

Fassada hybrid shift manifest

Passion for innovation into the classics of tomorrow

If S is the success of a project,
Then $S = p + h + p$
Where p stands for professionalism
h for humor
And p for passion (EC)



"And those who were seen you dancing,
where thought to be insane by those,
who could not hear the music"
(F. Nietzsche)

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Prologue

Two voices, one vision

Every movement begins with a spark, a single idea powerful enough to challenge the rules and reimagine what’s possible.

For Fassada, that spark came from founder and inventor, Eric Claeys, whose determination to disrupt the façade industry has shaped a technology unlike anything before.

Two decades later, that vision is carried forward by his daughter, Stephanie

Claeys, whose journey from aspiring lawyer to second-generation CEO has been driven by the same passion for innovation, sustainability, and excellence.

Together, they represent the past, present, and future of Fassada: one voice born from invention, the other from evolution. United by a belief that façades should do more than stand; they should perform, protect, and inspire.

Founders perspective: the spark behind the shift

Dear Reader,

Innovation is a rare sight in an industry as traditionally rooted as construction. True game-changers, those capable of sending shockwaves through the sector, are even rarer, often dismissed as unrealistic dreams.

Yet the global façade market is in desperate need of change. Façade contractors disappear faster than they can start, and curtain walls without leaks are more the exception than the rule.

In 2005, the year I began developing the idea of hybrid, now 20 years ago, I felt it was my responsibility to act. At Fassada, innovation isn't just a buzzword, it's our DNA.

This conviction led to the creation of a cutting-edge, high-performance, and globally patented technology, rooted in an engineering philosophy that places maximum cost efficiency and risk control

at its core. Innovation is good, but disruption is better.

Our aluminium and cold-rolled steel curtain wall systems are designed to disrupt the market, setting new standards, solving persistent challenges, and making the impossible possible. We offer tangible, proven answers to the climate crisis and deliver sustainable, energy-efficient solutions for the buildings of tomorrow.

Our mission is simple: build better, smarter, and far more cost-effectively. Guided by Garry Kasparov's words, "At the end of the day, it's all about money," we live by our motto: "Professionalism and profit in one façade."

By combining globally patented USPs with unique financial advantages, such as drastically reduced labour, installation, and fabrication costs, we've created a formula for real disruption.

This unique blend is what sets our technologies apart; some might even call them incomparable.

We take pride in developing solutions that endure, inspire, and help shape the future of façade construction. As you read through this manifesto, I invite you to explore the thinking, engineering, and vision behind the Fassada hybrid system.

Because the future of façades does not belong to those who keep improving the candle. It belongs to those who dare to design the light bulb.

*Eric Claeys, ir. MSc MBA
Fassada's Founder & Inventor*



**"It is better to believe than to disbelieve,
in so doing you bring everything to the realm
of possibility" - A.E.**

Next generation: continuing the family legacy

Dear Reader,

Even though my background is law, my fascination with façades started long before I ever opened a legal textbook. As a child, I spent countless hours wandering through my father’s façade engineering company, watching engineers at work, listening to conversations about structures and the quiet confidence of a team building something meant to last for decades. I didn’t yet understand the equations or the details of the profiles, but I understood the energy. I understood the passion.

What was meant to be a short summer internship before starting my legal career turned into something much greater. One project led to another. I wanted to know how things worked, why certain problems kept recurring in the industry, and how our approach at Fassada was different. Fifteen years later, that curiosity has become my compass — guiding me every day as I work to lead this company into its next chapter.

The values my father built into Fassada - integrity, boldness, and the refusal to accept “good enough” - are more than guiding principles. They are the foundation of our culture. His vision has not only inspired me personally, but has shaped an exceptional team that shares the same drive to challenge the rules and redefine the possible.

Every innovation we bring to the market is the result of that shared commitment. Stepping into my father’s shoes is not just about inheriting a role. It’s about embracing responsibility. His legacy is not only one of engineering excellence, but of disruption. He taught me that if you want to change an industry, you must have the courage to question its very assumptions and the determination to prove there’s a better way. That philosophy is embedded in our technology, our business model, and our way of thinking.

Looking ahead, I see Fassada not only as a leader in high-performance façades, but as a catalyst for change in how buildings are conceived, built, and maintained. Our mission is to keep pushing boundaries, to ensure our systems are smarter, cleaner, and more sustainable, and to do so without ever compromising on quality or vision.

We’re not just building façades; we’re building the next chapter of an industry. And I’m confident that with the foundation my father laid and the team we have in place, the story of Fassada will continue to be one of disruption, inspiration, and transformation for many years to come.

Stephanie Claeys, LLM
CEO Fassada



“Do not follow where the path may lead.
Go instead where there is no path and leave a trail.”
- Ralph Waldo Emerson

Vision & **origin**

Our DNA is simple & clear, to offer to the market

- State-of-the art, groundbreaking
- Not just innovative, but disruptive
- Cost-effective technologies
- Engineered with a holistic philosophy of max cost reduction and risk control
- With never seen attention for sustainability, climate change & reduction of CO₂ emissions

Fassada is an **economic vision**
with the necessary concern for the wellbeing on our planet.

2. Why “good” just isn’t good enough anymore

The answer to that question is simple:
the proof of the pudding is in the eating.

For decades, the façade industry has faced a challenging reality. Many curtain wall contractors find it difficult to achieve long-term stability and even struggle, while system houses have consistently maintained strong market positions thanks to comfortable profits. This contrast reveals a structural imbalance in how value and profit are created and shared across the sector.

Part of the reason lies in the fact that both players have opposite interests.

System houses earn their revenue by selling linear meters (of profiles and gaskets) on the one hand, and by selling pieces (accessories, screws, ...) on the other hand.

The sales of each extra meter and/or each extra accessory results in an extra margin and profit.

However façade contractors generate profit, better said need to try to generate a profit, by delivering installed square meters of façade. Transforming the linear meters and pieces from the system house into finished square meters requires four intermediate cost-intensive steps: 1/ design and engineering, 2/ fabrication, 3/ transport, and 4/ installation. The fewer the number of profiles and parts needed, the lower the cost will be of the complete construction process by the façade contractor.

It is clear these findings are the direct opposite of the system supplier’s interests.

Put simply, the challenge in creating a new curtain wall technology was inspired more by economic realities than by pure technical ambition, guided from the outset by the well-known KYC principle: “know your customer.”



workers, a global problem that will only get worse in the future

- The challenge to install, including architectural claddings, everything from inside
- The issue of decimation of maintenance costs
- The poor performances of most conventional systems if tested in conditions representative of the reality
- The elimination, or at least most, of human dependence of the final quality of the curtain wall
- The elimination of non-durable products requiring lots of maintenance such as silicone
- The challenge of the Green Deal requirements

What if the façade wasn’t just a static shell, but an active, intelligent component of the building?
What if it could reduce risk, save cost, cut emissions, increase value — and even generate energy?

But there is not just the issue of the overcomplexity of the system cost, as the entire value chain at every level needs to be reengineered:

- Engineering and cost calculation models
- All risk related aspects of the construction of a curtain wall
- Fabrication: the tremendous lack of automation compared to other industries
- The issue of the huge transportation costs for unitized
- The challenge of the lack of skilled

- And from an ecological standpoint, sustainability is paramount, keeping the footprint as low as possible through efficient material use, fewer parts and minimal non-recyclable waste.
- To only name a few.

...

It's time to set a new standard.

This manifesto is not a collection of technical solutions, it's an invitation to rethink what curtain wall systems should be in a world where buildings must perform, not simply exist.

Such questions cannot be answered by merely refining systems from a previous era. They require a clean-sheet approach.

The result is the Fassada hybrid system. A complete reinvention of how curtain walls are designed, manufactured, transported, installed, and maintained. In the chapters ahead, you'll discover the thinking, engineering, real world solutions behind Hybrid and that sustainability is about more than reducing a carbon footprint. It's about building smarter from the start: shortening the supply chain, reducing waste, eliminating unnecessary transport, and choosing systems that support operational performance, not just theoretical compliance.

This is not the next step in curtain wall technology. This is an entirely new path.

We're proud to share the story behind Fassada hybrid and even more excited to show you how it can transform your next project.



**Fassada hybrid,
welcome to a new era in façade design**

3. A holistic challenge: innovation is good, disruption is better

“The light bulb wasn’t invented by improving the candle.”

That simple truth is at the heart of the Fassada hybrid story. Real innovation isn’t about fine-tuning what already exists. It’s about questioning the very foundation, daring to start from a blank page, and refusing to accept the trade-offs the industry has long treated as inevitable.

When we first began developing what would become the Fassada hybrid system, we were told repeatedly that it was impossible to satisfy the needs of all the stakeholders in façade construction at the same time.

The reasoning seemed unshakable:

- **The architect** wants maximum design freedom, complete technical reliability, and sustainability without compromise.
- **The investor** demands value for money, fast execution, low maintenance, and high performance.
- **The façade** contractor needs minimum cost, minimum technical risk, high performance, and the ability to make a healthy margin.

For decades, the industry treated these priorities as fundamentally conflicting. Meeting one group’s needs meant sacrificing another’s.



Fassada has proven this assumption wrong.

Breaking the triangle of compromise

From the outset, our challenge was not to improve what already existed, but to question the entire premise. Why should design freedom mean higher risk for the contractor? Why should sustainability and high performance come at the cost of affordability? Why can’t the same system serve beauty, performance, and profitability?

We approached the problem with the mindset of the light bulb - a complete reinvention - rethinking every connection, every component, and every process from extrusion to installation to decades of maintenance.

Innovation without trade-offs

The Fassada hybrid system was engineered to resolve, not choose between, these competing demands.

- For **architects**, hybrid removes mechanical constraints, integrates claddings, shadings, and double-skin façades without performance loss, and delivers a clean, pure aesthetic - all while meeting the highest sustainability benchmarks.
- For **investors**, it cuts CAPEX through faster and safer installation, lowers OPEX with maintenance-free sealing, easy interior access, and a façade grid which is futureproof.

- For **façade contractors**, it simplifies production, minimizes components, eliminates common failure points, and allows efficient, repeatable installation — reducing both cost and technical risk while protecting margins.

Designed for performance.

Destined to disrupt

Hybrid doesn’t play by the old rules of curtain walling. There are no silicone joints to age and fail, no pressure plates to distort glass, no external access requirements to inflate costs and schedules. Structural performance and thermal efficiency are built in, not added on. Every decision - from monolithic mullions to field-drainage logic - was made to maximize performance and value for **every stakeholder**.

One system. Three winners.

The result is a façade technology that architects, investors, and contractors can all champion — not because it makes compromises between their needs, but because it removes the conflicts entirely.

It is proof that in façade construction, the “triangle of compromise” is not a law of nature.

It is proof that with the right thinking, **everyone can win**.

4. Hybrid: the 4th generation of curtain walls, too good to be true?

To truly appreciate what makes the hybrid system different, it's worth looking at how far curtain walls have come and how much they have stayed the same.

Over time, the curtain wall industry has witnessed 3 generations of products:

- **1st Generation (1960s–1970s):** stick systems : a variety of components assembled on site. Low material and fabrication cost, but labor-intensive and weather dependent.
- **2nd Generation (1980s–mid-1990s):** unitized systems : pre-assembled panels fabricated in factories and delivered to construction sites in one piece for installation. Greatly reduced on-site labor, but introduced high material costs, as well as high fabrication costs and higher transport costs.
- **3rd Generation (mid-1990s–present):** high-performance stick and unitized systems allowing in: daylight reducing heating costs and creating solar shading to reduce colling costs. While energy efficiency improved, systems remained mechanically complex.

The three generations mentioned solved some problems, but carried forward others.

The key conclusion is simple: **over roughly the past 40 years, there has been no real technical evolution in the fundamental build-up and construction methods of curtain walls.**

The Fassada hybrid is not an evolution of those systems, it is their replacement.

By addressing the needs of all stakeholders at once, Fassada technology earns its place, and it was Prof. Dr. Ir. Arch. N. Van den Bossche (University of Ghent), a renowned authority on the field of curtain walls, called Fassada hybrid system the **4th Generation** — a complete reinvention of the method of construction.

This new disruptive, holistic approach combines:

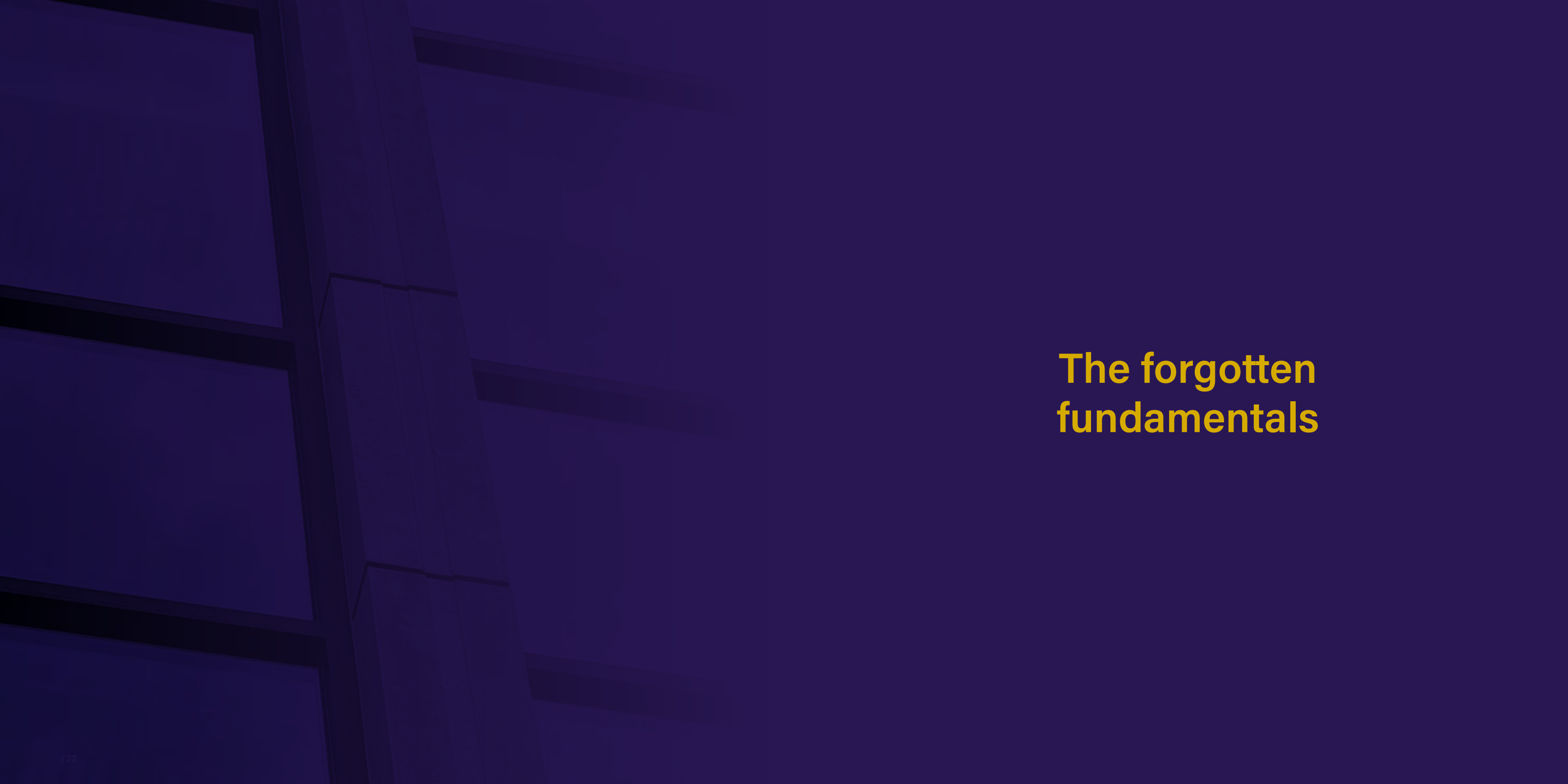
- Radical efficiency: a never-seen reduction in material use, production time, and installation time — cutting costs without compromising performance.

