



Certified Carbon Storage Catalogue

Biobased Construction projects

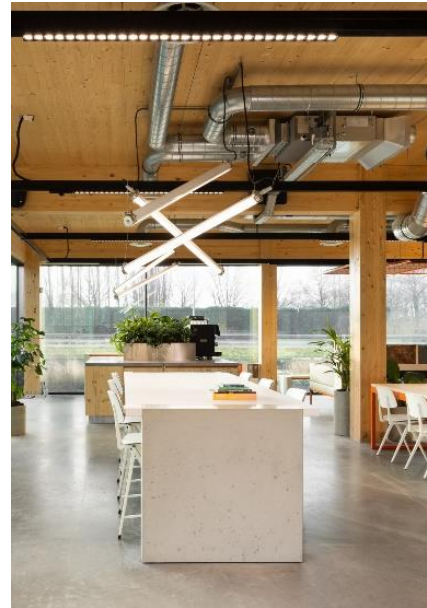
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Houtlab – Woody Builders



The Net Carbon Removal Benefit of the project is calculated at:

391

t CO₂e

Per square meter Gross Floor Area of the project this equates to:

158,1

kg CO₂e / m²

With a total lifespan of at least

35 years



Project description

Houtlab is a sustainable, circular, and inspiring building where collaboration takes precedence. It serves as the home base for Woody Builders and other subsidiaries of JAJO, such as PVVT, New horizon, and Revolve. It's a true "hive" for parties interested in timber construction and circularity.

Project Details

 **Nieuwkuijk, The Netherlands**

Realisation year: **2023**

Project lifespan: **50 years**

Gross Floor Area: **2475 m²**

Project type: **Utility (other)**

Project phase: **As Built**



Calculation input

The table below shows the registration numbers of the EPDs of the biobased products used in the project, as well as the manually entered data used to calculate the project's Net Carbon Removal benefit:

Product name	Product quantity	CO ₂ removed from the atmosphere per unit	Total CO ₂ removed from the atmosphere (CSC)	Total lifespan
Unit	[m ³]	[kg CO ₂ e / unit]	[kg CO ₂ e]	[years]
X-LAM (Cross laminated timber) with retour system	371,82	-768,00	-285557,8	50
Glued laminated timber (Glulam)	135,9	-773,00	-105050,7	50
OSB	8,968	-890,00	-7981,52	50
Vuren (Picea spp)	0,665	-200,68	-133,4522	35
Vuren (Picea spp)	0,057	-200,68	-11,43876	35
Vuren (Picea spp)	28,539	-200,68	-5727,207	35
Vuren (Picea spp)	1,864	-200,68	-374,0675	35
Wood fibre insulation boards	56,1624	-198,40	-11142,62	50

Learnings

Houtlab was a valuable edge case for certification, given the industrial typology of the building and its phase: as built. This meant that certification was performed using supplier invoices, which allowed us to test the data requirements for projects 'as built'. The data proved reliable and workable, resulting in a robust certificate. Moreover, Houtlab serves as the perfect example of the reliability of carbon storage in biobased constructions. Much of the CLT used in the project is visible from the inside and can be inspected at all times.



KNOEST – Revolve Development



The Net Carbon Removal Benefit of the project is calculated at:

533

t CO₂e

Per square meter Gross Floor Area of the project this equates to:

165,3

kg CO₂e / m²

With a total lifespan of at least

35 years

Project description

'Knoest' contains 29 circular apartments in a wooden building. Cleverly designed with optimal (re)use of materials. A new distinctive place for people who want to live intentionally. Living in a wooden building has many advantages. Did you know, for instance, that wood naturally has a high insulation value? So, it's energy-efficient! Moreover, wood has a positive effect on your health. Living comfort and sustainability come together perfectly here.

