



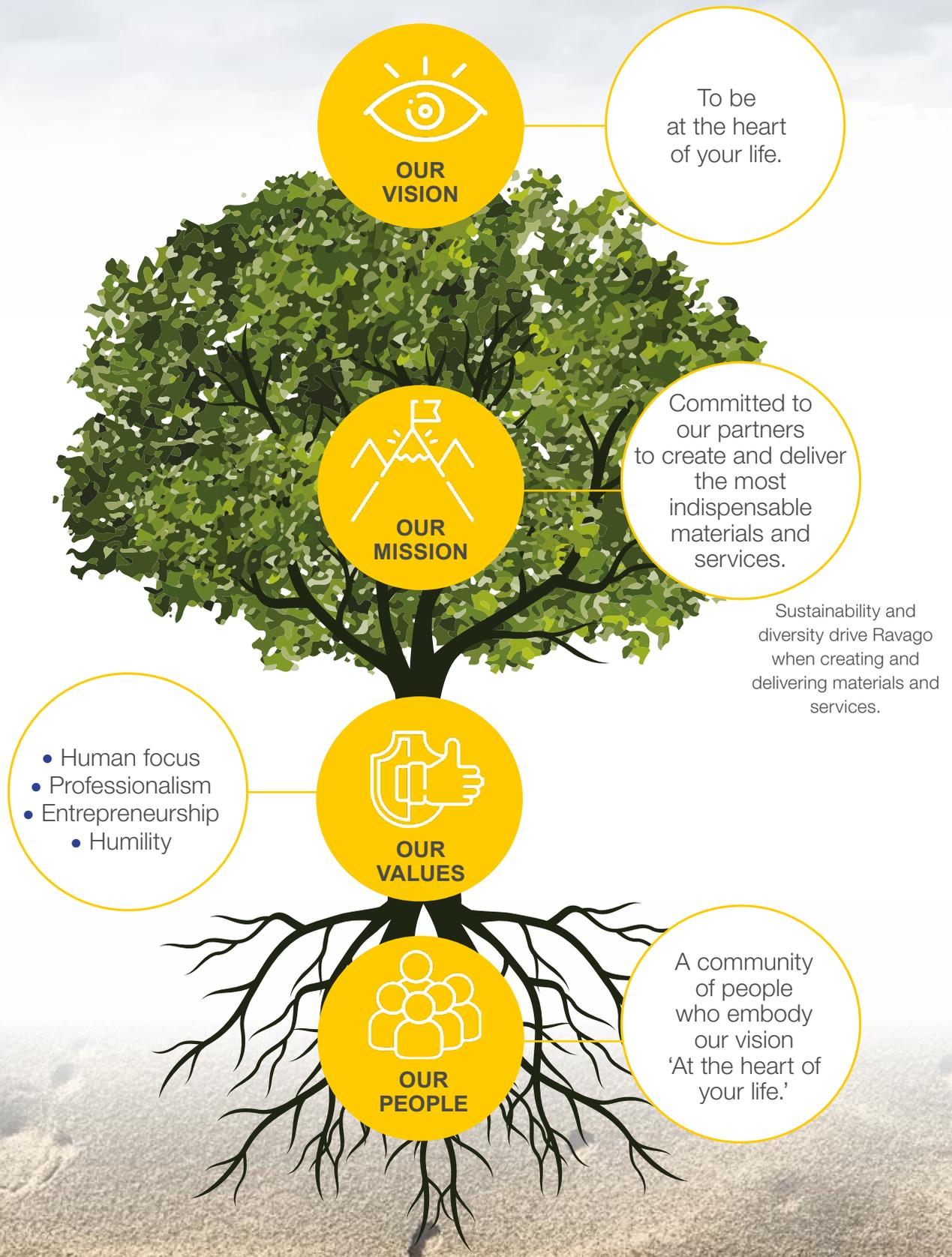
RAVATHERM™ XPS: FROM PRODUCTION TO PERFORMANCE – OUR SUSTAINABILITY BLUEPRINT



Content

Our Ravago Tree	3
Our Vision	4
Our Mission	5
Our Values.....	6
Ravago Group – Our Sustainability Pledge	8
Our belief.....	9
Sustainable at the heart of your life.....	9
Sustainable solutions – Enhancing the lifecycle of our products	10
Responsible operations – Operating ethically while minimizing our environmental impact	11
Empowered People – Engaging and Strengthening Our Communities	13
Ravago Building Solutions	
A 360° Commitment to Sustainability: From Production to Delivery.....	14
Comprehensive Sustainability Strategy:	
From Responsible Production to Circular Economy	15
Raw materials.....	16
Production Plants.....	17
Operation	18
Logistics	20
Marketing & Sales	21
Product	22
Product end-life.....	23
RAVATHERM™ XPS – Versatile & Long-lasting.....	24
Our Product Families.....	25
XPS Building materials plants	26
Co-operation.....	27
Certifications	28
Reference Projects	
Germany	29
Greece	30
Hungary	31
Italy	32
Netherlands.....	33
UK.....	34

Our Ravago Tree





OUR VISION

Many products in our day-to-day surroundings that improve our quality of life are made possible thanks to the materials and services that Ravago provides.

Ravago will therefore invest in and develop businesses that have a noticeable presence in, and a positive impact on as many people as possible.

We constantly aspire to have a positive impact at every stage of people's lives.

**That is why our vision is
'to be at the heart of your life'.**





OUR MISSION

In each role in the company, we put our partners first, as we believe they are key in what we do. We are a one-stop-shop for our partner's needs. We offer a broad range of materials and a state-of-the-art infrastructure for distribution through efficient supply chain, technical expertise and financial support. We also commit to invest in our people and create a safe and inspiring professional environment where they can thrive by growing, feeling good and by learning.



**Our mission truly is to be
'committed to our partners to
create and deliver the
most indispensable materials
and services'.**



OUR VALUES

During its evolution, Ravago has always relentlessly emphasized its values:



Human focus



Professionalism



Entrepreneurship



Humility

These are not just buzzwords, but the company's core principles that define who we are, what we stand for, and how we want to be perceived.

For us, staying loyal to who we are is crucial. Not only because this was Raf Van Gorp's vision for the company, but because it has proven to be the foundation of Ravago's success, and because it will define our future.



Our Values



Human focus

Our human focus involves a respectful and thoughtful approach toward people, both internally and externally. Every single employee contributes to creating a trusted, safe and collaborative environment that incorporates ethical behavior, caring for each other's well-being, and respect for all aspects of diversity. The personal approach toward employees and other stakeholders enables the long-term relationships on which the company is built.



Professionalism

By our professional value, we combine sharp and entrepreneurial decision-making by not compromising our structure and professional attitude towards colleagues and important stakeholders. Professionalism implies holding yourself accountable for your actions, words and thoughts, never jeopardizing your moral compass along the way. This value is one of the foundations for long-term partnerships.



Entrepreneurship

Our entrepreneurial value is based on the opportunity for each employee to create value for the company. Employees should be able to take initiative and go beyond their assigned scope of work to improve their professional environment, and they should feel empowered to do so. For entrepreneurship to work, failures should be viewed as learning opportunities in the professional scope. We only fail if we don't try.



Humility

Humility is based on two interconnected principles: external discretion and internal pride. Ravago's below-the-radar strategy is not only a personal choice of our family shareholder, but also a strategic decision. Also, this value recognizes internal successes and initiatives, encourages an environment where our people can thrive. Ravago's business is based on long-term partnerships and this means that everyone should welcome others' opinions and perspectives, where successes are celebrated together.

RAVAGO GROUP OUR SUSTAINABILITY PLEDGE

Sustainable
solutions



Responsible
operations

Empowered people

Our belief

Sustainability has always been a large part of who we are. Ravago has been committed to various aspects of sustainability since the company was founded in 1961. Today, the word sustainability has become a different story, sometimes misunderstood and misused.

We want to take a stance on sustainability by sharing our interpretation, what it means to us and how we aim to make a difference on a global scale. Like our core values – human focus, professionalism, entrepreneurship and humility – sustainability is at the heart of our company by our 60+ years of recycling expertise. We've always strived to reach a balance between people, the environment and business.

In other words, we are making a pledge to our employees, customers, suppliers, and everyone who is a part of our company's ecosystem.

A materiality assessment enabled us to define our view on sustainability in 3 pillars: Sustainable Solutions, Responsible Operations, and Empowered People. Together, we will make an impact through these 3 sustainability pillars.

