



Forest Carbon Partnership Facility

Portfolio Management and Decisions on ER-PDs

Twentieth meeting of the Carbon Fund (CF20)

Washington D.C.

June 8-11, 2019

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
 - Monte Carlo simulation
 - ER delivery risk assessment model
 - Summary of different portfolio management models
 - HFLD Adjustments in the portfolio

Portfolio Decisions at CF20

- **Decide whether to select Dominican Republic, Fiji, Guatemala, Nicaragua and Peru'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
- 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, 2019 (in \$ thousands)

Participant Name	Total	Outstanding*	FY19	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											363	6,347
France	5,114						114				5,000		
Germany	321,002	55,680	57,265	29,616	54,771	13,329	32,108	27,280	6,557	15,443	21,125	3,819	4,009
Norway	297,895	27,973	27,618	12,640		58,352			161,311				10,000
Switzerland	10,796									10,796			
The Nature Conservancy	5,000												5,000
United Kingdom	209,295	191,355									17,940		
United States of America	18,500				4,500				4,000		10,000		
Committed Funding	902,720	275,009	84,883	42,256	59,271	71,681	32,222	27,280	171,867	36,913	71,800	4,182	25,356

*Amounts may vary due to exchange rate fluctuations.

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Almost
\$903
million

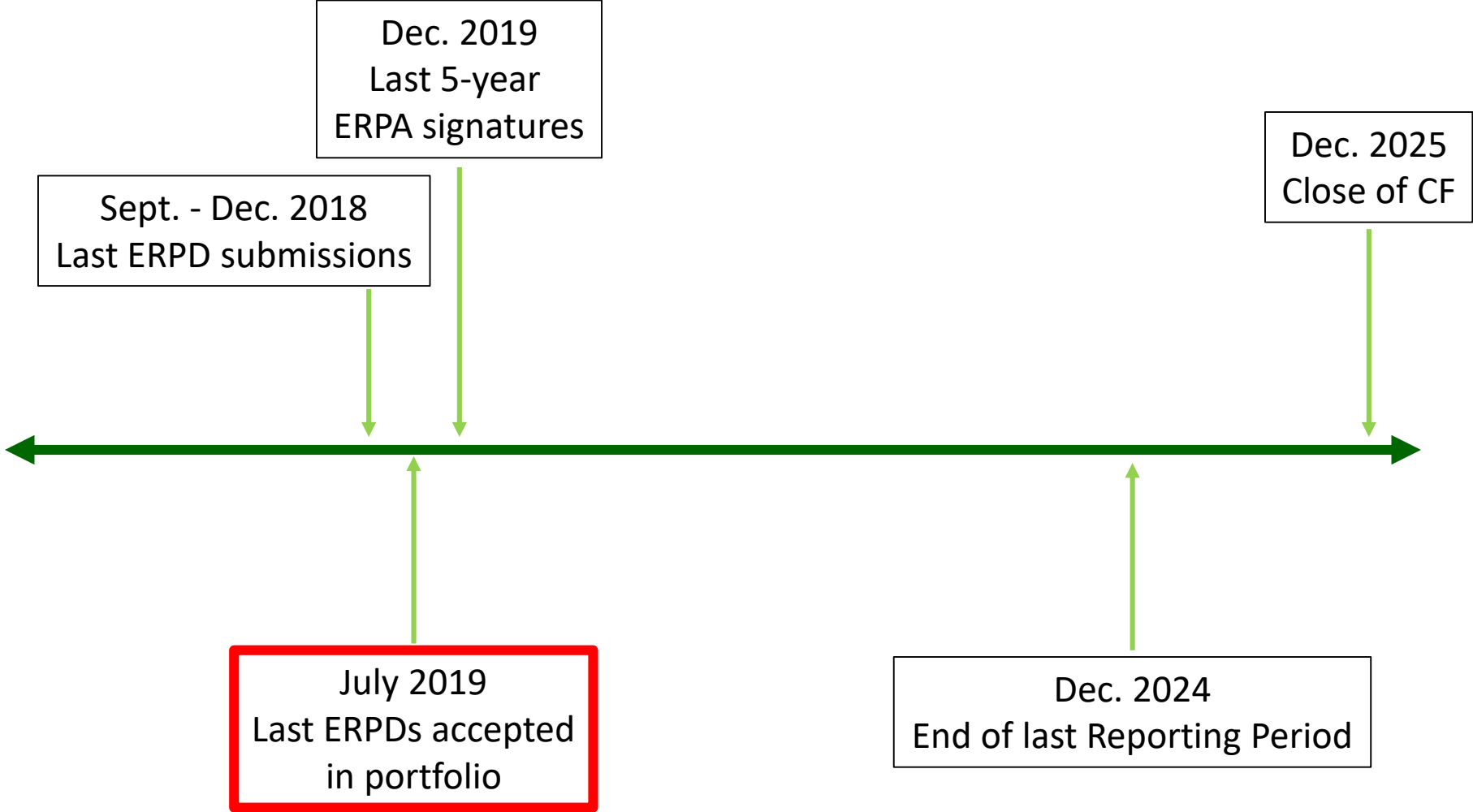
Carbon Fund Financial Situation: Sources and Uses Summary

