



By  Hydro

HOW TO ACHIEVE A CIRCULAR RENOVATION?

Your guide to low carbon renovation




Architecture School INSA, France
Photographer: Camille Charbi
Architect: COSA / RHB (associated)

EDITORIAL



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Property owners, subject to increasingly stringent regulations and environmental commitments, are seeking solutions for sustainable renovation and reducing energy costs.

"The built heritage is a precious legacy, carrying history, identity, and aesthetics that must be renovated today.

In the face of current environmental challenges, the preservation of these buildings is crucial. Renovation represents a significant investment that must endure over time, adapt to usage, and maintain the value of the real estate asset.

Property owners, subject to increasingly stringent regulations and environmental commitments, are seeking solutions for sustainable renovation and reducing energy costs.

How can renovation be reconciled with a controlled carbon footprint, performance, and respect for authenticity? TECHNAL, a pioneering player in decarbonisation, continues its commitment to more sustainable, resilient buildings that are better adapted to global warming by offering solutions tailored to the circular renovation of buildings."

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PARTNER OF PROFESSIONALS



01. THE IMPORTANCE OF **RENOVATING** BUILDINGS



Building renovation is a key lever for reducing greenhouse gas emissions, preserving resources, and adapting to new regulations. In the face of rising raw material costs and climate demands, it allows for the optimisation of material usage while enhancing real estate heritage. This is a major challenge for an industry that must balance environmental performance with the longevity of investments.

ADDRESSING CLIMATE CHALLENGES, RESOURCE PRESERVATION AND NORMS

- **The 11th Sustainable Development Goal (SDG) adopted by the UN**, which aims to make human settlements more "safe, resilient, and sustainable" by 2030, is mobilizing all stakeholders in the building sector.
- **Responding to inflation and the increasing scarcity of raw materials** makes the reuse of building materials more necessary than ever.
- **The standards and regulations** governing the sector are constantly evolving and require continuous adaptation efforts.

ENVIRONMENTAL PERFORMANCE AT THE HEART OF THE ISSUES.

Mitigating the effects and adapting to them represents a dual objective that the building sector, responsible for more than a fifth of global greenhouse gas emissions, must address.

Aware of this challenge, its main stakeholders clearly expressed their commitment to advancing towards decarbonisation in March 2024, through the Chaillot Declaration, adopted by 70 countries at the conclusion of the Global Building and Climate Forum. To achieve this, however, the right strategy must be adopted. In the field of construction, all discussions on the subject lead to the same conclusion: the shortest path to carbon neutrality lies in the high-performance renovation of buildings. This is particularly true within the European Union, where **85% to 95% of approximately 220 million housing units will still exist in 2050.**

ENHANCEMENT OF REAL ESTATE HERITAGE

For stakeholders in the building sector, the environmental challenge is accompanied by a real financial challenge. The rapid evolution of the regulatory and normative framework in the sector has a direct impact on the value of assets.

Their high-performance renovation is not only a way to achieve the objectives set by the Paris Agreement, but also helps protect long-term investments by maintaining the value of real estate heritage over time, both in terms of structure and usage. This sustainability is beneficial to both the public and private sectors.

COMFORT AND QUALITY OF SPACES

Adopting a sustainable renovation approach for buildings not only leads to increased energy performance of infrastructures (insulation, ventilation, etc.), but also enhances the quality of life and comfort for residents and users.

This improvement can even extend to the expansion of living spaces, made possible by the technical quality of the materials used. This renovation approach can also involve changes in the building's purpose. It allows for the shared use of spaces (co-working, co-living, etc.), offering a significant space gain, particularly at a time when regulatory pressure around land artificialisation is intensifying.

Global investment in energy efficiency for buildings increased by **14%** in 2021, according to the United Nations Environment Programme (UNEP).

The global market for building energy performance was valued at **285 \$ BILLION** in 2022, according to the latest edition of the Global Status Report on Buildings and Construction.