- Technical superiority: elimination of traditional weak points such as silicone joints and torque-dependent screws, resulting in greater watertightness, airtightness, and structural adaptability.
- Architectural freedom: seamless integration of external claddings, shading systems, and even double-skin façades, without limiting design expression.
- Patent-protected innovation: a suite of globally granted patents safeguarding unique connection logic, monolithic mullion design, and inside-out installation methods.

The hybrid system stands out as the architecture of tomorrow — lighter, smarter, more sustainable, and more profitable to build and maintain. In short: the first curtain wall concept designed not for the past's limitations, but for the future's possibilities.



Fassada hybrid: The future of facades is here, and we're excited to take you on this journey with us!



The forgotten fundamentals

5. The 2 key universal sciences: building physics and building static

Every curtain wall has to be designed and engineered in compliance with all kinds of standards and building sciences.

The good functioning of any curtain wall is determined by 2 sciences:

- Building statics : a curtain wall hangs from the primary structure like a curtain from a rod. Consequently, it follows every movement of the building.
- Building physics : that same curtain wall is the building's skin, the physical barrier between inside and outside.

And yet, it is alarming to see that, across the entire world, **the fundamental knowledge of both building sciences is fading.**

It is unfortunate to see that too many in the industry no longer truly understand the core principles of what they are working with.

Using computers and powerful software is one thing, but having basic knowledge and common sense is a whole different story. And that story is what truly matters and makes the difference!

The rise of computers and software has made us complacent. Instead of making quick calculations in our heads, we reach for a calculator. If the software outputs any kind of result, we almost accept it without questioning whether it makes any sense or not...

Computers and software are crucial tools, which cannot be missed, but they are no substitute for understanding and common sense.

Basic know-how and logic are key for designing any curtain wall.

Without, the way is wide open for catastrophic consequences.

Last but not lest: building physics and statics are universal sciences! They apply from North to South, from West to East on earth.

Local standards and regulations may differ, but the laws of science are exactly the same all over the world!

Fassada hybrid: because technology, design, and construction methods may evolve but the laws of physics never change.

6. Building statics: not 1 single building on earth is rigid

One might sometimes get the impression a building is infinitely rigid. But this is not correct. Nevertheless, it seems difficult to dispel the impression that a significant number of designers continue to think this way.

The denial of building statics can have enormous consequences for the curtain wall.

Every building moves.

On one hand there the external loads such as wind loads, thermal dilatation and contraction,

On the other hand, there are building related loads and movements: slab deformation comes from multiple inevitable sources:

- the dead load of the primary structure,
- the dead load of the curtain wall itself,
- the dead load of interior finishings,
- the mobile loads post-occupancy
- eventual cleaning installations (on top floor)
- he long-term creep of concrete.

Furthermore, there are the so-called differential movements between slabs: no two floors behave identically.

Whether we like it or not, the movements and deformations are guaranteed realities, dictated by the universal well-known **law**

of gravity by Newton, saying that an object will remain at rest or in uniform motion unless acted upon by an external force. In simpler terms: if you have a apple in the hand and you open your hand, the apple will fall and not float...

In many projects, our dear Mr. Isaac Newton seems to be unknown or forgotten when it comes to the design of buildings.

Hanging like a curtain on the slab

A curtain wall is installed at the edge of a slab and is not part of the building's load-bearing structure.

Each slab is moving. One and another means that the horizontal alignment of the curtain will follow the one of the slabs, nice or not.

In older construction, thick slabs and over-engineered structure limited this movement. Nowadays, mostly to save money, lighter structures with longer spans are designed more looking like lasagna than a primary structure of a building.

Standard test conditions vs. real-world reality

Many ask, "If these systems are flawed, why did they pass tests?"

A simple real-life example: some standards prescribe "vertical inter story" testing, where a slab is moving up and down parallel to its original position. Such a test makes no sense, as it is not representative of reality. After all, a slab doesn't go up and down like an elevator. On top of that, there are the differential movements.

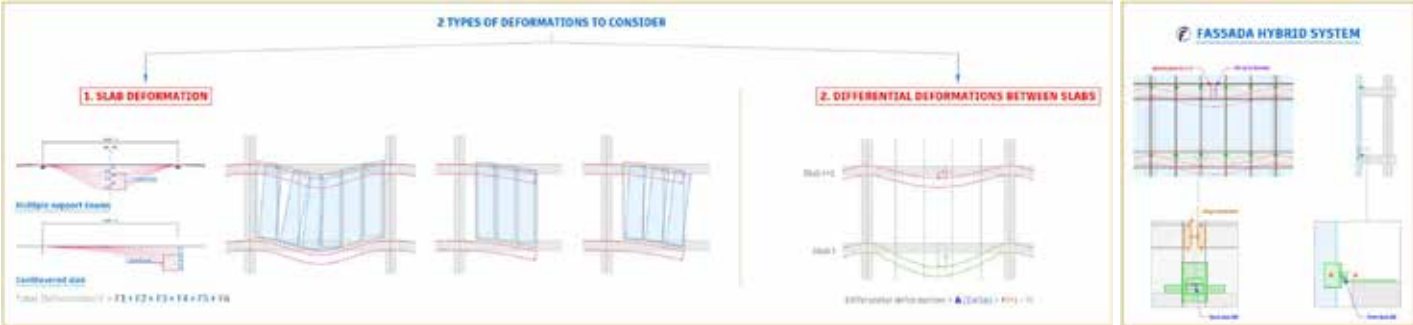
The consequence of denying this reality is twofold: a curtain wall system may have a positive test certificate, yet the building will eventually leak all around when building statics have been ignored.

The hybrid advantage: designed to move

The Fassada hybrid system starts with the acceptance of an unchangeable truth: building statics always wins. Therefor hybrid is engineered to work with building movement, not against it.

There is only one way to address all building movements and ensure the curtain wall functions properly: treat the curtain wall not as a rigid grid, but as a flexible system in which the "horizontal" profiles are hinge-connected to the "vertical" profiles. See Topic 32: smart structural engineering for more details.

“Because in the end, façades don’t defy physics. They perform best when they dance with it.”
S.C.



7. Building physics: controlling noise, heat and cold, ... logic

If building statics defines how a curtain wall hangs from and interacts with the building's frame, building physics defines how it performs as the building's skin, the physical barrier between the controlled indoor environment and the unpredictable outdoors.

This science governs how air, heat, and moisture move through the façade, and it also includes two critical subfields: acoustics and thermal performance. Together, they determine whether a façade will deliver comfort, efficiency, and durability in the real world.

Why building physics is key
A curtain wall that fails to control air, moisture, heat, and sound will compromise comfort, increase operational costs and shorten the building's lifespan no matter how beautiful it looks.

Laboratory tests may confirm airtightness, watertightness, and thermal values under perfect, static conditions, but real buildings face seasonal changes, wind pressures, and structural movement. The hybrid system is engineered to perform under these realities, delivering acoustic and thermal performance that last.

From Sydney's summer heat to the North Pole's sub-zero winters, every façade faces the same universal forces:

- Air pressure differentials driving infiltration and exfiltration
- Water in all its forms - rain, snow, vapor - trying to find its way inside
- Temperature gradients causing heat gain or loss
- Sound waves travelling through glass, frames, and joints

A successful curtain wall must control these flows. It must manage the forces in a way that protects the building, optimizes energy performance, and ensures occupant comfort over decades.

Two factors that define performance
For both acoustics and thermal performance, the overall performance of a curtain wall is determined by the same two elements:

1. the performance of its infill elements : glass or opaque panels
2. the performance of the profiles : the curtain wall framing system itself

Even the best glass or panel will be undermined if the frame design contains weak points that bypass or diminish its performance. For example, each screw creates both an acoustical as a thermal bridge.

A. Acoustic performance: controlling the invisible intruder

Noise is one of the most underestimated comfort factors in modern buildings. In dense urban environments, hospitals, offices, or residential towers, unwanted sound can undermine productivity, health, and well-being.

Acoustics are primarily governed by the Law of Mass, which states that the heavier and denser a barrier, the better it is at blocking sound. Fassada understands this law very well and has designed the hybrid system with monolithic profiles free of the common weak points found in conventional systems. See further topic 24.

2 simple well-known, daily real-life examples of a lack of basic knowledge and common sense:

Case 1: no doubt all curtain wall specialists encounter daily SSG façades with open joints showing only a single EPDM gasket — in other words, a massive acoustic bridge that can never be solved simply by using high-performance acoustic glazing. Actually a gasket has no mass at all, which means that each joint is an acoustical bridge.

Case 2: non-equal performances of the infill elements

Case 3: a façade perforated for all kinds of structures or brackets..

B. Thermal performance: driven by thermal conductivity and solar factor

While acoustics are governed by the Law of Mass, thermal insulation in winter depends on a material's insulating capacity and the presence of trapped air.

In summer, beyond the insulating capacity of the infill elements, the key factor is the solar factor of those elements. The solar factor is a measure of how much solar energy passes through glazing and enters a building. It represents the fraction of incident solar radiation that is transmitted through the glass, including both direct transmission and energy absorbed and re-emitted inwards.

...

... Again, 5 simple well-known, daily real-life examples of some a lack of basic knowledge and common sense:

Case 1: In some regions, it is quite common to glue the insulation directly against the composite panel instead of installing it against the concrete of the structure, which needs to be insulated. This way a huge problem is created, instead of solving one.

Case 2: a great example of greenwashing: the claim of a “sustainable fully glazed façade.”

Anyone making this statement has clearly never experienced the greenhouse effect of glazing — or the heat when sitting in a veranda on a sunny day.

The greenhouse effect is the phenomenon in which sunlight passes through the glazing, is absorbed by interior surfaces, and is then trapped, causing the indoor temperature to rise.

The best-performing glazing has a solar factor (also called the g-value) of 0.20. A good dynamic shading device should reduce this by at least a factor of 10 to 20.

Even if a building uses sustainable energy sources, overheating can only be solved mechanically. In a building without this overheating effect, the same sustainable energy could be used for more meaningful purposes.

Case 3: see case 1 of acoustic performance.

A CAD-drawing is very willingly. The shape of a gasket in theory (the CAD) drawing is one thing, the real shape is quite another story (how they come out of the cardboard boxes)

Otherwise said: the kind of gaskets never close the open joint, with the consequence that all of these systems need to be considered as non-thermally broken systems (as it is in reality), which can result in huge consequences.

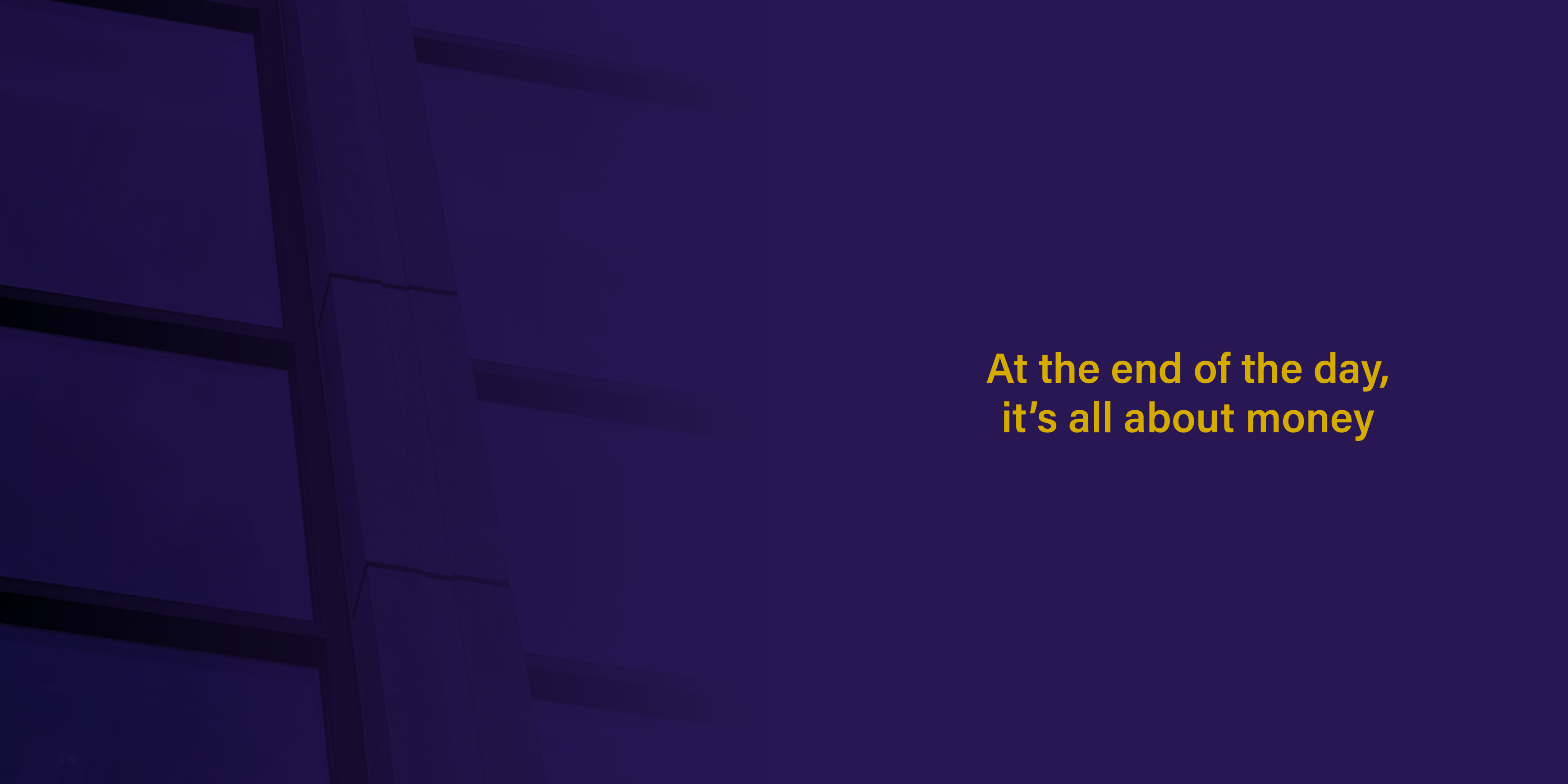
Case 4: specifications where high-performance glass is required to be installed in low-performing frames make no sense at all, as achieving overall performance requires that the individual performance of the components do not differ too much.

