

REQUIREMENTS

# Model Assurance

Requirements for Assurance: Mixed engagement

**Version:** 1.0

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# 1. Scope

## 1.1. The purpose of this document

- 1.1.1. To define the requirements to be conformed to by organisations to achieve Model Assurance which can calculate product carbon footprints (PCF) and/or organisational carbon footprints (OCF) (varying boundaries of Scope 1, 2 and 3 emissions).
- 1.1.2. Is for both the Carbon Trust and external parties.
- 1.1.3. Is for assurance of a Model that generates greenhouse gas (GHG) footprints (hereafter: 'footprint'/'footprints') in conformity with selected standard(s) and relevant Requirements for Assurance (RfA).
- 1.1.4. Supports two types of Models
  - **General Purpose Model:** These can calculate footprints across one or multiple product categories **and/or** organisational sectors. This **shall** be defined in the Model Assurance Boundary [see 3.1].
  - **Parameterised Model:** Fixed structure and a restricted number of parameterised inputs. They are used to calculate footprints for a set of similar products. This Model type **shall** only be for PCF. All activity data and (most) emission factors are built in the tool. A finite number of bespoke calculation methodologies **shall** be pre-built in the tool. An example would be a tool capable of calculating footprints for multiple packaging products. Due to their fixed structure, Parameterised Models can be eligible for auto-verification of outputs [see 11 for additional criteria].<sup>1</sup>
- 1.1.5. Is applicable to Models built in any appropriate format, for example in Microsoft Excel, in commercial software or in the form of an online calculator.

<sup>1</sup>Requirements for Parameterised Models are not presently included in this version of the requirements but will be reviewed and added to the next version.

## 1.2. Successful Model Assurance

- 1.2.1. General Purpose Model Assurance does not guarantee the generated results would be verified. Resultant footprints **shall** need to be verified through the respective RfA, although streamlined, dependent on findings from the Model Assurance process [see Appendix 4].
- 1.2.2. Parameterised Models **may** result in auto-verified results [11].<sup>2</sup>
- 1.2.3. Qualifies the Model to carry the Carbon Trust Model Label, subject to a separate Label Licence fee.
- 1.2.4. Organisations **may** receive Model Assurance with/without the Model Label.

<sup>2</sup>This requires additional assessment activities to verify all possible Model outputs that fall under the Model Assurance Boundary.

## 1.3. Document update process

- 1.3.1. The Carbon Trust reserves the right to update this document as deemed necessary.
- 1.3.2. You **shall** ensure that they are using the latest version available except where the project commences within six months of signing the contract and the requirements version has been released or updated within that period. In this case, the previous version **may** be used.

## 2.Acronyms and terms

### Key abbreviations

|                        |                                                                     |
|------------------------|---------------------------------------------------------------------|
| <b>GHG</b>             | Greenhouse gas                                                      |
| <b>RfA</b>             | Requirements for Assurance                                          |
| <b>CO<sub>2</sub>e</b> | Carbon dioxide equivalent                                           |
| <b>PCF</b>             | Product carbon footprint                                            |
| <b>OCF</b>             | Organisational carbon footprint                                     |
| <b>PCF RfA 1</b>       | Product carbon footprint: Requirements for Assurance, part 1        |
| <b>PCF RfA 2</b>       | Product carbon footprint: Requirements for Assurance, part 2        |
| <b>OCF RfA 1</b>       | Organisational carbon footprint: Requirements for Assurance, part 1 |
| <b>OCF RfA 2</b>       | Organisational carbon footprint: Requirements for Assurance, part 2 |
| <b>QC</b>              | Quality control                                                     |

### Assurance terms

|               |                                                          |
|---------------|----------------------------------------------------------|
| <b>Shall</b>  | A requirement to be in conformance with this document    |
| <b>Should</b> | A recommendation, but not a requirement of this document |
| <b>May</b>    | An option that is allowable or permissible               |

### Parties involved

|              |                                                                 |
|--------------|-----------------------------------------------------------------|
| <b>Us</b>    | The verification body                                           |
| <b>Owner</b> | The developer and owner of the Model, applying for Assurance    |
| <b>User</b>  | The user of the Model (which may be the owner or a third party) |