The EU has set a **70%** target for the recovery of waste from the construction and demolition sector, as part of the Energy Transition for Green Growth Act of August 17, 2015, with a deadline of 2020. This target has not yet been achieved.

Two forward-looking studies conducted by Ademe (France) in 2019 highlighted that new construction would consume 1.3 billion tonnes of materials, which is 17 times more than the renovation of the existing stock to the BBC standard, between 2015 and 2050.

AMBITIOUS GOALS

Sustainable building renovation is not limited to improving energy performance.

It also contributes to the quality of life of occupants, while addressing the economic and environmental challenges of the sector.

More than a necessity, it is an opportunity to rethink our spaces to make them more comfortable, functional, and adapted to the needs of tomorrow.

26%

of non-residential buildings in the EU will need to be renovated by 2033.

Source: The European Directive on the Energy Performance of Buildings, 2024.

20% to 22%

The average primary energy consumption of residential buildings will need to decrease by 20 to 22% by 2035.

Source: The European Directive on the Energy Performance of Buildings, 2024.



02. GO FURTHER WITH DECARBONISED RENOVATION



Beton House, UK
Photographer: John Kees Photography
Architect: Whittam Cox

PRINCIPLES OF **DECARBONISATION** IN BUILDING **RENOVATION**

The decarbonisation of buildings is based on three key principles: sobriety, circularity, and anticipation. Renovating frugally limits the carbon footprint by focusing only on what is essential. The integration of recycled materials and the design of buildings for disassembly pave the way for more sustainable architecture, where each element can be reused to reduce the environmental footprint of the sector.

ADOPT A FRUGAL RENOVATION APPROACH

This approach aims for optimal resource use and involves renovating only what is strictly necessary.

For example, changing only certain parts of a façade, such as glazing and covers, while retaining the framework, meets this imperative.

INCORPORATING PRODUCTS MADE FROM RECYCLED MATERIALS.

Frugality and circularity go hand in hand in decarbonised renovation. It is essential to prioritise the use of products made from recycled materials (such as recycled concrete, recycled glazing or recycled aluminium).

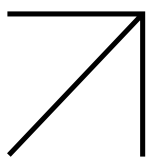
Often less energy-intensive, these materials contribute to reducing the carbon footprint of the building.

ANTICIPATING THE END OF A BUILDING'S LIFE.

Designing easily disassemblable and sortable systems not only facilitates the replacement of building components without complete demolition but also allows for the reuse of some of its elements.

This approach promotes circularity and mechanically reduces the amount of construction waste.





KEY STEPS FOR A **CIRCULAR RENOVATION**

01

AUDIT OF EXISTING MATERIALS.

It is impossible to adopt a circular approach without evaluating the potential of the materials present in the building to be renovated.

The goal is to accurately determine which materials can be preserved, reused, or recycled.

This analysis is even more crucial due to the evolving regulations regarding waste reduction.

02

SELECTIVE DECONSTRUCTION

The traditional demolition/construction approach has lost its relevance. Increasingly, selective deconstruction projects are replacing it.

This approach, which involves partially dismantling a building, allows for the recovery of certain materials.

It aims to reduce waste while promoting reuse and recycling, both for environmental and economic reasons.

03

SELECTION OF SUPPLIERS AND PARTNERS

Circularity applied to buildings requires the mobilisation of an entire ecosystem of partners capable of meeting its demands. Suppliers of recycled and recyclable products with a low carbon footprint, producers of renewable energy, decarbonised transporters: a network of local stakeholders must contribute to the implementation of circular renovation programs.

This is why TECHNAL expects its suppliers to adhere to a strict specification for accessories and other components of aluminium systems (such as, for example, its supplier of recycled polyamide gaskets).

URBAN MINING

Transforming urban waste into reusable resources

Originally developed to describe the recovery of raw materials from electronic devices, the concept of urban mining has since spread to the building sector. The principle is simple: collect any material from a building at the end of its life that can be reused, recycled, or repurposed. This approach proves to be virtuous in many ways:

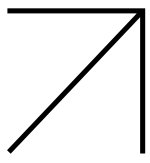
➤ It addresses the issue of the depletion of natural resources.