Case 5: a façade perforated for all kinds of structures or brackets implicates turning your façade, the watertight envelope, into a Swiss cheese. This is just asking for trouble.

With identical infill elements, the Fassada hybrid system will always deliver superior thermal and acoustic performance compared to any conventional façade system.



Physics says heat, cold, and sound move in;
Hybrid says not here.



**At the end of the day,
it's all about money**

8. The economics of smart engineering: cost cutting in every stage of the process

As explained in the chapter “Vision and Origin,” there is no alternative to cost cutting at every stage of the process.

Smart savings are a must, not an option. Since it is utopia to expect developers and building owners to suddenly increase their façades budgets, there simply is no other solution if façade contractors are to at least survive.

In modern construction, defined by fierce competition, every cost must justify its value, and every delay carries a cost. Efficiency is no longer optional—it is a strategic necessity. Architectural ambition must align seamlessly with economic rationale.

The Fassada hybrid System delivers exactly that balance.

Smart savings must happen at every stage:

- The basic curtain wall system (profiles and accessories) (See also topic 9: “The Hidden Cost of Complexity”)

Ordering a conventional unitized system from a system house results in one truck of profiles, two trucks of accessories, and three trucks of manuals that no one can read or understand.

- The same order from Fassada results in half a truck of profiles, a bucket of accessories, and a few smart glasses.
- Design and engineering - Powered by smart, groundbreaking software.
- Fabrication – The Fassada robotized production line achieves an output of about 1 min/sqft², which is 20 to 50 times faster than conventional unitized systems.
- Transport – This cost has zero added value as it is a lost cost.
- Installation, with innovations such as:
 - No need for external access equipment (see topic 12)
 - No external caulking
 - No use of any site cranes
 - Smart glasses: one foreman for ten projects instead of two for each project
 - Smart methods (see also topic 35: “Geometric Surveys”)

And last but not least: project lead times must be reduced:

- From the developer’s perspective: The faster the project is completed, the lower the financing costs and the sooner rental or sales income begins.
- From the façade contractor’s perspective (see also topic 11): A significant reduction in working capital is essential for two reasons:
 1. Most façade contractors are undercapitalized and lack the financial backbone to offer unitized systems.
 2. With the same production resources, hybrid system allows for exponential revenue growth, while reducing the required working capital can be decreases by a factor of two to three.

Cost cutting doesn’t mean cutting quality, on the contrary. Smart cost cutting is smart engineering: simple solutions that deliver the most cost-effective results



**Fassada hybrid:
where beautiful façades meet bulletproof budgets.**

9. The hidden cost of complexity: the blessing of simplicity

In façade engineering, success is often determined by the smallest components.

Accessories (fasteners, clips, brackets, gaskets, covers) may seem minor, but each one – and there are many - introduces cost, risk, and complexity.

Every part must be:

- Purchased and tracked
- Shipped and stored
- Installed with precision

At Fassada we say, when you order all materials for the same curtain wall

- of a conventional system: you will receive the delivery of 1 truck of profiles, 2 trucks of expensive accessories and 3 trucks of manuals, no one understands
- of a Fassada hybrid system: you will receive the delivery of: only half a truck of profiles, 1 bucket of accessories and couple of Fassada smart glasses

Each step adds time, cost, and room for error. And the more accessories a system requires, the more opportunities arise for technical complications—installation errors, misalignments, compatibility issues, failures. These aren’t just technical concerns; they become financial liabilities.

Fewer Components. Fewer Risks.

The Fassada hybrid system is engineered with a radically simplified approach. Unlike traditional curtain wall systems that depend on a maze of accessories, the Fassada hybrid minimizes parts from the start. This lean strategy unlocks major project advantages:

- Lower procurement and logistics costs
- Simplified inventory and site management

- Faster, cleaner installation
- Fewer failure points and technical risks
- More predictable budgets and timelines

Every accessory removed is a potential error avoided. That’s not minimalism, it’s intelligent engineering.

Simplicity as Strategy

This isn’t a compromise, it’s a calculated advantage. By reducing accessory dependence, Fassada hybrid achieves a level of efficiency, control, and reliability that traditional systems simply can’t match.

In a world where delays are expensive and complexity leads to cost, the Fassada hybrid system offers an elegant solution: do more with less.



Fassada hybrid:
The intelligent façade system that pays off—at every level.

10. Built to last: minimizing risk at every stage of the façade construction

The entire process and value chain of constructing a curtain wall is characterized by numerous risks, which need to be reduced and or managed.

Every risk, whatever the kind of risk, technical, organizational, implies a financial risk.

Wherever possible, human dependency in the process and its impact on the quality of the final product should be reduced to an absolute minimum or, whenever possible even eliminated.

Reduced technical risk = increase of profit margin.

Complex systems introduce multiple points of potential failure, in sealing, alignment, or torque. Hybrid's monolithic profiles improve consistency, reduce human error, and increase predictability. Fewer risks mean fewer surprises, and in construction, predictability equals profitability.

To name a few risks in the different stages:

System related risks

- Performance depending on screw torque of pressure plates. Solution: no pressure plate
- Silicone used for essential water barrier functions. Solution: no silicone
- Cascade-system evacuation of infiltration water. Solution, no cascade but field drainage
- Smart glazing requiring perforated mullions to pass the cabling. Solution: no perforation
- External architectural claddings and perforation of façade skin. Solution: no perforation by hang claddings directly on the mullions (see also topic 17)
- Need for highly skilled workers. Solution: no need for skilled workers
- Poor thermal performance. Solution: no screws in thermal break and no façade skin perforations
- Shock resistance and T-blocks transoms: Solution: no T-blocks, see also topic 32
- Large number of accessories = same number of risk at logistics or installation. Solution: drastically reduce the number of accessories, lowering logistical and installation risks
- Etc.

Project engineering

- It is a very simple truth: the smarter the solutions = the better = the easier = less risk

Procurement

- the less products/accessories = the less chance something goes wrong

Fabrication

- Automated and robotized production = virtually zero errors

Installation

- See also topic 27, Quality control
- Working methods. Smart installation by aligning brackets by the geometer, dividing up the job in separate blocks: firstly brackets + aligning, secondly just hanging the grid, thirdly the infill elements and glazing
- Bad weather – the end: Not only the fact that bad weather can be the reason to stop the installation works. Rain can interfere with the works. This risk needs to be eliminated With Fassada hybrid, all critical steps occur from the controlled interior. Rain doesn't interfere. Wind isn't a factor.
- No silicone: Silicone requires dry clean surfaces. No silicone has no requirements
- No scaffoldings or costly master climbers: Installers work from a stable, dry interior, simplifying safety compliance and minimizing insurance exposure.



Fassada hybrid:
less risk, more return

11. Lead time and time on site: an unprecedented impact

Topic 8: “the economics of smart engineering” explains why the project lead times must be reduced.

Key question: how can this be achieved?

As Fassada hybrid was engineered based on a KYC analysis, addressing the lead time issue was a main consideration from the very beginning.

Assuming that the times required for

- Project engineering
- Delivery of brackets
- Delivery of system materials
- are the same for a stick-built, unitized, or Fassada hybrid system,

and knowing that

- most projects use Fassada standard brackets
- bracket installation can begin in a very early stage of the project while concrete works are still in progress

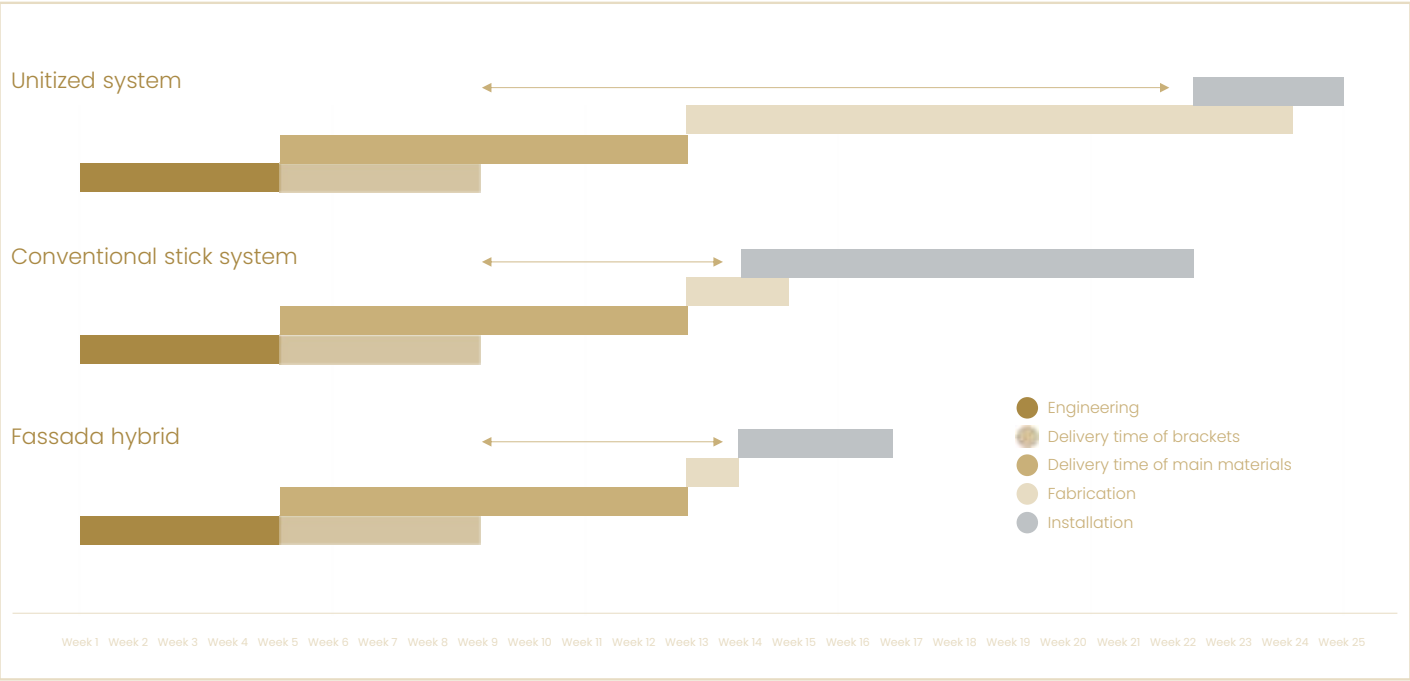
and also knowing that

- fabrication time for the hybrid system is about 1 min/sqft² (20 to 50 times faster than a unitized system)
- glass installation occurs on-site (implying an almost zero prefinancing cost) and is separate from the installation of the grid
- installation speed of the grid and glazing is almost the same for a team of three people (200–350 m²/day)

and that the hybrid installation is divided into five consecutive main blocks

1. brackets and façade alignment (including early-stage quality control of executed concrete works and “acceptance of the primary structure”)
2. the alumnium grid
3. exterior cladding (if applicable)
4. the infill elements and glazing beads
5. any interior finishing

the on-site execution time can be reduced, depending on project size, by a minimum of 2–3 months at the start, or even more, as shown on the figure on the left.



Fassada hybrid:
because time is money.

12. Goodbye forever cradles or any other vertical access platforms: relics of the past

In traditional façade construction, vertical access equipment such as scaffolding, cradles, or mast climbers is often viewed as a necessary evil—an unavoidable cost of doing business. These systems not only carry a significant rental expense, but also require additional time, safety protocols, and site coordination, all of which contribute to rising budgets and extended timelines.

Thanks to its innovative and intuitive design, the hybrid curtain wall system is not just installed and glazed entirely from the interior of the building but as well for all kinds of architectural cladding such as natural stone, metal or glass cladding, GRC panels. This foolproof, inside-out installation method eliminates the need for external access equipment altogether.

Immediate and significant cost savings

The financial impact of this feature is hard to overstate. Even before factoring in faster installation and reduced manpower, the savings on vertical access equipment rental alone are substantial.

In many regions, particularly across Europe and North America, the cost of renting scaffolding or façade cradles can average €20 to €40 per square meter of

façade, which may even exceed the entire profit margin of the façade...

On a mid-sized commercial building, this adds up to tens or even hundreds of thousands of dollars in avoidable expense.

- By removing this line item entirely, Fassada hybrid provides:
- Direct cost savings from day one
 - Simplified logistics and scheduling
 - Reduced site congestion and improved safety
 - No reliance on weather conditions or outdoor accessibility

More than just cost: efficiency and safety combined

Eliminating exterior access needs also brings operational and safety advantages. Crews work from inside the building envelope, where conditions are controlled, and risks are minimized. There is no need to coordinate with specialty contractors for cradle operation or manage the extended health and safety compliance required for elevated exterior work. This not only leads to increased productivity, but also reduces the potential for on-site accidents, delays, and disruptions—factors that can quickly derail project timelines and budgets.

Cradle-free is the evidence

As construction shifts toward smarter, safer, and more sustainable methods, the idea of relying on costly and outdated access systems begins to feel increasingly obsolete. Fassada hybrid system isn't just a leap in façade technology, it's a leap in construction economics. Save access. Gain in speed. Deliver better results.



Fassada Hybrid:
the skyline can rise, without a single scaffold in sight

13. Transport costs = 0 added value: hybrid decimates it compared to unitized

There can and must be no discussion about it: transportation costs add absolutely no value to the end product (the installed curtain wall) and are therefore a 100% wasted expense.

