

Accounting framework for biobased construction

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Holland Houtland

A tool that makes all the opportunities of
building projects value based

01 Building what is needed



The need for housing is high. Still, it remains difficult to build rapidly because of:

- Nitrogen deadlock
- Lack of building space
- Stacked and unique ambitions
- Formal zoning plans and permissions to build

Holland Houtland has investigated how to resolve this deadlock by scaling biobased building through new financing models. For this purpose Holland Houtland designed three interventions in this Accounting Framework for Biobased Construction. These interventions can be deployed collectively or separately based on your needs.

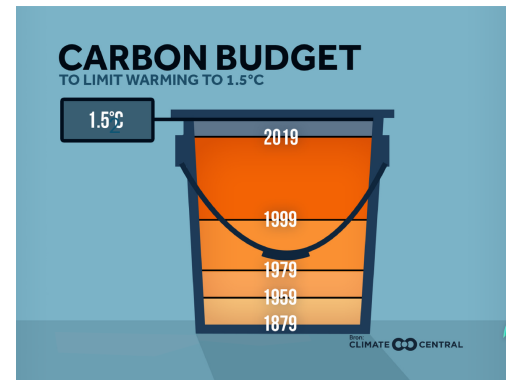
- 1) Identify the opportunities to build exactly what is needed; build one- and two-person housing by better utilizing existing buildings and adding timber and biobased building materials
- 2) a calculation model that support the value-assessment of your biobased contractors and partners
- 3) introducing blended finance at the start of project planning process.

With an integrated value assessment this framework makes all values and opportunities visible for residents, streets, neighborhoods, cities and regions. This connects supply and demand and match new market players with integrated solutions and shorten the lead time of building projects. Together we create positive impact and enable building for the highest social value.

"It is impossible to remain within the 1,5 °C of the Paris Agreement with the current level of Carbon emissions. Our Carbon budget will be exhausted."

(Dutch Green Building Council, Paris proof agreement)

We can proceed to build by limiting the maximum of carbon emissions per building project.



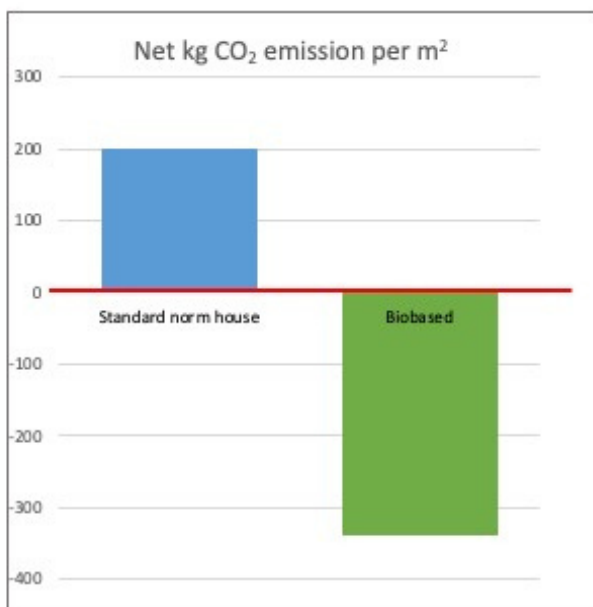
"WE HAVE TO RESOLVE THIS WITHIN THE BOUNDARIES OF OUR CLIMATE" MICHELLE VAN DIJK, MINISTRY OF INTERNAL AFFAIRS

For building without climate change beyond 1.5 °C, it is essential to substitute, sequester and store CO₂ by:

- using as little material (in weight) as possible, being virgin as well as renewable materials
- require as little fossil energy as possible to produce it
- use regenerative materials that absorb carbon during growth and retain this in the material.

Biobased materials provide the answer to this. In addition, with these materials, construction is made circular, detachable and flexible:

- with no or very low toxicity
- within the nitrogen emission norms
- healthy for employees and residents



A Paris Proof Net Carbon Balance can be calculated for every municipality, social housing corporation and investor that has the ambition to remain climate neutral or become climate positive.

03

Approach

Each building project has unique impact on social and environmental values. Biobased and timber construction provides a wide range of opportunities for the builders, the owners and the users of a housing project. Social housing projects as well as private developments that have the objective to enable healthy sustainable living should be able to seize these opportunities today and for future generations to come. Therefore it is essential to make timber houses affordable and wide-spread available.