➤ It follows a local approach, thus reducing the need for transportation.

➤ It also reduces the carbon footprint of the structures to which these materials are reintegrated.

➤ It helps reduce renovation costs.

➤ It also reduces the amount of waste.



BENEFITS OF CIRCULAR BUILDING RENOVATION

REDUCTION OF CARBON FOOTPRINT

By renovating with recycled materials or reusing existing elements, **emissions related to the extraction, production, and transportation of new materials are significantly reduced.**

OBTAINING ENVIRONMENTAL CERTIFICATIONS

Buildings designed with a circularity approach meet the criteria for ecological certifications (such as LEED, HQE, or BREEAM), which, in addition to their positive environmental impact, help **enhance the long-term value** of these real estate assets.

EASIER PROJECT FINANCING

Encouraged by public authorities and supported by an increasingly stringent regulatory framework in terms of environmental standards, **circular renovation projects are attracting more and more attention from investors.**

INCREASED BUILDING VALUE UPON RESALE

Circular renovation not only preserves the existing structure, but also makes it more sustainable, energy-efficient and easily adaptable, **making it more attractive for resale.**

LONG-TERM COST SAVINGS

Circular renovations often include solutions aimed at improving the energy efficiency of buildings (such as better insulation, etc.).

This leads to long-term savings on energy bills.

POSITIVE IMPACT ON THE COMPANY'S REPUTATION

Circular renovation is part of a global, foundational movement that addresses the collective challenges of our time. Participating in such projects can only have a **positive impact on the image of their stakeholders**, especially in a field as strategic as construction.



"We are deconstructing to rebuild less and less. And that's a good thing in terms of carbon impact."

Vianney FULLHARDT
Director of Energy Transition and Low Carbon
Eiffage Construction



RENOVATION IN OCCUPIED BUILDINGS, A CONSTRAINT... AND **AN OPPORTUNITY**

All project managers know that renovating in occupied buildings comes with a number of constraints. This type of project, which is expected to increase due to the rise in operations on existing buildings, is, however, not without its advantages.

NO RELOCATION COSTS DURING THE RENOVATION WORK

By definition, renovation in occupied buildings involves keeping the residents and users of the building in place. While this situation brings its share of challenges (safety, limiting nuisances, etc.), it also helps avoid others, such as the search for and funding of temporary relocation solutions or the displacement of activities.

ONLY TOUCH WHAT IS NECESSARY TO CONTROL COSTS

Renovating an occupied building requires limiting interventions that could affect the comfort of its occupants. This imperative leads to prioritizing an approach of preserving the existing structure (such as the spine of a façade) and replacing the elements integrated into it (for example, the glazing).

REDUCED INTERVENTION TIME

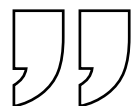
For obvious reasons, working on an occupied site requires working quickly. The renovation time, compared to a traditional renovation, is significantly reduced. There are plenty of project examples that demonstrate this.

All of these factors contribute to a significant decrease in renovation costs.



"This transformation work can be done in an occupied site."

Jean-Philippe Vassal
Co-founder of Lacaton & Vassal architecture
Laureate 2021 - Pritzker Architecture Price