Project Details

 Pijnacker, The Netherlands

Realisation year: 2025

Project lifespan: 75 years

Gross Floor Area: 3225 m²

Project type: Residential (multi-storey)

Project phase: Under construction



Calculation input

The table below shows the registration numbers of the EPDs of the biobased products used in the project, as well as the manually entered data used to calculate the project's Net Carbon Removal benefit:

Product name	Product quantity	CO ₂ removed from the atmosphere per unit	Total CO ₂ removed from the atmosphere (CSC)	Total lifespan
Unit	[m ²] or [m ³]	[kg CO ₂ e / unit]	[kg CO ₂ e]	[years]
KLH® - CLT (Cross Laminated Timber)	22,6 [m ³]	-726	-17221,2	100
KLH® - CLT (Cross Laminated Timber)	462,6 [m ³]	-726	-352501,2	100
HSB frame voor dragende en nietdragende binnenwand	2750 [m ²]	-9,072	-24948	75
X-LAM (Cross laminated timber) with retour system	99,2 [m ³]	-768	-76185,6	75
Glued laminated timber (Glulam)	0,2304 [m ³]	-773	-178,0992	75
Glued laminated timber (Glulam)	0,768 [m ³]	-773	-593,664	75
KLH® - CLT (Cross Laminated Timber)	40,25 [m ³]	-762	-30670,5	100
Vuren (Picea spp)	7,6095 [m ³]	-200,68	-1527,074	35

Learnings

With the use of CLT from established and respected manufacturers, KNOEST in Pijnacker exemplifies how Net Carbon Removal Benefit certification can be implemented effectively into construction processes. Moreover, KNOEST shows how carbon storage in biobased products is just one of the design tools developers and architects have to create buildings with positive impact. In a hybrid construction with circular second-life concrete, KNOEST is an example for many developers looking to work with a broad range of sustainable materials.

Natuurhuizen Heeze – Ballast Nedam Development



The Net Carbon Removal Benefit of the project is calculated at:

62

t CO₂e

Per square meter Gross Floor Area of the project this equates to:

44,0

kg CO₂e / m²

With a total lifespan of at least

60 years

Project description

Natuurhuis embodies a dream transformed into reality—the dream of climate-positive living, not limited to the adventurous pioneer, but accessible to all. It envisions a home crafted for people, animals, and nature alike, a residence that produces more energy than it consumes. It's a place where you can sense a profound connection with nature, houses with lush gardens, green roofs and façades. This is a place to create lasting memories, whether with your family or your like-minded neighbours. Natuurhuis Heeze consist of 8 single family homes made from biobased materials such as wood and straw.

Project Details

 Heeze, The Netherlands

Realisation year: **2025**

Project lifespan: **75 years**

Gross Floor Area: **1406 m²**

Project type: **Residential (slanted roof)**

Project phase: **In Design**



Calculation input

The table below shows the registration numbers of the EPDs of the biobased products used in the project, as well as the manually entered data used to calculate the project's Net Carbon Removal benefit:

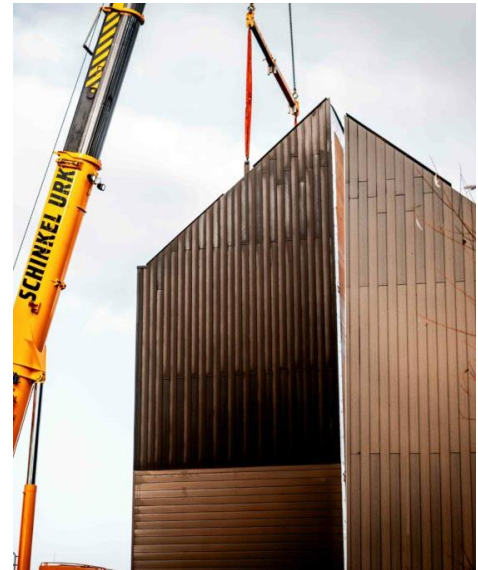
Product name	Product quantity	CO ₂ removed from the atmosphere per unit	Total CO ₂ removed from the atmosphere (CSC)	Total lifespan
Unit	[m ²]	[kg CO ₂ e / unit]	[kg CO ₂ e]	[years]
Gramitherm 100	41,1744	-7,034	-289,6207	60
Standard and Braced Straw Panels	162,88	-123	-20034,24	75
HSB frame voor dragende en nietdragende binnenwand	571,448	-9,072	-5184,176	75
HSB frame voor dragende en nietdragende binnenwand	45,424	-9,072	-412,0865	75
HSB frame voor vloerelement	416,184	15,46	6434,205	75
Gramitherm 100	542,9984	-7,034	-3819,451	60
Gramitherm 100	2372,2832	-7,034	-16686,64	60
Gramitherm 100	30,816	-7,034	-216,7597	60