For unitized systems, which is the only alternative for hybrid system installed from the inside; in such cases, transportation costs are typically higher than the façade contractor's entire profit margin!

The reason is obvious: transporting unitized systems essentially means transporting air, which makes logistics extremely expensive, both by truck and by container.

A standard 20ft container can hold a maximum of 32 panels measuring 4 x 12 ft², sometimes only around 28, which corresponds to less than 150 m² of façade.

In contrast, that same container can carry materials "ready for installation" for the hybrid system, sufficient for about 2,500 m² of façade – representing more than 15 times higher efficiency, or in other words, transportation costs per m² of façade that are 15 times lower.

- Combination of**
- drastic reduction of CO₂ emissions
 - drastic reduction of energy needs
 - drastic reduction of transport



Fassada hybrid:
Why pay to move air, when hybrid lets you move forward?

14. Service and maintenance reimaged: effortless upkeep and service from within

In conventional curtain wall systems, maintenance can be a daunting task - both in complexity and cost. Sealing issues, hardware degradation, and the logistics of accessing exterior façades often require specialized tools, skilled technicians, and expensive access equipment. Over time, these challenges compound into a significant operational burden for building owners and facility managers. With the Fassada hybrid system, maintenance is no longer a liability. it is a non-issue by design.

No silicone, no surprises

One of the most persistent long-term concerns in façade maintenance is the deterioration of silicone joints. Over time, silicone sealants:

- Age due to UV exposure
- Shrink or crack due to temperature cycles
- Lose adhesion, leading to air or water leakage
- Require costly, high-risk replacement procedures

The hybrid system solves this at the source. No silicone is used. That means:

- No sealant degradation
- No ongoing inspection or reapplication cycles
- No risk of water ingress due to failed joints
- No complicated patchwork repairs years down the line

The result is a curtain wall system that retains its integrity for decades, with

minimal intervention and no hidden weaknesses waiting to emerge.

Glass replacement: as simple as at home

Accidents happen. Glass can break. But unlike conventional systems that require disassembling pressure plates, removing exterior caps, or renting specialized lifting equipment, the hybrid system treats replacement like a simple window fix. Here's how it works:

1. Access from inside the building: no scaffolding or external lifts required
2. Remove the glazing beads: no special tools, no technical training needed
3. Swap the broken glass with a new unit
4. Replace the glazing beads
5. Done.

No stress. No delays. No need for specialist contractors or heavy equipment. Just clean, fast, cost-effective glass replacement, carried out in a matter of minutes.

This unique feature isn't just convenient, it's **future proof**. It ensures that your building remains serviceable, cost-effective, and operationally efficient over its entire lifespan.

Flexibility for every scenario

In rare cases where infill elements must be accessed or replaced from the exterior - due to design specifications, access limitations, or client preference - the system accommodates this seamlessly. The hybrid system is engineered for flexibility, making

exterior access just as straightforward when needed. There is no compromise on performance, integrity, or execution, regardless of the chosen access method.

Goodbye cradles. Goodbye costs.

In traditional curtain wall systems, façade maintenance often means deploying cradles, scaffolding, or mobile access platforms to reach the exterior. These tools are:

- Expensive to rent (often €20–40 per m² per intervention)
- Time-consuming to coordinate
- Dependent on weather conditions
- Inherently risky for personnel

Fassada hybrid eliminates this need entirely. The financial impact is immediate and long-term:

- Dramatic reductions in façade maintenance budgets
- Faster resolution times for damage or failures
- Greater building uptime and operational continuity
- Elimination of access-related safety risks

True façade value lies not just in how it looks or performs on day one—but in how it holds up year after year. With the Fassada Hybrid system, you're not just choosing high performance at installation. You're choosing decades of virtually maintenance-free operation, supported by durable materials, smart structural detailing, intuitive component replacement, future-proof accessibility.

Fassada hybrid: not a system that will age into problems—it is one that matures with confidence.



15. A key concern for the investor/owner: upgrading the building in the future at a minimal cost

Today sustainability and circularity are undeniably hot topics.

Yet, the lifespan of a well-designed building calls for a long-term perspective and a good portion of common sense, offering insights that go far beyond the flood of greenwashing we are served on a daily basis.

The best circularity is no circularity – the need for future upgrading

Again let's start with some common sense: a curtain wall is not a disposable product. When constructed properly, the idea of circularity becomes irrelevant.

In reality, the two key components of a curtain wall have very different lifespans:

- A high-quality grid lasts easily around 50 years.
- The infill elements have a much shorter lifespan:
 - Insulated glazing: approximately 20 years (in line with standard warranties).
 - Opaque panels: potentially longer, but still shorter than the grid.

However, there are two important considerations for both components:

1. Significant technical advances in energy performance are expected in the coming years.

2. Increasingly strict legislation—such as Europe's ESG regulations—demands ever more efficient façades.

This means that, within the 50-year lifespan of the grid, two upgrades of the building will be unavoidable.

Upgrading implies replacing the infill elements with new, high-performance, innovative products.

For conventional unitized curtain walls, this process is highly problematic: it requires dismantling the entire façade, leaving the building unoccupied for an extended period while a new façade is installed.

Fassada hybrid offers the only viable solution: all glazing can be replaced or upgraded from inside the building.

The financial impact is equally striking. If the cost of a newly installed curtain wall is 100:

- Upgrading all glazing in a Fassada hybrid system costs about 25.
- Upgrading in a conventional unitized curtain wall, means dismantling and a new curtain wall, have a total cost of about 300—twelve times more.

In the margin: a simple rule of thumb is that the curtain wall absorbs around 20% of the total construction budget of a building.

If this façade budget equals 20, then the upgrade cost for Fassada is about 5, while for a conventional façade it amounts to 60.

Knowing that over a period of 50 years at least two upgrades will be unavoidable, the final owner will end up paying not once, but effectively twice the cost of the building.

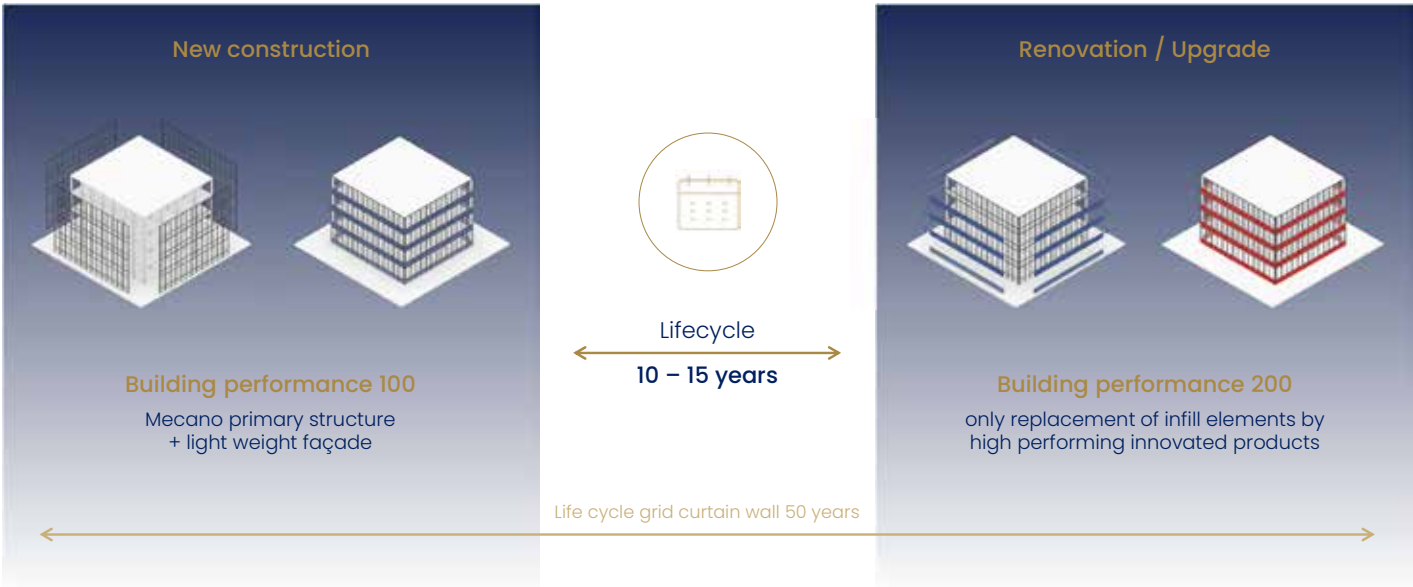
Conclusion is clear and simple: SSG unitized façades are the exact opposite of smart investment and sustainable construction.

Even for developers who "build to sell," the upgrade potential is a decisive asset. Thinking "it's not my problem" is a costly mistake.

The ability to upgrade is a phenomenal selling point:

- Selling a building with the Fassada hybrid upgrade asset = net added value and can be sold on yield basis, benefiting both developer and future owner.
- Selling a building without it = loss of significant potential profit margins for both parties.

The best circularity is no circularity



Fassada hybrid: at the end of the day, it's all about money.
Hybrid is the essential tool for total value creation, not just another technical product.



Architectural freedom & perfection

16. Hybrid: a non-visible technology

The core of Fassada hybrid is a groundbreaking technology located inside the profiles, making it invisible from the outside. You may compare it to the movement of a high-end clock. This combination ensures that architectural flexibility is virtually limitless.

The technology combines the advantages – on top of significant cost benefits- of both stick and unitized systems, while avoiding their common drawbacks, and adds a long list of unique features, such as:

- Silicone-free with groundbreaking performances
- Suitable for seismic areas (see also Topic 31)
- Unprecedented design freedom for architectural claddings (see also Topic 17)
- Ideal for cabled and “smart” glazing
- ...

Freedom in form: profiles without limits

Because the technology is housed inside the mullion, the shape of the interior shell of the mullion can be tailored without constraints. Whether for aesthetic, structural, or functional purposes, the design team can specify unique exterior forms to accommodate building-specific needs.

Equally important is the exterior shell of the mullion. The design can be guided entirely by the architect’s creativity. It can take virtually any extrudable shape—from soft curves to bold edges, fins, or framing elements—allowing the façade to become a true architectural signature.

As explained in other sections of this manifesto, the mullion is an insulated, monolithic profile (not assembled on-site with interior profile, pressure profile, screws, and exterior cap). This allows specific locking points to be easily inserted into the mullion in the workshop.

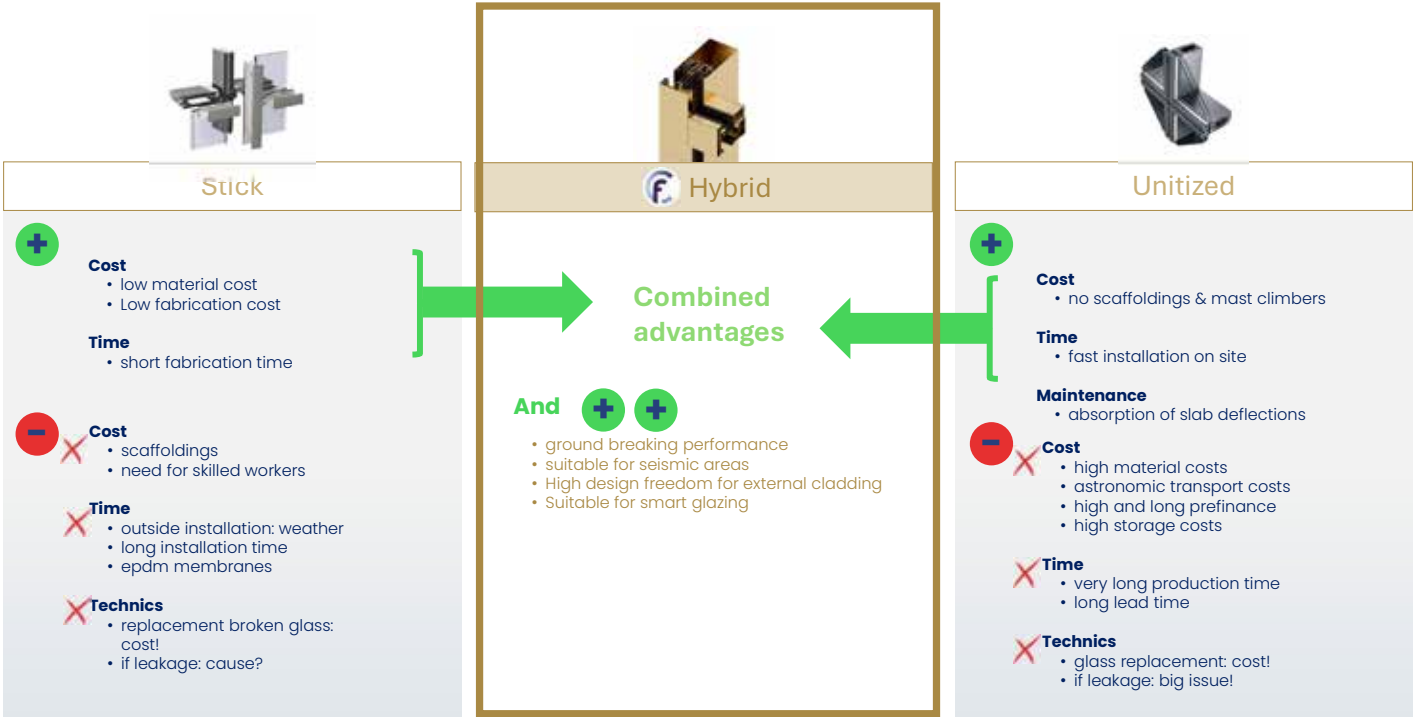
Such locking points enable the attachment of any additional external structures—louvers, neon lighting, walkways, etc.—without compromising water tightness or causing installation issues on-site.

The monolithic mullion has another unique feature: structurally, it behaves as a single profile, (I-values must be adjusted with a specific C-factor in compliance with the applicable standards (about80%))

In contrast to conventional curtain wall systems, where structural stiffness comes from the interior shell, Fassada hybrid offers flexibility to get the required I-value:

- Using the inner shell
- Using the outer shell, without a large internal tube, resulting in an ultra-flat interior façade
- Using a combination of both

The ultimate solution is a structural glass fin (glass fin combined with engineered printing = a unique sun-shading system) clamped mechanically (without using one single gram of silicone) in a semi-elliptical exterior mullion shell.



Fassada hybrid not only combines the best of both worlds, stick and unitized, but adds a long list of further USP's

Fassada hybrid: a new era.

17. Non limited freedom: external structures and architectural claddings

Architecture is no longer just about enclosing space. It's about expressing identity, enhancing performance, and engaging with the environment. In this context, the façade becomes more than a skin; it becomes a platform for creativity.