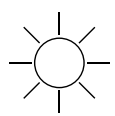
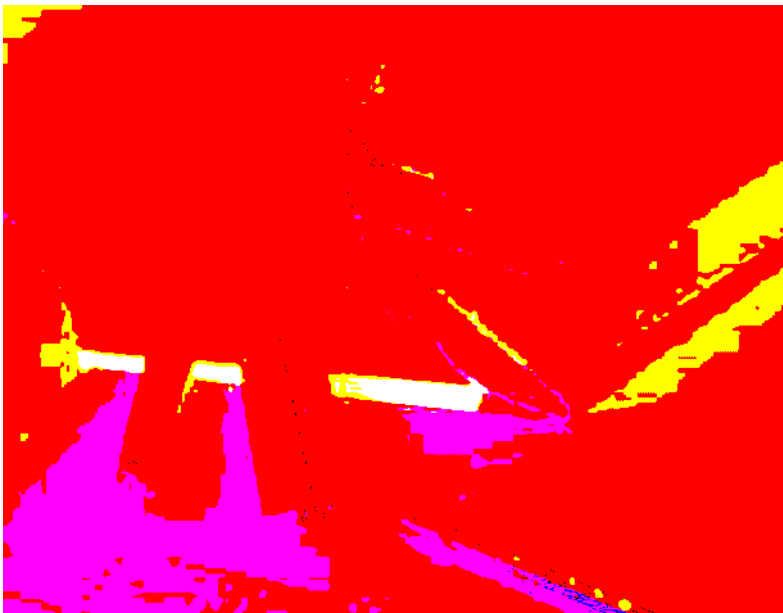


03. RENOVATION OF ALUMINIUM SYSTEMS

Zwarte Fles, Belgium
Photographer: Michiel Vergauwe
Architect: Vi.architectuur.atelier

ALUMINIUM, KEY PLAYER IN CIRCULAR RENOVATION

It is impossible today to adopt a sustainable renovation approach without prior consideration of the materials used. This is especially true in the design of aluminium systems, where materials such as aluminum, plastic, wood, and steel can be integrated. While each of these materials offers certain advantages, aluminum combines a set of properties that make it an excellent candidate for circular renovation.



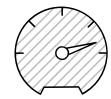
IMPROVED THERMAL INSULATION, ACOUSTIC PERFORMANCE, AND ENERGY EFFICIENCY

Contrary to popular belief, aluminum joinery is highly efficient. The thermal break technology gives it exceptional insulating properties, ensuring optimal thermal comfort, both in summer and winter. Furthermore, the slim profiles of aluminum allow for a significant increase in glazing surface, thus promoting a generous intake of natural light.



DURABILITY AND STRENGTH

Lighter and more flexible than most other metals, such as steel, aluminium remains strong. This strength can be enhanced through anodisation and alloys with other metals. These processes help prevent premature aging of aluminum products and provide good resistance to corrosion. (For example, the dome of the San Gioacchino Church in Rome was covered in aluminum sheets in 1898, which are still original, more than a century after their installation.)



MINIMAL MAINTENANCE

Whether anodised or painted, and unlike wood, aluminum requires no specific maintenance.

Given its long lifespan, this represents a significant advantage in terms of both economic and ecological cost.



MODERN AND CUSTOMIZABLE AESTHETICS

The density of aluminium is about three times lower than that of steel, making it one of the most malleable and ductile metals in the world.

These mechanical properties provide great design flexibility, amplified by extrusion processes that offer an almost infinite range of potential shapes.

This creative advantage is further enhanced by the hundreds of surface finish options that aluminium allows.



RECYCLABILITY AND REDUCED ENVIRONMENTAL IMPACT

Aluminium can be recycled infinitely.

The result is a significant reduction in pressure on resources and substantial energy savings (see page 15 "maintained quality and durability").

ADVANTAGES OF TECHNAL SOLUTIONS

In the face of the challenge of reducing the environmental impact of the industry, TECHNAL offers solutions capable of lowering the carbon footprint of buildings while enhancing their energy performance.

A REDUCED CARBON FOOTPRINT FOR AN ENVIRONMENTAL IMPACT

TECHNAL solutions integrate 75% recycled content and are 95% recyclable, thus reducing their environmental impact. Their main component, Hydro CIRCAL® aluminum (composed of at least 75% post-consumer aluminum), has

a carbon footprint of 1.9 kg CO₂ eq./kg Al, which is up to 80% lower than the European average compared to primary aluminum.

MAINTAINED QUALITY AND DURABILITY

"Recycling" is not synonymous with a loss of quality. TECHNAL's recycled

GUARANTEED HIGH PERFORMANCE

The operational phase represents a significant portion of a building's life cycle. Therefore, the most effective way to reduce its operational emissions is to offer high-performance products that optimize energy consumption.