Carbon Fund Sources and Uses Summary (\$m)		
	All 19	Possible scenario
Sources (\$m)	903	903
Number of Lols (#)	19	19
Number of ER Programs expected	19	16
Uses		
Costs over Fund Lifetime		
Fixed Costs (FY10 to FY26)	22.7	22.7
ER Program Costs	45.0	41.5
Total Costs	67.7	64.2
Available for Purchase of ERs	835.3	838.8
Average ER Program	44.0	52.4

LOI Commitments

Country	Max Lol Volume	ERPA Contract Volume	HFLD
Cameroon	11.5		x
Chile	5.2		
Costa Rica	12.0		
Cote d'Ivoire	16.5		
DR Congo	10.0	11.0	x
Dominican Republic	7.5		
Fiji	3.6		
Ghana	18.5	10.0	
Guatemala	10.5		
Indonesia	22.0		
Lao PDR	8.4		
Madagascar	16.4		
Mexico	8.7		
Mozambique	8.7	10.0	
Nepal	14.0		
Nicaragua	11.0		
Peru	6.4		No
Republic of Congo	11.7		x
Vietnam	10.3		
Total	212.9	31.0	

ERPA and ERPD Timeline



FCPF: Carbon Fund Summary

- Carbon Fund term ends 31 December 2025
- 19 countries in pipeline, 18 have submitted Program Documents (ERPDs) by deadline of June 2019
- 13 countries selected into portfolio, 5 to be considered at this meeting, Cameroon not yet considered
- ERPA workshops held and default ERPA term sheet shared with all 13 in portfolio
- DRC ERPA signed September 2018 (committed \$55 million)
- Mozambique ERPA signed January 2019 (committed \$50 million)
- Ghana ERPA signed July 2019 (committed \$50 million)
- Total committed \$155 million, plus call options in all 3 signed ERPAs
- Discussing commercial terms with 6 others – Chile, Mexico, Costa Rica, Madagascar, Vietnam, Nepal



FCPF Carbon Fund

Monte Carlo simulation

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 Effectiveness

¹ June 2019

² drafts under review

³ For respective reference period

	<i>Unit: [million tCO_{2e}/year]</i>	HFLD Adjustment (% of total emissions)	Emissions ³	Removals ³	Effectiveness (% estimate, indicative)
Final ER-PD ¹	Chile		12.6	-12.4	3%
	Congo, Dem Rep	5.6 (13%)	43.5	-1.4	7%
	Congo Rep	5.4 (72%)	7.5	0.0	18%
	Costa Rica		10.2	-5.3	31%
	Cote d'Ivoire		9.7	-0.1	13%
	Dominican Rep		3.8	-3.1	58%
	Fiji		1.6	0.0	20%
	Ghana		45.2	-0.1	43%
	Guatemala		15.3	-2.2	6%
	Indonesia		68.4	0.0	20%
	Lao PDR		10.5	-2.0	25%
	Madagascar		11.5	-0.1	26%
	Mexico		24.0	0.0	33%
	Mozambique		6.5	0.0	25%
	Nepal		1.6	-0.7	62%
	Nicaragua		16.6	-1.0	84%
	Peru		33.8	0.0	16%
	Vietnam		10.9	-6.3	16%
	draft ERPD ²	Cameroon	1.9 (18%)	10.8	
	Total	12.9 (4%)	343.9	-34.7	

