Forest Carbon Partnership Facility

Portfolio Management and Decisions on ER-PDs

Eighteenth meeting of the Carbon Fund (CF18)

Paris, France

June 20-22, 2018

Outline of Presentation

- Portfolio decisions at this meeting
- Funding
  - Financial contributions and funds available for purchase of ERs
  - LOI commitments
- Portfolio Management
  - Timeline for ERPD submissions and proposal for deadline of ERPD submissions
  - Monte Carlo simulation
  - ER delivery risk assessment model
  - Summary of different portfolio management models
  - HFLD Adjustments in the portfolio

Task at CF18

- **Decide whether to select Lao PDR, Madagascar, and Nepal's ER Programs into the Carbon Fund portfolio**
- Portfolio selection is on a first come first served basis, while taking into account:
  - quality
  - selection criteria as per ER-PIN criteria, and
  - consistency with the Methodological Framework
- CF18 decision to select ER program would authorize Trustee to start negotiating an Emission Reductions Payment Agreement (ERPA), subject to World Bank due diligence and approval

Options for Decisions by Carbon Fund Participants (1)

i. Decide to **select** an ER Program into its portfolio and proceed to negotiating an ERPA, subject to completion of World Bank due diligence and final World Bank approval of the program

ii. Decide to **provisionally select** an ER Program into its portfolio and proceed to negotiating an ERPA subject to: completion of World Bank due diligence and final World Bank approval of the program and other requirements, such as a **list of key issues** to be addressed, have been fulfilled to the satisfaction of the World Bank

iii. Request the REDD Country to **resubmit a revised ER-PD** with specific revisions or attention to certain areas

iv. Decide **not to select** an ER Program into its portfolio and, therefore, not to proceed to negotiating an ERPA and do not request the country to resubmit (i.e. rejection)

Options for Decisions by Carbon Fund Participants (2)

- Option iv **(not to select program)** should only be valid if proposed ER Program is substantially different from the selected ER-PIN or the selection has portfolio management implications e.g., in relation to net emission reductions across the portfolio
- Other issues, such as non-compliance with the Methodological Framework, could be addressed through options ii **(provisional selection)** or iii **(request revised ER-PD)**

Carbon Fund Contributions to Date

FCPF Carbon Fund Donor Contributions as of April 30, 2018 (in $ thousands)									TF071077 TF072649			
Participant Name	**Total**	**Outstanding***	**FY18**	**FY17**	**FY16**	**FY15**	**FY14**	**FY13**	**FY12**	**FY11**	**FY10**	**FY09**
Australia	18,393								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	331,321	123,265	29,616	54,771	13,329	32,108	27,280	6,556	15,443	21,125	3,819	4,009
Norway	304,111	61,955	12,494		58,352			161,310				10,000
Switzerland	10,796								10,796			
The Nature Conservancy	5,000											5,000
United Kingdom	200,660	182,720								17,940		
United States of America	18,500			4,500				4,000		10,000		
Committed Funding	**910,619**	**367,940**	**42,110**	**59,271**	**71,681**	**32,222**	**27,280**	**171,866**	**36,912**	**71,800**	**4,181**	**25,356**