'We want to give back to the world what it has given us.'
– the Ravago family

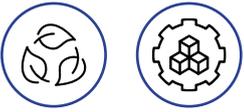
Sustainable at the heart of your life

Enhancing the lifecycle of our products



Operating ethically while minimizing our environmental impact

Engaging and strengthening our people and communities



Sustainable solutions

Enhancing the lifecycle of our products

Leading the Way in Sustainable Growth and Recycling

As an industry leader in recycling capacity, we are driving forward with bold ambitions, aiming for 25% growth from 2022 to 2025. A key driver of this expansion is our growing focus on Post-Consumer Recycled (PCR) materials, which are central to our mission of advancing a circular economy.

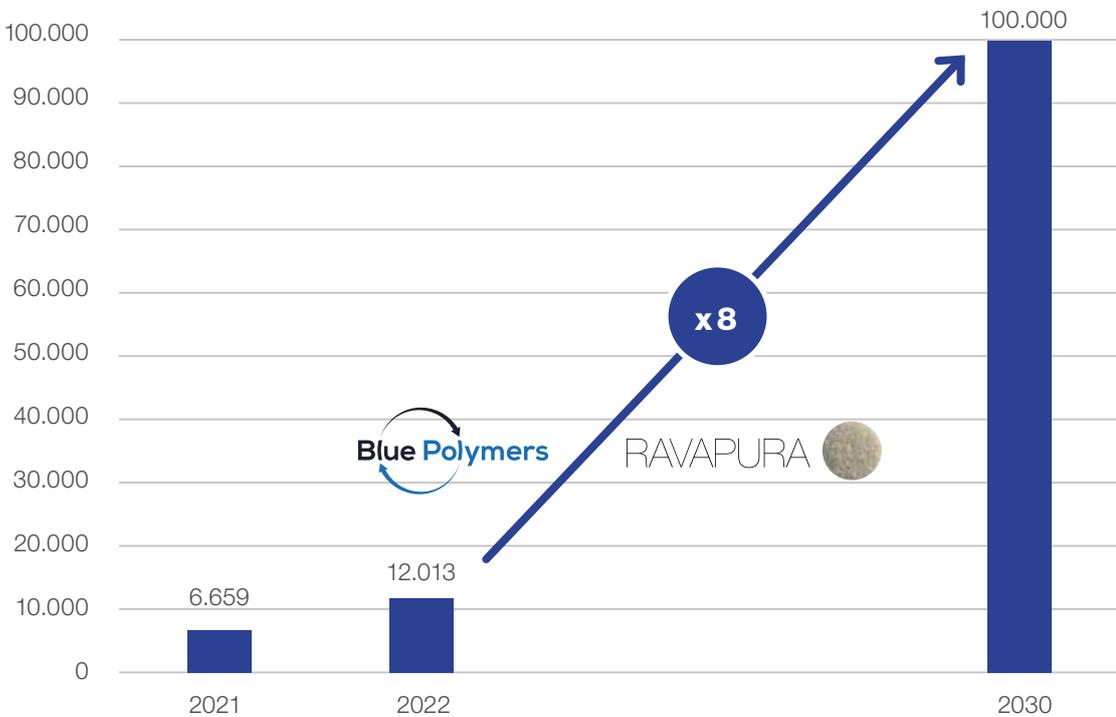
Our Life Cycle Assessment (LCA) pilot study demonstrates the environmental benefits of our recycled products, showing 50–85% lower carbon emissions compared to conventional prime materials. These findings highlight the significant role we play in reducing carbon footprints and offering more sustainable choices to our customers.

In addition to our recycled product lines, we offer a range of sustainable solutions that help our customers meet their environmental objectives, including:

- Innovative insulation materials for greater energy efficiency
- RavaBio®, our cutting-edge biobased product range
- Food-to-feed recycling that transforms food waste into valuable resources
- Sustainable water treatment solutions to enhance resource conservation

Our commitment to sustainability spans our entire product portfolio, ensuring that we not only meet today's demands but also contribute to a greener future for generations to come.

PCR certified volumes (mt)



Growth ambitions



Responsible operations

Operating ethically while minimizing our environmental impact

At Ravago Building Solutions, we are committed to taking meaningful action toward reducing our environmental footprint. As part of our sustainability strategy, we have set an ambitious -42% decarbonization target for our Scope 1 & 2 emissions by 2030. This goal underscores our dedication to lowering greenhouse gas emissions from our direct operations and energy consumption, helping us contribute to the global effort to combat climate change.

Environmental Footprint

Our Path Toward Decarbonization: 2025-2026 Goals

At Ravago, we are committed to making a measurable impact in the fight against climate change. As part of our sustainability efforts, we have set ambitious decarbonization goals to be achieved by 2025-26, focusing on energy efficiency, renewable energy, and innovative technology to reduce emissions. Here's how we plan to drive change:

Increase Energy Efficiency by 10%

Through continuous optimization and innovation, we aim to enhance our energy efficiency by 10%, reducing overall energy consumption across our operations while maintaining productivity.

Invest in Renewable Energy

We are committed to increasing the use of renewable energy in our operations.

By 2025-26, we will boost our captive renewable energy consumption by 10%, reducing reliance on fossil fuels and cutting carbon emissions.

Transition to Green Electricity

A key milestone in our decarbonization plan is to ensure that at least 60% of our remaining electricity consumption, currently sourced from non-renewable („grey“) sources, becomes green. To achieve this, we are actively pursuing a Power Purchase Agreement (PPA) to secure sustainable energy supply.

Innovating for Emission Reduction

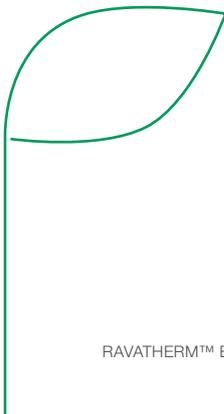
In line with our commitment to reducing scope 1 emissions, we are developing cutting-edge technology for electrical furnaces within our mineral wool production. This initiative will significantly cut down on direct emissions, with a clear plan to roll out this technology in the coming years.

Together, these actions will not only reduce our carbon footprint but also set a new standard for sustainability in our industry. We are dedicated to doing our part in creating a greener, more sustainable future.

Our decarbonization initiatives are aligned with industry best practices, focusing on adopting energy-efficient technologies, optimizing our production processes, and transitioning to renewable energy sources wherever possible. In addition to addressing Scope 1 & 2 emissions, we recognize the critical importance of reducing our Scope 3 emissions, which are associated with the broader supply chain and product lifecycle. As a global player, we are focusing on making our logistics operations more sustainable by implementing a series of initiatives aimed at optimizing our supply chain. These initiatives include network and transport mode optimizations, which will help reduce transportation-related emissions, lower fuel consumption, and minimize the environmental impact of our product distribution.

Decarbonization goals by 2025-26

- Increase **energy efficiency** by 10%
- Invest in **renewable energy** to increase captive consumption by 10%
- Decide on a **Power Purchase Agreement (PPA)** to turn remaining „grey“ (at least 60%) electricity consumption green
- Develop **technology for electrical furnaces** to reduce scope 1 emissions of mineral wool & make plan to roll out





Responsible operations

Operating ethically while minimizing our environmental impact

Ravago as a group is committed to  **Operation Clean Sweep**, a program designed to prevent plastic pellet, flake, and powder loss into the environment. This program aligns with Ravago's Sustainability Pillar, Responsible Operations, to create a world where plastic polymers are responsibly handled while minimizing the impact on the environment.

Operation Clean Sweep® (OCS) is an international program designed to prevent the loss of plastic pellets, flakes, and powders into the environment, particularly into waterways and oceans. The program was developed by the American Chemistry Council (ACC) and the Plastics Industry Association (PLASTICS) and has been widely adopted by companies across the plastics industry, including manufacturers, distributors, and processors.

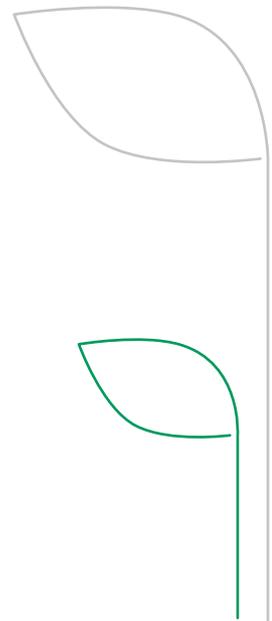
Ravago's Involvement: Ravago's commitment to OCS is part of its broader sustainability strategy. By participating in OCS, Ravago ensures that its operations are aligned with environmental best practices, reducing its ecological footprint while maintaining its role as a leader in the plastics industry. This commitment is a reflection of the company's dedication to responsible operations and its proactive approach to environmental management.