This is why TECHNAL products are tested and certified for their sealing qualities (water, air and wind), thermal and acoustic insulation and resistance.

COMPLIANCE WITH ENVIRONMENTAL STANDARDS

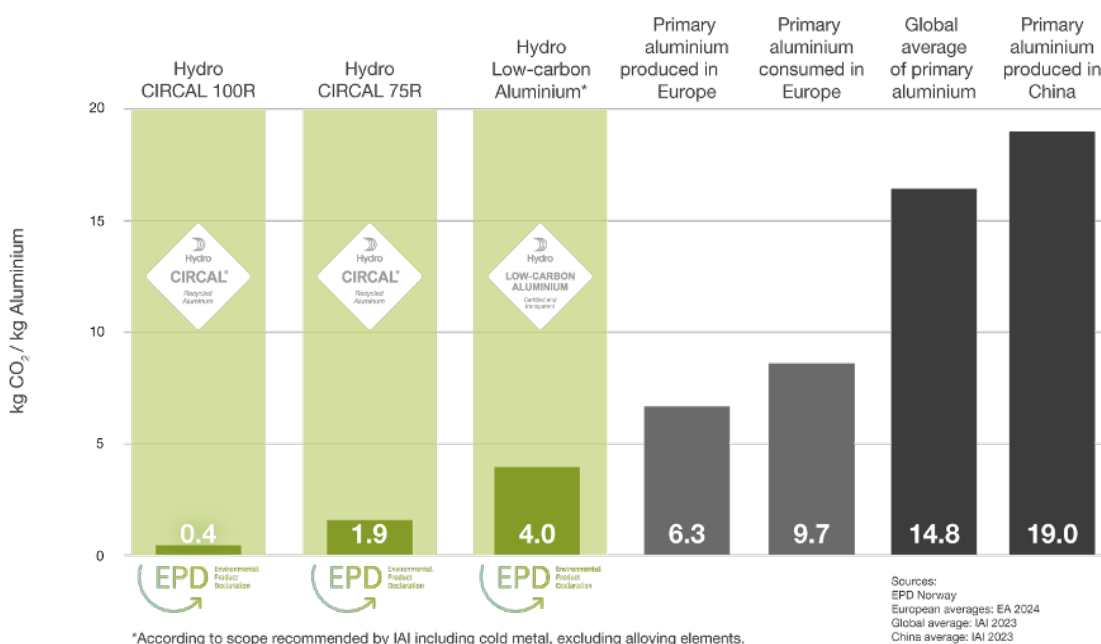
The brand's products comply with international standards (notably EN 15804 and ISO 14025). Due to their intrinsic qualities, they also meet the requirements of the most demanding environmental certifications and labels (see Focus on labels).

This is a significant advantage in terms of eligibility for environmental subsidies and financial assistance.

EASY TRACEABILITY AND MAINTENANCE

Thanks to GeniusID, it is possible to quickly access TECHNAL product information (quotes, technical details, 3D views, spare part references, etc.) via a simple QR code.

CO₂ CARBON FOOTPRINT OF ALUMINIUM



THE CERTIFICATIONS AND LABELS RECOGNIZED BY TECHNAL

Firmly committed to a sustainable approach, TECHNAL develops products that meet the most demanding national and international environmental certifications.



LEED (Leadership in Energy and Environmental Design)
Originating from North America, LEED is the most widely used environmental building assessment system in the world. It provides a framework for healthy, highly efficient, and cost-effective green buildings that offer environmental, social, and governance benefits.



HQE (Haute Qualité Environnementale)
Founded in 2004 based on a framework of 14 targets, the concept now supported by the HQE - France GBC association aims to "limit both the short-term and long-term environmental impacts of a construction or rehabilitation project, while ensuring healthy and comfortable living conditions for the occupants.