From solar shading systems and decorative fins to integrated lighting, signage, and walkways external features now play a central role in the architectural language of contemporary buildings. And this is exactly where Fassada hybrid sets a new standard.

A curtain wall that welcomes architectural expression

The Fassada hybrid system is more than a curtain wall, it is a flexible façade technology designed to empower architects to explore new possibilities. While it comes with a robust and standardized set of profiles for efficiency, its true strength lies in its adaptability.

At its core it is about a revolutionary, monolithic, insulated mullion - a single, factory-assembled profile (unlike conventional systems that are assembled onsite using multiple pieces: interior mullion, pressure plate, screws, and exterior cap).

This monolithic profile delivers performance previously unseen. More importantly, it ushers in a new era of architectural freedom, allowing a wide range of external structures to be fixed directly to the mullion, such as:

1. External claddings in virtually any shape, using unlimited kinds of lightweight materials such as metal and composite sheets, GRC panels, wood, decorative glazing, or natural stone. These claddings are supported by precision anchoring and locking devices, inserted into the exterior shell of the mullion during workshop fabrication before the system ever reaches the job site.
2. A variety of sun-shading devices, such a louveres, mesh curtains,
3. Special mullion designs for semi-ventilated curtain walls (see also topic 49) in opaque zones
4. Support brackets for external features, such as walkways in double-skin façades (see also topic 21)
5. The ultimate innovation: balconies suspended directly to the mullions. This breakthrough eliminates the need for perforating the building envelope, removes reliance on costly precast concrete elements, avoids complex interface connections, eliminates the need for expensive products such as Isotech and not to forget cranes for lifting.

From a structural perspective, considering the dead load of the cladding to be transferred to the mullions, extensive testing and smart engineering have achieved remarkable results:

- Dead loads below 10 N/mm (equivalent to 100 kg over 10 cm): no special requirements.
- Higher dead loads: at the level of the locking points, the exterior shell is mechanically secured using a simple

M10 bolt fixation to a tube inserted within the interior shell of the mullion. This M10 bolt is positioned within the 15 mm thermal break, enabling the mullion to safely carry very high loads while maintaining thermal performance.

The list of advantages over conventional curtain walls is not only extensive, but also diverse in nature:

Technical

- No need for a separate substructure, meaning not a single perforation of the façade (eliminating thermal or acoustic bridges and avoiding the risk of water leakage).
- No membranes required at the interfaces with glazed zones. Membranes are known to pose a long-term leakage risk and are therefore best avoided.

Architectural

- Since the cladding is fixed directly to the locking points on the mullions, there is no installation tolerance between the cladding and the curtain wall. The result: near-perfect precision.
- Combined with the smart pivot anchors (see topic 20), architects finally achieve what they aim for: vertical lines that are truly vertical.

Cost Savings

- No separate substructure
- Decimated installation costs, as the cladding simply hooks onto the locking points and all happens from the inside of the building
- No need for highly skilled installers,



- ... alignment of the cladding is built into the mullion design.
- No scaffolding or external mast climbers needed.

Two patented features make this possible:

1. The monolithic mullion : a patented innovation of the Fassada Hybrid.
2. Inside glazing : another patented feature.

A platform for performance and creativity

In an age where façades are expected to perform visually, thermally, environmentally, and structurally the Fassada hybrid system offers an elegant answer: a curtain wall that accommodates vision without compromise. By supporting the secure and seamless integration of external structures and claddings, it turns façades into platforms for innovation where aesthetics meet functionality and design meets engineering.

Designed for architectural freedom

What does this mean for architects and developers?

It means creative freedom, without technical compromise.

It means fewer trades on site and faster installation.

It means a façade system that performs beautifully and builds even better.

Whether you're designing a high-performance building envelope, a striking exterior design, or a sustainable, passive-shading façade, the Fassada Hybrid gives you the flexibility to build your vision inside and out.



Fassada hybrid: where the façade becomes your creative playground

18. Seamless operability: fully concealed operable vents

Modern façades are more than static barriers. They are dynamic systems that must adapt to the needs of the building and its occupants. Natural ventilation, passive cooling, and controlled air exchange are essential elements of sustainable, high-performance architecture.

This is why operable elements within curtain walls are becoming increasingly important, not only for comfort, but also for energy efficiency and occupant well-being.

With the Fassada hybrid system, operability is not an afterthought. It's built into the DNA of the design.

When a concealed vent - invisible from the outside - needs to be integrated in a conventional curtain wall system, they typically rely on the so-called top-hung outward opening window. Yet, it is well known that:

- From a ventilation perspective, this solution underperforms in its function (since warm rising air along the glazed façade is drawn directly into the building).
- From a safety perspective, this type of window is increasingly prohibited in many projects (due to the danger of objects falling out and dropping from the façade).

Full compatibility with operable elements

The Fassada hybrid system has been developed with maximum flexibility in mind, allowing for the integration of any type of operable part within the curtain wall grid. It provides a versatile platform that seamlessly accommodates all configurations.

Nevertheless, the patented fully concealed window represents the pinnacle of the system.

The crème de la crème. Fassada hybrid is the only truly continuous curtain wall system (not a window wall) in the world that offers this unique solution.

Introducing the invisible turn & tilt or pantograph window

This groundbreaking solution offers several unique features:

- Completely invisible, both from the outside and the inside
- No visibel hinges or hardware
- No additional framing required
- Optional electro-actuator opening for integration with automated control systems
- Seamlessly integrates with a 60 mm curtain wall frame
- Provides both inward tilt ventilation and side-hung opening for cleaning or maximum air exchange (turn and tilt)

The result is a window that combines the functionality of operability with the

visual purity of fixed glazing, a perfect solution for projects with strict aesthetic requirements.

Perfect solution for free night cooling

Night cooling refers to the operation of natural ventilation at night in order to purge excess heat and cool the building structure. A building with sufficient thermal mass, which can be exposed to night-time ventilation, can reduce peak daytime temperatures by 2° to 3° using this strategy.

Night cooling can minimize or even eliminate the need for mechanical cooling, improving indoor conditions in naturally ventilated buildings. Proper control is essential to maximize free cooling while avoiding overcooling, which could require re-heating and cause thermal discomfort the following day. Ultimately saving both energy and money.

Once again, the strength of the Fassada hybrid system is evident: its monolithic mullions allow the integration of an invisible operable vent, with fully automated night cooling, opening inward to the building to create optimal airflow.

The combination of a tilt vent with an actuator connected to the BMS system creates a cost-free night cooling solution—without the need for architecturally intrusive ventilation grills or similar elements.

With Fassada Hybrid, performance opens up, without leaving a trace.



19. No pressure plates: glass distortion is history

In modern architecture, glass does more than provide transparency. It acts as a more or less reflective shield, a design statement, and a defining aesthetic element. Whether used in sleek high-rises, cultural landmarks, or commercial façades, the visual clarity and reflection quality of coated glazing are vital to delivering the architectural intent.

However, in conventional curtain wall systems, this visual clarity is often compromised. A common yet frequently underestimated issue is glass reflection distortion. Those unsightly warps, waves, or ripple effects visible across the façade. The cause? It's often hidden in the very structure holding the glass in place.

The problem with pressure plate systems : tension-induced distortion

Most traditional curtain wall systems rely on a pressure plate and screw assembly to secure the insulating glazing units (IGUs). While structurally effective, this

approach introduces a serious issue:

- Screws must be torqued with precision; too loose and the panel isn't secure; too tight and the glass edge will be deformed as the gaskets will be compressed locally.
- Uneven pressure or inconsistent installation torque can cause localized stress on the glass, leading to visual warping.
- These stresses distort the flatness of the coated glass surface, especially in reflective or low-E glass, resulting in optical imperfections that are clearly visible from outside.

Even minor distortion in a high-spec façade can detract from the overall design integrity and trigger complaints from clients, tenants, or end users.

Fassada hybrid: the end of reflection distortion

The Fassada hybrid system takes an entirely different approach. There are no pressure plates, neither screws.

Instead, glazing is installed using the time-tested method of classic glazing beads:

- No pressure plate = no uneven load applied to the IGU
- No screws = no risk of over-tightening or localized stress
- Perfect uniform load distribution on the gaskets all around the glass perimeter, ensuring the glass lies flat and true within its frame

The result is a façade that retains the full clarity and optical precision of its high-performance glazing, free from deformation or visual compromise.

Designed for visual integrity

Glass distortion may seem like a small issue, but in façade design, every detail matters.

The hybrid system demonstrates how smart engineering not only solves technical challenges, but also protects and enhances architectural beauty. Because your glass shouldn't just perform, it should be a flawless reflection of your vision.



Fassada hybrid: Perfect lines.
Pure reflections. Zero distortion.

20. Pivot bracket technology: guaranteed tight vertical alignment

When the policy is to aim for the best, a curtain wall bracket is more than just a bracket.

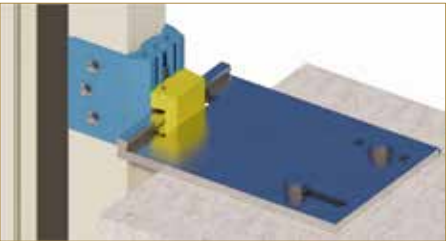
Considering all relevant bracket criteria, such as:

- Optimum load transfer to the primary structure
- Real slab deformations, as explained in topic 6: “Building statics: no single building is rigid”
- Specific movements, as explained in topic 30: “Seismic zones”
- Minimizing on-site work, installation tolerances, and therefore fixing key

components to the mullions in the workshop

- Ensuring vertical mullions remain perfectly vertical
- Addressing potential façade uplift in case of excessive deflections caused by improperly constructed primary structures, not respecting applicable standards (which happens a lot..., the so called “lasagna – structures”

Using advanced FEM analysis, Fassada has developed a unique pivoting telescopic bracket.



Fassada hybrid:
because every detail matters.

21. A new era for double skin facades

Further to Topic 17, double-skin façades typically require a secondary external structure whether for glass panels, solar shading systems, or any other type of second skin.

In traditional systems, the situation is clear and straightforward:

- Stick systems: technically impossible
- Unitized systems: prohibitively expensive

As mentioned earlier, the monolithic mullion of the hybrid system marks the beginning of a new era.

Smart load transfer

As explained in Topic 17, the load is transferred to the inner shell of the mullion. An inserted tube, directly fixed to the fork piece of the smart bracket, channels all permanent and dynamic loads to the primary structure without placing any additional stress on the curtain wall mullion itself.

Fully installed from the inside

Every double-skin façade consists of three main elements:

- The interior, insulated skin
- A spacer bracket, which may also serve as support for a walkway
- The exterior skin

Installation of a double skin wall has never been so easy:

1. Fix the spacer bracket to the mullion, using the pre-installed and pre-aligned locking points in the mullion.
2. Install the mullion.
3. If applicable, place the walkway elements (in any material such as glass, walkway grating, ...) onto the spacer brackets.
4. Install the exterior skin.

The ultimate double skin: the balcony suspended directly from the mullions

See topic 17.
This breakthrough eliminates the need for perforating the building envelope, removes reliance on costly precast concrete elements, avoids complex interface connections, eliminates the need for expensive products such as Isotech and not to forget cranes for lifting.

The first of its kind

By combining three key innovations - a monolithic insulated mullion, workshop-integrated fixation points, and a mechanically bolted thermal break - the **Fassada hybrid system** is the first curtain wall solution on the market to natively support double-skin façade construction. This is not a workaround. This is not a retrofit. This is a purpose-built system, engineered from the ground up to deliver high-performance, multi-layered façades with unrivalled simplicity, reliability, and design freedom.

Future-proof architecture, delivered today
Double-skin façades are no longer complex or prohibitively expensive. With Fassada hybrid, they become a practical, scalable solution. Enabling sustainable buildings, passive climate control, and bold architectural expression. Whether your goal is energy efficiency, acoustic excellence, or striking visual impact, Hybrid provides the tools to create façades that achieve more with less.

Whether you're designing for energy efficiency, acoustic performance, or visual drama, hybrid gives you the tools to create façades that do more with less.



Fassada hybrid: building envelopes for the buildings of tomorrow



Technical performances

In a landscape defined by stringent regulations and standardized classifications, innovation often finds itself boxed in and measured against benchmarks never designed to capture true advancement.

The Fassada hybrid system is a striking example of this paradigm shift. It doesn't merely adhere to existing norms; it transcends them.

This revolutionary façade technology doesn't fit neatly into traditional categories. It seamlessly blends the strengths of window systems and curtain wall systems, creating a hybrid approach that stands in a class of its own. As such, its performance is dual-tested and dual-certified, offering unmatched versatility and reassurance for high-performance buildings.

Standards and testing out of standards, let us meet the reality

Across the world, façades are tested against a wide range of standards — EN-ISO in Europe, AAMA in the United States, and others in Singapore, Australia, and the UK. But behind the alphabet soup of acronyms lies a simple truth: all these tests point to the same reality.

Physics doesn't change with geography. Water behaves the same in Brussels as it does in Canada, and a wind load of 3 kPa is 3 kPa — whether it hits New York, London, Dubai, or Sydney.

The key: non-standardized testing

Standards, tests, and trials are, of course, important.

Equally important, however, is ensuring that these tests are truly representative of what happens in and on a building in real life.

Too often, reality proves the opposite; where technical logic and common sense should rule, contradiction and pretence take their place. This occurs across all aspects of a curtain wall, including critical criteria such as fire performance (see, for example, Topic 45) as well as wind and water tightness under building movements and deformations.

Fassada, however, follows a strict ethical code and distances itself from such practices.

For this reason, Fassada additionally conducts laboratory tests that are not standardized, but which are fully representative of real-world conditions.

Honesty lasts. Where integrity meets innovation. Better for all of us.

Better for the façade contractor.
Better for the architect.
Better for the developer / investor.
Better for Fassada.



Fassada hybrid: ethics is more than just a word.

22. Thermal performance that sets the standard

In today's energy-conscious built environment, thermal performance is no longer a value-added feature. It's a fundamental requirement. With rising expectations for building sustainability, energy efficiency, and occupant comfort, a curtain wall must do more than just look good and hold glass. It must actively contribute to a building's thermal envelope, helping to reduce energy loss and limit operational carbon emissions.

The Fassada Hybrid system is engineered to achieve exactly that: delivering best-in-class thermal insulation by addressing both key components of the façade's thermal behavior.