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



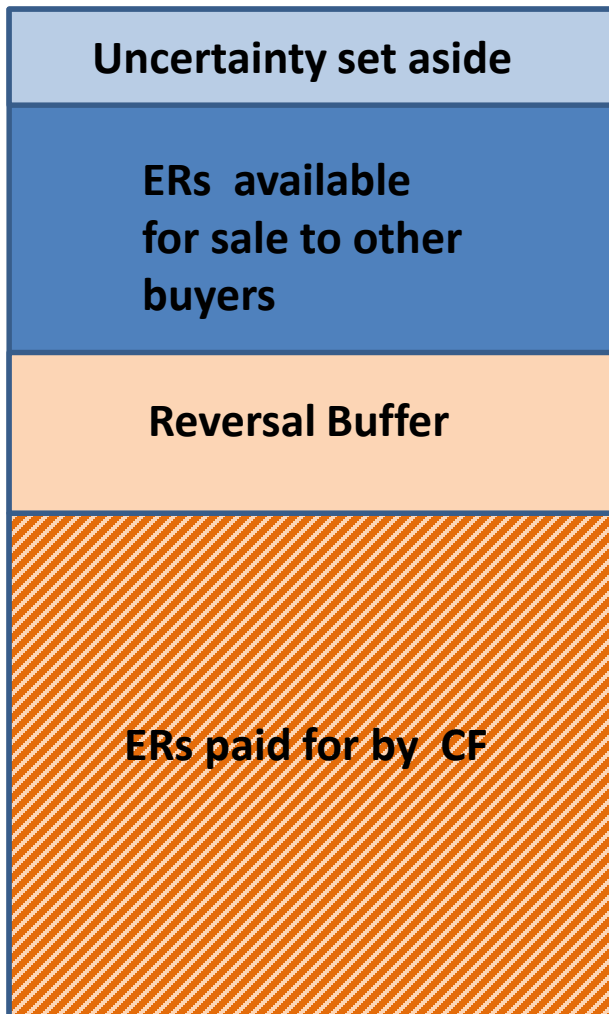
6. Pipeline attrition



Carbon Accounting

Calculation of Emission Reductions (ERs)

Total ER Volume



- 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	Cameroon	Chile	Congo, Dem Rep of	Congo, Rep of	Costa Rica	Cote d'Ivoire	Dominican Republic	Fiji	Ghana	Guatemala	Indonesia	Lao, PDR of	Madagascar	Mexico	Mozambique	Nepal	Nicaragua	Peru	Vietnam
Change relative to RL	+/-5%																		
Program effectiveness	1-5%	5-15%	10-30%	20-40%	10-25%	25-65%	10-20%	10-45%	5-20%	10-20%	20-40%	20-30%	20-40%	20-30%	30-70%	30-90%	5-20%	20-30%	5-20%
Uncertainty Buffer set-aside	4%	8%	8%	8%	4%	4%	7%	4%	6%	12%	4%	11%	8%	0%	4%	12%	4%	4%	0%
Reversal Buffer set-aside	20%	21%	20%	23%	20%	23%	20%	26%	20%	23%	26%	23%	28%	21%	30%	21%	22%	21%	24%
Share offered to Carbon Fund	90%	87%	38%	90%	78%	90%	90%	90%	90%	90%	24%	89%	82%	26%	80%	90%	90%	89%	24%
ERPA Term	5.01	5.76	5.78	5.26	5.01	5.26	5.01	5.01	5.68	5.01	5.26	5.01	5.26	5.01	5.84	5.26	5.01	5.01	5.26
LOI drop rate	33%	5%	0%	25%	25%	25%	25%	25%	0%	25%	25%	25%	25%	25%	0%	25%	25%	25%	25%

... and examine the outcome!