## 3. Pre-engagement requirements

3.1. The following activities **shall** be provided and confirmed before Assurance:

3.1.1. Model Assurance Boundary (OCF and/or PCF):

3.1.1.1. If OCF define the scopes/categories included

3.1.1.2. If PCF define boundary (e.g., cradle-to-gate, cradle-to-grave)

3.1.1.3. If OCF define the organisational types included (e.g., chemicals)

3.1.1.4. If PCF define the product types included

3.1.1.5. Geographical scope

3.1.2. The standards which the Assurance is against (e.g., ISO 14067, the GHG Corporate Protocol Standard, etc.)

3.1.3. Ownership (and responsibility for maintaining and building)

3.1.4. Intended Users (e.g., internal own use, company's business customers, licensed to multiple Users)

3.1.5. Implementation platform<sup>3</sup> (e.g., Excel, software)

3.1.6. Access, which will be provided to Us (User profile or screen sharing)

3.1.7. Databases used within the Model (e.g., emission factors)

3.1.8. Years the model can produce results

3.1.9. Communication claim the Owner wants to pursue based on the above

3.2. The Owner **should** demonstrate in the Governance System how the Model and Governance System meet the requirements in this document.

<sup>3</sup>The choice of tool undergoing assurance may have implications on time/costs for all parties, so shall be confirmed during scoping.

## 4. Key information

4.1. The Model **shall** consist of the following elements [see Table 1, Table 2 and Figure 1]. All elements of the Model **shall** be accessible directly or through screen sharing.

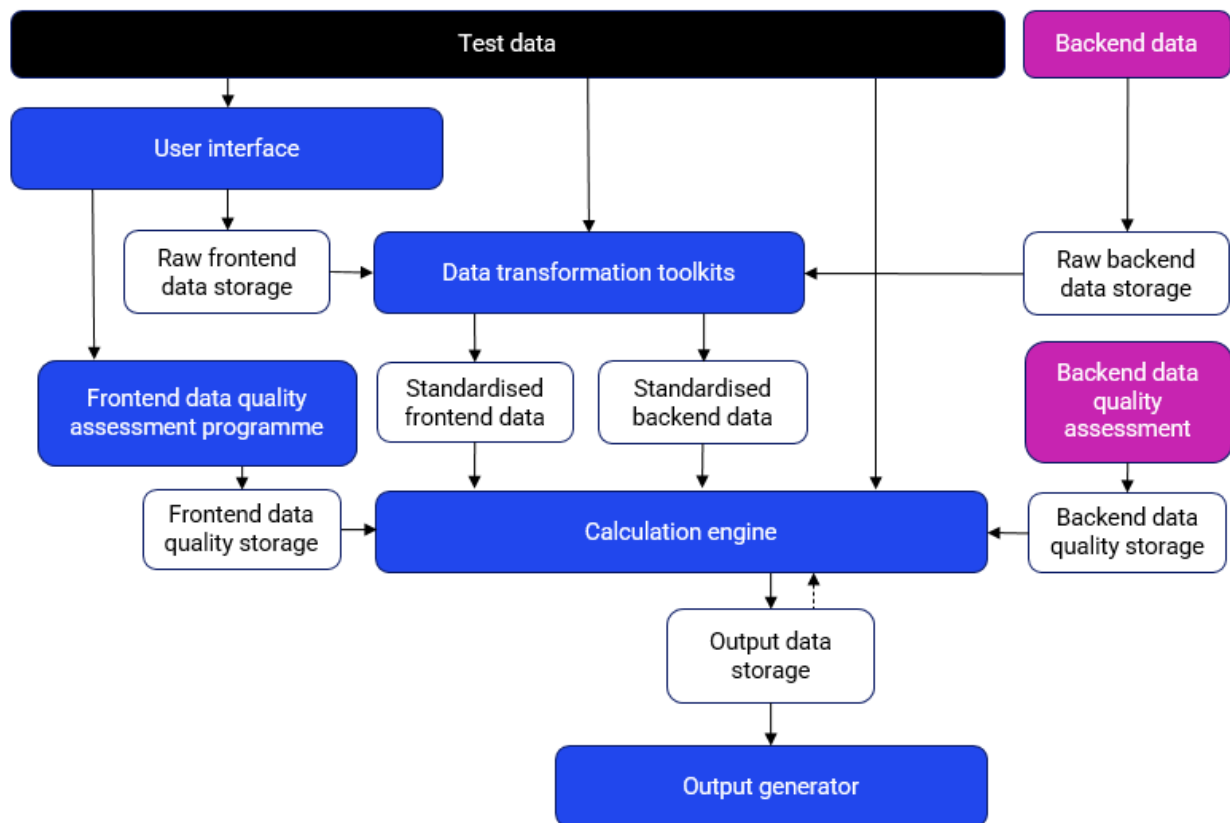
**Table 1. Elements of the Model to be reviewed during Assurance**

