

# APPENDIX TWO – ART-TREES

## 1. Background to TREES

The REDD+ Environmental Excellence Standard (TREES) sets out ART requirements for the quantification, monitoring, and reporting of GHG emissions and removals; demonstrating the implementation of the Cancún Safeguards; and verification, registration, and issuance of TREES credits. TREES has been designed to ensure that all TREES credits issued are real, measured, permanent, additional, net of leakage, verified by an accredited independent third party, and are not double-counted. As a result, TREES credits will represent high quality while still allowing flexibility for implementing REDD+ programmes at a national level or subnational as an interim measure.

Unlike other forest carbon accreditation programmes, ART includes a module for recognising carbon stored within High Forest Cover Low Deforestation (HFLD) countries and offers a dedicated recognition within the crediting programme that includes forest carbon protection. Most carbon accreditation programmes provide payments for restoring forests that were lost.

### Importance of Intact Forests to ART TREES

ART's standard TREES 2.0 includes approaches for the full range of necessary actions needed for a broad range of forest countries and communities to contribute to Paris Agreement targets. This includes reducing emissions from deforestation and forest degradation, the most urgent priority for the forest sector, and protecting intact forests and restoring forest landscapes.

By ensuring the continuum of climate action is eligible for participation in carbon markets, ART offers an incentive for jurisdictions to reduce deforestation, restore forests and ultimately become High Forest – Low Deforestation (HFLD). Intact forests contribute both climate mitigation and adaptation benefits by storing carbon, regulating local and regional climate, supplying critical moisture to agricultural lands, and resisting wildfire. Also, providing incentives to HFLD jurisdictions lowers the risk of cross-boundary shifting of deforestation emissions (i.e., leakage).

### TREES 2.0 Credits Are Additional and Fungible

TREES HFD credits are additional and fungible. HFLD credits constitute additional climate action. Published projections are that future deforestation will extend into intact, high

carbon forests, resulting in an estimated 170 billion tons of CO<sub>2</sub> greenhouse emissions by 2050,<sup>2</sup> equivalent to four times annual global CO<sub>2</sub> emissions (2019). TREES 2.0 incentivizes jurisdictions to protect intact forests since guarding the carbon sequestered in these forests is essential to meeting the goals of the Paris Agreement.

Jurisdictions that qualify as HFLD can use a different, conservative crediting approach, and must also report annual emissions from deforestation and degradation, account for leakage, uncertainty and reversals, avoid double counting and adhere to the same rigorous environmental and social safeguards requirements. These yielding credits are fungible with those generated by the approach used for non-HFLD jurisdictions.

Like all other ART participants, TREES requires action from HFLD jurisdictions. Under TREES, all HFLD jurisdictions must have a jurisdictional REDD+ implementation strategy, which in Guyana's case is its Low Carbon Development Strategy, that establishes the actions they are taking to mitigate current and future drivers of deforestation and forest degradation. Without financial incentives, it is less likely that forests in HFLD areas will remain effectively protected. Moreover, providing incentives to jurisdictions with intact forests to maintain those forests lowers the risk of deforestation shifting to these countries as nearby jurisdictions with high deforestation begin reducing their forest-related emissions.

## 2. ART-TREES Valuation of Guyana's Forest Climate Services

The ART-TREES valuation of Guyana's ecosystem services focuses on carbon valuation. In summary, the valuation adopts ART TREES V2 HFLD (High Forest Cover Low Deforestation) approach which computes crediting level of carbon units for sale using a formula:

$$\begin{aligned} & \textit{Historical Emissions for Past 5 years from the forestry sector} \\ & \quad + \\ & \textit{(HFLD Score X 0.05\% of country forest carbon stock)} \end{aligned}$$

While the ART-TREES mechanism does not yet include all aspects of what Guyana believes is needed for a robust, globally-applicable market mechanism, it is believed to provide a sound foundation for the next phase of Guyana's market integration. A summary of ART-TREES performance against Guyana's target methodology is set out in the table below.

