



# Forest Carbon Partnership Facility

## Portfolio Management Update

**Twenty Fourth Meeting of the Carbon Fund (CF24)**

February 15, 2022

# 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
  - ER Monitoring Report submissions
  - Early results from submitted ER MRs & possible Call Options
  - 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 December 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		
<b>Committed Funding</b>	<b>874,492</b>	<b>0</b>	<b>71,489</b>	<b>175,292</b>	<b>84,883</b>	<b>42,256</b>	<b>59,271</b>	<b>71,681</b>	<b>32,222</b>	<b>27,280</b>	<b>171,866</b>	<b>36,912</b>	<b>71,800</b>	<b>4,181</b>	<b>25,356</b>

\$874.5  
million

# Carbon Fund Financial Situation: Sources and Uses Summary

Carbon Fund Sources and Uses Summary (\$m)	
Sources (\$m)	874.5
Number of Lols (#)	18
Number of ER Programs expected	15
Uses	
Costs over Fund Lifetime	
Fixed Costs (FY10 to FY26)	25.5
ER Program Costs	64.0
<b>Total Costs</b>	<b>89.5</b>
Available for Purchase of ERs	785.0
Equiv to tons @ \$5 per ton (m)	157.0
Average ER Program	52.3

## Available for purchase of ERs

<b>Carbon Fund Sources and Uses Summary (\$m)</b>	
<i>Number of Programs</i>	<b>15</b>
Sources (\$m)	874.5
Available for Purchase of ERs	785.0
Signed ERPAs (15)	721.3
<i>Sub-total available</i>	63.7
<b>Total Available</b>	<b>63.7</b>

# LOI & ERPA Commitments

Country	Max LOI volume	ERPA contract volume	ERPA Contract value (\$ million)	HFLD	HFLD proportion
<b>Signed ERPAs (15)</b>					
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		
Guatemala	10.5	10.5	52.5		
<b>TOTAL</b>	<b>175.3</b>	<b>144.3</b>	<b>721.3</b>	<b>19.4</b>	<b>13%</b>

- Committed funding = \$874.5 million
- Committed through contract volumes in signed ERPAs of 144.3 m tons = \$721.3 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	5	February 4, 2021
Nepal			February 24, 2021
Dominican Republic			March 1, 2021
Republic of Congo			April 22, 2021
Guatemala			September 13, 2021

# Carbon Fund Portfolio Summary

- Carbon Fund term ends 31 December 2025
- 18 countries submitted Program Documents (ERPDs) and were selected unconditionally into the Carbon Fund portfolio
- 3 ER Programs cancelled (Mexico, Nicaragua, and Peru)
- All remaining 15 ERPAs have been signed: total committed \$721.3 million
- Conditions of Effectiveness fully met in 6 programs



# Update on signed ERPAs

## 1. Chile

- ERPA conditions of effectiveness fulfilled in June 2021
- 1<sup>st</sup> Reporting Period ER MR was submitted in June 2021 and completeness & quality check was conducted. Further analysis will be undertaken into the ER monitoring methodology employed by Chile.
- Meanwhile, the Trustee is awaiting indication from Chile on whether to proceed with validation and verification or to wait and decide after results of the additional analysis are available (anticipated to be ready by July 2022)

## 2. Costa Rica

- ERPA conditions of effectiveness deadline extended to March 8, 2022
- Signature of required sub-agreements with landowners (related to ER title transfer) are still in progress. BSP finalization is also dependent on this process. Costa Rica expects to meet this extended deadline
- 1<sup>st</sup> Reporting Period ER MR available online. Validation and verification is close to completion
- Total ER payment for the 1<sup>st</sup> Reporting Period is also dependent on the total sub-agreements to be secured

# Update on signed ERPAs

## 3. Cote d'Ivoire

- Conditions of effectiveness deadline was extended to February 28, 2022, to allow completion of the ministerial processes related to ER title transfer.
- Cote d'Ivoire is expected to meet this extended deadline following which it will be eligible to receive the upfront advance payment of \$1 million under the Tranche B ERPA

## 4. DR Congo

- 5 out of 6 ERPA conditions of effectiveness have been fulfilled
- Following the FREL revision, CFPs and DRC have agreed on a way forward including to amend the ERPA
- A draft ERPA amendment is currently being discussed with DRC
- Final BSP submission is the last pending condition. The BSP is being finalized to take into account the revised reference level.