We have learned that commissioning parties find it difficult to identify, compare and select the biobased builders and producers that add the most value within the current conditions and requirements of housing projects (price, risks, guarantees etc).

For each building project Holland Houtland recommends to:

- make a full assessment of values and create a manageable shortlist of potential contractors that share these values and can create the opportunities
- transform a list of tender requirements into a Program of Opportunities and thereby support the decision-making process with a description of values instead of lowest price.
- involve at an early stage a (or couple of) financing partner(s) that ensure that the highest value will be reached instead of the lowest price. With this approach of blended financing it is feasible to create comfort at the start of the construction project for the longer term which benefits all parties involved.

"WE SHOULD LET GO OF OUR FOCUS ON LOWEST PRICE BECAUSE THAT HAS BROUGHT US WHERE WE ARE TODAY. COMMISSIONING PARTIES AND CONTRACTORS NEED TO COLLECTIVELY COMMIT TO CREATING THE HIGHEST SOCIAL AND ENVIRONMENTAL VALUES" HARRY PLATTE, SOCIAL HOUSING CORPORATION PARTEON

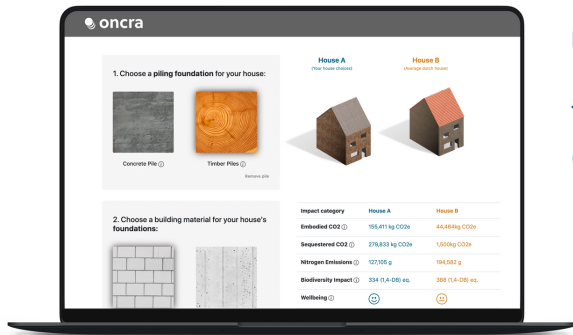


04 Assessment of values

Building for the highest social and environmental values is within reach with timber buildings!

The open source assessment tool online (www.oncrabio.web.app) helps every housing project to:

- identify the highest values of timber buildings compared to “traditional” building
- help the decision makers with their considerations and provide a broader perspective (sustainable development goals)
- enable impact investors to invest on value based impact



Materials Used	House A	House B	Impact category	House A	House B
Pile Foundation	Timber Piles	Concrete Piles	Stored CO2 ⓘ	40.7 tons	2.6 tons
Foundations	Sand-lime Brick	Concrete	Life Cycle CO2 ⓘ	13.3 tons	26.6 tons
Wall Construction	Timber & Hempcrete	Concrete	Net CO2 ⓘ	-27.4 tons	24.0 tons
Insulation	Flax insulation	Polyisocyanurate	Nitrogen Emissions ⓘ	16.6 kg	49.9 kg
Wall Covering	Wooden Shingles	Brick	Biodiversity Impact ⓘ	166 (1,4-DB) eq.	256 (1,4-DB) eq.
Roof	Wood & Flax	Timber & PIR	Wellbeing ⓘ	😊	😞
Roof Covering	Wood Shingles	Ceramic Tiles	Total Weight	39.6 tons	109.1 tons

Source: <https://oncrabio.web.app/tool>

Where in the proces?

Are you in the middle of planning a housingproject, purchasing consortium or a development project? This open source tool will provide a value based and broader perspective on your process and align all stakeholders involved.

With whom? Blended finance

The identified values of the biobased development are valuable to investors. To show and materialise the full range of values of the housing project it is instrumental to blend finance.

The blended finance model takes into account the carbon value of the carbon storage (see figure below). This can contribute to 5% of investment costs for a timber building. Investors interested in the CO2 are invited into a consortium of investors to complement the case and join the development.

"WE INTENT TO BUILD WITHIN AND BEYOND THE NORMS TO MAKE SURE WE MEET THE REQUIREMENTS FOR THE PARIS AGREEMENT." BIENSE DIJKSTRA, BUILDER DIJKSTRA DRAISMA

A case assessment

05



Holland Houtland developed and tested the Accounting Framework on an existing design study. This is the study by New Urban Networks into the potential of densification and flexible housing in a 1970s neighborhood. This study was commissioned by the Ministry of the Internal Affairs and Kingdom Relations and the Chief Government Architect.