ER-PD Version	[million tCO ₂ e]	Net emissions reductions	ER Volume in CF portfolio			Buffer	
		< historical*	Average*	Max	Min	Uncertainty*	Reversal*
draft under review	Cameroon	1.8	7.2	9.5	5.0	0.5	1.8
Oct-16	Chile	14.6	8.8	15.5	2.6	1.2	2.3
May-16	Congo, Dem Rep of	53.2	24.0	33.0	14.4	6.9	6.0
Dec-17	Congo, Rep of	12.1	23.3	26.3	20.1	3.2	7.0
Jul-17	Costa Rica	13.8	8.3	12.0	4.0	0.6	2.1
Apr-19	Cote d'Ivoire	23.8	14.3	20.6	6.9	1.0	4.3
Jun-19	Dominican Republic	5.3	3.3	4.7	1.7	0.4	0.8
Jun-19	Fiji	2.3	1.3	2.3	0.3	0.1	0.5
Apr-17	Ghana	32.8	20.6	39.5	3.0	2.0	5.1
May-19	Guatemala	13.6	7.5	11.4	3.5	1.6	2.2
May-19	Indonesia	100.7	17.3	27.3	6.8	4.0	6.1
May-18	Lao, PDR of	15.7	8.7	11.5	5.9	1.7	2.6
May-18	Madagascar	18.3	9.5	13.7	5.1	1.5	3.7
Nov-17	Mexico	30.2	6.2	8.4	3.8	0.0	1.7
Apr-18	Mozambique	19.0	9.8	14.4	5.2	0.8	4.2
May-18	Nepal	7.1	4.1	5.9	2.1	0.9	1.1
May-19	Nicaragua	11.1	6.8	12.7	0.9	0.4	1.9
Jun-19	Peru	21.4	3.9	7.3	0.3	0.0	1.2
Jan-18	Vietnam	22.7	14.2	18.3	9.8	0.9	3.8

... and examine the outcome! (using FCPF CF portfolio selection date)

ER-PD Version	<i>[million tCO₂e]</i>	Net emissions reductions	ER Volume in CF portfolio			Buffer	
		< historical*	Average*	Max	Min	Uncertainty*	Reversal*
draft under review	Cameroon	1.5	7.7	10.2	5.4	0.5	1.9
Oct-16	Chile	19.8	11.9	20.6	4.1	1.6	3.2
May-16	Congo, Dem Rep of	70.0	31.5	43.0	18.9	9.0	7.9
Dec-17	Congo, Rep of	13.4	25.8	28.9	22.4	3.6	7.7
Jul-17	Costa Rica	19.4	11.6	17.0	5.6	0.8	2.9
Apr-19	Cote d'Ivoire	25.2	15.1	22.6	7.2	1.0	4.5
Jun-19	Dominican Republic	5.8	3.6	5.0	1.8	0.4	0.9
Jun-19	Fiji	2.6	1.5	2.5	0.3	0.1	0.5
Apr-17	Ghana	45.1	28.3	51.9	1.5	2.7	7.1
May-19	Guatemala	15.0	8.3	12.6	3.5	1.8	2.5
May-19	Indonesia	108.6	18.6	28.4	8.3	4.3	6.5
May-18	Lao, PDR of	20.9	11.6	15.2	7.9	2.3	3.5
May-18	Madagascar	23.4	12.1	17.2	6.7	1.9	4.7
Nov-17	Mexico	44.1	9.1	12.1	5.8	0.0	2.4
Apr-18	Mozambique	22.3	11.5	16.3	6.2	0.9	4.9
May-18	Nepal	9.1	5.2	7.4	2.5	1.1	1.4
May-19	Nicaragua	11.8	7.2	12.8	1.4	0.5	2.0
Jun-19	Peru	33.7	6.1	11.0	0.9	0.0	1.9
Jan-18	Vietnam	23.0	14.4	18.5	10.6	0.9	3.8

