

# Engineering Sustainable Value across the Value Chain

## How BESIX supports its clients in the decarbonisation journey

The construction industry has long been known for its significant impact on the environment, but in recent years it has also been recognised for its potential to help mitigate that impact. This brings both challenges and opportunities for the sector to embrace more sustainable practices. BESIX Group recognises the importance of being a driving force in the transition towards sustainability, in accordance with the UN Sustainable Development Goals, the European Green Deal, and EU taxonomy.

Through close collaboration with clients, designers, and suppliers, the group rethinks how construction projects are executed to support clients in meeting new regulations on sustainability and green construction. The goal is to help clients and the industry as a whole to achieve their sustainability objectives, including net-zero emissions and circularity.

Additionally, the group is dedicated to guiding clients who need advice and assistance in making their projects more sustainable both in the short and the long term, **across the entire value chain:**

### 1. Design | Early Contractor Involvement (ECI)

By integrating BESIX's expertise and insights during the project's design phase, an ECI approach between BESIX and its client facilitates a collaborative approach to identifying innovative construction methods, sustainable materials, and efficiency improvements. This early partnership with the client allows for the optimisation of design solutions, minimisation of environmental impact, and efficient resource utilisation, all of which contribute to reducing waste and energy consumption. Furthermore, ECI supports the anticipation and mitigation of potential sustainability challenges, enabling more accurate budgeting and scheduling. Ultimately, this collaborative early-stage involvement leads to the delivery of more sustainable projects, offering better long-term value for both the client and the wider community.



### 2. Design | Life Cycle Analysis

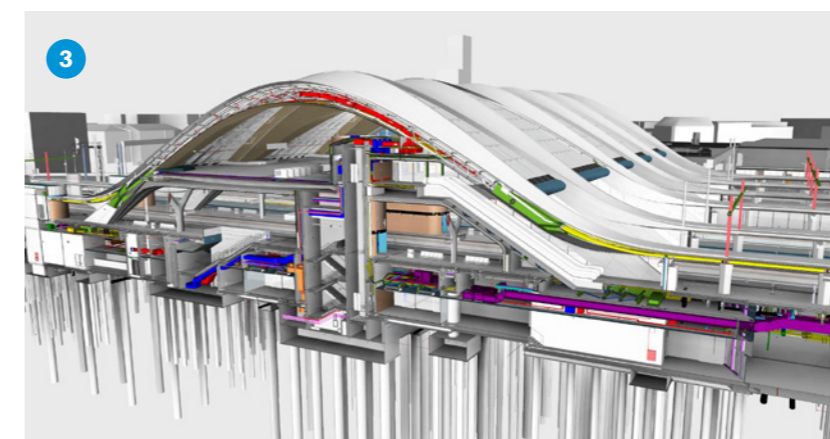
BESIX's sustainability experts are equipped to participate to relevant Life Cycle Analysis (LCA) for the client. This includes evaluating the environmental impact of materials and products throughout the life cycle of the client's assets they design and build. Also, the level of carbon dioxide emissions is systematically considered as a critical factor in the design process. Armed with this expertise, BESIX's sustainability engineers contribute to the design of projects that can achieve high environmental certifications and labels for their clients, such as BREEAM, LEED, HQE, Passive Buildings, Eco-construction, Cradle-to-Cradle, and Zero-Energy projects.