|                                            |                                                                                                                                     |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| User interface                             | Allows the Model User(s) to manually input frontend data and/or import frontend datasets.                                           |
| Data transformation toolkits               | Data transformation processes performed on raw frontend and backend data to create standardised frontend and backend data.          |
| Frontend data quality assessment programme | Data quality assessment performed by the User on the standardised frontend data.                                                    |
| Calculation engine                         | Applies footprinting methodologies by performing calculations using standardised frontend and backend data.                         |
| Data storage                               | Storage of raw frontend and backend data; standardised frontend and backend data; data quality assessment results; and output data. |
| Output generator                           | Generates combined output(s) from the calculation engine, including footprint and data quality assessment results.                  |
| Backend data                               | Data input and/or imported by the Owner.                                                                                            |
| Backend data quality assessment            | Data quality assessment performed by the Owner on the backend data.                                                                 |

4.2. The Model **shall** be supported by an applicable **Governance System** consisting of the following supporting documentation and **shall** be available for Model Assurance in the form of one or many documents available upon request:

**Table 2. Documents to support the Model**

|                         |                                                                                            |
|-------------------------|--------------------------------------------------------------------------------------------|
| Governance document(s)  | Provides background for how the Model is maintained and managed.                           |
| Methodology document(s) | Provides details on the calculation methodology used in the Model and how data is managed. |



**Figure 1. Overview of the Model elements to be reviewed during Assurance**

# 5. Data management and system usage

## 5.1. Data management within the Model

5.1.1. Data management **shall** be documented in the Governance System, and **shall** include:

5.1.1.1. Defined intended backend and frontend data to be used in the calculation engine;

5.1.1.1.1. Data appropriate for the Model Assurance Boundary.

5.1.1.2. Defined procedure(s) for sourcing backend data;

5.1.1.3. Procedure(s) for inputting backend and frontend data (e.g., User input and file import);

5.1.1.4. Necessary licences and agreements for external databases;

5.1.1.5. Procedure(s) for storing backend and frontend data in a secure location before and after transformation (as applicable);

5.1.1.6. Defined person(s) and role(s) responsible for all data management processes.

5.1.2. The Model **shall** include backend data covering all years the Model is producing footprints.

5.1.3. Backend data **shall** match the source.

## 5.2. Data transformation and traceability

5.2.1. Data transformation toolkits within the Model **shall**:

5.2.1.1. Be documented in the Governance System;

5.2.1.2. Be inaccessible for Users to manipulate.

5.2.2. Data traceability processes **should** have a place for Users to input the source of each set of frontend data.<sup>4</sup>

5.2.3. The Governance System **shall** include sources and age of all backend data.

<sup>4</sup>This functionality aids subsequent verification processes and simplifies producing subsequent years footprints.

## 5.3. Test data packages

5.3.1. The Owner **shall** submit frontend test data packages.

5.3.2. Test data packages **shall**:

5.3.2.1. Be sufficient to demonstrate the full range of functionality of the Model for the selected Model Assurance Boundary, including:

5.3.2.1.1. Data demonstrating common inputs;

5.3.2.1.2. Data suitable for testing the transformation toolkit(s);

5.3.2.1.3. Data suitable for directly testing the calculation engine, and each specific calculator;

5.3.2.1.4. Data suitable for end-to-end testing.

5.3.2.2. Represent and produce realistic, and typical footprints within the Model Assurance Boundary.

5.3.2.3. Be stored in a secure location, and the storage procedure documented.

5.3.2.4. Include test data supplied by Us.

5.3.3. Multiple test data packages **may** be required to meet 5.3.2.

5.3.3.1. The number of test data packages **shall** be suitable to ensure confidence in the Model.

5.3.4. The Owner **shall** define and justify in the Governance System acceptable ranges of results for the Model Assurance Boundary.