Business Integrity

Our sustainability efforts are not limited to environmental targets; we also place a strong emphasis on building long-term, ethical partnerships with our stakeholders. We believe in the power of collaboration to create shared value, and we strive to foster relationships based on transparency, mutual respect, and ethical business practices. By working closely with our suppliers, customers, and partners, we aim to create sustainable solutions that benefit not only our business but also the communities and environments in which we operate.

Health and Safety

At Ravago Building Solutions, the safety and well-being of our people are always a top priority. We are proud to report that we are on track to meet our -50% target for the Recordable Incident Frequency Rate (RIFR) by 2030, compared to our base year of 2019. This target reflects our commitment to ensuring a safe working environment across all our operations, and we are continuously improving our safety protocols, training programs, and risk management systems to achieve this goal. By prioritizing safety, we aim to protect our employees and create a culture where everyone can thrive in a secure and supportive workplace. Through these initiatives, we are working tirelessly to create a sustainable future for our company, our people, and the planet.





Empowered People Engaging and Strengthening Our Communities

Our people are our greatest asset. We believe that an engaged, diverse, and well-equipped workforce drives both our business success and the positive impact we have on society. Our mission is to create a thriving work environment where everyone feels valued, respected, and empowered to contribute their best.

Driving Engagement and Inclusion

We are dedicated to building a workplace that promotes inclusivity and engagement across all levels. By fostering a diverse culture and actively seeking to empower underrepresented groups, we ensure that different perspectives are embraced and that innovation flourishes.

Employee Engagement: 83% of our employees reported being engaged in our latest survey, reflecting the effectiveness of our efforts to create a supportive and inspiring environment. This is the second year in a row that we've scored 3% above the external industry benchmark, and we remain committed to further improving this.

Leadership Diversity: Currently, 29% of our leadership positions are held by women, and we are on track to meet our goal of over 35% female representation by 2030. Empowering women in leadership is essential to driving diversity and innovation across the company.

Cultural Representation: With 40 different nationalities represented in our senior management team, our global footprint is reflected in our leadership. This diversity ensures that our decisions are enriched by varied cultural perspectives and experiences. We are proud that 59% of the countries where Ravago operates are represented at the leadership level.

Equipping Our People for Success

We believe in continuous learning and growth. Our comprehensive training programs are designed to upskill our employees and prepare them for future challenges. These programs support not only their professional development but also their personal growth.

Training and Development: By 2025, we aim to have 95% of our white-collar workforce actively participating in our training platforms. From leadership programs to technical courses, our learning initiatives are built to ensure our people are equipped to succeed in an ever-evolving business landscape.

Employee Well-Being: We recognize that personal well-being is key to professional success. Our health and wellness programs, alongside our flexible working arrangements, are tailored to meet the needs of our people, ensuring they can maintain a healthy work-life balance.

Making a Difference Beyond the Workplace

Beyond the workplace, we are committed to contributing to the communities where we live and operate. We actively seek opportunities to make a meaningful social impact, whether through corporate social responsibility (CSR) initiatives, partnerships, or employee-driven volunteerism.

Community Involvement: We have invested in local community projects, supporting education, environmental initiatives, and social welfare programs. By giving back, we are able to create lasting positive change in the regions where we operate.

Employee Volunteering: We encourage our employees to engage in community service through structured volunteering programs, allowing them to make a personal impact while representing Ravago's values.

The Road Ahead

Our journey toward empowering our people and communities is ongoing. As we look to the future, we are committed to maintaining a culture that encourages growth, inclusion, and meaningful impact. Our long-term vision is to continue shaping a sustainable, diverse, and socially responsible company where everyone can thrive.

Together, we will continue to build a brighter, more inclusive future – both within our organization and beyond.

Ravago Building Solutions

A 360° Commitment to Sustainability: From Production to Delivery

At Ravago Building Solutions, sustainability isn't just an initiative – it's a core philosophy that drives every aspect of our business. As a leading producer of XPS thermal insulation, we recognize the critical role we play in reducing the global carbon footprint. That's why we have optimized our entire value chain to ensure that every step of our operations contributes to a more sustainable future.

From the production floor to final delivery, we've reengineered our processes to align with the highest environmental standards. Our 360° sustainability approach touches every corner of the company:

Raw Materials: We implemented cutting edge technologies to minimize raw material consumption.

Production: We've integrated energy-efficient technologies and raw material optimizations that reduce waste and emissions during the manufacturing of our XPS insulation products.

Packaging: We've minimized packaging waste by implementing eco-friendly materials and designs that lower resource consumption while ensuring the quality of our products remains uncompromised.

Logistics and Transport: By maximizing truck payloads and reducing the number of trips, we've significantly lowered fuel consumption and CO₂ emissions, further enhancing our environmental performance.

Marketing and Sales: Our green messaging isn't just lip service. We promote sustainable building solutions that enable our clients to reduce their environmental impact, encouraging a full-circle adoption of sustainability from production to end-use. Our commitment doesn't stop here. We continuously seek new ways to innovate, improving the efficiency of our products and services while minimizing environmental impact. We are proud to contribute to a future where sustainable building practices are not just the exception, but the norm.

Product: RAVATHERM™ XPS reflects our commitment to both performance and environmental responsibility. Over the years, we've significantly improved the thermal insulation efficiency of our products by optimizing its lambda value, enhancing energy efficiency and reducing heating and cooling needs in buildings. RAVATHERM™ XPS MULTI, our latest innovation, incorporates up to 50% of recycled material, is free from harmful ingredients and is fully recyclable, contributing to a more sustainable circular economy.

Product end of life: Our commitment to sustainability extends to the entire lifecycle of our products, including their end-of-life phase. RAVATHERM™ XPS is designed with longevity in mind, reducing the need for replacements and minimizing resource consumption. At the end of its life, RAVATHERM™ XPS is fully recyclable, allowing the materials to be reintroduced into the production cycle. To further ensure responsible handling, we offer take-back programs, such as our partnership with FPX in Germany, which facilitate the recycling or reuse of used RAVATHERM™ XPS insulation, reducing construction waste. For components that cannot be recycled, we provide clear guidance on safe disposal practices, minimizing environmental impact. Our ongoing R&D efforts are focused on increasing the amount of recycled content in our products, with the goal of offering the most sustainable XPS insulation on the market.

At Ravago Building Solutions, sustainability is at the heart of everything we do – ensuring that our thermal insulation solutions not only protect buildings but also the planet.



Comprehensive Sustainability Strategy: From Responsible Production to Circular Economy



Our Holistic Approach to Sustainability

At every stage of our business, we are committed to creating a positive environmental impact. Here's how we integrate sustainability into everything we do:

1. Holistic Sustainability

We take a comprehensive approach to sustainability, addressing every stage of our product's lifecycle – from raw materials to end-of-life. This allows us to drive long-term environmental change rather than focusing on isolated improvements.

2. Specific, Actionable Goals

We set clear and actionable goals, like reducing our use of raw materials, improving waste management, and cutting emissions. These tangible steps are critical to lowering our environmental footprint and ensuring meaningful progress.

3. Circular Economy

We are committed to a circular economy by transforming by-products and waste into new materials at the end of a product's life cycle. This ensures that nothing goes to waste and contributes to a sustainable future.

4. Transparency and Consumer Engagement

We believe in transparency and social responsibility. By educating and raising awareness among our consumers, we empower them to make eco-conscious decisions and join us in our sustainability journey.

5. Energy Efficiency and Product Innovation

We innovate with products like RAVATHERM™ XPS, which is not only durable but also energy-efficient with a low Lambda value and a high percentage of recycled content. Our goal is to deliver sustainable solutions that make a real difference.



Raw materials

Building Sustainability from the Ground Up

At Ravago Building Solutions, our commitment to sustainability begins with the careful selection and responsible sourcing of raw materials. We continuously strive to minimize our environmental impact by prioritizing the use of renewable, recyclable, and responsibly sourced materials throughout our product lifecycle. Our approach focuses on improving the sustainability of our raw materials, fostering a circular economy, and supporting environmental conservation efforts.

Responsible Sourcing and Ethical Practices

We ensure that the raw materials we use meet the highest environmental and ethical standards. This includes working with suppliers who align with our sustainability values, ensuring that they operate with transparency and adhere to strict environmental regulations. By prioritizing suppliers who utilize sustainable practices, we ensure that our products are built on a foundation of responsibility and long-term environmental care.

Replacing Prime Raw Materials with Recycled Materials

To significantly reduce our carbon footprint, we are continuously replacing prime raw materials with recycled materials. This process not only reduces the environmental impact of our products but also helps conserve natural resources. By increasing the amount of recycled content in our products, we are contributing to a more sustainable supply chain, reducing the need for new raw material extraction, and minimizing waste. This is a key part of our strategy to decrease our carbon emissions and promote a circular economy.