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<sup>2</sup>Busch, J. & Engelmann, J. (2017). Cost-effectiveness of reducing emissions from tropical deforestation, 2016– 2050. Environmental Research Letters. 13, 015001. <https://doi.org/10.1088/1748-9326/aa907c>

GUYANA'S FOREST CARBON FINANCING MECHANISM	ART-TREES	FURTHER WORK NEEDED
<b>Includes incentives for Reducing Deforestation</b>	Yes	No
<b>Includes Incentives for Forest Restoration</b>	Yes	No
<b>Includes Incentives for Forest Conservation</b>	Yes	No
Includes Incentives for GHG Removals	Forest Remaining Forest excluded from current structure.	Yes
<b>Use of HFLD Score</b>	<b>Yes</b>	<b>No</b>
Multiplier for Forest Carbon Stock applied at 0.1%	Multiplier for Forest Carbon Stock applied at 0.05%.	Yes
Forest Carbon stock to include all carbon pools appropriately adjusted for uncertainty.	Forest Carbon stock excludes soil, deadwood and litter.	Yes
Historical Average to cover the immediate historical period of 15 years.	Historical average determined by previous five years.	Yes
Adherence to Cancun Safeguards.	Yes	No

A key gap where Guyana believes ART needs to pursue further work in collaboration with Guyana and other forest countries, is to address removals. Under ART-TREES, sinks provided by 'forests remaining forests' in REDD+ are not currently valued, but they are significant in scale, are expected to continue functioning decades into the future if undisturbed, and face increasing threats. A mechanism is needed that explicitly gives a value to actions that maintain these sinks.

Despite this and other areas for future improvement, the methodology provides the potential for Guyana's next phase of market integration while the short-comings are addressed. The detailed calculation of Guyana's reference level, as well as the next steps in the ART process, are set out below.

### 3. Detailed Calculation

#### Guyana’s HFLD Score

The HFLD Score is the sum of the Guyana’s Forest Cover Score and Guyana’s Deforestation Rate Score, expressed as a unit value.

Guyana’s 2020 Forest cover = 83.7%  
 Guyana’s deforestation rate 2016-20 = 0.060%  
 Expressed as a unit value, Guyana’s HFLD Score is = 0.8

#### Guyana’s Historical Emission for Past 5 Years

Guyana’s MRVS Report 2020, has reported historical emissions for the past five years as 15,068,951tCO<sub>2</sub>.

#### Carbon Credits

Crediting levels are computed under ART TREES using the equation:

$$\begin{aligned} & \text{Historical emissions for past five years from the forestry sector} \\ & + \\ & (\text{HFLD Score} \times 0.05\% \text{ of country forest carbon stock}) \end{aligned}$$

Gives Results in tons of CO<sub>2</sub>:

$$\begin{aligned} & 15,068,951 \text{ tCO}_2 + (0.8 \times (0.05\% \text{ of } 17,196,304,923 \text{ tCO}_2)) \\ & = 21,947,473 \text{ tCO}_2 \end{aligned}$$

### 4. Additionality and Maintaining Environmental Integrity

To ensure environmental integrity, the following additional provisions will be made. Credits will be reduced if:

<b>ACTUAL GROSS EMISSIONS EXCEEDING 25% FROM HISTORICAL LEVEL</b>	<b>ACTUAL GROSS EMISSIONS EXCEEDING 35% FROM HISTORICAL LEVEL</b>	<b>ACTUAL GROSS EMISSIONS EXCEEDING 45% FROM HISTORICAL LEVEL</b>	<b>ACTUAL GROSS EMISSIONS EXCEEDING 55% FROM HISTORICAL LEVEL</b>	<b>ACTUAL GROSS EMISSIONS EXCEEDING 65% FROM HISTORICAL LEVEL</b>	---	<b>ACTUAL GROSS EMISSIONS DOUBLING HISTORICAL LEVEL</b>
Reduced by 10% on crediting level	Reduced by 15% on crediting level	Reduced by 20% on crediting level	Reduced by 25% on crediting level	Reduced by 30% on crediting level	...	No payments

**Provisions for Reversal Buffers:** If emissions exceed the Crediting Level, it is considered a reversal and is compensated by retiring buffer credits. If reported emissions are above the 15-year emissions average by greater than 15 percent, an additional deduction is taken from the final ERs.

**Provisions for Uncertainty (based on Monte Carlo Analysis):** Estimates of emission reductions and removals are adjusted based on estimated uncertainty to minimise the risk of over-crediting. Countries endeavor to minimise all forms of uncertainty. Uncertainty will be quantified in terms of the half-width of the 90% confidence interval as a percentage of the estimated emissions.

## 5. Issuance of credits

Credits will be issued under the Guyana Carbon Registry and any other structure that is associated with the Guyana credit issuance.