## 5.4. Continual improvement

5.4.1. A continual improvement plan **shall** be documented in the Governance System, and **shall** include:

- 5.4.1.1. Procedure(s) for identifying areas of improvement.
- 5.4.1.2. Frequency of backend data and calculation engine reviews.
- 5.4.1.3. Procedure(s) for backend data and calculation engine updates and releases.
- 5.4.1.4. Procedure(s) for reviewing User submitted feedback, including:
  - 5.4.1.4.1. How Users submit feedback, report errors or bugs;
  - 5.4.1.4.2. The frequency of User feedback reviews.
- 5.4.1.5. Procedure(s) for prioritising and resolving identified errors and bugs.
- 5.4.1.6. The person(s) and role(s) responsible for implementing the continual improvement plan.

## 5.5. Data quality

5.5.1. The Model and Governance System **shall** have the capability to assess data quality<sup>5</sup> and **shall**:

- 5.5.1.1. Assess backend data through a data quality assessment, assigning a data quality indicator (DQI);
  - 5.5.1.1.1. Include the Data quality assessment scoring system and methodology for assigning the DQI in the Governance System.
  - 5.5.1.1.2. Store DQIs of backend data in the Model.
- 5.5.1.2. Provide a data quality assessment methodology to all intended Users, for use on frontend data.
  - 5.5.1.2.1. Have functionality to input DQIs for frontend data within the Model; **or**
  - 5.5.1.2.2. Have functionality to assess DQ from frontend data within the Model;
  - 5.5.1.2.3. Store DQI of frontend data in the Model.
- 5.5.1.3. Include technological representativeness, geographical representativeness, time-related representativeness and precision for assessing DQ (further details in PEF)<sup>a</sup>
- 5.5.1.4. Combine the DQ for frontend and backend in the Model to produce a final DQI result.
- 5.5.1.5. Present the DQ in the outputs.

<sup>5</sup>Individual footprints may not be eligible for PCF/OCF assurance without updates if the data quality of the generated footprint is below the minimum data quality requirements in PCF RfA 1 or OCF RfA 1.

## 5.6. Quality control of backend data and data transformation toolkits

5.6.1. A quality control procedure **shall** be documented in the Governance System, and **shall** include:

- 5.6.1.1. Procedure(s) for assessing accuracy and appropriateness of backend data and data transformation processes;
- 5.6.1.2. Comparison of backend data against other sources to assess the appropriateness, and records in a log of the comparison to be shared with Us;
  - 5.6.1.2.1. The Owner **shall** justify if decided unnecessary.
- 5.6.1.3. Procedure(s) for solving issues identified;
- 5.6.1.4. Defined person(s) and role(s) responsible for conducting quality control.

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<sup>a</sup> PEF: Use of the environmental footprint methods to measure and communicate the life cycle environmental performance of products and organisations, Table 20.

## 5.7. Training of system Users

5.7.1. Training materials **shall** be made available to all intended Users,<sup>6</sup> and **shall** include:

- 5.7.1.1. The purpose of the Model;
- 5.7.1.2. Navigating the Model and Governance System;
- 5.7.1.3. The type of frontend data required to use the Model, including optional inputs;
- 5.7.1.4. Correctly input/import data into the Model;
- 5.7.1.5. Conducting effective quality control of frontend data;
- 5.7.1.6. Identifying and appropriately raising errors or bugs, and suggested improvements within the Model;
- 5.7.1.7. Interpreting the output from the Model.

<sup>6</sup>The level of detail of this training should be appropriate for the complexity of the Model.

## 5.8. User experience (UX)

5.8.1. The Model **should** be user-friendly, and **should** include:

- 5.8.1.1. Clear data entry points where User input and/or import is required;
- 5.8.1.2. Clear options whether the input requires numeric value or text;
- 5.8.1.3. Data validation used where possible.

5.8.2. Backend data and calculations (calculation engine) **shall** be inaccessible for Users to manipulate.

- 5.8.2.1. **If** the User is also the Owner, any modifications to Model during use shall be treated as releasing a modified version of the Model [8.1.3].

5.8.3. Input/import of units **shall** be clear where numeric inputs are required.

5.8.4. There **shall** be in-built checks to ensure valid data has been input (e.g., if a positive number is required, the value shall not be negative; if a percentage is required, the value **shall** be between 0 and 100).

- 5.8.4.1. The Model **shall** display a warning message if an error is detected.

## 5.9. Version control and testing log

5.9.1. There **shall** be a documented version control log(s) covering:

- 5.9.1.1. The Model;
- 5.9.1.2. Each document in the Governance System.