Amounts may vary due to exchange rate fluctuations

Over $910 million

Carbon Fund Financial Situation: Sources and Uses Summary

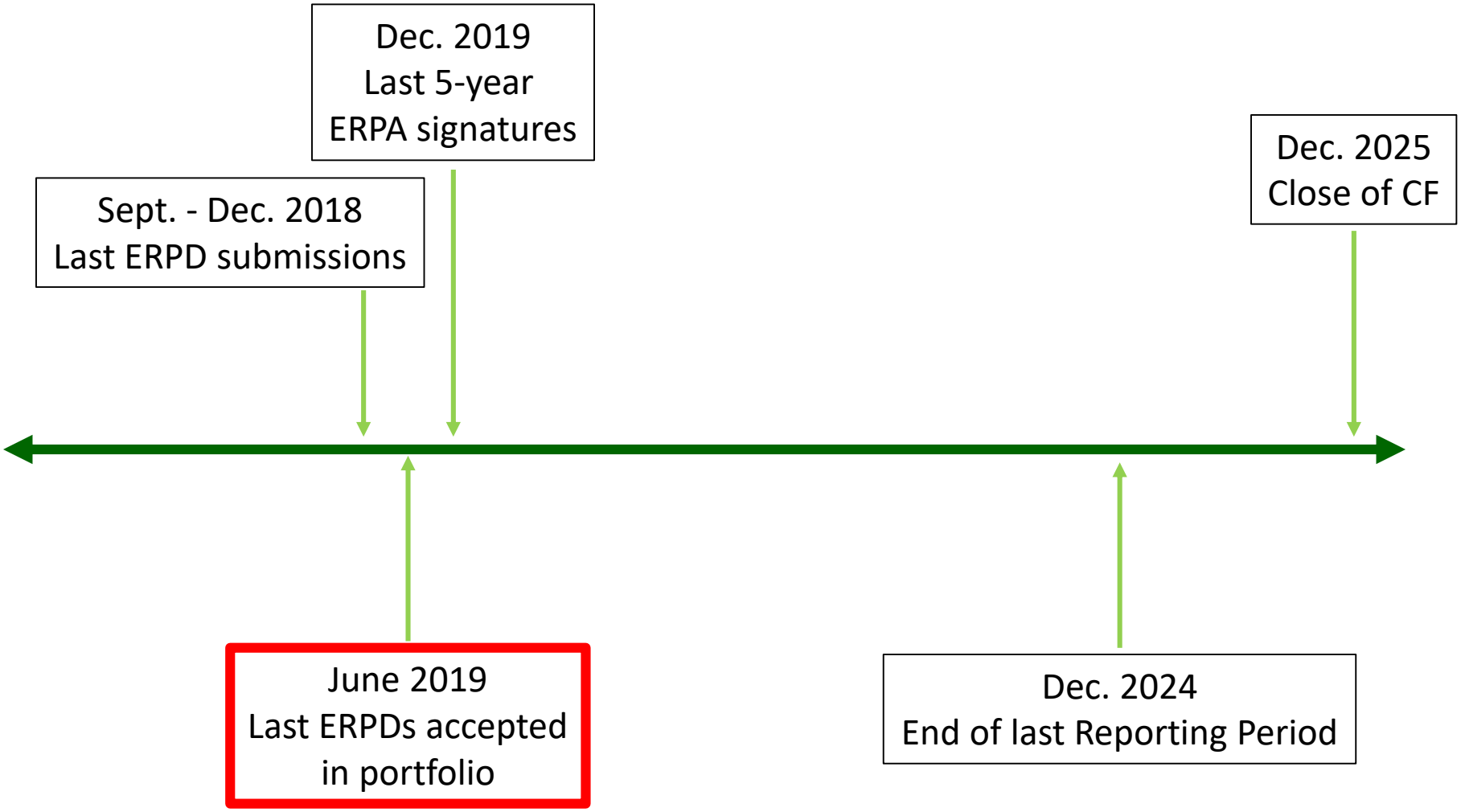
Carbon Fund Sources and Uses Summary ($m)	
	Current Situation
Sources ($m)	**910.6**
Number of LoIs (#)	**19**
Number of ER Programs (#)	13
Uses	
Costs over Fund Lifetime	
Fixed Costs (FY10 to FY26)	22.7
ER Program Costs	30.7
Total Costs	**53.40**
Available for Purchase of ERs	**857.2**
Average ER Program	**65.9**

LOI Commitments

Country	Max LoI Volume
Cameroon	11.5
Chile	5.2
Costa Rica	12.0
Cote D'Ivoire	16.5
DR Congo	10.0
Dominican Republic	7.5
Fiji	3.6
Ghana	18.5
Guatemala	10.5
Indonesia	22.0
Lao PDR	8.4
Madagascar	16.4
Mexico	8.7
Mozambique	8.7
Nepal	14.0
Nicaragua	11.0
Peru	6.4
Republic of Congo	11.7
Vietnam	10.3
Total	212.9

