: Average $921.5 million (184.3 million tons)
- ER delivery risk assessment model: around $765 million (153 million tons)
- Delivery risk remains difficult to predict in many of the programs so diversification remains important

Portfolio Management: Historical Comparisons

	CF15	CF16	CF17	CF18	CF19	CF20	CF21	CF22	CF23
Available for purchase of ERs ($m)	681	681	844	857	840	839	816	791.6	782.7
LOI maximum volume (m tons)	235	213	213	213	213	213	201.4	201.4	175.3
Monte Carlo 6 years/25% (m tons)	397	323	358	333	-	-	-		
Monte Carlo 5 years/33% (m tons)	330	270	297	277	-	-	-		
Monte Carlo (m tons) ERPA signature date					208	200			
Monte Carlo (m tons) portfolio selection date						240			
Monte Carlo (m tons)							230	213	184
Delivery Risk Assessment (m tons)	70-90	70-90	90	90	90	90	102	120	153

Decision/Feedback on Use of Uncommitted Funds (1)

- **Uncommitted funds: $61.4 million**
- **At $5 per ton this represents approx 12 million tons**
- Options for consideration to use uncommitted funds
  - **Option 1 – increase Contract Volume of existing ERPAs (in short term)**
    - Some countries requested higher contract volumes during ERPA negotiations. Not possible at the time as could potentially have led to lack of funds for later ERPAs but since some countries are not proceeding to ERPA signing (Mexico, Peru, Nicaragua), we need to consider this option first.

Decision/Feedback on Use of Uncommitted Funds (2)

- **Option 2 – Call Options**
  - Uncommitted funds could be used to purchase available additional ERs as Call Options
  - Call Options of differing types (prices, volumes etc) are included in all 15 ERPAs
  - If more RP1 ER MRs show positive results as these early submissions, there could be significant additional ERs (beyond Contract Volumes) in the future
  - First Call Option may be available in the next 6 months
  - Call Options should be considered on an individual basis so there is no commitment but CFPs could decide to assess Call Options as they become available

Decision/Feedback on Use of Uncommitted Funds (3)

- **Option 3 – Revisions to Contract Volumes (in medium term)**
  - As verifications come through, we should have more clarity of over-delivering and under-delivering programs
  - Based on this, and in conjunction with the use of Call Options, CFPs could allocate uncommitted funds to increase Contract Volume of over-delivering ERPAs (and potentially decrease contract Volume of under-delivering ERPAs)

Decision/Feedback on Use of Uncommitted Funds – Options

- Option 1 – increase Contract Volume of existing ERPAs (in short term)
- Option 2 – Call Options
- Option 3 – Revisions to Contract Volumes (in medium term)

- CFPs to provide feedback on all options and ideally Decision re Option 1 to be recorded in Chair's Summary (no Resolution)

THANK YOU!

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