Learnings

Ballast Nedam Development was a key partner in aligning the Certification Protocol with the practical reality of the multi-phased construction process. The 8 Natuurhuizen Heeze project served as the first pilot project to be publicly announced and Ballast Nedam Development formally committed to the carbon accounting and certification process. Natuurhuis served as a case for developing contractual agreements surrounding the certification process. The hundreds of collective hours put into these contractual learnings will translate into a much faster and more efficient certification process for future projects.

An interesting yet unfortunate learning was that the certification protocol came just too late to influence some design choices made in the project. This resulted in lower carbon storage than anticipated in earlier stages of the project – an outcome that perhaps could have been changed if the benefits of certified carbon storage were more apparent and available at the time.

52 Woningen in Wijk bij Duurstede – StartBlock



The Net Carbon Removal Benefit of the project is calculated at:

596

t CO₂e

Per square meter Gross Floor Area of the project this equates to:

196,3

kg CO₂e / m²

With a total lifespan of at least

75 years



Project description

On July 10th, councilor Hans Buijtelaar on behalf of the municipality of Wijk bij Duurstede and Jos Leyfer, director-manager of Heuvelrug Wonen, joined forces to realize 52 flexible homes at the site of the former equestrian center 'Het Kleine Ros.' The decision to create the homes has been made in favor of Startblock for the manufacturing, delivery, and installation of the flexible homes.

Project Details

 **Wijk bij Duurstede, The Netherlands**

Realisation year: **2024**

Project lifespan: **75 years**

Gross Floor Area: **3038 m²**

Project type: **Residential (slanted roof)**

Project phase: **As Built**



Calculation input

The table below shows the registration numbers of the EPDs of the biobased products used in the project, as well as the manually entered data used to calculate the project's Net Carbon Removal benefit:

Product name	Product quantity	CO ₂ removed from the atmosphere per unit	Total CO ₂ removed from the atmosphere (CSC)	Total lifespan
Unit	[m ³]	[kg CO ₂ e / unit]	[kg CO ₂ e]	[years]
Cross-laminated timber (X-LAM)	29,92	-753	-22529,76	75
Cross-laminated timber (X-LAM)	50,56	-753	-38071,68	75
Cross-laminated timber (X-LAM)	29,92	-753	-22529,76	75
Cross-laminated timber (X-LAM)	154,24	-753	-116142,7	75
Cross-laminated timber (X-LAM)	18,72	-753	-14096,16	75
Cross-laminated timber (X-LAM)	67,32	-753	-50691,96	75
Cross-laminated timber (X-LAM)	113,76	-753	-85661,28	75
Cross-laminated timber (X-LAM)	67,32	-753	-50691,96	75

Learnings

The 52 houses that Startblock has realised in Wijk bij Duurstede excel in their simplicity for certification. The flexible nature of the houses increase the likelihood that these buildings will last for generations, regardless of their location. As a modular builder, Startblock has the potential to contribute significantly to the transformation of the Dutch built environment into a carbon sink.

The certification process of these 52 houses was relatively easy, with its simple bill of materials. However, translating the certification process to a modular approach proved insightful.