5.9.2. Version control logs **shall** include:

- 5.9.2.1. Date of update
- 5.9.2.2. Description of update
- 5.9.2.3. Role(s) and person(s) that made the update
- 5.9.2.4. Role(s) and person(s) that reviewed the update

5.9.3. There **shall** be a documented testing log, including:

- 5.9.3.1. Internal audit results
- 5.9.3.2. Internal audit date
- 5.9.3.3. Role(s) of person(s) that performed internal audit

## 6. Calculation engine

### 6.1. Methodological requirements

- 6.1.1.** The calculation engine **shall** meet the methodological requirements of the chosen accounting and reporting criteria related to the type of PCF or OCF it is producing.<sup>7,8</sup>

<sup>7</sup>For PCF Models, this includes the methodological requirements in the Carbon Trust's PCF RfA.

<sup>8</sup>For OCF Models, this includes the methodological requirements in the Carbon Trust's OCF RfA.

*Example 1: If the Model generates footprints for coffee products, the calculation engine will need to calculate biogenic emissions, biogenic removals, and land-use change emissions.*

*Example 2: If the Model generates footprints for organisations aiming to apply for the reduction label claim in OCF RfA 2, the calculation engine will need to calculate a results comparison between the baseline and current footprinting periods; with rebaselining if required.*

- 6.1.2.** Methodological decisions **shall** be documented in the Governance System [see Appendix 1], and **shall** include but is not limited to decisions relating to:

- 6.1.2.1.** Model Assurance Boundary;
- 6.1.2.2.** Methodological choices;
- 6.1.2.3.** Assumptions and justification;
- 6.1.2.4.** Allocation – inputs, outputs, and recycling;
- 6.1.2.5.** Grouping;
- 6.1.2.6.** Non-attributable processes;
- 6.1.2.7.** Excluded attributable process and justification;
- 6.1.2.8.** Limitations;
- 6.1.2.9.** Methodological changes since previous update.
- 6.1.2.10.** Role(s) and person(s) responsible for reviewing and updating the calculation engine

- 6.1.3.** The calculation engine **shall**:

- 6.1.3.1.** Include unit conversions through to end results.
- 6.1.3.2.** Flag errors to Users if frontend data does not match units of backend data and there is no functionality for data transformation.

### 6.2. Applying test data packages

- 6.2.1.** During Assurance, **if** the results from the test data packages [5.3] fall outside the accepted range approved by Us [5.3.4], **or** are not repeatable, the Owner **shall**:

- 6.2.1.1.** Amend and run the tests until the results are within the acceptable range **or**;
- 6.2.1.2.** Justify the outcome from the test data package results and final output.

# 7. Outputs from the Model

## 7.1. Conformity with standards

- 7.1.1.** Model generated footprints **shall** be presented in a format compliant with the chosen accounting and reporting criteria.

*Example 1: If the Model generates footprints for coffee products aligned to ISO 14067, the output will need to include separate fossil, biogenic and direct land-use change emissions.*

*Example 2: If the Model generates footprints for soy-fed livestock aligned to WRI LSRG, the output will need to include reference to any validation or chain-of-custody Models for the sourced soy.*

- 7.1.2.** At a minimum the results **shall** be presented by:

**7.1.2.1.** Life cycle stage for PCFs

**7.1.2.2.** Source, scope and category for OCFs

- 7.1.3.** Information that **shall** be available to the User includes, but is not limited to [see Appendix 3]:

**7.1.3.1.** Background information

**7.1.3.1.1.** User's organisation name;

**7.1.3.1.2.** User's organisation contact information;

**7.1.3.1.3.** Model Assurance Boundary;

**7.1.3.1.4.** Accounting and reporting criteria;

**7.1.3.1.5.** Date of footprint generation;

**7.1.3.1.6.** Function unit/final reference flow (if applicable);

**7.1.3.1.7.** Footprint period.

**7.1.3.2.** Footprint Boundary

**7.1.3.2.1.** Life cycle stages included (PCF);

**7.1.3.2.2.** Scopes and categories included (OCF);

**7.1.3.2.3.** Non-attributable processes;

**7.1.3.2.4.** Excluded attributable processes.

**7.1.3.3.** Methodology

**7.1.3.3.1.** Methodological choices;

**7.1.3.3.2.** Assumptions with justification;

**7.1.3.3.3.** Allocation – inputs, outputs, and recycling;

**7.1.3.3.4.** Grouping.

**7.1.3.4.** Data quality (total footprint, including activity data and emission factors)

**7.1.3.5.** Results

**7.1.3.5.1.** Overall breakdown of emissions;

**7.1.3.5.2.** Split by life cycle stage (PCF);

**7.1.3.5.3.** Split by source for Scope 1 and 2 emissions, and by category for Scope 3 emissions (OCF);

**7.1.3.5.4.** Other additional reporting requirements for the chosen accounting and reporting criteria.

## 7.2. Emissions report

- 7.2.1.** An emissions report **should** be provided to the User, including all required Model outputs [7.1].