Aggregate Simulated Portfolio at CF20

(using variable settings above, with ERPA signing date)

	Net emissions reductions	ER Volume in CF portfolio			Buffer	
	< historical*	Average*	Max	Min	Uncertainty*	Reversal*
<i>[million tCO₂e]</i>	420	200	294	101	28	58

Aggregate Simulated Portfolio at CF20

(using variable settings above, with portfolio selection date)

	Net emissions reductions	ER Volume in CF portfolio			Buffer	
	< historical*	Average*	Max	Min	Uncertainty*	Reversal*
<i>[million tCO₂e]</i>	514.7	241	353	121	33	70



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 (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 new; but should be useful for portfolio management in the future**

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 pipeline of 305 million (over \$1.5 billion @ \$5 per ton)
 - Risk factor (% delivery) of between **14 and 60%** across programs
 - Results in a portfolio delivery of around **90 million** risk-adjusted ERs over ERPA periods (**\$450 million @ \$5 per ton**)
 - ER estimates based on:
 - Latest versions of ERPDs (Changes significant in some cases)
 - Contracted volumes expected to evolve from what was first established in Lols
 - Many programs in early design stage, which makes it difficult to assess risk

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 as program risk is assessed better, tool expected to provide most relevant ER delivery data
 - **Intend to review tool and risk assessments prior to next CF meeting**

Carbon Fund: Portfolio Management: Summary

- Too early for firm predictions
- Available for purchase of ERs: approximately \$839 million
- Assuming \$5 per ton
- Monte Carlo using ERPA signing date: Average \$1 billion (200 million tons)
- Monte Carlo using portfolio selection date: Average \$1.2 billion (240 million tons)
- ER delivery risk assessment model: around \$450 million (90 million tons)
- LOI values: 212.9 million tCO₂e @ \$5 per ton = \$1.1 billion (x 2/3rds = \$713 million)
- At this stage in developing the portfolio these numbers indicate that the delivery risks are difficult to assess and diversification across a number of programs is important

Portfolio Management: Historical Comparisons

Comparisons of information on Portfolio Management						
	CF15	CF16	CF17	CF18	CF19	CF20
Available for purchase of ERs (\$m)	681	681	844	857	840	839
LOI maximum volume (m tons)	235	213	213	213	213	213
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
Delivery Risk Assessment Model (m tons)	70-90	70-90	90	90	90	90

Carbon Fund: Portfolio Management: HFLD Adjustments

- 3 of the 19 programs in the pipeline are requesting HFLD adjustments (DRC, RoC, Cameroon – no longer Peru)
- DRC and RoC are only HFLD programs in portfolio to date
- 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/ERPA contract volume*	HFLD Programs	HFLD Proportion
Programs Selected into Portfolio			
Chile	5.2		
Costa Rica	12.0		
DRC	11.0	11.0	
Ghana	10.0		
Lao PDR	8.4		
Madagascar	16.4		
Mexico	8.7		
Mozambique	10.0		
Nepal	14.0		
ROC	11.7	11.7	
Vietnam	10.3		
Cumulative Sub-Total	117.7	22.7	19%

HFLD Adjustments

A Review of the Portfolio (2)

Program	Max LOI Volume/ERPA contract volume*	HFLD Programs	HFLD Proportion
Programs Selected into Portfolio (continued)			
Cote d'Ivoire	16.5		
Indonesia	22.0		
Cumulative Sub-Total	156.2	22.7	15%
Programs to be considered at CF20			
Dominican Republic	7.5		
Fiji	3.6		
Guatemala	10.5		
Nicaragua	11.0		
Peru	6.4		
Cumulative Sub-Total	195.2	22.7	12%
Programs not yet considered			
Cameroon	11.5	11.5	
Grand Total	206.7	34.2	17%
* in millions tCO2e			

Carbon Fund: Portfolio Management: Some Options

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

Summary of Decisions Sought

- **Decide whether to select Dominican Republic, Fiji, Guatemala, Nicaragua and Peru'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



THANK YOU!

www.forestcarbonpartnership.org