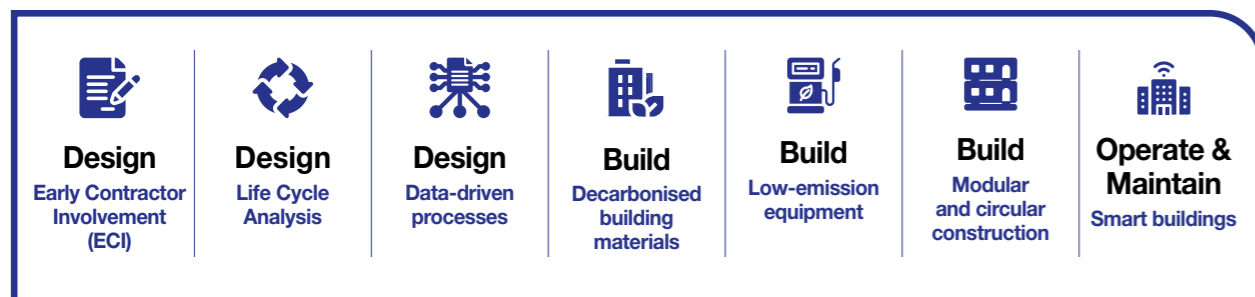
### 3. Design | Data-driven processes

Data-driven decision-making significantly enhances a project's sustainability and value for money. By harnessing technologies like BIM, parametric design, automation, and robotics, BESIX experts can analyse vast amounts of data in real-time to make informed choices together with the client about materials, design, and construction methods that optimise energy efficiency, reduce waste, and minimise environmental impact. Additionally, these data-driven processes are foundational for efficiently exploring various sustainability scenarios - comparing the impacts of using concrete versus steel, concrete versus wood, or alternative compositions of these materials. This analytical capability forms the basis for the ESG KPIs in the construction sector, allowing for a nuanced assessment of sustainability outcomes and the alignment of project execution with broader environmental goals.

For example, BIM, as both a centralised and shared information management tool, enables the virtual and collaborative construction of a project in a 3D environment before physical work begins, identifying potential issues early and allowing for adjustments that save time, reduce costs, and enhance sustainability. Parametric design uses algorithmic thinking to generate more efficient designs that adapt to environmental conditions, improving building performance and reducing resource consumption. Together, these data-driven approaches ensure that projects are not only more sustainable but also more cost-effective, by streamlining processes, reducing errors, and enabling more precise planning and execution - again a win-win for both the client and BESIX.



1. Renewal and widening of the A27 highway (The Netherlands), a collaborative contract with the Dutch Road Authority
2. Data centre (Belgium), for which an LCA baseline calculation has been performed and various reduction strategies have been proposed
3. Ultra-precise BIM model for the Rail Baltica Central Station (Latvia)



## 4. Build | Decarbonised building materials

Together with the Procurement experts, the BESIX Engineering team systematically proposes a thoughtful selection of low-impact materials to support the dual goals of sustainability and economic efficiency, making it a smart choice for forward-thinking construction projects.

Materials like timber, when sourced responsibly, serve as a renewable resource that stores carbon dioxide, thus reducing the overall carbon footprint of a project. Concrete, with additives like fly ash or slag, can significantly reduce the embodied carbon associated with traditional concrete mixes, while still providing the durability and strength required. Similarly, steel, especially when recycled, offers a high strength-to-weight ratio, facilitating more efficient designs and reducing the quantity of material needed. Utilising these materials not only minimises environmental impact through reduced emissions and resource consumption but also can lead to cost savings through more efficient use of resources and longer life-cycle performance.

Collaboration between BESIX, its Engineering department, suppliers, and clients is paramount in the journey to shift to decarbonised materials, as you can read in the text box below.

which significantly reduces greenhouse gas emissions associated with fossil fuels, enhancing the project's environmental profile. Additionally, deploying renewable energy sources, like solar panels, for on-site power generation not only diminishes reliance on non-renewable energy but can also lead to substantial cost savings over time. These sustainable technologies contribute to a cleaner construction site, minimise the carbon footprint of the building process, and align with BESIX's and the client's global sustainability targets.

## 6. Build | Modular and circular construction

In its start-ups' portfolio, BESIX is supporting PropTech companies active both in modular and circular construction. Modular construction involves prefabricating components in a controlled factory setting before assembling them on-site. This method not only reduces waste and material use through precise manufacturing but also shortens construction timelines, leading to considerable cost savings and a reduction in the project's environmental impact. Circular construction, on the other hand, emphasises the reuse and recycling of materials and components throughout the life cycle of a building. By designing for disassembly and future reuse, circular construction minimises waste, extends the life of materials, and reduces the demand for new resources. Thanks to this expertise, BESIX can promote to its clients alternatives with a more efficient use of materials and energy, contributing to a lower carbon footprint and enhanced project value through reduced operational and life-cycle costs.