## 8. Internal audit and surveillance

### 8.1. Internal audit

**8.1.1.** The Owner **shall** perform internal audits at a suitable and justified interval to be approved by Us, **and**;

**8.1.2.** The person(s) and roles(s) responsible for internal audit **shall** be defined in the Governance System.

**8.1.2.1.** Internal audit **shall** include:

**8.1.2.1.1.** Running the approved test data packages [5.3] through the latest assured version of the Model, **and**;

**8.1.2.1.2.** Running the approved test data packages [5.3] through the live version of the Model, **and**;

**8.1.2.1.3.** For each Test Data Package compare the generated footprint with the expected output, **and** act on any unexpected outcomes.

**8.1.2.1.4.** Run the same test data packages multiple times to ensure repeatability of results.

**8.1.2.1.5.** Record results and any updates in a dated testing log [5.9].

**8.1.3.** If releasing a modified version of the Model, the Owner **shall**:

**8.1.3.1.** Perform internal audits, **and**;

**8.1.3.2.** Record Model updates in the dated version log [5.9], **and**;

**8.1.3.3.** Update the corresponding sections of the Governance System, **and**;

**8.1.3.4.** Archive the previous version of the Model and Governance System.

**8.1.4.** Updates to the Governance System **shall** be clearly recorded in a dated version log [5.9].

**8.1.5.** If releasing a new version and Model updates result in outputs outside the approved results range for the test data packages [5.3.4] (hereafter 'significant'); **or**

**8.1.6.** If the Owner adds functionality or additional scope to be included in the Model Assurance Boundary (hereafter 'significant'), the Owner **shall**:

**8.1.6.1.** Inform Us, prior to any updates, that a significant change will be made, **and**;

**8.1.6.2.** Inform Us, prior to any updates, of the planned release date, **and**;

**8.1.6.3.** Submit the Model and Governance System, in full, to Us for surveillance, **and**;

**8.1.6.4.** Not claim a broader Model Assurance Boundary as assured until surveillance has successfully completed.

**8.1.6.5.** **May** claim Model Assurance of the previous Model Assurance Boundary after new version launch, without Us reviewing.

**8.1.7.** There **shall** be a dated testing, results and errors log, which **shall** be populated with every test run.

**8.1.7.1.** This **shall** include recording the differences between the new test result and assured test results.

### 8.2. Surveillance

**8.2.1.** The Owner **shall** inform Us of any planned updates to the Model and Governance System following achieving assurance before making the updates.

**8.2.1.1.** Surveillance **shall** align to each update period unless excessive, **or**;

**8.2.1.2.** **Shall** occur midpoint through the claim period, if there are no planned updates.

**8.2.2.** The Owner **shall** demonstrate, during surveillance that:

**8.2.2.1.** No action has been taken that invalidate the assurance, **and**;

**8.2.2.2.** Non-conformities, raised during the previous mixed engagement, are being addressed.

## 9. Repeat Assurance

- 9.1.** If the Owner wishes to maintain assurance following expiration of claim period, the Owner shall demonstrate conformity to all prior clauses in addition to;
  - 9.1.1.** Providing an explanation for any changes between the previous and current versions, **and**;
  - 9.1.2.** Evidence of action taken to address suspended minor non-conformities.
- 9.2.** This shall be performed through a new contract and re-run the Model Assurance process.

## 10. Requirements for labelling and communication

- 10.1.** The output from the Assurance will specify the type of organisations or products the Model Assurance Boundary includes, and which types of methodological requirement functionality are possible.
- 10.2.** The Owner may inform the User(s) of the Model that if their product/organisation falls under the Model Assurance Boundary they may be streamlined for PCF/OCF Assurance [see Appendix 4], but if used outside of that definition, it will not.