We are continually working to increase the percentage of recycled materials used in our products, pushing the boundaries of what is possible in order to create a truly sustainable future. Our ongoing R&D efforts aim to further enhance the use of recycled content, ensuring that our solutions not only meet but exceed industry standards for sustainability.

Low Environmental Impact Sourcing

We actively seek raw materials that have a minimal impact on the environment. This includes evaluating the carbon footprint, water usage, and energy consumption associated with sourcing and processing materials. By working with suppliers that prioritize low-impact methods and sustainable practices, we reduce the environmental burden of our raw material supply chain.

Collaboration for Sustainability

Our efforts to source sustainable raw materials are supported by close collaboration with our supply chain partners. Together, we work to identify opportunities for reducing environmental impact, from improving sourcing practices to increasing material recycling rates. By sharing knowledge and resources with our partners, we strive to create a more sustainable and resilient raw material supply chain for the future.

Impact on Product Sustainability

The use of sustainably sourced and recycled raw materials directly enhances the environmental profile of our products. Through innovations like RAVATHERM™ XPS MULTI, which incorporates up to 50% recycled content, we are able to offer high-performance products that align with both environmental responsibility and building industry needs. By reducing reliance on virgin materials and lowering carbon emissions throughout production, we ensure that our products contribute to a more sustainable built environment.



Production Plants

Harnessing Wind Power and Driving Energy Efficiency: example of our UK operations

At RBS, UK, we're proud of our continued commitment to sustainability and reducing our environmental footprint. One of our key successes has been utilizing renewable energy, specifically from a **local wind turbine**. This turbine supplies power directly to our extrusion line, allowing us to significantly reduce our reliance on conventional energy sources.

Renewable Energy Impact

By July 2024, nearly **24% of our total energy** consumption has come directly from this green energy source. In 2023, **23%** of our electricity came from the turbine, and we are determined to increase this share in the near future. As part of our future vision, we aim to boost our usage of wind energy to **40%**, as we look forward to acquiring the site's infrastructure. This will provide us with more flexibility to purchase additional green energy, benefiting both our operations and the environment.

Energy Consumption Reduction Initiatives

We have also implemented several **energy efficiency projects** that have greatly reduced our energy consumption, with a focus on long-term sustainability. A few of our most impactful initiatives include:

Heat Recovery: We use recovered energy from our air compressor systems to heat our entire workshop, changing rooms and storage rooms.

Pump Efficiency: By changing our processes, we eliminated two electric pumps that previously ran 24/7, significantly cutting down our power usage.

Lighting Optimization: We upgraded all facility lighting to energy-efficient LED systems with sensors, reducing the operating time from continuous use to only 60% of the day.

Cooling Pump Upgrades: We are replacing oversized cooling pumps, reducing their energy usage from **33kWh** to just **5.5kWh** per hour.

Ventilation Fan Optimization: One ventilation fan's energy consumption was reduced by 30%, without affecting performance.

Automated Shutoffs: We installed flow meters and sensors to automatically shut down machines when not in use, conserving energy without relying on manual intervention.

Results and Future Goals

Our commitment to energy efficiency is already paying off. By comparing our data, from January to July 2024, we used **91MWh less energy** than the same period in 2023, despite running for 9 extra days. Adjusting for this, we've actually reduced energy usage by **228MWh** under the same conditions as 2023. Over the course of the year, we anticipate reducing our energy consumption by nearly **390MWh**, which equates to a **7% reduction** compared to 2023.

Not only have we reduced energy use, but we've also increased our production efficiency, producing an additional **6% of prime material** while consuming less electricity.

Across our European XPS production plants we have implemented a structural energy efficiency program, continuous monitoring and sharing best practices across the plants is driving our energy consumption downwards.



Operation

Water Management at RBS – A Commitment to Sustainability

At RBS, we are deeply committed to the sustainable and efficient use of water across all our operations. Our water management practices not only ensure the responsible consumption of this vital resource but also focus on long-term protection of local water sources.

Here's an overview of how we manage water at our plants:

Total Water Consumption

Water acts as a key ingredient, specifically as a blowing agent during manufacturing. Our production plants operate in a closed loop, meaning the water is recycled within the process, reducing waste. Any spills are carefully managed, with clean water pumped back into the system.

Cooling Water System

Our cooling system, which keeps equipment at optimal temperatures, works in a closed loop, ensuring efficient water use.

Water Discharge and Waste Management Wastewater

Contaminated water is collected and treated responsibly, ensuring no harmful substances are released into the environment.

Fire Protection System

In the unlikely event of a fire, our plants are equipped with an advanced Fire Protection System. The system uses water from a dedicated firewater tank to ensure rapid response, while minimizing any unnecessary water use.

Routine Maintenance and Quality Control

We adhere to a rigorous maintenance plan for all our water systems. Regular inspections, testing, and system calibrations are conducted to ensure everything is operating efficiently and safely. This includes:

- Monthly checks and filtration maintenance
- Quarterly chemical analysis
- Annual system overhauls, including bacteria testing and replacement of key components.

Our Commitment

By implementing these water management systems and maintaining strict oversight, RBS is dedicated to reducing our environmental footprint and promoting the sustainable use of water. Every drop is managed with care, reflecting our broader commitment to environmental stewardship and sustainability.

Enhancements in Production Plant Sustainability

These projects collectively highlight our commitment to reducing energy usage, improving waste management, and minimizing emissions, all in line with our sustainability objectives.



Operation

Reducing plastic packaging for a greener future

In line with our commitment to sustainability, we have made substantial progress in reducing plastic packaging for our XPS products. Over the past year, we have dedicated significant efforts to optimizing our packaging materials, minimizing plastic usage without compromising the protective qualities essential for product safety during storage and transport.

It's important to remember that „Reduce, Reuse, Recycle“ is not just a catchy phrase, but a guiding principle for responsible material use. By reducing the amount of packaging we use, we are addressing the very first of the three Rs, lessening the waste generated from packaging right from the start.

This approach not only reduces waste but supports other key benefits: enhanced durability, easier transport, and improved ease of consumption. Lighter, more flexible packaging also reduces greenhouse gas emissions from transportation, as more material can be transported per shipment, furthering our environmental goals.

- **Shrink Film Reduction:** For bundle packaging, we successfully reduced the thickness of shrink film by 12.5%, cutting down on plastic use while ensuring our products remain securely wrapped and protected.
- **Stretch Film Optimization:** In pallet packaging, we implemented a 39% reduction in stretch film thickness and optimized the stretch ratio applied, further reducing plastic without compromising stability.

This project, implemented across Ravago Building Solutions (RBS) with the active support of our packaging suppliers, has led to a remarkable yearly reduction of 160 metric tons of plastic packaging. This achievement not only highlights our ability to reduce waste but also reflects our commitment to the durability, quality, and sustainability of our products.

Through the use of **lightweighting** – thinning packaging and **rightsizing**, which optimizes packaging while still keeping its features, we continue to explore ways to reduce material use. These innovative processes not only help us to reduce waste but also bring us closer to our sustainability goals by minimizing our environmental impact and supporting a more efficient use of resources.

As part of our ongoing sustainability mission, we are constantly looking for new ways to optimize our packaging design, aiming for even greater efficiency and environmental benefits in the future.



Logistics

Sustainable Logistics: Efficiency and Impact at RBS, Germany

At the core of our sustainability initiatives is the continuous improvement of logistics efficiency. In the last years, we have made significant strides in optimizing transport operations, which has had a direct positive impact on both fuel consumption and carbon emissions.

Optimizing Payload and Reducing Truck Usage

One of the primary ways we have reduced our environmental footprint in logistics is by increasing the payload capacity of our trucks. By doing so, we've been able to transport the same volume of materials with fewer trips, thus **lowering fuel consumption and emissions**.

In **2023**, our logistics efforts were already efficient, but in **2024**, we've achieved even better results. We've increased our average payload by about 10%, leading to a 24% reduction in truck trips compared to the previous year.

If we had maintained the same payload as in 2023, we would have required an additional 91 trucks this year.

Our optimization efforts have thus resulted in fewer trucks on the road, less fuel consumed, and reduced emissions, reflecting our commitment to more sustainable logistics.

Estimated CO₂ Reductions

By optimizing payload and reducing the number of truck trips, we could **reduced CO₂ emissions by approximately 24.4 tons** between 2023 and 2024*.