## 5. Dominican Republic

- Work is underway to fulfill the two conditions of effectiveness – ER title transfer related and submission of a final BSP
- 1<sup>st</sup> Reporting Period ER MR is expected to be submitted before end FY22

# Update on signed ERPAs (contd.)

## 6. Fiji

- ERPA conditions of effectiveness fulfilled in October 2021
- 1<sup>st</sup> Reporting Period ER MR was submitted in September 2021 and a completeness & quality check has been done
- Some updates are in progress following which the validation and verification will be initiated – expected in February 2022

## 7. Ghana

- ERPA conditions of effectiveness fulfilled in April 2020
- Upfront advance payment of \$1.3 million under the Tranche B ERPA made in August 2020
- 1<sup>st</sup> Reporting Period ER MR available online. Validation & verification is expected to complete before the end of FY22
- Anticipated payment is \$5.8 million. Upfront advance payment will be deducted from this payment.

## 8. Indonesia

- ERPA conditions of effectiveness fulfilled in November 2021
- Work in progress to submit the 1<sup>st</sup> Reporting Period ER MR

# Update on signed ERPAs (contd.)

## 9. Lao PDR

- ERPA conditions of effectiveness fulfilled in December 2021
- Lao PDR is now eligible to receive the upfront advance payment of \$3 million under the Tranche A and Tranche B ERPA

## 10. Madagascar

- ERPA conditions of effectiveness deadline extended to March 21, 2022, to allow for completion of the documentation for the remaining conditions – Project Operations Manual and ER title transfer related
- 1<sup>st</sup> Reporting Period ER MR expected to be submitted in next few months

## 11. Mozambique

- ER issuance and payment for the 1<sup>st</sup> Reporting Period completed in July 2021 (ER MR & Validation & Verification Report available on FCPF website)
- 2<sup>nd</sup> Reporting Period ER MR (Jan 1, 2019 - Dec 31, 2020) available online. Verification started in January 2022
- First interim advance payment was made for period Jan 1 – Dec 31, 2019. Payment of about \$605K was made against ERs reported in the 2<sup>nd</sup> ER MR (50% of the value of 2019 monitored ERs)

# Update on signed ERPAs (contd.)

## 12. Guatemala, Nepal, Republic of Congo

- Work in progress to fulfill the conditions of effectiveness

## 13. Vietnam

- ERPA conditions of effectiveness deadline has been extended to April 8, 2022 – this is due to the pending Prime Minister's Decision related to ER title transfer & BSP
- 1<sup>st</sup> Reporting Period ER MR available online. Validation and verification are close to completion with an ER payment anticipated by end FY22

# ER MR submissions & Validation Verification - Summary

Country	ER MR Submission	Validation and Verification status
Chile	Submitted (1 <sup>st</sup> RP)	To be determined
Costa Rica	Available online (1 <sup>st</sup> RP)	Expected to complete before end FY22
Fiji	Submitted (1 <sup>st</sup> RP)	Expected to start in February 2022
Ghana	Available online (1 <sup>st</sup> RP)	Expected to complete before end FY22
Indonesia	Within FY22 (1 <sup>st</sup> RP)	Not yet started
Madagascar	Within FY22 (1 <sup>st</sup> RP)	Not yet started
Mozambique	Available online (1 <sup>st</sup> RP)	Validation & Verification report online
	Available online (2 <sup>nd</sup> RP)	Started in January 2022
Vietnam	Available online (1 <sup>st</sup> RP)	Expected to complete before end FY22
Cote D'Ivoire, Dominican Republic, Guatemala, Lao PDR, Nepal, ROC	Due in 2022 (1 <sup>st</sup> RP)	Not yet started
DR Congo	To be updated (1 <sup>st</sup> RP)	To be updated



# Early results from submitted ER Monitoring Reports & possible Call Options

- Estimated portfolio delivery to date stands at **13%** (delivery against contract volumes only)
- Early results from some of the ER MRs that are still under validation & verification show a delivery of ERs in addition to the contract volume
- Estimated total portfolio delivery (contract volumes + potential additional ERs) is 16%
- Availability of any additional ERs subject to conclusion of validation & verification
  - Estimated at 3.6 million ERs
  - Could potentially be considered under Call Option
  - Summary below of Call Option composition of FCPF ERPAs