Houtwerk II – Lingotto and Woody Builders



The Net Carbon Removal Benefit of the project is calculated at:

760 t CO₂e

Per square meter Gross Floor Area of the project this equates to:

221,5 kg CO₂e / m²

With a total lifespan of at least 75 years



Project description

With HoutWerk II, the second new construction project at Campus Werkspoor, the sustainable trend continues with yet another wooden structure and the use of circular building materials.

Project Details

 Utrecht, The Netherlands

Realisation year: 2024

Project lifespan: 75 years

Gross Floor Area: 3433 m²

Project type: Utility (office)

Project phase: Under construction



Calculation input

The table below shows the registration numbers of the EPDs of the biobased products used in the project, as well as the manually entered data used to calculate the project's Net Carbon Removal benefit:

Product name	Product quantity	CO ₂ removed from the atmosphere per unit	Total CO ₂ removed from the atmosphere (CSC)	Total lifespan
Unit	[m ³]	[kg CO ₂ e / unit]	[kg CO ₂ e]	[years]
Glued laminated timber (Glulam)	78,92	-773	-61005,16	75
Lariks (Larix decidua)	15,83	-260,7275	-4127,316	75
Glued laminated timber (Glulam)	87,11	-773	-67336,03	75
X-LAM (Cross laminated timber) with retour system	235,96	-768	-181217,3	75
X-LAM (Cross laminated timber) with retour system	626,25	-768	-480960	75

Learnings

The certification of Houtwerk II was aided by visual inspection on-site, clearly showing the glued laminated timber and larix beams in place. Data was delivered simply and smoothly, resulting in the fastest certification process to date.



SAWA - Nice Developers & ERA Contours



The Net Carbon Removal Benefit of the project is calculated at:

2.425 t CO₂e

Per square meter Gross Floor Area of the project this equates to:

194,0 kg CO₂e / m²

With a total lifespan of at least 150 years



Project description

SAWA is a unique and circular wooden residential building standing 50 meters tall, adding value to the neighborhood and the city in the broadest sense. These "shared values" pertain to CO₂ reduction, strengthening biodiversity, and creating a circular building with affordable housing for an inclusive community.

Project Details

 Rotterdam, The Netherlands

Realisation year: **2024**

Project lifespan: **75 years**

Gross Floor Area: **12500 m²**

Project type: **Residential (multi-storey)**

Project phase: **Under construction**



Calculation input

The table below shows the registration numbers of the EPDs of the biobased products used in the project, as well as the manually entered data used to calculate the project's Net Carbon Removal benefit:

Product name	Product quantity	CO ₂ removed from the atmosphere per unit	Total CO ₂ removed from the atmosphere (CSC)	Total lifespan
Unit	[m ³]	[kg CO ₂ e / unit]	[kg CO ₂ e]	[years]
X-LAM (Cross laminated timber) with retour system	2100,96	-768	-1613537	150
X-LAM (Cross laminated timber) with retour system	128,37	-728	-98588,16	150
X-LAM (Cross laminated timber) with retour system	439,23	-768	-337328,6	150
X-LAM (Cross laminated timber) with retour system	651,67	-768	-500482,6	150

Learnings

The developers behind the SAWA project have been frontrunners in Construction Stored Carbon for years. SAWA posed a unique challenge. On the one hand, the carbon storage in the load-bearing structure of SAWA is robust, reliable and – with the take-back guarantee from Derix – very durable. On the other hand, the sale of SAWA to its homeowners' association made the certification process more complicated. Certifying SAWA provided much insight into ownership questions surrounding carbon removal certificates and shaped the development of the 'three stages model' we employ in our certification process.



