**Instructions for Tables Appendix – Category A:**

* **The cumulative length of Table Appendix – Category A shall not exceed 8 pages.**
* **See Section IV.D.2 of the FOA for content requirements.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table I.F.1: Material Carbon Storage** | | | | | |
| Chemical Composition of Proposed Material: |  | | | | |
|  | Proposed Material | Best-in-class Incumbent | Conventional Incumbent | Justification | Notes/  Information |
| Material Name / Type |  |  |  |  |  |
| Weight % Carbon (100 max) |  |  |  |  | Percentage of material weight from carbon derived on a carbon, not CO2e basis |
| Percentage of Carbon derived from (100 max): | | | | | |
| Atmospheric CO2 |  |  |  |  | Include biogenic CO2 |
| Methane |  |  |  |  | Include biogenic methane |
| Mineral |  |  |  |  |  |
| Fossil |  |  |  |  |  |
| Recycled |  |  |  |  |  |
| Percentage of recycled carbon originally from (100 max): | | | | | |
| Atmospheric CO2 |  |  |  |  | Include biogenic CO2 |
| Methane |  |  |  |  | Include biogenic methane |
| Mineral |  |  |  |  |  |
| Fossil |  |  |  |  |  |

|  |  |
| --- | --- |
| **Table I.F.I.1: Carbon Negative Material Technology Description** | |
| **Property** | **Description** |
| Chemical composition of proposed material and estimate of wt.% atmospheric carbon that will be stored in the finished material product. Specify method of carbon measurement. |  |
| How carbon negativity will be achieved on a cradle-to-gate basis (i.e. A1-A3) for the finished product. |  |
| Market (e.g., performance or cost) improvement relative to best-in-class incumbent building element(s). |  |
| Initial key performance tests (e.g., strength, flammability, thermal resistance) and each relevant test based on applicable standards (i.e. ASTM/ISO) for selected building element(s) being replaced and building type(s) / climate zone(s) selected and as defined in Section I.C. |  |
| Identify challenges for end-of-life strategy for the proposed material and specify applicable test(s) to evaluate (e.g., nail pull) based on building type(s) and geographic region(s) identified by Applicant and as defined in Section I.C. |  |
| Testing method to assess durability over time, accounting for possible exposure scenarios in constructed building (e.g., cyclic UV exposure for accelerated weathering with before and after testing). |  |

**Preliminary LCA Information (retain instructions section)**

In the remaining space below, please provide preliminary LCA information either in the form of Table I.F.I.2 or as a preliminary LCA which covers the same information. Please highlight your selection below:

* I am submitting LCA information in the form of Table I.F.I.2 (below).
* I am submitting a preliminary LCA which covers the information in Table I.F.I.2 in a different form (below). I have deleted Table I.F.I.2.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table I.F.I.2: Carbon Negative Materials - Preliminary Life Cycle and Technoeconomic Assessment** | | | | | |
|  | Conventional Incumbent | Best-in-class Incumbent | Proposed Material | Justification | Notes/Information |
| Choose a Conventional Incumbent currently used in the construction industry that your proposed material would displace. This can be multiple materials. | | | | | |
| Choose the most likely material (early commercial or emerging) with which your material would be in direct competition. | | | | | |
| Functional Unit[[1]](#footnote-2) |  | | |  | Must be the same for all materials |
| Example Product[[2]](#footnote-3) |  |  |  |  | Define the products in each category (eg, concrete in a particular application or a brand of material) |
| Weight to Achieve Functional Unit |  |  |  |  |  |
| Service Life |  |  |  |  |  |
| Market for Material (in [functional units/yr] |  |  |  |  |  |
| Cost Estimation (include both raw material and processing costs) |  |  |  |  | Quantitative ranges or qualitative descriptive measure acceptable |
| **Life Cycle GHGs [CO2-eq/functional unit]**  ***See table below for detailed guide for proposed material worksheet. Provide sources/contacts for incumbent/best competitor material data.*** | | | | | |
| Raw Material Acquisition |  |  |  |  | Quantitative required |
| Transport |  |  |  |  | Quantitative required |
| Production |  |  |  |  | Quantitative required |
| Use Phase |  |  |  |  | Qualitative, include maintenance, refurbishment, changes in carbon content over material lifetime, anticipated impacts on operational energy consumption |
| End-of-Life (Most likely case) |  |  |  |  | Options include disposal in landfill, incineration, recycle, reuse, etc. |
| End-of-Life (Best Case) |  |  |  |  | Options include disposal in landfill, incineration, recycle, reuse, etc. |