### Payment Scenarios

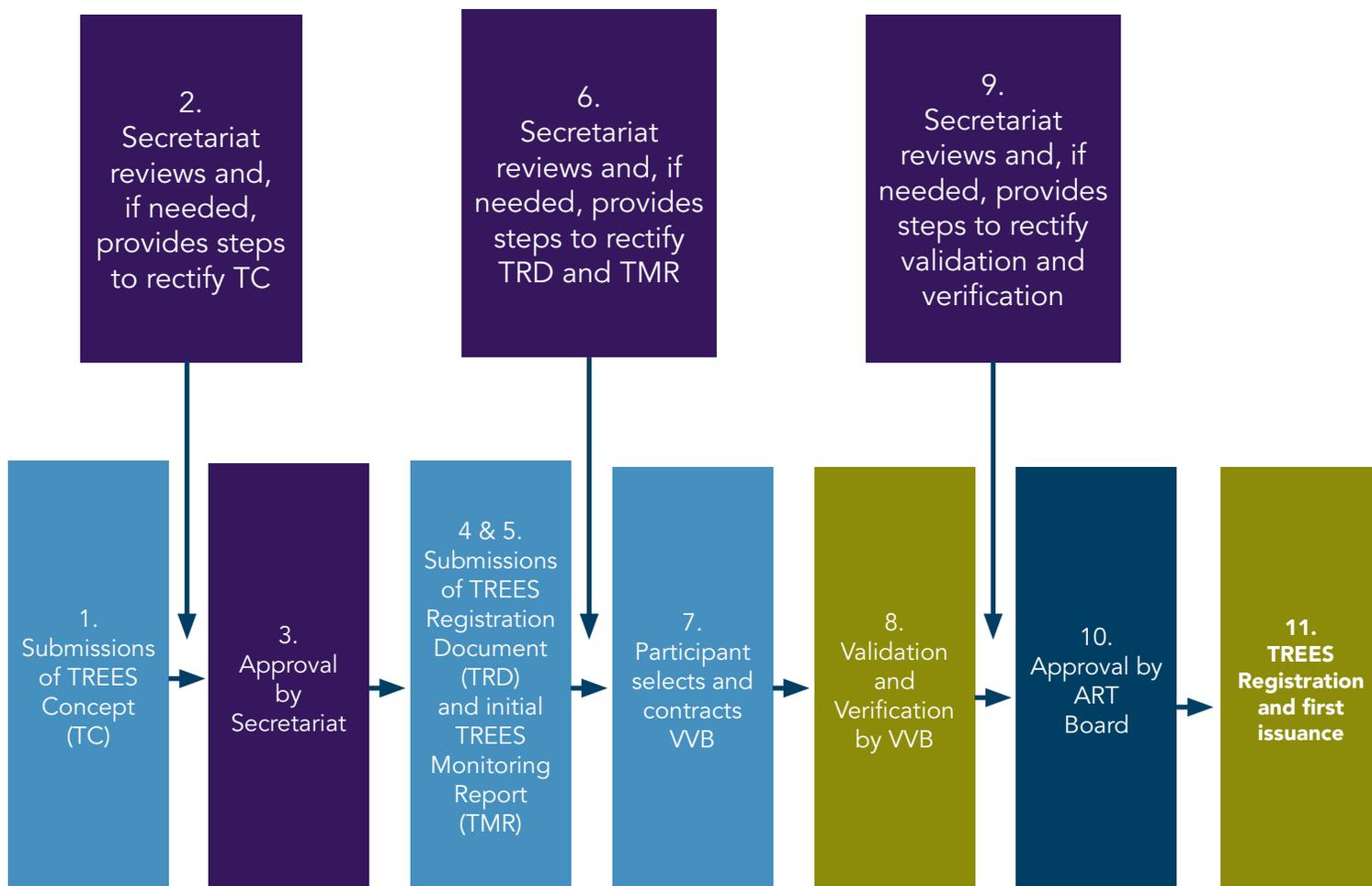
FOREST VALUATION BASED ON CARBON MARKET POTENTIAL					
CASE YEAR PRESENTED - YEAR 2021					
CREDITING LEVEL (TCO2)	PROJECTED EMISSIONS LEVEL (TCO2)	EMISSIONS REDUCTIONS (TCO2)	PAYMENT LEVEL AT US\$10 PER TON/CO2	PAYMENT LEVEL AT US\$20 PER TON/CO2	PAYMENT LEVEL AT US\$30 PER TON/CO2
21,947,473	13,000,000	8,947,473	89,474,730	178,949,459	268,424,189