212.9 million tons @$5 per ton = $1.06 billion

ERPA and ERPD Timeline



Indicative Timeline for ERPD Submissions

ERPDs Accepted* in Portfolio
Chile
Costa Rica
DRC
Ghana
Mexico
Mozambique
ROC
Vietnam
ERPDs Presented at CF18
Lao PDR
Madagascar
Nepal

Advanced Draft ERPDs Likely by December 2018
Cote d'Ivoire
Indonesia
Nicaragua
Advanced Draft ERPDs Potentially by December 2018
Fiji
Peru
Advanced Draft ERPDs Unlikely by December 2018
Cameroon
Dominican Republic
Guatemala

*or provisionally accepted

Proposed Deadline for Final ERPD Submission

- FMT proposes a deadline for submission of final ERPDs by the summer 2019 CF meeting
- Requires submission of draft ERPDs between September and December 2018
- Any agreed wording would be included in the Chair's Summary from this meeting (no resolution required)
- If agreed, FMT would announce to participants shortly after this meeting
- Wording would include phrase "unless decided otherwise by CFPs" to allow future flexibility

FCPF Carbon Fund

Monte Carlo simulation

FOREST CARBON PARTNERSHIP FACILITY

Today's Pipeline:

Estimated Reference Levels and Program Effective-ness

[1] *June 2018*
[2] *For respective reference period*

	Unit: [million tCO_2e/year]	HFLD Adjustment (% of total emissions)	Emissions [3]	Removals [3]	Effectiveness (% estimate, indicative)
Final ER-PD [1]	Costa Rica		10.2	-5.3	47%
	DRC	5.6 (13%)	43.5	-1.4	10-30 %
	Chile		12.6	-12.4	15-20 %
	Mexico		24.0		80%
	Rep. Congo	6.7 (61%)	10.9		50%
	Ghana		45.1	-0.5	6%
	Mozambique		6.5		30-40%
	Vietnam		10.9	-6.3	20-30%
	Lao PDR		10.5	-2.0	26%
	Madagascar		11.5	-0.1	7-51%
	Nepal		1.6	-0.7	74-417%
	Nicaragua		14.2	-0.1	15-37%
ER-PIN [2]	Guatemala		11.5		37%
	Peru	3.1 (18%)	17.6		24%
	Cote d'Ivoire		18.4		16%
	Dom. Republic		2.8	-5.5	49%
	Fiji		0.3	-0.1	91%
	Indonesia		49.9		10-20%
	Cameroon	10.0 (227%)	4.4		-
	Total	***25.4 (9%)***	***306.4***	***-34.4***	

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 (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