Applicants are required to provide the information requested in the table below for the proposed material, making estimations, if necessary, then tally up all emissions and add the result to the above table. All estimations must be justified. All values shall be **per functional unit** of the proposed material.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| For the following stages, note direct net energy consumption **per functional unit** (positive = consumption, negative = export): | | | | | |
|  | Raw Material Extraction | Production | Transport (Raw materials and final product) | Notes/Information | Justify all estimations. Justification if Different emission factors or energy sources are used |
| Electricity (kWh) |  |  |  | Assume 500 g CO2e/kWh |  |
| Natural Gas (MJ LHV) |  |  |  | Assume 67.5 g CO2e/MJ |  |
| Steam – Natural Gas Boiler (MJ steam) |  |  |  | Assume 79.4 g CO2e/MJ |  |
| Steam – Electric Boiler (MJ steam) |  |  |  | Assume 164 g CO2e/MJ |  |
| Ton-miles Transported (Transport step only) |  |  |  | Assume 105 g CO2e/ton-mile (ton = U.S. short ton) |  |
| Other Energy Used (MJ) |  |  |  | Assume 90 g CO2e/MJ energy source if fossil, 25 g CO2e/MJ if biogenic |  |
| If stage uses electricity, specify grid where electricity is used (e.g. TRE, SERC, WECC, etc.) | | | | | |
| Raw Material Extraction |  |  |  |  |  |
| Production |  |  |  |  |  |
| Transportation |  |  |  |  |  |
| Tally up direct emissions **not stemming from energy or fuel consumption** of the following gases per functional unit: | | | | | |
|  | Raw Material Extraction | Production | Transportation |  |  |
| Non-atmospheric CO2 (kg) |  |  |  |  |  |
| Atmospheric CO2 (kg) |  |  |  | CO2 that was captured as part of the process but released later. Include biogenic CO2 |  |
| Fossil-derived CH4 (kg) |  |  |  |  |  |
| Atmospheric CH4 (kg) |  |  |  | CH4 that was captured as part of the process but released later. Include biogenic CH4 |  |
| N2O (kg) |  |  |  |  |  |
| Other GHGs from the IPCC AR5 (list one per new row) |  |  |  |  |  |
| Tally up capture of the following gases during each stage per functional unit: | | | | | |
|  | Raw Material Extraction | Production | Transportation |  |  |
| Non-atmospheric CO2 (kg) |  |  |  |  |  |
| Atmospheric CO2 (kg) |  |  |  | Include biogenic CO2 |  |
| Non-atmospheric CH4 (kg) |  |  |  |  |  |
| Atmospheric CH4 (kg) |  |  |  |  |  |
| N2O (kg) |  |  |  |  |  |
| Other GHGs from the IPCC AR5 (list one in a new row) |  |  |  |  |  |

NOTICE OF RESTRICTION ON DISCLOSURE AND USE OF DATA

*Pages [1 through\_\_] of this document may contain trade secrets or commercial or financial information that is privileged or confidential and exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes or in accordance with a financial assistance or loan agreement between the submitter and the Government. The Government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source.*

1. Examples of functional units (options are not restricted to these): (1) 2x4 or (1) 4x8 board equivalent; 1 kg of PU foam insulation equivalent; a specific mass (kg); or a specific volume (m3). Note that the latter two functional unit examples shall only be used if the proposed material is functionally identical to both the conventional incumbent and best-in-class incumbent. [↑](#footnote-ref-2)
2. Example product description: [brand name and product name]. PU foam insulation, R 6/in [↑](#footnote-ref-3)