The Carbon Shepherd

Software for whole life Decarbonization of real estate

RVO reference number DEI723005

"Het project is uitgevoerd met subsidie van het Ministerie van Klimaat en Groene Groei, het Ministerie van Landbouw, Visserij, Voedselzekerheid en Natuur, en voor zover van toepassing, [het Ministerie van Binnenlandse Zaken en Koninkrijksrelaties] of [het Ministerie van Infrastructuur en Waterstaat], Regeling nationale EZK- en LNV-subsidies, Topsector Energie uitgevoerd door Rijksdienst voor Ondernemend Nederland."

21 May 2025

Gegevens project

• Projectnummer en projecttitel

DEI723005

The Carbon Shepherd: Software for whole life decarbonisation of real estate.

• Penvoerder en deelnemers

WiseBrick – Lead Applicant

Delta Development Group – Participant as key client with pilot projects

• Projectperiode

8 January 2024 t/m 8 January 2025

Samenvatting van de uitgangspunten en doelstelling van het project

• Een tekening, schema of foto's van het proces dat u heeft onderzocht of gedemonstreerd, zodat een breder publiek een beeld krijgt van het project.

• Beschrijving van de behaalde resultaten, de knelpunten, de doelgroep en het perspectief voor
toepassing.

• Beschrijving van de bijdrage van het project aan de doelstellingen van de regeling (duurzame energiehuishouding, versterking van de kennispositie).

• Spin off binnen en buiten de sector

• Overzicht van openbare publicaties over het project en waar deze te vinden of te verkrijgen zijn.

• Vermelding waar meer exemplaren van dit rapport te bestellen zijn.

• Vermelding van contactpersoon (personen) voor meer informatie.

Context and goals

The reason to start this project was to provide support to a crucial yet overlooked solution, which is quick access to trusted and actionable data around the whole life carbon impact of buildings. Sustainability in the built environment has traditionally almost solely focused on energy usage, which is important but not forming the full impact. An important "elephant in the room" that has been neglected for long was the "embodied carbon" impact. These materials related impact form around 50% of the total building impact, when taking the period 2020-2050, and there was no way to measure and steer in a reliable efficient way.

This project aimed to build the digital tools and the processes meant to provide instant and reliable insights to the real estate key stakeholders, in order to measure and steer the whole life carbon impact of their buildings, both new and renovations of existing ones.

Through the use of 4 pilot projects (3 new builds and 1 major renovation) with 2 different real estate developers, we aimed to design, build and test 3 key capabilities for a seamless end to end solution:

1. **Digitization at scale:** Automated, granular and sanity checked for both new and existing buildings.
2. **Whole life carbon (WLC) insights generation**: Instant, granular and dynamic quantification of WLC insights through an optimized and efficient mapping to Life Cycle Assessments (LCA)

3. **Simulation for improvements**: Simulation for various realistic scenario comparisons. Granularity of data to enable realistic building products, materials and dimensions simulation, at any points in the design and build cycle.

Results and key stakeholders

This project has allowed us to achieve our core stated goals and address the key bottlenecks to advance the whole life decarbonization of buildings a significant step further. Fundamentally, it has allowed us to have quicker, more efficient and more reliable access to insights.

Fundamentally this happened through shortening the digitization time of buildings, both new and existing, as well as generate the whole life carbon insights more accurately and efficiently.

The core audience for these insights are real estate developers, who then have instant and reliable access to knowledge around the "materials impact" performance of their buildings. This allows them to assess risk, steer performance and leverage marketing value in their sales and marketing process. It allows them to cross that "extra mile" and be future proof when it comes to sustainability performance, ahead of their competitors.

During this project we have succeeded in:

- **Digitisation automation:** Reducing processing time to extract data from IFC files and upload into our software by building
- **Common taxonomy translation**: Reducing mapping time to our internal product catalogue by applying suggestions based on text search and ML support, using the EU Levels framework mapping and reporting structure.
- **Optimized LCA mapping for quality insights generation**: Increasing accuracy in first pick of closest LCA mapping. Furthermore, we have reduced the manual mapping effort, ensuring that the bulk initial mapping work is done automatically.
- **Automated reporting**: Enhancing our reporting output through a semi automated generation of Whole life carbon reports that are conform to European norms (EN 15978 and EN15603).
- **Enhanced granularity of insights**: Enabled an advanced granularity of insights functionality that allows viewing various scopes of the buildings and the plot of lands, as well as various modules of the LCA. This is important for fair and consistent comparisons, depending on the context of the insights or reports to be created
- **Simulation towards optimization**: Enhanced the simulation capability to allow actionable insights that reflect concrete and realistic choices to be made. Simulation at the level of alternative products, materials and design choices, done at various timelines of the building. This has proved crucial to steer the decarbonization path of these buildings from early design phase
- **Integration of an end to end solution**: All the above, if left in siloes, would not provide the end value to the client, and hence won't be adapted. The key here is that we have worked on an "end to end" integration, from data to actionable insights.
- **Recognition of value of these insights**: A non technical but rather business and crucial positive outcome of this project was the recognition of the value of these insights to the key stakeholders being the real estate developers. The fact that these insights were easy to present and explain, and provide clear ammunition for action in terms of steering the building to become "Paris proof". The coining of a new building tag addressing carbon science based target, showed that it can become a marketing advantage for these parties and they started positioning their buildings beyond the traditional commoditized sustainability certificates (like BREEAM). This allowed them to get additional interest from potential investors or corporate occupants. Finally this allowed them to tick a compliance future box and reduce risk through ensuring their assets are EPBD proof.

These outcomes, though they still need further fine tuning and improvement, form a fundamental step in making the consideration of whole life carbon “business as usual” in the design and build phase.

It lowered the threshold of adoption, in terms of effort and trust around such insights. 1) Embodied carbon of materials was largely neglected due to lack of regulations, 2) the difficulty to measure and steer, and 3) the missing of low carbon alternative products.

Today all 3 obstacles are being addressed: 1) The EPBD (Energy Performance Building Directive) has finally put materials impact on the map in the EU as of 2008. 2) Today Information tech, when properly deployed, is allowing scalable digitization and analytics around whole life carbon of buildings (as shown in this project). 3) The supply chain is starting to shape up with lower footprint alternatives including biobased market approved products. At the end the increasing demand, starting with the “end clients” (opdrachtgevers) will tirgger a supply chain adaptation and product innovation.

Contribution to the decarbonization and energy transition

This project contributes to the heart of the energy transition and decarbonization themes that are central to RVO. Thousands of tons of CO2 were saved in these 4 test projects whereby informed decisions on alterative lower carbon choices were made. This would only have been possible through the access to these insights and the simulation capabilities that our tool offered.

Communication

Top Sector Energie

https://c.spotler.com/ct/m8/k1/5vBxNELrsgheLNvWJoG-6UqJKTf4fzrcimybEXq1-SdE4l7JxyPbT6l0EerhNT2s-nnKX1yueuq36Zst3QbIiW6yf8uYS7ZuByyJG4VMqB-dJgULt0446A7NGjFMEmT6/SBQ9QzYKqqGpEb8

https://www.youtube.com/watch?v=Of5scxAwiwo

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