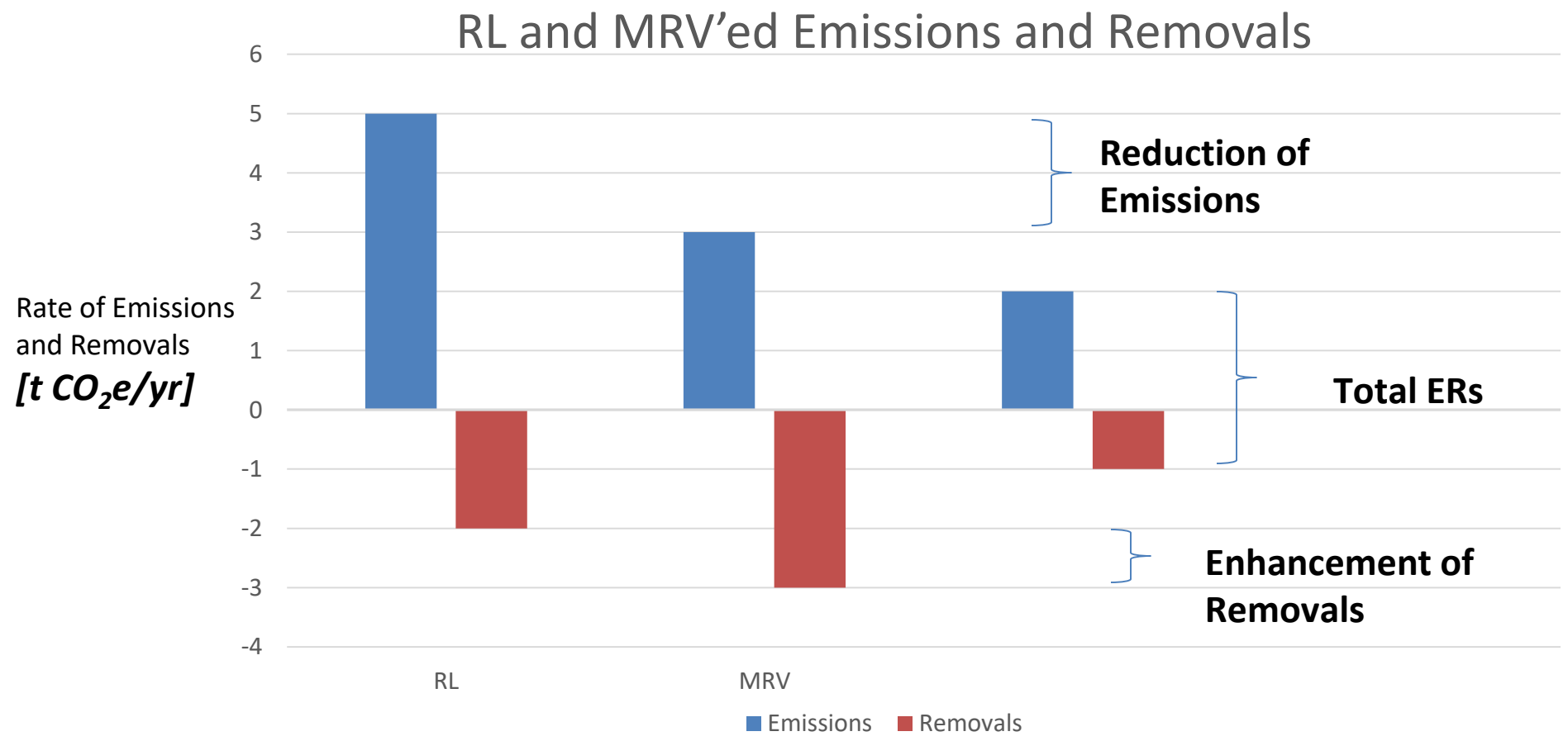
Key variables that affect the eventual ER Volume in the Carbon Fund portfolio (cont.)

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 is risk reduced)

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

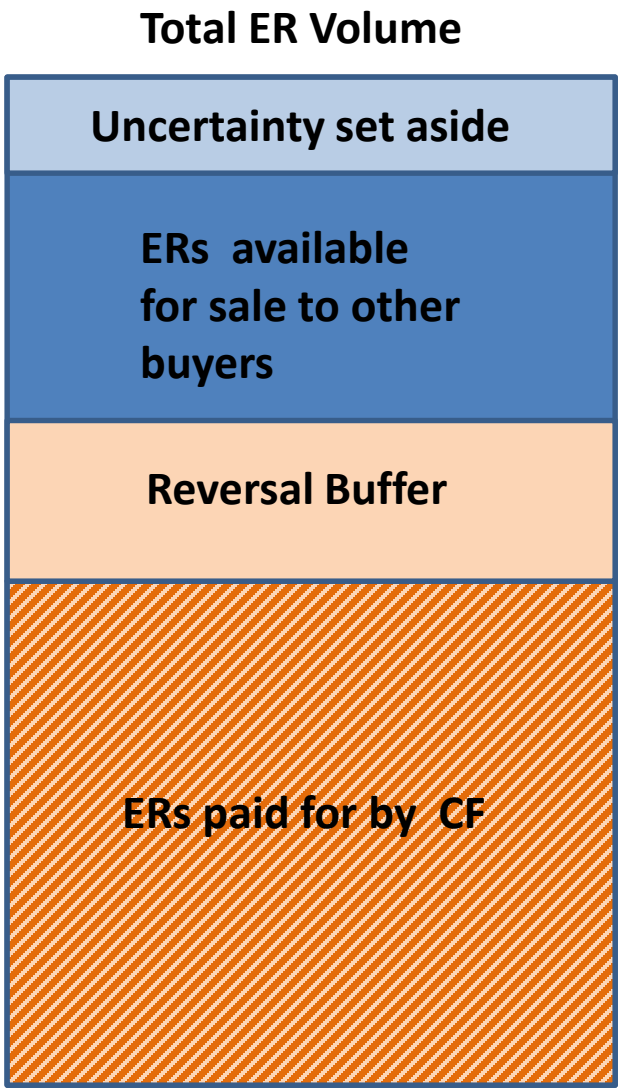
6. Pipeline attrition

The starting point for the analysis: Total Volume of ERs generated by a country's REDD+ program