Call Option pricing categories	ERPAs	Countries
With price to be negotiated under both Tr A & Tr B	6	Chile, Costa Rica, DR, Indonesia, Mozambique, Nepal
With fixed price for Tr A and to be negotiated for Tr B	5	Cote d'Ivoire, Guatemala, Lao PDR, Madagascar, ROC
With fixed price under both Tr A and Tr B	4	DRC, Fiji, Ghana, Vietnam



# 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

	<i>Unit: [million tCO2e/year]</i>	HFLD Adjustment <small>(% of total emissions)</small>	Emissions	Removals	Effectiveness <small>(% estimate, indicative)</small>
1st ER MR	Chile		19.1	-12.6	5%
Final ER-PD	Congo, Dem Rep	5.6 (13%)	43.5	-1.4	18%
Final ER-PD	Congo Rep	5.4 (72%)	7.5	0.0	35%
1st ER MR	Costa Rica		7.4	-4.8	43%
Final ER-PD	Cote d'Ivoire		9.7	-0.1	58%
Final ER-PD	Dominican Rep		3.8	-3.1	22%
1st ER MR	Fiji		3.0	-1.1	56%
1st ER MR	Ghana		5.0	0.0	53%
Final ER-PD	Guatemala		15.3	-2.2	20%
Final ER-PD	Indonesia		68.4	0.0	25%
Final ER-PD	Lao PDR		10.5	-2.0	26%
Final ER-PD	Madagascar		11.5	-0.1	34%
1st & 2nd ER MR	Mozambique		5.3	0.0	26%
Final ER-PD	Nepal		1.6	-0.7	98%
1st ER MR	Vietnam		12.1	-6.9	55%
	<b>Total</b>	<b>12.9 (4%)</b>	<b>223.6</b>	<b>-35.0</b>	

# 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)

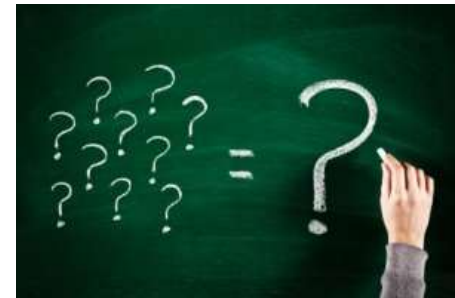
## 2. Program Effectiveness (*percentage change in rate of emissions or removals during program implementation*)