Ongoing Commitment to Sustainable Transportation

As we look to the future, we will continue to seek ways to reduce both the environmental impact and operational costs of logistics. Our commitment to efficiency, combined with investments in modern technologies, ensures that we are building a greener supply chain for the years to come.

Across Europe we have similar improvement programs aiming to reduce the number of trucks needed to transport our products.

To help visualize 24.4 tons of reduced CO₂ emissions, here are some comparisons that put this number into perspective:

A reduction of 24.4 tons of CO₂ is equivalent to the carbon sequestered by around 400-450 mature trees in a year. Alternatively, it represents the total emissions of 5 typical cars driving 20,000 kilometers each annually. This is also comparable to the CO₂ emissions from 55 economy-class round-trip flights between New York and London, with each flight emitting 0.44 tons of CO₂ per passenger. These comparisons demonstrate the significant environmental impact of our 24.4-ton CO₂ reduction, highlighting our meaningful contribution to sustainability.**

* Calculation based on average fuel consumption/CO₂ Emissions per trip (a typical heavy-duty truck uses **35 liters of diesel per 100 km** (an average fuel consumption). Diesel emits **2.68 kg of CO₂ per liter** of fuel burned)
 ** Source: European Environment Agency, ACEA CO₂ Emissions Data, ICAO Carbon Emissions Calculator



Marketing & Sales

Driving Sustainability through Marketing & Sales

At Ravago Building Solutions sustainability isn't just part of our products—it's embedded in every aspect of our business, including how we market and sell. Our commitment to sustainability extends across our marketing and sales operations, ensuring that we reduce environmental impact while promoting conscious consumerism.

Sustainable Marketing: A Greener Approach

Our marketing strategies are designed to minimize waste, promote eco-friendly products, and encourage responsible consumption. Here's how we make a difference:

Eco-Friendly Materials & Digital Solutions

We prioritize using eco-friendly materials in all printed materials, opting for recycled paper and sustainable inks wherever possible. In many cases, we've gone fully digital, reducing paper waste through online marketing campaigns and electronic brochures.

Green Branding & Transparent Messaging

We are committed to promoting products that meet high sustainability standards, ensuring clear and honest communication. Greenwashing has no place in our company—when we claim sustainability, we back it up with real data and certifications.

Sustainable Product Design

Our marketing teams highlight products and services that are designed to have minimal environmental impact, whether they are made from recycled materials, designed for long-term use, or come with minimal packaging.

Consumer Education

We believe that informed consumers make better choices. Through our marketing, we educate customers on how our products and services contribute to a more sustainable future, empowering them to make eco-conscious decisions.

Sustainable Sales: Ethical and Responsible Growth

Our sales teams are equally dedicated to sustainability, working to promote products and services that support both our customers' needs and the planet's well-being.

Promoting Sustainable Choices

Our sales staff are trained to communicate the environmental benefits of our offerings, helping customers understand how their purchasing decisions can positively impact the planet. Whether it's promoting energy-efficient products or eco-friendly services, sustainability is always at the forefront.

Ethical Partnerships

In line with our commitment to a sustainable supply chain, we collaborate with suppliers and partners who share our values. This ensures that from production to sale, every step of the process supports sustainability.

Building a Sustainable Future, Together

By integrating sustainability into our marketing and sales operations, we are reinforcing our commitment to a greener future. Whether it's through innovative product design, transparent messaging, or ethical sales practices, we are driving change that benefits both our customers and the environment.

Together, we can make sustainability the norm in all business practices, ensuring a better tomorrow for future generations.



Product

Sustainable Aspects of RAVATHERM™ XPS

Enhanced Energy Efficiency

Over the years, we have optimized the lambda value of RAVATHERM™ XPS X from 0.031 to 0.030, significantly improving its thermal insulation performance. This results in better energy efficiency for buildings, reducing the need for heating and cooling, and helping to lower their carbon footprint.

Low Global Warming Potential (GWP)

RAVATHERM™ XPS is engineered with an exceptionally low Global Warming Potential (GWP) of less than 5, making it one of the most environmentally responsible insulation products available. Its low GWP ensures minimal contribution to global warming throughout its lifecycle.

Exceptional Longevity and Performance

RAVATHERM™ XPS is known for its remarkable durability. In fact, we have opened inverted roofs after nearly 40 years and found that the thermal insulation properties remained unchanged. This long-lasting performance not only ensures reliable insulation over decades but also makes the product highly sustainable, as it minimizes the need for replacement and additional resource consumption.

Durability and Longevity

Beyond its proven lifespan in real-world applications, RAVATHERM™ XPS is designed to maintain its insulating properties under challenging conditions, further extending its service life and reducing the overall environmental impact of buildings.

Environmental Impact Reduction

By improving a building's energy efficiency over the long term, RAVATHERM™ XPS help to lower overall energy consumption and associated emissions, making a meaningful contribution to reducing the environmental impact during the operational phase of buildings.

New product introduction in France and Spain

After years of dedicated research and innovation, we are proud to introduce **RAVATHERM™ XPS MULTI** – our latest advancement in high-performance thermal insulation. Designed with sustainability and versatility at its core, RAVATHERM™ XPS MULTI delivers robust insulation that meets the evolving needs of modern construction.

RAVATHERM™ XPS MULTI is a high-performance thermal insulating panel made from extruded polystyrene. Renowned for its robustness and durability, this product reflects our commitment to environmental sustainability.

Here are the key features:

Recycled Materials: RAVATHERM™ XPS MULTI incorporates <50% recycled materials, significantly reducing its carbon footprint and promoting a circular economy.

Free from Expansion Gases: Manufactured without harmful expansion gases, this product contributes to a healthier indoor environment and protects the ozone layer.

No Colorants: The manufacturing process does not include any colorants. While the color may vary due to the use of recycled panels, this does not affect the product's performance.

Durability and Longevity: Designed for exceptional thermal and mechanical performance, this product minimizes the need for maintenance or replacement, thus reducing long-term waste.

100% Recyclable: At the end of its life cycle, RAVATHERM™ XPS MULTI is fully recyclable, contributing to an environmentally friendly lifecycle.

High Thermal Performance: With a thermal conductivity (lambda) of 0.032 W/(m·K), this insulation minimizes energy losses, supporting the energy efficiency of buildings and reducing their overall consumption and CO₂ emissions.

In Summary: MULTI is the best in class XPS in the market regarding environmental footprint and insulation properties while still available at affordable prices.



Product end-life

Recyclability and Circularity

At the end of its life, RAVATHERM™ XPS is designed to be recyclable, allowing the materials to be reintroduced into the production cycle, supporting the circular economy and reducing landfill waste.

Take-Back Programs and Partnerships

To ensure responsible handling at the end of the product's life, we offer take-back programs i.e. the cooperation with FPX in Germany, that facilitate the recycling or reuse of used RAVATHERM™ XPS insulation, minimizing construction waste.



Safe Disposal Options

For any components that cannot be recycled, we provide clear guidance on safe disposal practices, ensuring the environmental impact is kept to a minimum. Additionally, we explore waste-to-energy options when recycling is not possible, ensuring that non-recyclable materials are used responsibly.

Recycled Content and Sustainability

All of our XPS produced in Europe contains a substantial proportion of recycled raw materials, significantly reducing the need for newly extracted resources. This commitment to using recycled content not only minimizes our environmental footprint but also supports a more circular economy. Our R&D efforts are continuously focused on increasing the levels of recycled raw materials in our products, with the goal of offering the most sustainable XPS insulation on the market.



RAVATHERM™ XPS – Versatile & Long-lasting

Durability for Long-Term Efficiency

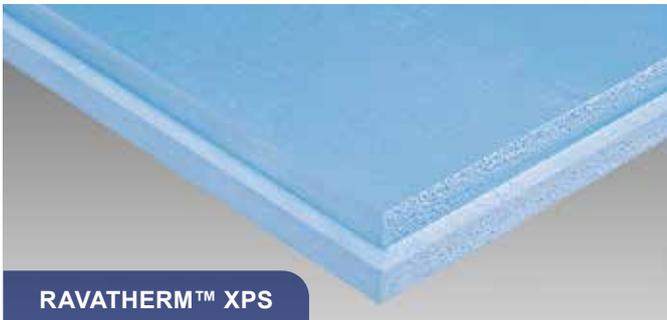
The durability of XPS insulation is unparalleled. Our products provide thermal efficiency that remains intact for decades. With their resistance to moisture and pressure, they maintain their performance, helping to reduce the energy consumption of buildings over their entire lifespan. This not only leads to significant cost savings but also minimizes the ecological footprint of your construction projects.