The two pillars of curtain wall thermal performance

To understand what makes a curtain wall system thermally superior to another, it's essential to look at the two primary contributors to thermal behavior:

1. The insulation properties of the infill elements (e.g. double or triple glazing, insulated spandrel panels)
2. The thermal performance of the frame system itself (which includes mullions, transoms, gaskets, seals, and connections)

While many systems rely on high-performance glass to drive their thermal numbers, the weakest point is almost always the frame itself, particularly at the intersection of materials, mechanical fasteners, and thermal breaks.

Where traditional systems fall short

In conventional stick curtain wall systems, the presence of screws and pressure plates introduces numerous thermal bridges, small but highly conductive interruptions in the insulation path. These metallic fasteners:

- Penetrate the thermal break, creating thermal bridges
- Reduce the continuity of insulation along the mullions and transoms
- Compromise the theoretical U-values often cited in product brochures

Worse yet, these screws are spaced every 15–20 cm, meaning that across a typical façade, there may be thousands of individual thermal bridges.

In traditional unitized systems, there are the open joints with gaskets closing more or less the cavity behind. However, the reality is different. The shape of a gasket coming out of the carton package is not the one of the computer screen. The cross connections between panels are never tight. One and another means that the so-called thermally broken or protected system, is not protected at all.

The Fassada hybrid advantage: engineered for efficiency

The hybrid system eliminates this weakness by design:

- No screws through the thermal barrier

No metallic fasteners penetrate the insulating core of the system. This eliminates thermal bridging caused by fixings, resulting in more consistent and reliable insulation values across the façade.

- Equipped with the largest polyamide thermal break available on the market

The thermal break used in the hybrid system is the widest dimensionally available solution. This means: a longer insulation path across the profile, a lower U-value at the frame, greater resistance to condensation and temperature transfer

Together, these two innovations ensure that for any given glass or panel type, the overall thermal transmittance of a Fassada hybrid system is the lowest ever—when using identical infill elements.

Real-world impact: performance you can feel and measure

Thermal superiority isn't just a number on paper. It has direct benefits for:

- Building energy use: lower heating and cooling loads
- Carbon emissions: both operational and life cycle
- Interior comfort: fewer cold zones and drafts
- Condensation control: especially in cold climates or highly glazed buildings
- Thermal reliability: consistent performance over time, not vulnerable to detail flaws on site

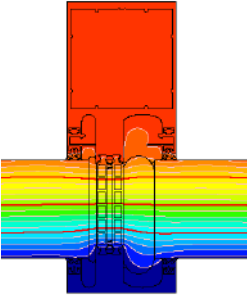
...

... These factors all contribute to better performance against LEED, BREEAM, WELL, and other sustainability frameworks, helping building owners and designers meet energy goals without relying on expensive compensatory systems.

**Designed to minimize loss.
Built to maximize efficiency.**

Thermal performance should not be dependent on perfect installation or theoretical calculations. With Fassada hybrid, high thermal efficiency is built into the DNA of the system, ensuring that what is designed on paper is what performs on site.

- No fasteners breaking the insulation
- No guesswork at connections
- No compromise in U-values due to system complexity
- Just clean, continuous thermal performance—exactly where it matters most



With hybrid, thermal efficiency isn't a feature; it's the foundation.

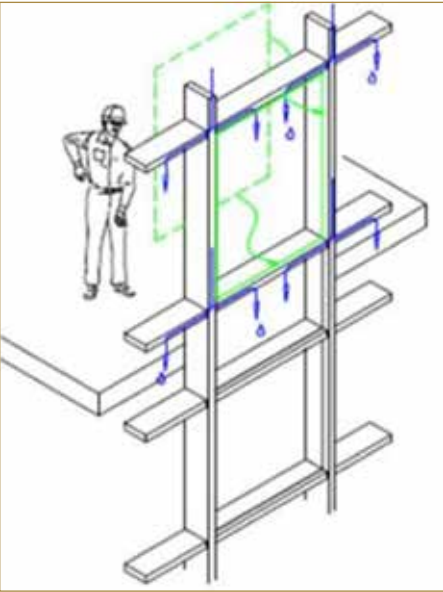
23. Air- and watertightness redefined: field working

Watertightness is one of the most critical and challenging aspects of façade performance. A curtain wall system must serve as a durable, impermeable barrier against water ingress across decades, weather cycles, and structural movement. Yet most conventional systems still depend on failure-prone components like silicone sealants, screwed pressure plates, and interconnected drainage paths. Fassada hybrid takes a fundamentally different approach; one that redefines watertightness as an engineered certainty rather than an installer-dependent hope.

No silicone. No screws. No weak links.

- Traditional systems typically achieve watertightness through:
- Silicone joints: vulnerable to UV degradation, shrinkage, poor adhesion, and misapplication
 - Screwed pressure plates: relying on consistent torque to compress gaskets evenly
 - Transom–mullion junctions: common leakage points due to rigid connections and accumulated stress

Each of these introduces technical risks, particularly when exposed to real-world conditions: wind-driven rain, building movement, installation variation, and time. Fassada Hybrid eliminates all three from the design. No silicone is used. No pressure plates or screws disrupt the system's logic. And no rigid joints compromise the envelope under deformation. Instead, watertightness is assured through two engineered principles built directly into the system: compartmentalized pressure equalization and field drainage.



1. Pressure equalization and air tightness: stopping water at its source

The key to preventing water ingress in curtain wall systems is to eliminate pressure differentials between the external environment and the internal drainage cavity. Without proper pressure equalization, wind-driven rain or shifts in pressure can draw water past gaskets and into the cavity. If the cavity is not pressure-equalized due to air leakage into the building, infiltrating water cannot be drained, as the external pressure would remain higher than inside the cavity.

In most conventional curtain wall systems, watertightness relies primarily on silicone or mechanical pressure: gaskets are compressed by pressure plates and screws to form a barrier intended to keep water out. If the compression is uneven, (due to installer error, inconsistent screw torque, or material aging) even minor pressure imbalances, can allow water to bypass the gasket. These systems typically include a drainage channel behind the gasket to remove any intruding moisture, but this drainage is basic and passive.

Fassada hybrid takes a fundamentally different approach by introducing compartmentalized pressure equalization. Rather than relying on gasket tension, the system stabilizes pressure between the exterior and the cavity behind the first line of defense. Each compartment becomes its own self-contained pressure zone. When wind or environmental pressure changes occur, air pressure equalizes near-instantly maintaining balance and preventing water from being sucked inward by capillarity.

If water does enter the cavity (as it inevitably will in any system), it's automatically drained, not resisted. Equal pressure ensures water is not sucked in and instead, follows a controlled drainage path out of the façade. This shift from resisting water to neutralizing the force that causes leaks marks a major evolution in façade logic.

2. Field drainage: precision over dependence

- In most conventional systems, water is managed using the cascade principle: water entering the system flows downward from one façade level to the next through transom-to-mullion connections until it exits somewhere. While simple in theory, this design introduces serious vulnerabilities:
- A single leak or blockage can affect multiple levels
 - Drainage paths are hard to trace, inspect, and repair
 - Faults are often hidden and only discovered after damage occurs
 - Repairs require exterior access

Fassada hybrid replaces this outdated logic with **field drainage**. Each individual field has its own isolated drainage logic, like a standalone window. Water is drained and pressure-managed within each unit, eliminating the vertical interdependency between floors.

- In the unlikely event of water ingress, this approach offers several key advantages:
- **Leak localization:** Any water entry is confined to a single panel field, making detection and correction straightforward.

- ...
- **Interior access:** Inspection and maintenance can be carried out from inside the building, without the need for scaffolding or lifts.
 - **Drainage reliability:** With no reliance on multi-story channels, water is never passed “downstream” to cause failure elsewhere.
- Every field in a Fassada hybrid façade is independently watertight, pressure-

stabilized, and easily controllable in case of an issue.

Engineered clarity, not sealing guesswork

By combining pressure equalization with field drainage, the system ensures that watertightness is achieved

through geometry, structure, and tested performance.
Not through sealants, installer skill, or post-installation adjustments.
No site-applied silicone. No torque-sensitive screws. No hidden water paths. Just clean, compartmentalized, self-regulating protection—built into every square meter of the façade.

Fassada hybrid, because when it comes to façades, controlling water means controlling risk.

24. Acoustics: soundproof by design

In today's-built environment, acoustic performance is no longer a luxury, it's essential. As cities grow denser and buildings rise taller, the need to control noise infiltration becomes essential for comfort, productivity, and overall well-being. Nowhere is this more critical than in façade systems, where every detail contributes to the effectiveness of sound insulation.

In the realm of curtain walls, acoustic performance is determined by two key factors: The acoustic rating of the infill elements (typically glass or opaque panels); and The acoustic integrity of the curtain wall framing system itself, particularly the profiles and joints.

While infill elements receive a lot of attention, the role of the framing system is equally important and often underestimated. Sound can travel through gaps, mechanical connections, or lightweight components, reducing the effectiveness of even the most advanced glazing.



Fassada hybrid: a system built for silence

The Fassada hybrid system breaks new ground in this domain by rethinking the very structure of curtain wall framing from an acoustic perspective. It integrates several intelligent design choices that collectively enhance sound insulation and eliminate common sources of sound transfer.

1. No external screwed pressure plate = no acoustical bridges
Unlike traditional stick curtain wall systems use external pressure plates held in place by metal screws, each one acting as a potential noise bridge. Vibrations and airborne sound waves can travel through these screws, bypassing insulation layers and compromising acoustic performance. In contrast, the hybrid system eliminates this weak point entirely. With no pressure plate and no screws, the system minimizes mechanical transmission paths, significantly reducing structure-borne sound.
2. No open joints = no acoustical bridges
Unlike most unitized systems, the hybrid façade has no open joints. These joints are sealed with a thin gasket, creating a continuous acoustic barrier along the perimeter of each infill element.
3. Thick, dense exterior shell – strength that silences
Designed for exceptional structural performance, Hybrid features a heavy, high-mass external shell. This design decision, originally made to enhance static and wind-load resistance, has an additional benefit: it adheres to the Mass Law of Acoustics, which states that heavier materials naturally block more sound.

The result?
A façade system that naturally dampens airborne noise such as traffic, construction, and urban activity even before you account for the glass or panel elements.

Silence is the new luxury

Whether it's for a hospital, hotel, residential high-rise, or commercial office tower, acoustic comfort defines user satisfaction. With hybrid, Fassada offers not only unmatched structural integrity and thermal efficiency, but also a uniquely quiet façade experience.

Fassada, in a world full of noise, we've engineered silence.

25. Silicone: over and out with the heaven and hell solution

In most of traditional curtain wall systems, silicone sealants play a central role in maintaining airtightness and watertightness, especially at critical junctions such as the interface between transoms and mullions, and in the connection of interior gaskets.

On paper, silicone offers flexibility and adhesion, which has made it a go-to material for decades. But in practice, this reliance on silicone often becomes the weakest link in the façade’s long-term performance.

The problem with conventional silicone use

The primary and perhaps most critical issue with silicone joints is their dependence on human application: some installers do it correctly, while others do not.

Silicone is widely used in façade construction because of its initial elasticity and ability to conform to irregular joints. However, this approach comes with significant long-term limitations, especially in high-rise or high-movement structures:

- **Weather dependent:** proper application of silicone requires dry, clean surfaces and favourable weather. Even minimal moisture—such as morning dew or tiny water droplets on aluminium profiles—can prevent proper adhesion.
- **Incorrect application leads to early failure:** silicone is often applied between one vertical and one horizontal surface, forming a “triangle joint.” This configuration is incorrect. Silicone joints should be placed between two

parallel surfaces. The triangular setup introduces shear stress, which can lead to cracking, detachment, or loss of elasticity.

- **Environmental vulnerabilities:** silicone deteriorates when exposed to UV light, moisture cycles, dirt, and temperature fluctuations. Over time, it may pull away, crack, or fail entirely, compromising the seal it was intended to provide.
- **Maintenance challenges:** in conventional systems, silicone joints are almost always accessible only from the exterior. When failures occur
 - particularly on multi-storey façades
 - repairs become costly, difficult, and dangerous, requiring scaffolding, cradles, and specialized access.

In summary, silicone might pass a laboratory test, but it rarely survives the realities of a building’s life cycle.

The Fassada hybrid approach: engineered, durable, dry sealing

The hybrid system takes a radically different approach, developed from the ground up for durability, precision, and long-term performance.

- Key components of the hybrid sealing system:
- All silicone joints are replaced by dry joints (TPE, epdm,...)
 - All connections and junctions are ensured by either precast TPE-pieces or suitable foams.
 - The geometry of all of these “dry connections” accommodates building movements.

Silicone-free, worry-free

The result of this engineered approach is a curtain wall system that performs as intended not only on day one, but year after year, even as the building moves and ages.

With Fassada hybrid:

- There is no reliance on silicone that needs periodic inspection or replacement
- Water and air tightness are preserved even under long-term dynamic stress
- Maintenance is drastically reduced
- Performance is ensured by design, not by on-site application quality

A smarter standard

In façade engineering, relying on silicone as a primary sealing material is a relic of the past. The Fassada hybrid system offers a forward-thinking solution designed for modern buildings, realistic load behavior, and the unavoidable truth that buildings move.

Fassada hybrid: no silicone, no shortcuts—just intelligent sealing that endures



26. Burglary protection and shock-resistance: tamper-proof by design

In façade engineering, safety must be understood in two dimensions: **outside to inside**—burglary resistance, preventing unauthorized entry; and **inside to outside**—shock resistance, protecting against internal force events such as impacts, accidents, or pressure blasts.

While conventional systems often address these separately and incompletely, the Fassada hybrid system is designed for total security. It resists forced entry from the exterior and withstands internal shock without structural compromise. Not by adding components, but by engineering security into the system’s very core.

Outside to inside: burglary resistance by design

Traditional curtain wall systems typically expose mechanical fasteners. Pressure plates fixed by screws can be accessed by removing the exterior cap, offering an easy target for tampering. Once exposed, these screws can be removed to dismantle parts of the façade.

Fassada hybrid eliminates this vulnerability. Its monolithic exterior profile has no screws, no detachable pressure plates, and no weak mechanical interfaces. The exterior shell is thick, robust, and continuous, forming a physical

barrier that cannot be disassembled from the outside. This integrated security protects both the insulating glass unit and the entire façade envelope, making forced access extremely difficult. If not impossible.

Critically, this is not an optional add-on or a specialized configuration. It’s standard, built into every hybrid system. Burglary resistance isn’t applied later—it’s embedded from the start.

Inside to outside: shock resistance where it matters

True façade security also considers internal forces. In high-rise towers, public buildings, hospitals, or transport hubs, façades must resist impact or pressure from within whether due to accidents, crowd movement, equipment collisions, or unforeseen structural loads.