New Urban Networks has created in this study space to add 150 homes to the 150 existing houses by extensions on top, add-ons and changing the function of the groundlevel garages. The existing buildings remain the same and because of the speed of prefab construction the construction process hardly causes any inconvenience.

In the Netherlands there are 1800 similar neighborhoods where this program can be executed adding up to a potential of 1 million new homes. The construction and the layout of the existing buildings offer sufficient opportunities to build rapidly, affordable and scalable.

Impact assessment

- Building within the 1,5 °C
- Carbon reduction (74%) of total building process and materials
- Carbon storage represents 2,5 % of the total value of the Development costs
- Building within nitrogen norm
- Modular building and industrialisation leads to efficiency; building on-site in days/weeks instead of months (shorten building time with 40%)
- 63% lighter than traditional materials
- New differentiation and combinations of housing types (senior, families and students)
- Higher Quality of urban (green) landscape
- Shorter formal procedures for building and permissions
- Doubling the number of houses

06

Step-by-step

Holland Houtland has developed this approach in four steps.

Ecosystem definition

1. Identify the key requirements for construction:
 - a. use as little material as possible (weight)
 - b. require as little fossil energy as possible to produce it
 - c. use regenerative materials that absorb carbon during growth and retain this in the material
2. Desk research of frameworks and methods for assessment of social and environmental impacts
3. Deep dive in framework of criteria for tender processes "nieuwe normaal" of the Dutch City Deal Conceptual and Biobased Building.
4. Incorporating the sustainable development goals at project level

Conditions

1. Explore locations and projects
2. Exploring biobased, prefab and modular solutions
3. Stakeholder consultations
 - a. Social housing corporations
 - b. National Municipality Bank (BNG bank)
 - c. Ministerie of Internal Affairs
 - d. Builders and architects

Development

Tender based on opportunities

Item	Indicatie	Uitleg	Beoordeling	Beoordeling	Beoordeling	Beoordeling
1.1	1.1.1	1.1.1.1	1.1.1.1.1	1.1.1.1.1	1.1.1.1.1	1.1.1.1.1
1.2	1.2.1	1.2.1.1	1.2.1.1.1	1.2.1.1.1	1.2.1.1.1	1.2.1.1.1
1.3	1.3.1	1.3.1.1	1.3.1.1.1	1.3.1.1.1	1.3.1.1.1	1.3.1.1.1
1.4	1.4.1	1.4.1.1	1.4.1.1.1	1.4.1.1.1	1.4.1.1.1	1.4.1.1.1
1.5	1.5.1	1.5.1.1	1.5.1.1.1	1.5.1.1.1	1.5.1.1.1	1.5.1.1.1
1.6	1.6.1	1.6.1.1	1.6.1.1.1	1.6.1.1.1	1.6.1.1.1	1.6.1.1.1
1.7	1.7.1	1.7.1.1	1.7.1.1.1	1.7.1.1.1	1.7.1.1.1	1.7.1.1.1
1.8	1.8.1	1.8.1.1	1.8.1.1.1	1.8.1.1.1	1.8.1.1.1	1.8.1.1.1
1.9	1.9.1	1.9.1.1	1.9.1.1.1	1.9.1.1.1	1.9.1.1.1	1.9.1.1.1
1.10	1.10.1	1.10.1.1	1.10.1.1.1	1.10.1.1.1	1.10.1.1.1	1.10.1.1.1

1. Data collection for case study
2. Calculations of all impacts and indicators (ONCRA assessment tool)
3. Visualisation
 - a. Render of project study
 - b. Talkshow "Value of everything" to explain the conditions for a broader audience
4. Validating calculations with stakeholder

Delivery

1. Launch talkshow "value of everything"
2. Delivery of the assessment tool
3. Delivery of the accounting framework for bioabased construction





This brochure benefits from the support of Built by Nature, a network and grant-making fund, founded by Laudes Foundation, with a mission to accelerate the timber building transformation in Europe and a vision of a built environment that works in unison with nature.

Its network connects and supports pioneering developers, architects and engineers, asset owners and managers, investors and insurers, city leaders, academics, researchers, non-profits and policymakers in their journey to decarbonise the built environment and protect the world's natural capital.

Find out more: www.builtbn.org

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