Recyclable for a Sustainable Future

XPS insulation stands out for its outstanding reusability. Thanks to its robust structure and durability, RAVATHERM™ XPS can be easily recycled and reused in new projects once they reach the end of their lifespan. This not only reduces the need for raw materials but also minimizes waste, actively contributing to environmental protection.

Our Product Families



The Smart Choice for Thermal Insulation

RAVATHERM™ XPS is a high-performance thermal insulation board that stands out in the insulation market for its numerous advantages:

Key Benefits

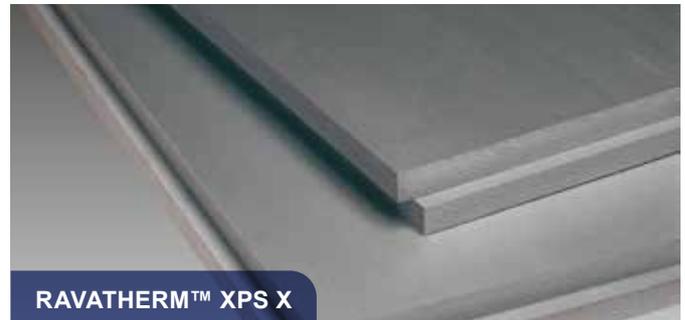
Exceptional Thermal Performance: RAVATHERM™ XPS provides superior thermal resistance, helping to maintain optimal indoor temperatures and reduce energy consumption. Its low thermal conductivity ensures that buildings remain warm in winter and cool in summer.

Long-Lasting Durability: Designed to withstand the test of time, RAVATHERM™ XPS is highly resistant to aging, moisture, and chemical damage. This longevity translates into lower maintenance and replacement costs over the life of the building.

Water-Resistant Properties: The closed-cell structure of RAVATHERM™ XPS makes it impermeable to water, preventing moisture absorption that can lead to mold growth and thermal bridging. This ensures a healthier indoor environment and enhances the insulation's effectiveness.

Sustainability Commitment: Manufactured using environmentally friendly processes, RAVATHERM™ XPS contributes to sustainable building practices. It can also be recycled at the end of its life, minimizing landfill waste.

Versatile Applications: Suitable for a wide range of applications, including roofs, walls, and floors, RAVATHERM™ XPS can be used in both residential and commercial buildings. Its versatility makes it a go-to choice for architects and builders.



The Sustainable Choice for Superior Insulation

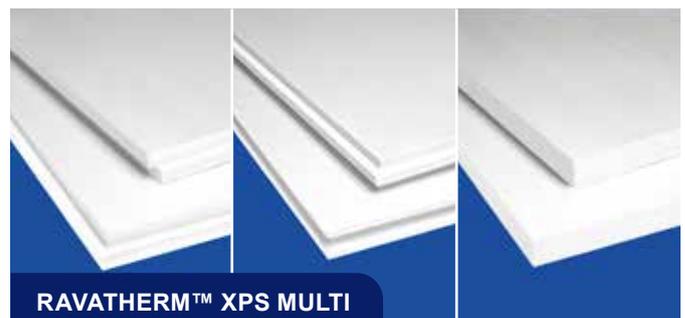
RAVATHERM™ XPS X is a polystyrene extruded foam that meets the rigorous standards set by the Deutsche Gesellschaft für Nachhaltiges Bauen (DGNB). This means you can achieve exceptional insulation performance while significantly reducing the thickness of insulation materials compared to conventional XPS products.

Key Benefits

Enhanced Insulation Performance: RAVATHERM™ XPS X, you achieve superior thermal efficiency, ensuring your buildings remain energy-efficient year-round.

Reduced Material Thickness: Our innovative technology allows you to use much thinner layers without compromising on performance, saving you valuable space.

Environmental Responsibility: By choosing RAVATHERM™ XPS X you're not only optimizing your insulation but also making a positive impact on the environment. Our eco-friendly manufacturing process reduces waste and lowers your carbon footprint.



RAVATHERM™ XPS MULTI is a versatile and eco-friendly thermal insulation panel crafted from extruded polystyrene, designed to deliver high performance in diverse applications. With > 50% recycled content and manufactured without harmful expansion gases, it offers robust durability while promoting sustainability. Its excellent thermal conductivity ($\lambda = 0.032 \text{ W}/(\text{m}\cdot\text{K})$) enhances energy efficiency, making it ideal for use in floors, walls, roofs, and more. Fully recyclable at the end of its lifecycle, RAVATHERM™ XPS MULTI is a resilient, environmentally conscious choice for modern construction needs.

XPS Building materials plants



Co-operation



Ravago Building Solutions is a member of the Green Roof Organisation (GRO), an independent, not-for-profit trade association, established to support and develop the UK Green Roofing industry.

RAVATHERM™ XPS X insulation boards were originally designed for inverted roof applications, providing exceptional thermal performance for buildings, and reducing the need for heating and cooling systems. Green roofs retain these thermal benefits while capturing carbon dioxide in plants and creating habitats for urban wildlife. These environmental benefits can only be realised when a green roof is designed and installed to meet performance criteria, and the GRO places a crucial role in ensuring best practice is followed.



SENTINEL HOLDING
INSTITUT



As a pioneer in the industry, Ravago Building Solutions is one of the first companies ever to utilize the innovative Product Pass from the renowned Sentinel Holding Institute (SHI). This groundbreaking innovation simplifies and expedites the search and documentation of essential product qualities concerning sustainability, health, and recyclability.

The Sentinel Holding Institute offers a comprehensive range for healthier and sustainable construction. Only products that meet specific criteria for environmental compatibility are included and listed by the Sentinel House. These products receive a sustainability certificate and the „QNG ready“ label. Ravago Building Solutions has been represented with RAVATHERM™ XPS since 2023.



DGNB®

Deutsche Gesellschaft für Nachhaltiges Bauen e.V.
German Sustainable Building Council

The DGNB (Deutsche Gesellschaft für Nachhaltiges Bauen) is the German Sustainable Building Council, which provides one of the leading international certification systems for sustainable building and development.

DGNB certification is a system for evaluating and recognizing the sustainability of buildings, interiors, and neighborhoods. It goes beyond environmental aspects by considering the entire lifecycle of a building and addressing economic, ecological, and social dimensions. As a member of the DGNB, Ravago Building Solutions is part of a leading network promoting sustainable construction practices, innovation, and collaboration.

FPX Fachvereinigung
Extruderschamstoff



Ravago Building Solutions Germany is cooperating along to FPX e.V. to the sustainable initiative “XPS Circular System”

The goal: sorting of clean XPS insulation board sections, The material is crushed, melted, homogenized, compacted, extruded through a nozzle, and cut into lentil shape.

In short: It is recycled. The resulting reggranulate is mainly used for the production of new XPS insulation boards.

Co-operation with Interzero, Germany

Through our co-operation with our logistic partner Interzero Germany, we were able to save 318 Tons of gas emissions and 1,889 Tons of primary resources.



In practice that means:

- The annual emissions of approximately 70 average cars
- The energy consumption of about 35 households per year
- The carbon sequestration of approximately 28 hectares of forest over one year
- The emissions from approximately 390 round-trip flights between Berlin and Paris.



Certifications



The Produktpass is an initiative aimed at enhancing transparency in the construction industry, particularly for building materials, by providing detailed information about the product's composition, environmental performance, and lifecycle. The Sentinel House is a certification and testing platform designed to assess and ensure that products meet sustainability standards, especially in terms of their environmental impact and performance.

All our products are certified with a Produktpass offering a digital certification that helps stakeholders – such as manufacturers, architects, and builders – access comprehensive data about building materials. This ensures that our products used in construction meet specific environmental, social, and regulatory criteria.



Our products come with Environmental Product Declarations (EPDs), ensuring that sustainability is at the core of every construction project. These EPDs provide transparent and verified information about the environmental impacts of our products throughout their life cycle. From raw material extraction to production and disposal, we prioritize eco-conscious practices to minimize our carbon footprint. With our EPDs, you can confidently choose environmentally responsible solutions that contribute to a greener future while meeting your project's needs for quality and performance.



Our building certifications provide you with security and confidence in your construction project. With our expertise and experience, we assist you in realizing your visions and smoothly implementing your construction project. Trust in our expertise to ensure the safe and efficient execution of your construction project.



Our plants in Lavrion, Rheinmünster and Drusenheim have been producing RAVATHERM™ XPS X panels for years with a minimum recycled content of 10%. This is to comply with the current legislation in force in Italy, aimed at the realization

of building projects sensitive to environmental issues. All RAVATHERM™ XPS X panels produced in Lavrion are therefore “CAM (criteri ambientali minimi) Certified”.