## 11. Parameterised Models additional requirements

- 11.1.** This is not presently included but will be reviewed and included in the next version of requirements [see Appendix 5].

# 12. Appendices

## Appendix 1: Governance document template (informative)

| Key points                 | Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Version control            | <ul style="list-style-type: none"> <li>A dated version control log for the Governance System</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Context and objectives     | <ul style="list-style-type: none"> <li>Model Assurance Boundary (OCF and/or PCF):               <ul style="list-style-type: none"> <li>If OCF define the scopes/categories included</li> <li>If PCF define boundary e.g. cradle-to-gate, cradle-to-grave.</li> <li>If OCF define the organisational types included</li> <li>If PCF define the product types included</li> <li>Geographical scope</li> </ul> </li> <li>The standards which the assurance is against (e.g., ISO 14067, the GHG Corporate Protocol, etc.)</li> <li>Ownership (and responsibility for maintaining and building)</li> <li>Intended Users (e.g., internal own use, company's business customers, licensed to multiple Users)</li> <li>Implementation platform (e.g., Excel, software)</li> <li>Access which will be provided to Us (User profile or screen sharing)</li> <li>Emission factor databases used within the Model</li> <li>Years the model is capable of producing results</li> <li>Communication claim the Owner wants to pursue based on the above</li> </ul> |
| Data management            | <ul style="list-style-type: none"> <li>Person(s) and role(s) responsible for all data management processes</li> <li>Procedure for importing/inputting backend data</li> <li>Procedure for storing frontend and backend data</li> <li>Data transformation procedures</li> <li>Procedure for storing test data packages</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Test data packages         | <ul style="list-style-type: none"> <li>Acceptable range(s) for the Model Assurance Boundary</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Continual improvement plan | <ul style="list-style-type: none"> <li>Procedure for identifying areas of improvement</li> <li>Frequency of data and calculation engine reviews</li> <li>Procedure(s) for backend data and calculation engine updates and releases</li> <li>How Users submit feedback, report errors or bugs</li> <li>Procedure for reviewing User feedback, including frequency</li> <li>Procedure for prioritising and resolving identified errors and bugs</li> <li>Person(s) and role(s) responsible for implementing the continual improvement plan</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Data quality               | <ul style="list-style-type: none"> <li>Data quality assessment template for Users</li> <li>Data quality threshold for User reporting</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

|                             |                                                                                                                                                                                                                                                                                 |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Quality control             | <ul style="list-style-type: none"> <li>• Procedure(s) for assessing accuracy and appropriateness of backend data and data transformation processes</li> <li>• Procedure for solving issues identified</li> <li>• Person(s) and role(s) responsible for conducting QC</li> </ul> |
| Training                    | <ul style="list-style-type: none"> <li>• User training materials</li> </ul>                                                                                                                                                                                                     |
| Output                      | <ul style="list-style-type: none"> <li>• Emissions report template</li> </ul>                                                                                                                                                                                                   |
| Internal audit              | <ul style="list-style-type: none"> <li>• Person/role(s) responsible for conducting internal audit</li> <li>• Dated testing, results and errors log</li> </ul>                                                                                                                   |
| Communication and marketing | <ul style="list-style-type: none"> <li>• Definition of what can be communicated internally by the Owner</li> <li>• Definition of what can be communicated externally by the Owner</li> </ul>                                                                                    |

## Appendix 2: Methodology document template (informative)

| Key points                | Information                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dated version control log | <ul style="list-style-type: none"> <li>• A dated version control log for the Model</li> </ul>                                                                                                                                                                                                                                                                                                                                                                             |
| Data management           | <ul style="list-style-type: none"> <li>• Intended frontend and backend data</li> <li>• Frontend and backend data collection</li> <li>• Sources and age for all backend data</li> <li>• Backend data licences required</li> </ul>                                                                                                                                                                                                                                          |
| Data quality              | <ul style="list-style-type: none"> <li>• Data quality assessment on all backend data</li> <li>• Data quality assessment scoring system</li> <li>• Methodology for assigning data quality indicators</li> </ul>                                                                                                                                                                                                                                                            |
| Methodology               | <ul style="list-style-type: none"> <li>• Data transformation toolkit(s) methodology</li> <li>• Model Assurance Boundary</li> <li>• Methodological choices</li> <li>• Assumptions and justification</li> <li>• Allocation – input, outputs, and recycling</li> <li>• Grouping</li> <li>• Non-attributable processes</li> <li>• Excluded attributable processes and justification</li> <li>• Limitations</li> <li>• Methodological changes since previous report</li> </ul> |