Carbon Accounting

Calculation of Emission Reductions (ERs)



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

Monte Carlo-Based Portfolio Simulations

First, set variables …

Portfolio Variable	Cri	DRC	Mex	Chi	RoC	Gha	Moz	Vie	Nep	Lao	Nic	Mad	ER PINs
Change relative to RL	+/-5%												+/-40%
Program effectiveness	40-50%	20-30%	20-40%	10-20%	20-30%	5-10%	20-40%	20-30%	74-245%	10-30%	15-37%	23-43%	10-30%
Uncertainty Buffer set-aside	10%	10%	0%	4%	8%	6%	4%	4%	12%	8%	4%	8%	5-15%
Reversal Buffer set-aside	20%	20%	20%	11%	23%	20%	30%	21%	21%	11%	22%	28%	10-30%
Share offered to Carbon Fund	32%	44%	96%	96%	92%	94%	90%	96%	52%	90%	90%	90%	90%
ERPA Term	6 years (5 years)												
LOI drop rate	25% (33%)												

… and examine the outcome!

6-year ERPA, 25% drop rate

	[million tCO_2e]	**Net emissions reductions**	**ER Volume in CF portfolio**			**Buffer**	
		< historical*	Average*	Max	Min	Uncertainty*	Reversal*
Values from Final ER-PD	Costa Rica	41.8	**9.6**	*11.0*	*8.4*	4.4	2.5
	DRC	67.2	**32.1**	*37.4*	*27.0*	9.9	8.3
	Chile	22.5	**17.2**	*23.9*	*11.7*	0.8	2.1
	Mexico	43.1	**28.8**	*40.3*	*18.2*	0	6.7
	Rep. Congo	16.2	**39.3**	*41.8*	*37.2*	5.4	12.4
	Ghana	20.5	**12.9**	*18.0*	*8.1*	1.3	2.1
	Mozambique	11.7	**6.0**	*8.5*	*3.8*	0.6	2.6
	Vietnam	25.6	**16.2**	*20.3*	*12.3*	1.0	3.9
	Lao PDR	15.0	**11.1**	*16.9*	*5.5*	1.2	1.8
	Madagascar	23.0	**11.9**	*16.2*	*7.9*	1.7	3.9
	Nepal	21.5	**7.8**	*11.9*	*3.7*	2.3	2.0
Values from ER-PIN & Simulated Values (Monte Carlo)	Guatemala	13.7	**8.4**	*21.0*	*2.4*	1.9	1.3
	Peru	21.2	**24.0**	*44.0*	*12.2*	5.0	5.3
	Cote d'Ivoire	19.0	**11.5**	*29.3*	*3.3*	1.7	1.8
	Dom. Republic	10.0	**5.9**	*13.2*	*1.9*	0.9	1.5
	Fiji	0.4	**0.3**	*0.6*	*0.1*	0.1	0.1
	Nicaragua	23.4	**14.4**	*20.9*	*8.1*	1.0	5.3
	Indonesia	60.3	**36.5**	*89.4*	*8.8*	8.0	6.6
	Cameroon	5.2	**39.2**	*53.7*	*29.4*	9.4	10.5

… and examine the outcome!