Reference-Project Germany

Sustainable Construction at its Finest: Richard-Strauss-Straße 76, Munich

At the heart of Munich's Bogenhausen district, Züblin AG is leading the way in sustainable construction with the development of two high-rise buildings and a connecting structure at Richard-Strauss-Straße 76. This project to be finished by 2026, exemplifies our commitment to responsible building practices, resource conservation, and community well-being.

With a total site area of **19,600 m²**, this project embraces innovative, eco-friendly techniques from excavation to construction. The selection of insulation material was a key element in aligning the project with its sustainable building concept. To meet these high standards, RAVATHERM™ XPS 300SL in 140mm and 160mm thickness was chosen for its superior thermal efficiency and environmental benefits. Its high durability and resistance to moisture make it an ideal choice for the perimeter insulation in demanding construction projects like this one. By choosing RAVATHERM™ XPS 300 SL, Züblin AG ensures the building meets the highest standards of thermal performance and sustainability – critical factors in the successful implementation of this green project. The former Siemens building on this site was demolished in 2021, and the design of the new excavation balances practicality with environmental stewardship. Half of the excavation will feature a bored pile wall, while the other half utilizes a sheet pile wall, both secured with anchors to minimize environmental impact and ensure stability, particularly near the adjacent Underground metro tunnel.

Gold Certification

This project is aiming for **Sustainable Construction Site certification** from the **German Sustainable Building Council (DGNB)**. The approach is driven by clear objectives:

- **Resource Efficiency:** Recycling demolition materials to reduce waste and transport needs.
- **Emission Reduction:** Implementing cutting-edge noise and dust control technologies, including soundproof curtains and monitoring systems.
- **Worker and Community Well-being:** Protecting nearby natural landscapes and ensuring the health and safety of all site personnel.

Picture credits: Zueblin München

Innovative Techniques for a Greener Future

Sustainability efforts are reflected in several key measures that go beyond typical construction practices:

- **Noise Control:** During rotary drilling, soundproof curtains are installed around the machinery to reduce noise pollution. In certain areas, scaffolding fitted with soundproof cladding moves along with the equipment to ensure continuous protection.
- **Recycling Demolition Materials:** A portion of the demolition debris from the old Siemens building is crushed and reused on-site, minimizing the need for external fill material and transport, thus reducing the project's carbon footprint.
- **Eco-friendly Steel Sheet Piles:** The sheet piles used are made entirely from recycled steel and manufactured with 100% renewable energy. This reduces the CO₂ footprint of the materials by 80% compared to conventional methods.
- **Concrete Wash Area:** Dedicated washing and unloading stations for concrete trucks ensure that leftover concrete is managed efficiently. This concrete is crushed and recycled into the construction process, preventing unnecessary waste.
- **Photovoltaic Installations:** It is currently in discussions to install solar panels on the site's temporary structures, further enhancing the site's energy efficiency.
- **Tree Protection:** Special wooden fencing was installed to shield the surrounding trees from heavy machinery, preserving the local environment during construction.

Conclusion

Zublin AG chose RAVATHERM™ XPS 300SL for its exceptional thermal efficiency, durability, and environmental benefits, ensuring that the project meets the high sustainability standards required by DGNB and contributes to a greener, more energy-efficient future.



Reference-Project Greece The Tavros Project

At Tavros project, an old three floored building that was constructed back in 1972, the Greek engineers team called Passivistas, was using Ravago’s material RAVATHERM™ XPS 300 SL at a thickness of 20 cm extruded polystyrene boards.

Positive characteristics of RAVATHERM™ by Ravago:

1. High performance at thermal insulation. RAVATHERM™ delivers excellent thermal insulation and as a result reduces the thermal losses and ensures thermal comfort throughout the year.
2. Light and flexible. The lightness of RAVATHERM™, allows fast and easy installation, thus reduces time and cost of the construction works.
3. Resistance to humidity. RAVATHERM™ is designed to withstand water and humidity in general. This ensures that the lifecycle of the construction will be long without problems that involve humidity.
4. Reliability and performance. Declared characteristics of performance, ensures that RAVATHERM™ is a solid and valuable choice for demanding constructions, and ensuring the longterm quality.

Why RAVATHERM™ was the choice

The choice of Ravago’s RAVATHERM™ was based on the combined ability to offer high thermal insulation and humidity resistance and ease of construction. In combination with the sustainable practices that Passivistas team is committed, RAVATHERM™ is the ideal solution to create an energy efficient and friendly environment building.

This approach supports the goals of Tavros project and contributes to the philosophy of sustainable development and energy efficiency.

Screenshots from the energy audit before renovation

	Treated floor area of	Criteria	Alternative criteria	Fulfilled?
Space heating	Heating demand kWh/(m².a)	176.39	15	no
	Heating fuel Water	88	-	-
Space cooling	Cooling & dehum. demand kWh/(m².a)	55.63	17	no
	Cooling fuel Water	93	11	-
Frequency of overheating (> 25 °C) %				
		-	-	-
Frequency of excessively high humidity (> 12 g/kg) %				
		1	16	yes
Airtightness	Pressure-tightness test result n ₅₀ 1/h	2.0	1.0	no
Non-renewable Primary Energy (PE)	PE demand kWh/(m².a)	559	-	-
Primary Energy Renewable (PER)				
	PER demand kWh/(m².a)	334	211	no
	Generation of renewable energy (in relation to pre-project kWh/(m².a) building footprint area)	15	120	no

Screenshots from the energy audit after renovation

	Treated floor area of	Criteria	Alternative criteria	Fulfilled?
Space heating	Heating demand kWh/(m².a)	8.75	15	yes
	Heating fuel Water	9	-	-
Space cooling	Cooling & dehum. demand kWh/(m².a)	55.52	17	no
	Cooling fuel Water	10	11	yes
Frequency of overheating (> 25 °C) %				
		-	-	-
Frequency of excessively high humidity (> 12 g/kg) %				
		5	16	yes
Airtightness	Pressure-tightness test result n ₅₀ 1/h	1.0	1.0	yes
Non-renewable Primary Energy (PE)	PE demand kWh/(m².a)	63	-	-
Primary Energy Renewable (PER)				
	PER demand kWh/(m².a)	35	36	yes
	Generation of renewable energy (in relation to pre-project kWh/(m².a) building footprint area)	170	120	yes



Conclusion

From the screenshot we can see that energy consumption for heating and cooling was dramatically reduced. This fact results in lower expenses for the building residents but more importantly in better living conditions. Finally the actual value of the building was increased, by the energy upgraded constructions that were performed.

Dimitris Pallantzias
Building physicist NTUA
Certified Passivhaus designer



Reference-Project Hungary

OTP Headquarters – M12 Office Building, Budapest

Opened in the summer of 2022, OTP's new office building, located in Budapest, is a prime example of sustainable architecture. Built by Market Építő Zrt., the M12 office complex spans nearly 13,000 square meters and consists of seven floors, including three levels of underground parking. With a total area of over 84,000 square meters, the building has been awarded GOLD certification by the LEED (Leadership in Energy and Environmental Design) system for its environmentally conscious design and construction.

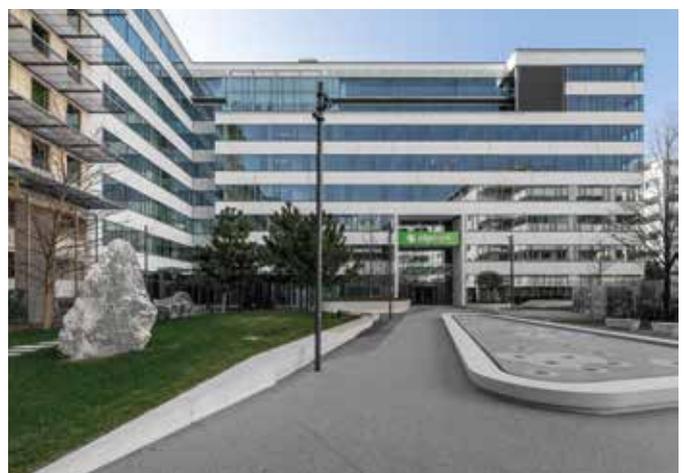
The M12 building features advanced, sustainable solutions, such as modern mechanical and electrical systems, ceiling heating and cooling, waste heat utilization from heat pumps for hot water production, rainwater recycling, and smart lighting control. Additionally, the building incorporates a cutting-edge management system to optimize the efficiency of various energy-generating devices. The parking garage, with space for 878 cars, is equipped with 20 electric car chargers, further emphasizing the project's commitment to sustainability.