- 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

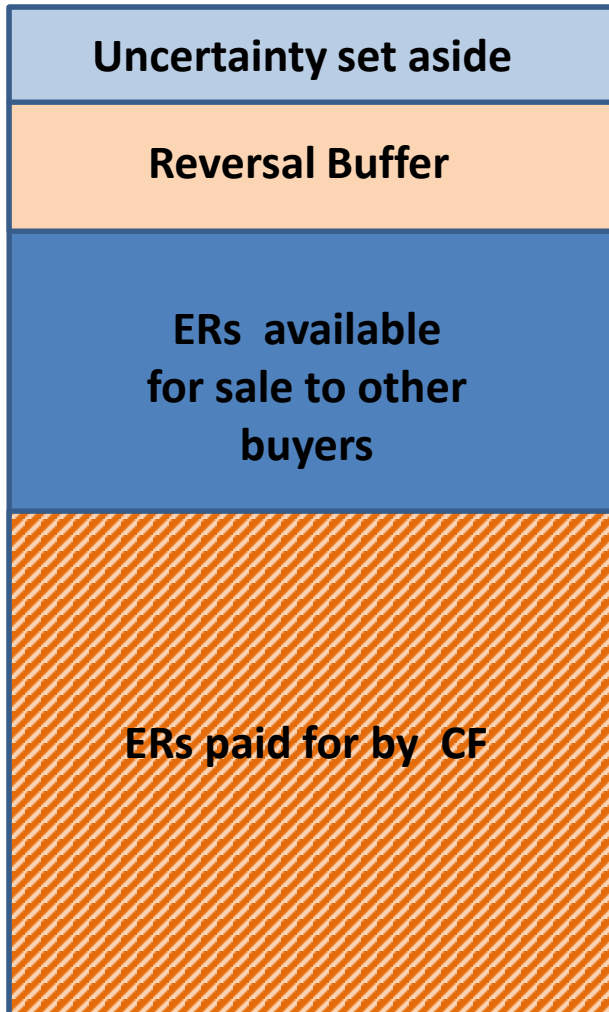




# Carbon Accounting

## Calculation of Emission Reductions (ERs)

### Total ER Volume



- 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	0-20%	10-30%	20-40%	35-55%	45-65%	10-30%	45-65%	45-65%	10-20%	20-40%	20-30%	20-40%	20-40%	30-90%	45-65%
Uncertainty Buffer set-aside	8%	8%	8%	12%	4%	9%	4%	8%	15%	4%	11%	8%	3%	12%	12%
Reversal Buffer set-aside	21%	20%	23%	10%	23%	15%	16%	18%	23%	26%	23%	28%	39%	11%	21%
Share offered to Carbon Fund	80%	46%	69%	37%	44%	90%	20%	74%	90%	51%	77%	65%	115%	72%	16%
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%	0%	0%	0%	0%	0%	0%	0%

# ... and examine the outcome!

<i>[million tCO<sub>2</sub>e]</i>	Net emission reductions	ER Volume in CF portfolio			Buffer	
	< historical*	Average*	Max	Min	Uncertainty*	Reversal*
Chile	18.9	<b>10.9</b>	24.2	0.0	1.5	2.9
Congo, Dem Rep of	43.1	<b>23.9</b>	34.3	14.6	5.7	6.0
Congo, Rep of	11.1	<b>18.7</b>	21.4	16.4	3.1	5.6
Costa Rica	38.2	<b>11.2</b>	13.9	9.0	4.6	1.2
Cote d'Ivoire	22.2	<b>7.2</b>	9.0	5.5	0.9	2.2
Dominican Republic	5.4	<b>3.7</b>	5.4	1.8	0.5	0.6
Fiji	12.6	<b>2.1</b>	2.4	1.6	0.5	0.4
Ghana	15.4	<b>8.6</b>	10.7	6.6	1.2	1.9
Guatemala	12.8	<b>6.8</b>	10.7	3.1	1.9	2.0
Indonesia	100.0	<b>36.0</b>	58.4	16.1	4.0	12.7
Lao, PDR of	18.9	<b>9.9</b>	13.0	6.7	2.1	3.0
Madagascar	16.9	<b>7.3</b>	10.4	3.9	1.4	2.9
Mozambique	10.5	<b>4.5</b>	6.5	2.4	0.3	2.9
Nepal	8.6	<b>4.9</b>	7.2	2.5	1.0	0.6
Vietnam	72.7	<b>8.1</b>	9.8	6.5	8.7	2.2

# Aggregate Simulated Portfolio at CF24

<i>[million tCO<sub>2</sub>e]</i>	Net emission reductions	ER Volume in CF portfolio			Buffer	
Total	407.5	163.9	237.4	96.5	37.3	46.9



# 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 should be more useful for portfolio management now that 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%
<b>TOTAL</b>	<b>34,400</b>		<b>8,040</b>	<b>16,000</b>	<b>8,040</b>	<b>50%</b>

# FCPF Carbon Fund preliminary ER delivery risk assessment

- Preliminary estimates:
  - Indicates net program ERs (after deduction of buffers) from current portfolio of 282 million (over \$1.41 billion @ \$5 per ton)
  - Risk factor (% delivery) of between **50% and 79%** across programs
  - Results in a portfolio delivery of around **181.6 million** risk-adjusted ERs over ERPA periods (**\$908 million @ \$5 per ton**)
    - ER estimates based on:
      - Latest versions of the ER Monitoring Reports from Chile, Costa Rica, Fiji, Ghana, Mozambique and Vietnam
      - Latest versions of ERPDs
      - Contracted volumes and expected contract volumes

# 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 in ER Monitoring Reports (or best available estimate), after adjusting for the uncertainty and reversal buffers
  - 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 \$785 million
- Assuming \$5 per ton
- Monte Carlo: Average \$819 million (163.9 million tons)
- ER delivery risk assessment model: around \$908 million (181.6 million tons)
- Delivery risk remains difficult to predict in several of the programs so diversification remains important

# Portfolio Management: Historical Comparisons

	CF15	CF16	CF17	CF18	CF19	CF20	CF21	CF22	CF23	CF24
Available for purchase of ERs (\$m)	681	681	844	857	840	839	816	791.6	782.7	785
LOI maximum volume (m tons)	235	213	213	213	213	213	201.4	201.4	175.3	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	164
Delivery Risk Assessment (m tons)	70-90	70-90	90	90	90	90	102	120	153	182



THANK YOU!

[www.forestcarbonpartnership.org](http://www.forestcarbonpartnership.org)