5-year ERPA, 33% drop rate

	[million tCO_2e]	Net emissions reductions	ER Volume in CF portfolio			Buffer	
		< historical*	Average*	Max	Min	Uncertainty*	Reversal*
Values from Final ER-PD	Costa Rica	34.9	**8.0**	*9.3*	*6.9*	3.4	2.2
	DRC	57.2	**25.4**	*29.9*	*21.5*	7.4	5.8
	Chile	18.8	**14.5**	*19.3*	*9.3*	0.9	1.9
	Mexico	35.9	**23.9**	*33.6*	*15.2*	0	5.1
	Rep. Congo	13.6	**32.8**	*34.9*	*31.0*	4.5	10.1
	Ghana	17.1	**10.9**	*15.0*	*6.8*	1.1	2.1
	Mozambique	9.8	**5.1**	*7.0*	*3.2*	0.4	1.9
	Vietnam	21.4	**13.5**	*16.8*	*10.5*	0.8	3.8
	Lao PDR	12.3	**9.0**	*14.0*	*4.4*	0.8	0.6
	Madagascar	19.3	**10.0**	*13.5*	*6.6*	1.9	3.0
	Nepal	17.8	**6.5**	*9.9*	*3.0*	1.9	1.8
Values from ER-PIN & Simulated Values (Monte Carlo)	Guatemala	11.7	**7.1**	*16.9*	*1.8*	1.0	3.4
	Peru	17.9	**20.3**	*36.3*	*10.5*	4.4	6.2
	Cote d'Ivoire	15.6	**9.3**	*23.1*	*2.5*	1.5	1.2
	Dom. Republic	8.3	**5.1**	*10.4*	*1.9*	0.8	0.5
	Fiji	0.4	**0.2**	*0.5*	*0.1*	0.0	0.1
	Nicaragua	19.5	**12.1**	*17.8*	*6.7*	0.8	3.6
	Indonesia	50.3	**30.1**	*74.8*	*8.4*	3.6	5.0
	Cameroon	4.4	**33.0**	*43.3*	*24.4*	5.5	9.5

Aggregate Simulated Portfolio at CF17

(using variable settings above)

6-year ERPA, 25% drop rate

	Net emissions reductions	ER Volume in CF portfolio			Buffer	
	< historical*	Average*	Max	Min	Uncertainty*	Reversal*
[million tCO_2e]	**461**	**333**	**518**	**210**	**57**	**81**

5-year ERPA, 33% drop rate

	Net emissions reductions	ER Volume in CF portfolio			Buffer	
	< historical*	Average*	Max	Min	Uncertainty*	Reversal*
[million tCO_2e]	**386**	**277**	**426**	**175**	**41**	**68**

* Average of 1000 randomly generated portfolios

FCPF Carbon Fund

ER delivery risk assessment model

ER delivery risk assessment model

- Projects expected ER delivery for each program, considered in light of its 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 new; but will be useful for portfolio management

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 – cont'd

- Preliminary estimates:
  - Indicates net program ERs (after deduction of buffers) from current pipeline of 263 million (~ $1.32 billion @ $5 per ton)
  - Discount factor of **14-48%** across programs
  - Results in a portfolio delivery of approximately **90 million** risk-adjusted ERs over ERPA periods (**$450 million** @ $5 per ton)
    - ER estimates based on:
      - Changes made from draft ERPDs to final ERPDs, significant in some cases
      - Contracted volumes expected to evolve from what was first established in LoIs
      - ERPA periods could be longer than 5 years in some early ERPAs
      - Many programs in early design stage, which makes it difficult to assess risk

FCPF Carbon Fund preliminary ER delivery risk assessment

- Monte Carlo analysis:
  - Global analysis based on program's assumed effectiveness (%) against its Reference Level
  - Provides a range of potential outcomes that can inform how far to over-program the portfolio
  - Estimates **overall supply of ERs from portfolio, not contracted ERs**
- 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), adjusting for the uncertainty and reversal buffer
  - Over time as ERPAs are signed and as program risk is assessed better, tool expected to provide most relevant ER delivery data

Carbon Fund:
Portfolio Management: Summary

- Too early for firm predictions
- Available for purchase of ERs: $857 million
- Assuming $5 per ton
- Monte Carlo: Average $1.7 billion (6 year ERPA term, LOI drop rate 25%); $1.4 billion (5 year ERPA term, LOI drop rate 33%)
- New ER delivery risk assessment model: around $450 million (based on WB Systematic Operations Risk-rating Tool (SORT))
- LOI values: 212.9 million tCO_2e @ $5 per ton = $1.1 billion x 2/3rds = $713 million
- At this stage in developing the portfolio these numbers should not weigh very heavily (or not at all) on the review and decisions on the new ER-PDs
- Other factors to consider (eg HFLD adjustments)