A key focus of the design was thermal insulation, ensuring the building's energy efficiency. More than 1,000 m³ of RAVATHERM™ XPS 300 SL extruded polystyrene foam thermal insulation was installed on the inverted flat roof, with a thickness of 20 cm, providing optimal insulation and contributing to the building's overall sustainability.

The architectural concept of the M12 building is rooted in biophilia, emphasizing the integration of natural elements into the design. With lush green spaces, inner courtyards, roof gardens, and nature-inspired motifs in the interior, the building aims to create a pleasant and inspiring environment for its occupants.

Conclusion

RAVATHERM™ XPS 300 SL was chosen as the insulating material for the M12 building due to its exceptional thermal performance, durability, and resistance to moisture – qualities critical for the building's energy-efficient and sustainable design. Its ability to provide long-lasting insulation ensures minimal heat loss and contributes to the project's commitment to reducing environmental impact, aligning perfectly with the M12 building's advanced sustainability goals.



Picture credits: Ravago Building Solutions Hungary



Reference-Project Italy

Designing Sustainability with RAVATHERM™ XPS X

RAVATHERM™ XPS X, the high-performance gray XPS, played a key role in the energy-efficient renovation of the Building Parco Caserta in Reggio Calabria, Italy.

The project, completed at the end of October 2023, focused on revitalizing this prominent residential complex in the city. Spearheaded by civil engineer Giovanni Canale, the renovation embraced sustainability by incorporating advanced thermal insulation solutions, with Ravago Building Solutions as a strategic technical partner to ensure optimal energy efficiency and living comfort.

The Parco Caserta complex comprises seven buildings, housing around 100 residential and office units, alongside underground parking. Built in the late 1970s, the complex is situated on a hillside with favorable climatic conditions. However, to further enhance its energy efficiency, significant upgrades were made to the heating systems, including the installation of solar thermal and photovoltaic systems, new condensing boilers, and extensive insulation work on the building envelope, roofs, and terraces.

Collaboration for Sustainable Solutions

Ravago Building Solutions, contributed to the renovation of over 2,500 square meters of flat roofs and terraces, all insulated with RAVATHERM™ XPS X 300 SL.

For this project, 50mm-thick **RAVATHERM™ XPS X 300 SL** panels were chosen, offering a thermal resistance of 1.65 K/W and a thermal conductivity of λ_D 0.030 W/mK. The high resistance to water absorption, durability, and mechanical stress makes it an excellent solution for roof renovations, where durability is critical.

According to engineer Canale, „We removed the old screed

and waterproofing layer from the 1970s and installed a new lightweight screed and waterproofing system. On top of this, two layers of 5cm RAVATHERM™ XPS X 300 SL panels were placed, followed by a final screed and high-reflectance ceramic flooring.“

High Performance for Sustainable Design „We chose RAVATHERM™ XPS X 300 SL for its outstanding performance, which allowed us to minimize thickness. Its high compressive strength and resistance to mechanical stress, deformation, and aging, tested for up to 30 years, made it ideal for the external terraces and roofs where we installed the photovoltaic and solar thermal systems,“ explains Canale.

Conclusion

By integrating RAVATHERM™ XPS X into the project, the Super Building Parco Caserta stands as a model for sustainable renovation, combining energy efficiency with long-term durability, all while improving the comfort and quality of life for its residents.



Reference-Project Netherlands

Aquadrome Swimming Pool, Enschede

Sustainability at the Heart of Sports and Well-being

The newly constructed Aquadrome swimming pool in Enschede has been designed as a state-of-the-art center for sports, well-being, and recreation. It caters to a wide range of activities, including recreational swimming, swimming lessons, competitive sports, and events, all within a sustainable and future-proof framework.

Sustainable Design and Certification

The all-electric Aquadrome is a model of innovative, energy-efficient architecture, boasting an impressive score of 10 for energy performance in the GPR building assessment. It is a fully energy-neutral facility, achieving an EPC rating of 0.0. Key sustainability features include:

- **High-quality insulation**

The pool is insulated with 801 m² of RAVATHERM™ XPS 300 SL (180mm) and 2,301 m² of RAVATHERM™ XPS 300 SL (100mm), ensuring optimal thermal performance and energy savings.

- **LED lighting and energy-efficient systems**

Frequency-controlled pumps and heat recovery systems contribute to reduced energy consumption.

- **Solar energy**

The installation of 250 solar panels supports the building's energy neutrality.

- **Natural gas-free**

In alignment with the Netherlands' energy transition goals, the facility is completely free of natural gas, paving the way for a sustainable future.

Innovative Insulation with RAVATHERM™ XPS

The RAVATHERM™ XPS insulation from Ravago played a critical role in achieving the building's sustainability goals. Its key features include:

1. **High thermal insulation performance**

RAVATHERM™ ensures year-round thermal comfort and reduces energy losses.

2. **Lightweight and flexible**

Its light structure allows for quick and cost-effective installation.

3. **Moisture resistance**

Designed to withstand water and humidity, RAVATHERM™ ensures the longevity of the building.

4. **Reliability and durability**

With exceptional performance, RAVATHERM™ is a dependable choice for demanding construction projects.

Connection to Sustainable Heating Networks

The Aquadrome is future-ready, with the option to connect to Enschede's certified sustainable heating network, located near the site. This network can provide sufficient heat for the complex and swimming pool water, further improving the GPR and EPC scores.

Conclusion

RAVATHERM™ XPS was chosen for its lightweight and easy installation. IT supported the project's goals of achieving an EPC rating of 0.0 and a GPR energy score of 10. By reducing energy losses and aligning with innovative, gas-free technologies, RAVATHERM™ played a key role in realizing this fully energy-neutral, future-ready facility.

Picture credits: Ravago Building Solutions Benelux





Reference-Project UK

Building the UK's largest Passivhaus leisure centre with RAVATHERM™ XPS X 700 SL

The challenge

There's a lot resting on the basement of the new Spelthorne Leisure Centre. The facility could be one of the most energy efficient in the world when it opens, as well as the largest one in the UK built to Passivhaus standards. Making this possible requires insulation that ticks every box: compressive strength, thermal conductivity, and thickness – with the latter proving a key consideration, given the enormity of the basement, which alone holds a filtration room, a 20m x 10m learner pool, and an eight lane 25m pool with spectator seating.

The project team initially opted for another XPS insulation product, due to their familiarity with the brand, which was being used elsewhere in the project. However, it later became clear that this product was not compatible with mechanical fixing, presenting a dilemma for installing the insulation in the basement. *"It makes life so much easier to have that flexibility in application, particularly for Passivhaus, where you have to account for heat loss through even the fixings"*, explains Josh Wardle, senior architectural technologist at GT3 Architects.

The solution

The team began exploring more suitable alternatives, a search which led to RAVATHERM™ XPS X 700 SL. Phil Harding, senior design coordinator at Willmott Dixon: *"It was easier to use than the original product and surpassed it on thermal performance too"*. Two layers of 700SL (250mm) were applied to the underside of the pool slab and three layers (360mm) to vertical sides to achieve an improved U-value of 0.08W/m²K.

The results

Once complete, Spelthorne Leisure Centre will be the UK's largest wet and dry leisure centre to achieve the stringent and internationally recognised Passivhaus standards, with energy consumption expected to be up to 70% lower than a standard new building.

Customer feedback

"From the initial enquiry through to delivery on-site, it was a pleasure to have Ravago on board with Farncombe Construction to achieve the high specification insulation demanded by Passivhaus at Spelthorne Leisure Centre.

...

Numerous questions and requests from our team regarding deliveries and installation were dealt with promptly and professionally.

...

The regular updates given to our site management with information of delivery dates and times helped immeasurably with the specific logistics on a project surrounded by the general public."

Tim Harrison, Construction Director, Farncombe Construction

Conclusion

RAVATHERM™ XPS X 700 SL was chosen for its superior thermal performance, compatibility with mechanical fixing, and ease of application—key factors for meeting the stringent Passivhaus standards. By achieving an impressive U-value of 0.08W/m²K, it ensured optimal energy efficiency while simplifying installation logistics for a challenging project.





Ravago Building Solutions

www.ravagobuildingsolutions.com

Notes: The information and data contained herein are provided to the best of our knowledge and belief. However, no guarantees are made. Furthermore, no liability, warranty, or guarantee is assumed for systems or applications in which Ravago Building Solutions products are used. No release from patent claims can be derived from this. This document does not constitute a sales specification. The decision regarding the suitability of Ravago Building Solutions products for any particular application lies with the buyer. It should be noted that any construction measure, including thermal insulation, is subject to applicable building regulations, and the buyer is responsible for ensuring that relevant laws and regulations are observed during processing and disposal. The buyer must consider that applicable laws and regulations may vary locally and can change over time.