The CubeHouse - A.S.R. Real Estate and G&S&



The Net Carbon Removal Benefit of the project is calculated at:

2.662 t CO₂e

Per square meter Gross Floor Area of the project this equates to:

160,2 kg CO₂e / m²

With a total lifespan of at least

64 years



Project description

The first hybrid-timber building at the Amsterdam Zuidas. The CubeHouse will be Paris Proof upon delivery, certified with a WELL-gold indoor climate, and various unique features promoting sustainability and well-being.

Project Details

 **Amsterdam, The Netherlands**

Realisation year: **2025**

Project lifespan: **64 years**

Gross Floor Area: **16618 m²**

Project type: **Utility (office)**

Project phase: **Under construction**



Calculation input

The table below shows the registration numbers of the EPDs of the biobased products used in the project, as well as the manually entered data used to calculate the project's Net Carbon Removal benefit:

Product name	Product quantity	CO ₂ removed from the atmosphere per unit	Total CO ₂ removed from the atmosphere (CSC)	Total lifespan
Unit	[m ³]	[kg CO ₂ e / unit]	[kg CO ₂ e]	[years]
CLT (Cross Laminated Timber)	2401,8	-762	-1830172	64
CLT (Cross Laminated Timber)	499,392	-762	-380536,7	64
CLT (Cross Laminated Timber)	26,94564	-762	-20532,58	64
CLT (Cross Laminated Timber)	116,8	-762	-89001,6	64
CLT (Cross Laminated Timber)	161,28	-762	-122895,4	64
CLT (Cross Laminated Timber)	397,568	-762	-302946,8	64
CLT (Cross Laminated Timber)	61,2864	-762	-46700,24	64
CLT (Cross Laminated Timber)	0,0198	-762	-15,0876	64

Learnings

The CubeHouse is a potent example of a hybrid construction that scores exceptionally on all metrics. This includes carbon storage, with a load-bearing CLT structure that stores more than double the amount of CO₂ that is emitted in the production and installation process of all materials used in the project. As investor and owner of the building, A.s.r. real estate shows real pioneering spirit by investigating how the carbon stored in the building can gain tangible value in their own portfolio. Instead of relying on the sale of carbon credits, the team at A.s.r. real estate is paving the way for carbon storage in biobased products to contribute significantly to compliance with the EU Corporate Sustainability Reporting Directive.



Koelmalaan - Woonwaard & Finch Buildings



The Net Carbon Removal Benefit of the project is calculated at:

2.419 t CO₂e

Per square meter Gross Floor Area of the project this equates to:

279,3 kg CO₂e / m²

With a total lifespan of at least **150 years**



Project description

In total, 129 apartments in the social and mid-rental segments, along with communal facilities, have been realized from 260 modules spread across five residential floors. In the largest modular wooden building in the Netherlands to date (12,000 m²), three different types of residences have been created: studios of 31 m², three-bedroom apartments of 61 m², and four-bedroom apartments of 81 m².

Project Details

 Alkmaar, The Netherlands

Realisation year: **2024**

Project lifespan: **75 years**

Gross Floor Area: **8661 m²**

Project type: **Residential (multi-storey)**

Project phase: **As Built**



Calculation input

The table below shows the registration numbers of the EPDs of the biobased products used in the project, as well as the manually entered data used to calculate the project's Net Carbon Removal benefit:

Product name	Product quantity	CO ₂ removed from the atmosphere per unit	Total CO ₂ removed from the atmosphere (CSC)	Total lifespan
Unit	[m ³]	[kg CO ₂ e / unit]	[kg CO ₂ e]	[years]
Cross-laminated timber (X-LAM)	3097,45	-753	-2332380	150
Glued laminated timber (Glulam)	224,48	-773	-173523	150

Learnings

The Koelmalaan project shows how the climate and housing crises can be tackled simultaneously with smart design, ambition and persistence. As a modular construction for social housing, the Koelmalaan has the potential to be replicated across The Netherlands by modular developers and social housing corporations. With its carbon storage easily quantifiable and certifiable, following in the footsteps of these pioneers becomes more achievable.