### Provisions for Amaila Falls Hydro Power Project

The development of Guyana’s Amaila Falls Hydropower Project (including road line, transmission line corridor and dam extent) is expected to impact approximately a quarter of one percent of Guyana’s forest, and this expectation has been integrated into Guyana’s LDCA, since it was first launched. Given the centrality of Amaila Falls Hydropower to Guyana’s clean energy goals as outlined in Chapter Four, provisions were made to support its development within the Guyana-Norway partnership. The precedent established under the Guyana-Norway partnership will be carried forward into ART-TREES.

## 6. The ART Process

The process to enter ART using TREES requires approval of a TREES Concept, a successful initial Validation and Verification, and TREES Registration. Guyana will be required to submit documents and gain approval for each of the stages above to reach the final step of issuance of the approved credits to be sold. The eleven (11) steps involved in the ART process are outlined below:



**The steps that Guyana will be required to follow as summarised in the diagram above is as follows:**

1. The participant submits a TREES Concept to the Secretariat for review. Guyana completed this step in December, 2020.
2. The ART Secretariat reviews the TREES Concept for completeness and will request revisions as needed. Guyana completed this step in December, 2020.

3. The Secretariat approves the inclusion of the participant in ART. Guyana has completed this step in December, 2020.
4. Following approval, the participant's TREES Concept is referenced in the ART Registry as listed. Guyana is listed on the ART Registry.
5. The participant submits the TREES Registration Document and the initial TREES Monitoring Report covering the initial calendar year(s) to the Secretariat for a completeness check. These documents are prepared in draft for submission for periods 2016 to 2020 and 2021 to 2025 have been developed in draft to be submitted by end of September 2021.
6. The Secretariat reviews the TREES Registration Document and TREES Monitoring Report for completeness and will request revisions as needed. The Secretariat then approves the TREES Registration Document and TREES Monitoring Report for validation and verification.
7. The participant selects a Validation and Verification Body from the list of approved ART Validation and Verification Bodies maintained on the ART website. The participant solicits bids and negotiates contracts directly with the selected Validation and Verification Body (VVB). The selection process will include a disclosure of conflicts of interest and mitigation measures, if conflicts are identified.
8. The Validation and Verification Body conducts the validation of the TREES Registration Document and the verification of the TREES Monitoring Report in line with the requirements of the TREES Validation and Verification Standard.
9. The Validation and Verification Body submits the Validation and Verification Report and Verification Statement to the Secretariat who reviews the documents to ensure completeness. The Secretariat will request revisions as needed.
10. The Secretariat submits the participant's final package and a recommendation to the ART Board for approval. The Board requests additional information as appropriate and approves the credit issuance.
11. Following Board approval, the participant's TREES Registration Document and Monitoring Report are referenced in the ART Registry as Registered and TREES credits are issued based on the initial verification. For countries like Guyana, which have demonstrated conformance with the High Forest /Low Deforestation (HFLD) criteria and have used the HFLD crediting approach, TREES credits issued will be labeled as HFLD.

The HFLD crediting approach is explained below.

## 7. Eligibility to Participate as HFLD in ART

Participation in ART can take one of two tracks. The first focuses on reducing deforestation and being credited for doing so. As Guyana has maintained low deforestation rates and emissions levels, this avenue will yield very low benefits for Guyana.

The second track (the HFLD participation) allows for the maintained low rates of deforestation rates and emissions level to be factored into the determination of crediting level for payment. Conceptually, this track offers a more beneficial structure for Guyana as an HFLD country.

To be eligible to participate in ART as an HFLD country, the HFLD score threshold must be met. The HFLD Score is therefore a central part of the HFLD crediting approach and comprise the main eligibility criterion, and also is a main part of the formula used for computing the crediting level.