Carbon Fund:
Portfolio Management: Comparisons over Time

Comparisons of information on Portfolio Management				
	CF15	CF16	CF17	CF18
Available for purchase of ERs ($m)	681	681	844	857
LOI maximum volume (tons)	235	213	213	213
Monte Carlo 6 years/25% (tons)	397	323	358	333
Monte Carlo 5 years/33% (tons)	330	270	297	277
Delivery Risk Assessment Model (tons)	70-90	70-90	90	90

Carbon Fund:
Portfolio Management: HFLD Adjustments

- 4 of the 19 programs in the pipeline are requesting HFLD adjustments (DRC, RoC, Cameroon and Peru)
- DRC is only HFLD program in portfolio to date
- RoC is provisionally selected into portfolio
- No HFLDs to decide at this meeting
- What does Meth Framework say?

Portfolio Management: HFLD Adjustments
What does the MF say?

- General Approach: Carbon Fund Participants seek both **to achieve net emission reductions across the portfolio**, and to pilot REDD+ across a diverse set of countries, including countries that have historically experienced low deforestation rates. Carbon Fund Participants will take this into account when selecting Emission Reductions Programs (ER Programs) for signing an Emission Reduction Payment Agreement (ERPA).

- Criterion 13 (HFLD adjustment) (footnote): The Carbon Fund seeks both **to achieve net emission reductions across its portfolio** and to pilot REDD+ across a diverse set of countries, including those countries with high forest cover and low deforestation. Carbon Fund Participants will take this into account when selecting ER Programs.

HFLD Adjustments
A Review of the Portfolio (1)

Program	Max LOI Volume*	HFLD Programs	HFLD Proportion
Programs Accepted** in Portfolio			
Chile	5.2		
Costa Rica	12.0		
DRC	10.0	10.0	
Ghana	18.5		
Mexico	8.7		
Mozambique	8.7		
ROC	11.7	11.7	
Vietnam	10.3		
Cumulative Sub-Total	**85.1**	**21.7**	**25%**
Programs Presented at CF18			
Lao PDR	8.4		
Madagascar	16.4		
Nepal	14.0		
Cumulative Sub-Total	**123.9**	**21.7**	**18%**

* in millions tCO2e

** or provisionally accepted

HFLD Adjustments
A Review of the Portfolio (2)

Program	Max LOI Volume*	HFLD Programs	HFLD Proportion
Remaining Programs in Pipeline			
Likely to submit advanced draft ERPDs by Dec 2018			
Cote d'Ivoire	16.5		
Indonesia	22.0		
Nicaragua	11.0		
Cumulative Sub-Total	**173.4**	**21.7**	**13%**
Potential to submit advanced draft ERPDs by Dec 2018			
Fiji	3.6		
Peru	6.4	6.4	
Cumulative Sub-Total	**183.4**	**28.1**	**15%**
Unlikely to submit advanced draft ERPDs by Dec 2018			
Cameroon	11.5	11.5	
Dominican Republic	7.5		
Guatemala	10.5		
Total	**212.9**	**39.6**	**19%**
* in millions tCO2e			
** or provisionally accepted			

Carbon Fund:
Portfolio Management: Options

- Increase contract volumes for lower risk programs
- Avoid large increases above LOI volumes for HFLD programs
- Use of call options – improves flexibility vis a vis high and low performing programs and HFLD programs

Summary of Decisions Sought

- **Decide whether to select Lao PDR, Madagascar, and Nepal's ER Programs into the Carbon Fund portfolio**
- Portfolio selection is on a first come first served basis, while taking into account:
  - quality
  - selection criteria as per ER-PIN criteria, and
  - consistency with the Methodological Framework
- **Feedback on proposed deadline for submission of final ERPDs by the summer 2019 CF meeting**

THANK YOU!

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