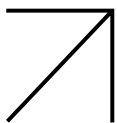


BREEAM (Building Research Establishment Environmental Assessment Method)
It is the method for evaluating the environmental behavior of buildings. Created in 1986, this label has gradually become one of the most comprehensive and recognized methods for calculating the environmental performance of buildings.

A photograph of two men in business attire shaking hands. The man on the left is wearing glasses, a grey blazer, and a blue shirt, and is smiling. The man on the right is partially visible, wearing a dark suit. The background is a bright, out-of-focus office environment. White lines in the top right corner form a partial frame.

04. INTERVIEW WITH A BUILDING INVESTOR

INTERVIEW WITH AN EXPERT IN PRIVATE EQUITY INVESTMENT



Jean-Pierre SABATIER, a private equity investment expert, in relation with investors at a European real estate operator, shares his vision on renovation.



WHAT DOES YOUR ACTIVITY CONSIST OF?

Our business consists of identifying degraded or obsolete real estate assets and carrying out renovation and transformation work to bring them up to the highest environmental standards, in order to add value and later sell them. All of this is done while naturally taking into account the expectations of the users.

HAS DECARBONISED RENOVATION AND CONSIDERATION OF USER EXPECTATIONS BECOME ESSENTIAL IN YOUR VIEW?

Absolutely. On one hand, user needs have evolved significantly in recent years across all real estate asset classes, and it is essential to take these changes into account.

Crises like the Covid pandemic have shifted demand and the trend now leans towards optimizing space, whether in residential areas or offices.

As for renovation, the focus on regulatory optimization regarding energy standards has become unavoidable.

The priority now is to focus on assets classified as BEPOS (Positive Energy Buildings). This is actually the general goal: moving towards positive energy buildings. The search for regulatory optimization in buildings has become essential.

CAN BUILDING RENOVATION HELP INCREASE THE VALUE OF A REAL ESTATE ASSET?

That's the whole point of the process. **Today, a building with poor energy performance is no longer of interest. It is already difficult, if not impossible, to rent or sell.**

However, if the asset meets the highest standards in terms of energy certification, it becomes immediately more attractive because it is more comfortable for its users and has moderate maintenance costs.

Therefore, value is added through efficient renovation, and the most energy-efficient assets are the most sought after by future buyers and institutional investors.

AS A REAL ESTATE OPERATOR, WHAT RETURN ON INVESTMENT DO YOU EXPECT?

This obviously varies from one asset to another, as it depends on the work undertaken. But let's take a typical example: an obsolete asset with an acquisition cost of 100. For this operation, a renovation and technical fees budget of around 35 should be allocated to bring it up to the highest standards.

Upon completion, this investment could increase the asset's value by 33, once all project-related expenses are accounted for.

This is substantial, and the asset's new durability undoubtedly enhances its value in the eyes of future buyers.

05. CASE STUDY



Cinema Batalha, Portugal
Photographer: Brutos audiovisual
Architect: Atelier 15



TOWER

BOIS-LE-PRÊTRE

The Bois-le-Prêtre Tower is a 16-story building located in the 17th arrondissement of Paris, social housing units.

Built in 1959, the tower was initially slated for demolition in the late 2000s. However, under the influence of the city hall, the landlord ultimately opted for a rehabilitation and expansion of the entire building.

Entrusted in December 2009 to architects Anne Lacaton and Jean-Pierre Vassal, the project resulted, after the completion of the work, in:

- A 40% increase in the net usable floor area (from 8,900 to 12,460 m²).
- The development of additional housing units (from 96 to 105). The increase in apartment sizes from 20 to 60 m² (from studio to 7-room apartments).

TECHNAL, a key player in this transformation.

TECHNAL's aluminium systems facilitated the customization of the building, characterised by the creation of a double-skin facade. This allowed for the addition of 2-meter-deep winter gardens, extended by continuous one-meter balconies. The building's energy renovation was placed at the heart of the project.

The installation of 748 window frames and 1,470 sliding shutters designed by TECHNAL contributed to achieving these ambitious energy goals.