Shock resistance depends on three key factors:

- Profile stiffness (moment of inertia)
- Strength and logic of the transom-mullion connection
- Continuity of the structural load path under sudden force

Traditional curtain wall systems fall short. Lightweight mullions, used to reduce cost, often lack stiffness. Transoms are typically connected with just two small screws

on T-connector pieces per side, relying entirely on torque and precision. Under internal impact, this setup becomes a liability: profiles may deform or detach, infill panels can collapse, and the façade envelope may breach, causing injury, property damage, or service disruption.

The Fassada hybrid system neutralizes these risks through a different structural philosophy. The mullion is monolithic, delivering greater stiffness for the same weight. Its thicker external walls contribute directly to strength and resilience. More importantly, Hybrid replaces screw-based connections with a snap-in connection. Transoms are locked within machined mullion channels, creating an interlocked system that resists pulling, shearing, or buckling under stress. Forces are distributed evenly across surfaces, not concentrated at two tiny screws. This isn’t just stronger, it’s smarter. It transforms the curtain wall into a resilient, load-absorbing framework that protects occupants, assets, and operations from within.

Where it matters most

Every façade must offer more than beauty or energy efficiency. It must endure. The Fassada hybrid system does both: it prevents intrusion and absorbs impact, without relying on external brackets, adhesives, or exposed hardware.



Fassada hybrid: when façade safety means holding strong—inside and out.

27. Quality control made simple: clarity, consistency and confidence

Quality control in façade construction is often a delicate balancing act, managing dozens of variables, tight tolerances, complex assemblies, and ever-present risks of human error. In traditional curtain wall systems, ensuring a consistent, defect-free installation can feel more like crisis management than a structured process. Between external installation logistics, pressure plate torque, sealant quality, and transom-mullion alignment, quality control can quickly become both complicated and costly. The Fassada hybrid system offers a refreshing alternative. One that transforms quality control from a struggle into a strength.

Quality control in all stages of the construction process

It might look obvious now, but no one had done it before Fassada. Since the quality of the final installed curtain wall is the sum of:

1. The quality of the base materials
2. The quality of the production
3. The quality of the installation

Only when these three objectives are achieved will the developer receive the final product he has ordered and to which he is entitled.

It is a **matter of fundamental respect: Fassada cares about the developer/investor.** That is why Fassada follows a completely new policy : unprecedented quality control throughout every stage of the curtain wall construction:

1. **Base materials:** only the best manufacturers for all materials have been selected by Fassada as partner



- suppliers.
2. **Production:** either Fassada carries out the production itself in one of its state-of-the-art facilities with robotized Fassada production lines.
 3. **Installation:** may only be carried out by “Fassada Certified Installers” who have completed an intensive training program led by seasoned Fassada expert installation instructors.

Fassada takes it responsibility, Fassada doesn’t deliver, take the money and run.

Moreover, the Fassada technology was developed based on a KYC analysis, and every effort was made to avoid problems during installation, such as for example:

- Full installation from inside
- No screws
- No silicone
- Fassada smart glasses

Full installation from inside = full visual and physical access

With the Fassada hybrid system, everything is installed from inside the building. This simple but powerful shift creates a controlled environment where every detail is:

- easy to reach
- easy to inspect
- easy to verify before moving forward

There’s no need for visual checks from scaffolding or suspended platforms. No risk of overlooking details due to bad weather or poor visibility. The inspection team works in the same environment as the installation team, on the same floor, at the same level, with the same information.

It’s a streamlined process built for accuracy.

No delicate screw-based connections

One of the most failure-prone elements of traditional stick curtain walls is the screwed connections of the pressure plates on the mullions. If screws are not properly torqued, the air- and watertightness can be compromised, either immediately or over time. In the Fassada Hybrid system, this risk is designed out. The structural logic does not rely on these intricate and often inconsistent screw assemblies. This means:

- no screws = no torque risk
- no mechanical tension-induced stress
- no long-term worry about hidden faults behind the façade

With this simplified structure, the control process becomes visual and mechanical, not forensic. Offering better reliability with less oversight.

No silicone = no sealant worries

Another challenge in conventional façades is silicone. Though commonly used, silicone requires perfect application, perfect curing conditions, and periodic inspection throughout the life of the building. If not properly maintained, silicone can shrink, crack, or lose adhesion, leading to air or water infiltration. Fassada hybrid uses no silicone in its assembly. That means:

- no need to test joints for adhesion or consistency

- ...
- no risk of sealant degradation
 - no long-term maintenance schedules related to sealing

The façade remains tight, dry, and protected without relying on materials that naturally deteriorate.

Fassada smart glasses

The lack of skilled workers is probably the main concern of all façade contractors. It is not a local, but a real global problem.

And one may like it or not, it is an illusion to think this situation will improve in the future. On the contrary, the future doesn't look very hopeful on this matter.

A curtain wall system may have been simplified down to the bottom, as is the case with Fassada technologies, but at the end, it still has to be installed on site by people.

Being aware of this huge concern, Fassada has made a giant innovative stride forward by introducing smart glasses for both the installation people, as well as the workers on the floor of the workshop.

Fassada smart glasses sets a **new standard in the market.**

Reducing errors and increasing productivity are the 2 main objectives. Frontline workers and field technicians are connected in real-time with remote experts, zooming in on the smallest details, to get the job done, fast and effectively. Some operators work outside, some work inside. Some wear safety glasses and helmets, some don't. Some need prescription glasses. Some work in sterile



environments, others in dusty or loud environments, some in hazardous areas. **The one thing they have in common is that they need both hands and the correct information to do their job.** Smart glasses help field workers everywhere in the world to their job the best possible way.

- In our specific application for curtain wall fabrication and installation on-site, the use cases are 4-way
1. Step-by-step workflow guidance for tasks to be performed
 2. Remote assistance
 3. Quality control
 4. Registration

1. Step-by-step workflow guidance for all tasks to be performed

The built-in heads-up display of Fassada smart glasses gives step-by-step information to the wearer, telling and showing him – with animation videos - what to do next or how to do something. This assisted reality application helps the installation and fabrication people to execute all critical steps of a procedure or workflow in a correct way and order or to execute a critical inspection in the correct way. When combined with the streaming functionalities (SWIS), it provides full step-by-step guidance to operators during the execution of complex workflows or inspections on our building sites. The heads-up display does not obstruct the wearer's view, so he or she maintains full contextual awareness in the industrial work setting.

2. Remote assistance

Handsfree real-time support for our frontline workers, whether installation people on-site or whether workers in production.

Smart glasses enable remote assistance to support our frontline workers with real-time feedback and information from a distant expert, making their interventions more effective and safer. Smart glasses enabling ‘See-What-I-See’ (SWIS) and remote assistance provide video-conferencing capabilities that allow everyone in the call to see what the smart glasses wearer is seeing, from his or her point of view. Remote assistance increases maintenance quality and reduces on-the-job learning time because Fassada smart glasses enable field staff to consult more experienced remote experts within the company in real-time. Machine up-time is higher because after-sales engineers of complex capital equipment can remotely assess the situation and solve complex problems faster and more efficient.

3. Quality control

Where and when required, all quality control steps can be inserted in a digital format to ensure a quality-controlled installation or fabrication meets all the technical requirements of Fassada technologies.

4. Registration - reporting

In combination with installed special software, a complete report gives all information regarding the delivered performances at the end of the day.

The software works as a service-based central platform to manage enterprise procedures, work instructions and inspections simply and easily, while making the remote execution paperless and mobile. It is available on any type of wearable: tablet, phone, PC and smart glasses. Digitizing work instructions results in reduction of quality related network, decrease of admin costs and improvement of execution efficiency.

...

... **The final result of all of this: effortless quality control**

Taken together, these innovations mean that the Fassada hybrid system is not only easier to install. It's easier to **inspect, verify, and trust.**

The benefits for project management and site teams are immediate:

- faster sign-off on completed sections
- fewer errors to track or rework
- simpler documentation and quality assurance reporting
- greater confidence in long-term performance

Where traditional systems demand vigilance, hybrid offers **clarity**. Where others require constant inspection, hybrid provides **built-in confidence**. **Build with certainty**

The Fassada hybrid system is more than a façade solution—it's a smarter way to build. By reducing reliance on fragile processes, difficult-to-control variables, and long-term maintenance dependencies, it creates a building envelope where **quality is engineered and integrated into every detail.**



Fassada hybrid: where quality control becomes part of the process—not a problem to solve

28. Heavy load glass, handled with ease

The Fassada hybrid system redefines how glass is handled, installed, and maintained, both in construction and across the building’s lifecycle. It solves the logistical challenges of handling large-format units and eliminates the optical issues typically caused by conventional clamping systems. From first installation to long-term performance, Hybrid delivers literal clarity and technically.

A Harry Houdini trick

How to install a glass unit from inside, into the systems pockets, when the glass unit is larger on all four sides than the inside rebate of the curtain wall? Fassada did it.

Flexible installation: from the inside or outside

In conventional façade systems, the installation of glass units, especially large or heavy ones, depends on exterior access: scaffolding, lifts, cradles, and highly coordinated, weather-sensitive operations. Fassada hybrid changes this completely. Its internal logic supports full glass installation from either side of the building. Whether working from inside or outside, teams can install panels in a safe, controlled, and clean environment.

Interior glazing is especially valuable in high-rise projects or dense urban conditions, eliminating the need for elevated access equipment. External glazing remains just as efficient for ground floors or podiums, with no changes to system logic or sealing behavior. In either case, installation is fast, weather-independent, and repeatable with minimal site disruption.

Heavy glass, handled with confidence

As insulating glass units grow larger, thicker, and more technically demanding, conventional systems struggle to keep up. Fassada Hybrid is structurally and logistically prepared. The system accommodates oversized and heavy IGUs without special reinforcement or altered detailing. Whether a unit is 4 m² or more, the hybrid technology and glazing logic allow it to be placed, commonly using a manual or electric glass lift for the load, with full control from the interior, minimizing risk and simplifying equipment needs. Workers benefit from stable footing, ideal sightlines, and no exposure to wind or weather. Alignment, sealing, and inspection are performed with greater accuracy, reducing the chance of damage during handling or rushed execution between weather windows.

Simple, safe glass replacement. Built in for life

The system’s glazing logic also transforms long-term maintenance. If a panel is ever damaged or needs to be replaced, the hybrid design allows for safe, localized removal and reinstallation entirely from the inside. There’s no need for scaffolding or cradles. Glazing beads are removed internally, the unit is withdrawn and replaced, and the façade remains intact with no impact on neighboring fields or system performance. Traditional curtain walls require disassembling pressure plates, cutting silicone, and accessing mechanical fixings from the exterior. It’s risky, slow, and expensive. Fassada Hybrid eliminates these dependencies with no exterior screws, no sealant reliance, and no

need for special tools. Maintenance becomes a fast, precise operation keeping façades serviceable even decades after installation.

Distortion-free clarity: protecting the view

Beyond access and safety, the Fassada hybrid system preserves the visual integrity of the glass itself. Traditional systems compress the IGU with pressure plates and gaskets, applying clamping forces that distort the perimeter and often produce visible optical deformation, especially in large-format units. This effect, known as glass distortion or “glass warping,” reduces the quality of reflections and can be clearly visible from street level.

Hybrid solves this by eliminating pressure plates entirely. The glass is positioned and sealed using continuous, uniform glazing beads, which create a stable seating surface without point pressure or torque-dependent compression. The result is a glass unit that holds its geometry exactly as manufactured. Free from distortion, even at the edges. Reflections remain true, surface flatness is maintained, and architectural intent is fully preserved.

A complete glazing system : inside, out, and end to end

Fassada hybrid doesn’t just rethink how glass is installed. It rethinks what glazing means in a façade system. From access and handling to visual quality and long-term serviceability.

Fassada hybrid: flawless glazing, from installation to reflection



29. Inside or outside glazing: you choose

The Fassada hybrid system was purposefully designed to revolutionize curtain wall installation, especially in complex, vertical, and high-rise environments. At the core of this innovation is its ability to allow complete installation and glazing from the inside of the building. A feature that dramatically improves safety, efficiency, and cost-effectiveness.

However, we also understand that architecture is diverse, and so are project conditions. Different building types, site constraints, or design intentions may call for a more conventional glazing approach. That's why the Hybrid system is engineered not just for innovation, but for flexibility.

Developed for interior installation, not limited to it

The hybrid system's standard configuration allows panels, mullions, and glazing to be installed entirely from the interior, removing the need for scaffolding, cradles, or exterior lifting equipment. This method is ideal for:

- High-rise façades
- Urban infill projects with limited external access
- Projects with strict safety protocols
- Installations in adverse weather zones

But if the project calls for it - due to design logic, access strategy, or specific façade typologies like shopfronts or podium-level façades - glazing from the outside is equally possible, with no need to alter the core curtain wall system. When and why outside glazing may be preferred.

- Certain conditions may make external glass installation preferable:
- Shopfronts and ground-level façades, where access is easy and visibility is key
 - Renovation projects, where internal space must remain untouched or occupied
 - Special façade zones with large panels or decorative exterior elements
 - Highly transparent public spaces, where large units are installed during off-hours

In all these cases, the Hybrid system easily adapts to external glazing logistics, without compromising structural integrity, thermal performance, or water tightness.

True versatility without compromise

- Whether installed from the inside or outside, the system maintains:
- The same aesthetic appearance
 - The same performance classification for airtightness, watertightness, and wind resistance
 - The same ease of maintenance and accessibility
 - The same structural load transfer logic through its monolithic mullion design

This dual capability makes Fassada Hybrid one of the most flexible curtain wall systems on the market today. Suitable for any scale, any height, any function.

A system that works for your project, not against It

With Fassada Hybrid, you're not locked into one way of building. You're empowered to choose the most sensible, efficient, and cost-effective method based on the unique characteristics of your project.

Inside glazing when it matters. Outside glazing when it suits. One system—adapted to every scenario.



Fassada hybrid: Built for performance. Designed for real-world flexibility

30. Seismic zones: let it shake!

Seismic action refers to the forces and stresses exerted on structures due to seismic events, such as earthquakes, which can lead to increased internal tensile stress, bending moments, and potential damage to structural elements.

Earthquakes are geological events caused by sudden releases of energy in the Earth's crust, often along fault lines, which generate seismic waves.