### Appendix 3: Emissions report (informative)

| Background information                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>User's organisation name</li> </ul>                                                                 |
| <ul style="list-style-type: none"> <li>User's organisation contact information</li> </ul>                                                  |
| <ul style="list-style-type: none"> <li>Model Assurance Boundary</li> </ul>                                                                 |
| <ul style="list-style-type: none"> <li>Accounting and reporting criteria</li> </ul>                                                        |
| <ul style="list-style-type: none"> <li>Date of footprint generation</li> </ul>                                                             |
| <ul style="list-style-type: none"> <li>Functional unit/final reference flow (if applicable)</li> </ul>                                     |
| <ul style="list-style-type: none"> <li>Footprint period</li> </ul>                                                                         |
| Footprint boundary                                                                                                                         |
| <ul style="list-style-type: none"> <li>Life cycle stages included (PCF)</li> </ul>                                                         |
| <ul style="list-style-type: none"> <li>Scopes and categories included (OCF)</li> </ul>                                                     |
| <ul style="list-style-type: none"> <li>Non-attributable processes</li> </ul>                                                               |
| <ul style="list-style-type: none"> <li>Excluded attributable processes</li> </ul>                                                          |
| Methodology                                                                                                                                |
| <ul style="list-style-type: none"> <li>Methodological choices</li> </ul>                                                                   |
| <ul style="list-style-type: none"> <li>Assumptions with justification</li> </ul>                                                           |
| <ul style="list-style-type: none"> <li>Allocation – inputs, outputs, and recycling</li> </ul>                                              |
| <ul style="list-style-type: none"> <li>Grouping</li> </ul>                                                                                 |
| Data quality                                                                                                                               |
| <ul style="list-style-type: none"> <li>Data quality assessment of all data used in the footprint</li> </ul>                                |
| Results                                                                                                                                    |
| <ul style="list-style-type: none"> <li>Overall breakdown of emissions</li> </ul>                                                           |
| <ul style="list-style-type: none"> <li>Split by life cycle stage (PCF)</li> </ul>                                                          |
| <ul style="list-style-type: none"> <li>Split by source for Scope 1 and 2 emissions, and by category for Scope 3 emissions (OCF)</li> </ul> |
| <ul style="list-style-type: none"> <li>Other additional reporting requirements for the chosen accounting and reporting criteria</li> </ul> |

## Appendix 4: Verification of PCFs/OCFs after achieving Model Assurance (informative)

Effect on subsequent PCF and OCF verifications for footprints produced which fall within Model Assurance Boundary:

- Backend data will be fully verified. There will be limited necessary assessment activities for backend data in subsequent verifications.
- The calculation engine will be validated. Therefore, there will be limited necessary assessment activities for the footprinting methodology in subsequent verifications.
- Frontend data is not assessed. Subsequent verifications will have to perform standard assessment activities on frontend data.

For product or organisation footprints generated by the Model, but not within the Model Assurance Boundary, the subsequent verification will require complete assessment activities.

## Appendix 5: Parameterised Models (informative)

- **Definition:** A Parameterised Model has a fixed structure and a restricted number of Parameterised inputs. They are used to calculate footprints for a set of similar products. This Model type shall only be for PCF. All activity data and (most) emission factors are built-in the tool. A finite number of bespoke calculation methodologies shall be pre-built in the tool. An example would be a tool capable of calculating footprints for multiple potato products. Parameterised tools can be built in excel, in commercial software or in the form of an online calculator. Note that due to their fixed structure, Parameterised Models can be eligible for auto-verification of outputs [13].

## VERSION HISTORY

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| Version | Date       | Summary of changes | Author                                  | Approved by                           |
|---------|------------|--------------------|-----------------------------------------|---------------------------------------|
| 1.0     | 04/11/2024 | Initial version    | Joshua Howard,<br>Senior Analyst        | John Kazer, Senior<br>Consultant      |
|         |            |                    | Imogen Catterall,<br>Senior Consultant, | John Newton, Director                 |
|         |            |                    | Paschalena Mavrou,<br>Consultant        | Martin Hockaday, Head<br>of Assurance |
|         |            |                    |                                         | Martin Barrow, Director               |

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