The HFLD Score is the sum of the Participant’s Forest Cover Score and the Participant’s Deforestation Rate Score as exemplified in the figures below and outlined in the equations in 4.1 below. Participants whose HFLD Score is 0.5 or higher for each year of the reference period meet the HFLD Score threshold and are considered HFLD participants under ART.

$$\text{HFLD Score}_t = \text{FCS}_t + \text{DRS}_t$$

**WHERE**

<b>HFLD Score<sub>t</sub></b>	<b>HFLD Score in year t</b>
<b>FCS<sub>t</sub></b>	<b>Forest Cover Score in year t (Equation 3)</b>
<b>DRS<sub>t</sub></b>	<b>Deforestation Rate Score in year t (Equation 4)</b>

## 8. The ART TREES HFLD Crediting Methodology

The HFLD Crediting Level will be calculated in accordance with the formula presented in Equation 5. The TREES Crediting Level is first calculated (emissions crediting level from the average of emissions during a historical period of five years with no overlaps with crediting period and no gaps). This crediting level is then adjusted based on Guyana’s HFLD Score and forest carbon stocks to determine the HFLD Crediting Level.

$$\text{HFLDCL}_n = \text{CL}_n + (\text{HFLD Score}_{\text{avg}} * \text{Carbon Stock})$$

## WHERE

<b>HFLDCL<sub>n</sub></b>	<b>HFLD Crediting Level for crediting period n; CO<sub>2</sub>e/yr</b>
<b>CL<sub>n</sub></b>	<b>Crediting Level for crediting period n; CO<sub>2</sub>e/yr (Section 5.1)</b>
<b>HFLD Score<sub>avg</sub></b>	<b>HFLD Score averaged across reference period (Section 5.2.1)</b>
<b>Carbon Stock</b>	<b>0.05% of Standing Forest Carbon Stock withing jurisdiction</b>

## 9. Additional Provisions

### Reversal Risk Assessment

TREES establishes a starting level of reversal risk for participants of 25 percent. The starting risk level may be lowered if participants can demonstrate that mitigating factors exist. The risk level is associated with a buffer deduction taken from the final verified TREES ERR quantity prior to each issuance.

Guyana is required to provide for the number of TREES credits that will be contributed to the buffer at each issuance. Each monitoring report must identify the buffer contribution and all justifications for the contribution for each year reported. Performance payment in Chapter Three provides for reversal buffers from identified amounts.

### Uncertainty Assessment

TREES requires that estimates of emission reductions and removals are adjusted based on estimated uncertainty to minimise the risk of over-crediting. Participants are required to endeavour to minimise all forms of uncertainty. Requirements to track uncertainty and to avoid systematic bias must also be included in country submissions.

Under TREES, uncertainty is quantified in terms of the half-width of the 90 percent confidence interval as a percentage of the estimated emissions. Sampling errors must be estimated and included in the uncertainty calculation.

Model and allometric errors are excluded; as such errors are considered consistent between emissions in the crediting level and crediting periods.

Uncertainty is required to be assessed on both activity data and emission factors. Errors need to be propagated between sources using Approach 2 (Monte Carlo simulation). Monte Carlo simulations are required to use the 90 percent confidence interval and

a simulation n of 10,000. The bootstrapping method is allowed to be used where the probability density function is unknown. The simulations will form the basis for estimations both of value and uncertainty at each step, as the simulated sum of components will be more accurate than an arithmetic approach.

### **HFLD Annual Emissions Increase Deduction**

For each year of the Crediting Period, HFLD Participants are required to compare their total reported annual emissions. If the total annual emissions exceed the crediting level, a deduction must be applied to the total credits generated. The deductions are as follows:

### **ENVIRONMENTAL, SOCIAL, AND GOVERNANCE SAFEGUARDS**

TREES requires Participants to demonstrate they have implemented REDD+ actions defined in the REDD+ implementation plan consistent with Cancún Safeguards ensuring activities do no harm. It is the goal of this Standard to provide concrete guidance on how a participant can demonstrate that it has addressed and respected all the Cancún Safeguards, while drawing on the step-wise nature of REDD+ implementation.

### **REGISTRY REQUIREMENTS/ACCOUNT REQUIREMENTS**

All participants, including Guyana, will have an account in the ART Registry, managed by the ART Secretariat. The ART Registry will contain country information, documentation, Validation and Verification Reports, records of serialised credit issuance, and credit cancellation, transfer, and retirement data. The Secretariat will also manage a pooled reversals buffer account in the ART Registry which will be publicly available.

### **PUBLICLY AVAILABLE DOCUMENTATION**

All approved and final TREES documents will be publicly available through the ART Registry. Participants may designate certain parts of the documentation as Commercially Sensitive Information (CSI). In these cases, redacted versions of TREES documentation can be made publicly available. However, this information as well as any requested supporting documentation must be available for review by the Secretariat and Board and the Validation and Verification Body (VVB).