## 7. Operate & Maintain | Smart buildings

BESIX regularly integrates smart technologies into its clients' asset design and operation as this forward-thinking approach maximises both economic and environmental performance. Thanks to its expertise in smart buildings and smart services, BESIX harnesses the power of advanced technology and IoT to optimise an asset's performance, significantly improving sustainability and value for money. These intelligent systems can monitor and control a wide range of environmental variables - from lighting and heating to air quality and energy use - ensuring operations are as efficient as possible. By analysing data collected in real-time, smart buildings can adapt to the needs of occupants and the external environment, leading to substantial energy savings, reduced operational costs, and a lower carbon footprint.

Jabba is a good example of a groundbreaking smart energy management system that makes buildings smarter: Jabba leverages artificial intelligence to optimise household energy use in response to the fluctuating dynamics of electricity demand and renewable energy supplies. Partnering with aug-e, one of the start-ups in BESIX's PropTech portfolio, to enhance the functionality of home batteries, Jabba has transformed its platform to offer a community-based interface that consolidates customer interactions and provides advanced services like peak shaving and smart control. This innovative platform enables users to manage energy costs effectively through intelligent buying and selling of power, supporting the broader transition to sustainable energy use.

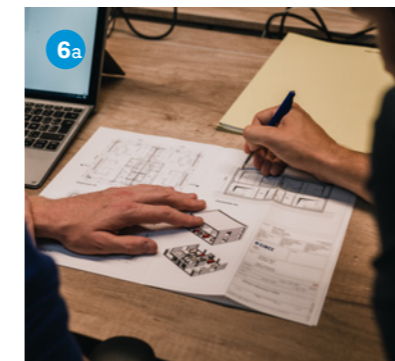
## Sustainable procurement

In 2023, the BESIX Group Procurement Department launched the first BESIX Suppliers' Sustainability Forum, engaging around 40 key suppliers associated with significant Scope 3 greenhouse gas emissions, specifically in cement, concrete, and steel. This forum served as a platform to share BESIX's commitments to ESG and sustainability, alongside the group's procurement vision and goals.

"The Suppliers' Sustainability Forum marked the beginning of our renewed efforts to reevaluate and seek competitive, alternative solutions for high CO<sub>2</sub> emission materials. At Procurement, our goal is to convert regulatory constraints into business opportunities through close collaboration with our key suppliers. We are committed to addressing climate change by developing sustainable practices and co-creating solutions that are sustainable at mutually acceptable prices. Sustainability will increasingly become a key factor in our selection process, alongside traditional criteria such as quality, cost, delivery, and service." Sylvain Sainton, Chief Procurement Officer BESIX Group.

## 5. Build | Low-emission equipment

For a couple of years, BESIX has been integrating equipment such as electric vehicles for transportation and logistics,



- 4. 41,000 tonnes of green steel will be used in the Port of Neom (Saudi Arabia)
- 5. Electric truck equipped with self-loading crane and hook-lift, used for road infrastructure projects (The Netherlands)
- 6a. Modular homes built by CIRCL in less than 6 weeks (Belgium)
- 6b. BuildUp prefabricates components off-site before assembling them on-site for retrofitting (France)
- 7. Smart energy management systems are used to optimise energy use in response to fluctuating dynamics of electricity demand and renewable energy supplies
- 8. Jan Van Steirteghem, COO BESIX Construction

**“Our team of in-house experts collaborates with clients to identify areas where sustainability can be improved and offer innovative solutions that are both practical and effective. By incorporating green building practices into construction projects, our clients can benefit from increased asset value, improved risk management and control, and lower operating costs. We encourage our clients to join us in our commitment to sustainability and to collaborate with our team of experts to implement concrete solutions at the earliest stage of a project's design concept. The most value is created at the very beginning of a project life cycle.”**

Jan Van Steirteghem, COO BESIX Construction