Among them :

- A 50% reduction in heating consumption thanks to optimised management of solar gains.
- Enhanced thermal insulation year-round with a U_w of 1.8 W/m².K.



MOVIE THEATER BATALHA

Winner of the 3rd edition of the World Architecture Award (WATA) in 2024 in the "Rehabilitation - Tertiary" category, the Batalha Cinema is located in Porto, Portugal.

Designed by architect Artur Andrade in the 1940s, this iconic modernist building had become a symbol of resistance against the dictatorship over time. However, its progressive degradation made a complete restoration essential. Under the guidance of the Atelier 15 agency, the building was transformed into a leading cultural center.



The contribution of TECHNAL to the project

To carry out this transformation, the installer Ribeiro & Rocha used TENTAL curtain walls and SOLEAL doors. These solutions offered a wide range of finishes, allowing the original architecture to be preserved. They also enhanced the building's thermal and acoustic performance, as well as its natural light intake. True to the original structure, the restoration gives the building a new shine while meticulously respecting the heritage and initial architecture.

06.

PARTNER OF PROFESSIONALS

TECHNAL®

TECHNAL offers aluminium building systems designed to inspire contemporary architecture, both in new constructions and renovations: facades and curtain walls, doors, windows, sliding doors, railings, pergolas, gates...

Particularly attentive to environmental issues and the product lifecycle, from its manufacturing to its obsolescence, TECHNAL implements new industrial processes that meet the needs for recyclability and product reuse.

A leader in its market, its excellence, expertise, unique design and innovative vision make it a global reference.



TECHNICAL SUPPORT

- Design Software and Tools
- Engineering Office and Technical Support
- Complete Technical Documentation
- Product Traceability via QR Code



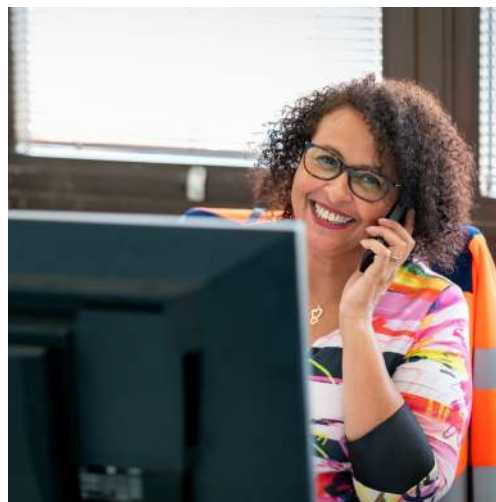
TRAINING AND CERTIFICATION

- Product and Software Training
- Certifications, Standards, and Labels



SUSTAINABILITY, CIRCULARITY AND INNOVATION

- Sustainable products and solutions
- Environmental labels and EPD
- R&D, continuous innovation
- Test center and acoustic laboratory



COMMERCIAL SUPPORT AND AFTER-SALES SERVICE

- Approved professional network
- Support for specification and sales
- After-sales commercial assistance



PRODUCTION AND LOGISTICS

- Complete Control of Manufacturing
- Integrated Industrial Production
- Internal Aluminium Supplier within the Group

KEY TAKEAWAYS

- **CLIMATE URGENCY**
demands renovations that comply with regulations to reduce carbon footprints.
- **CIRCULAR RENOVATION**
focuses on recycled materials, resource efficiency and anticipating the end of a building's life cycle.
- **INVESTING IN RENOVATION**
reduces operational costs, enhances property value and secures environmental certifications.
- **MORE SUSTAINABLE ALUMINIUM,**
100% recyclable and without property loss, offers excellent insulation, durability, and resistance.
- **WITH 75% RECYCLED AND 95% RECYCLABLE SOLUTIONS,**
TECHNAL pushes the boundaries of circularity while ensuring optimal performance and longevity.
- **BENEFIT FROM TECHNAL'S EXPERT SUPPORT,**
with tools, training and a dedicated network to optimize every project.