The sudden movement of rocks along a fault generates the energy that produces these waves. These waves are the vibrations generated by these sudden releases of energy, including those from earthquakes. When these waves reach the Earth's surface, they cause the ground to shake, which is the seismic movement, it is the physical manifestation of the

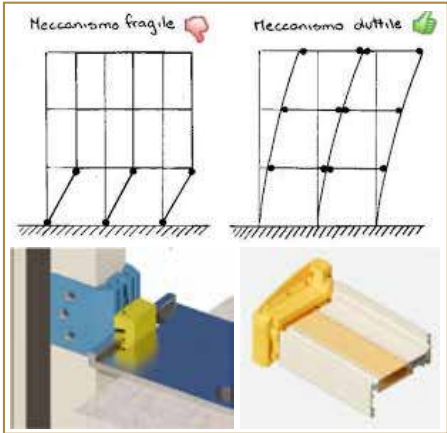
earthquake's energy and cause the ground to shake. While earthquakes are a major source of seismic waves, other events like volcanic eruptions, landslides, and even large explosions can also generate seismic movements.

Seismic zones require a kind of flexible skin which allows to move and to reduce the transfer of seismic forces, caused by the movements, to the structure of the building. It is about the ability of the curtain wall to deform without failing.

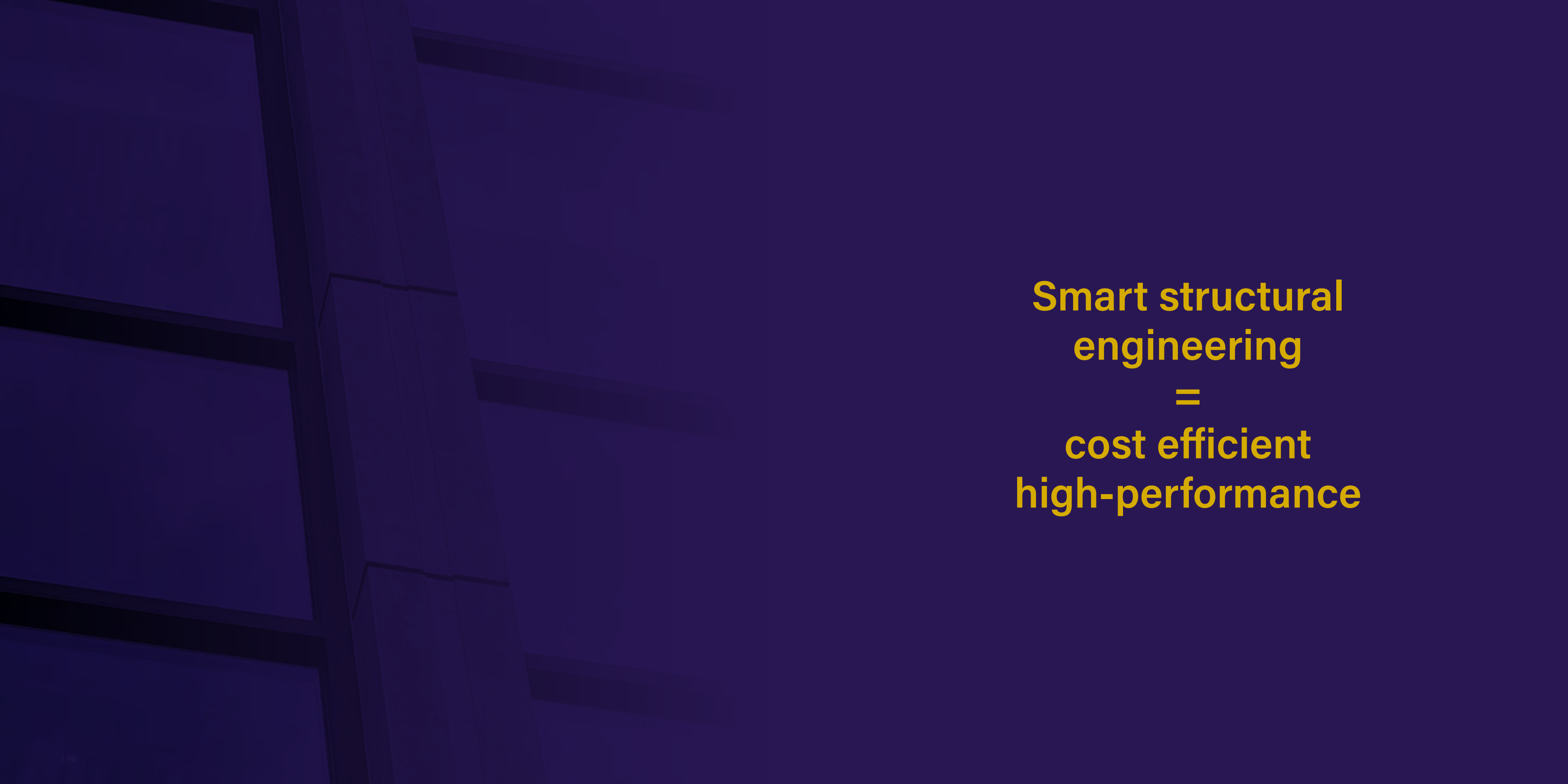
- Considering
- The unique spigot/splicer technology – silicone free - for the mullion connections
 - The unique mullion/transom connection where conventional screw-based connections are replaced by a snap-in

- connection. Transoms are locked within the machined grooves of the mullions, with the transoms going in the mullions instead of being fixed in between
- The remarkable features of this mullion/transom connection (see topic 32) combining blocking – translation – rotation in one single TPE-device
 - The groundbreaking telescopic pivot brackets (see topic 20)

which makes the **Fassada hybrid curtain wall one large “mesh structure” where all connections (mullion/transom and mullion/slab) function as a hinge allowing rotations as axial movements (shortening or extension) as well of the “mesh pieces”, being the transoms and mullions.**



Fassada hybrid was engineered to shake



**Smart structural
engineering
=
cost efficient
high-performance**

31. Vertically: not just a mullion, but a thermally broken monolithic mullion

When evaluating the structural performance of curtain wall systems, particularly under demanding structural conditions, the rigidity and structural logic of the profiles are of paramount importance.

Unlike conventional systems - where a mullion typically consists of at least three components (an interior profile, a pressure plate secured with multiple screws, and a cover cap) - the hybrid system introduces a revolution in the industry: a mullion formed as a monolithic, composite, insulated profile, comprising an exterior and interior shell joined by a polyamide thermal break.

This unique patented concept offers a long list of unique selling points (USPs):

- 1. **Stiffness of the monolithic mullion**
For any thermally broken profile, the I-value is calculated for the complete section, with both the interior and

exterior shells contributing structurally, while the thermal break acts as a spacer. This differs from conventional screwed systems, where the pressure plate does not contribute to mechanical performance. Because the moment of inertia relates to the cube of the profile height, the hybrid system fully exploits the potential of the mullion's height. For the same profile depth, the hybrid system achieves roughly double the I-value of conventional systems.

- 2. **Lowest weight per linear meter for the same I-value**
As profile depth drives the I-value, the hybrid mullion weighs approximately 5% less per meter than any conventional system for the same structural performance.
- 3. **The monolithic mullion delivers a never seen thermal performance** (see topic 22).
- 4. **Direct fixing of all types of architectural cladding to the mullions**

See also topic 17. This feature opens a new era for architects, offering unprecedented design freedom.

- 5. **Uniform pressure on glazing around its entire perimeter (no screws required)**

See also topic 19. Glass distortion becomes a thing of the past.

- 6. **Glazing installation from the interior**
The advantages speak for themselves.

Engineered for excellence

By merging structural intelligence with material efficiency and mechanical clarity, the Fassada hybrid system sets a new benchmark in curtain wall technology. Offering a seamless integration of form and function, it provides architects and engineers with a powerful tool to meet the evolving demands of high-performance building envelopes—while preserving architectural freedom without compromise.



Fassada hybrid: because real performance starts with the profiles.

32. Horizontally: the smart transom-mullion connection: intelligent engineering for a high-performance façade

In curtain wall construction, the connection between transoms and mullions is a critical determinant of structural strength, watertightness, ease of installation, and long-term durability. Often overlooked in conventional systems, it becomes even more crucial as buildings grow taller, lighter, and more dynamic.

Unlike conventional systems, the Fassada hybrid system redefines this interface with a screw-free, maintenance-free, and mechanically advanced connection that overcomes the weaknesses of traditional designs.

As explained before in topic nr 6, the curtain wall has to be engineered not as a rigid grid, but as a flexible system in which the “horizontal” profiles are hinge-connected to the “vertical” profiles.

This way of construction means a real revolution in the world of curtain walls. However, these hinge connections have a multiple function. On both ends of the thermally broken transom, a special TPE end piece is installed.

These end pieces have a triple function

- firstly, the function of a sliding piece in the mullion chambers whilst installation of the transom
- secondly, the creation of a watertight connection between the transom and the mullion
- thirdly, to allow the absorption of differential movements of the building or thermal dilatations or contractions

As such, the transom is pinched in the exterior and interior slots milled in the mullion and an optimum connection between transom and mullion is obtained:

1. following the x-axis (the longitudinal axis of the transom), the transom can dilate free
2. following the y-axis (the longitudinal axis of the mullion) the transom is perfectly blocked
3. following the z-axis (the axis perpendicular to the plane of the curtain wall) the transom is perfectly blocked as well!

Multi-axial performance: controlled where it matters, free where it's needed

This way, the connection absorbs any structural movement. Whether from slab deflection, wind sway, or thermal expansion, the end piece flexes in

controlled ways that protect the profiles from long-term stress or cracking.

This snap-fit optimized connection not only improves installation precision but also guarantees that forces are transferred predictably and safely throughout the structure, contributing to both static and dynamic performance

Optimum transfer of dead load of the glazing to the mullions

Because the transom snaps into the mullion and is resting on it without any mechanical or screwed connection, the dead load of the glass on the transom is transferred in an optimal way to the mullion.

Easier, more reliable, better, faster, no risk and highly cost-effective.

On-site and lifecycle advantages

Thanks to the slot-in logic, installation is fast and accurate with minimal reliance on high-skill labour. There's no risk of mis-drilled holes or overtightened screws, and the system is far more forgiving to the movement and settling that every building experiences over time. It's a connection that performs as well on day one as it does years down the line.



Fassada hybrid: because a curtain wall should dance with the building—not fight against!



The labour challenge: costs and scarcity redefined

33. In the factory: Fassada' s robotized production line

In topics 2 and 3, it has already been explained why a holistic and disruptive approach is essential.

Compared to many other industrial sectors, automation and robotization in façade production are still in their infancy. Automation and robotization are not merely about controlling labour costs or dealing with related challenges such as absenteeism and labour shortages.

As highlighted in topic 27, **the primary driver is the need for consistent product quality.**

Many assembly operations, such as installing gaskets and various accessories, are relatively simple, yet their precise and accurate execution is essential to ensuring the quality of the final installed product.

It is precisely because these operations are so simple on the one hand, yet need to be performed hundreds if not thousands of times during a production day, that the

risk arises of inconsistent, inaccurate, and imprecise execution.

This risk can only be eliminated by replacing human intervention with automation or a robot.

With the Fassada robotized production line, Fassada has made a giant leap in this field, achieving an unprecedented productivity of about **1 minute per sqft² of production time** for the hybrid façade, while guaranteeing consistent quality.

In comparison with conventional unitized systems, production time is thus reduced, depending on the system type, by a factor of 10 up to even 50 (!).

In countries with high labour costs (Western Europe, USA, Canada, ...) and considering that production costs can easily account for 20–30% or more of the total installed façade cost, this factor alone is market disruptive.



Fassada hybrid: because quality matters

34. On site: installation reinvented: faster, easier, safer and more cost effective

It is already mentioned, one of the biggest challenges in construction today is the shortage of skilled labour. Traditional curtain wall systems with their intricate profiles, multi-part assemblies, and sometimes exterior access requirements demand highly trained specialists to ensure quality and compliance. This dependence on scarce expertise creates delays, raises costs, and limits scalability.

But what if façade installation didn't have to be so complicated? What if the system itself was designed to be so intuitive that it reduced the need for specialist skills, enabling teams to work faster, safer, and with less training?

That's exactly what the Fassada hybrid system delivers.

To reduce the risk of time and related financial losses on-site, it is important to divide the façade installation process both in terms of timing and tasks, as follows:

1. Installation and alignment of the façade using the fixing anchors (team of 2 people)
2. Installation of the mullions (team of 3 people, with an installation capacity of approx. 250 m² of façade area per day)
3. Clicking in the transoms (2 teams of 1 person each, combined installation capacity of approx. 250 m² of façade area per day)
4. Placement of the spandrel panels (team of 2 people, with an installation capacity of approx. 250 m² of façade area per day)

5. Placement of the glazing and panels (team of 3 people, with an installation capacity of approx. 250 m² of façade area per day)
6. Clicking in the glazing beads (2 teams of 1 person each, combined installation capacity of approx. 250 m² of façade area per day)
7. Any further interior finishing

None of these tasks are subject to interruption due to potential damage or missing materials, and all can proceed simultaneously. **Faster, easier, safer and more cost effective.**

From complexity to clarity

From engineering and manufacturing to delivery and installation, hybrid is designed to strip away complexity. Gone are the dozens of screws, pressure plates, gaskets, and delicate sequencing steps. In their place: a streamlined process with fewer components, simplified connections, and logical, repeatable assembly.

Installation happens from the inside, improving safety, working conditions, and efficiency. Precision manufacturing ensures that parts align perfectly on site, leaving little room for error and making workflows intuitive even for less experienced crews.

Show, don't tell: training made simple

Instead of thick manuals and complex instructions, Fassada provides short, animated videos and smart glasses showing each installation step in real time. These visual guides are language-independent, easy to share on site, and far more engaging than written documentation. Workers learn faster, retain more, and need less supervision - whether they're seasoned installers or new recruits.

Empowering a flexible workforce

By making façade installation accessible to low- or semi-skilled workers, hybrid allows developers and contractors to scale teams without being held back by labour shortages. Onboarding is faster, training costs drop, and larger crews can be deployed to meet tight schedules, all without sacrificing quality.

Hybrid's simplicity isn't just a convenience; it's a cost advantage. Fewer hours per square meter, smaller crews to meet deadlines, and reduced errors translate into measurable savings on every project. In an industry where time and skill are scarce, Fassada turns simplicity into strength.

No complex manuals. No specialist dependency. Just streamlined, intelligent façade construction.



... **The near future:
installation by androids**

Since the initial development phase in 2005, the ultimate ambition for hybrid technology has been twofold: on the one hand, achieving highly automated, fully robotized production, and on the other, enabling on-site assembly carried out by androids.

The guiding principle behind making this vision a reality was crystal clear: **keep it simple.**

Every task, in both production and assembly, had to remain straightforward and efficient.

Now, twenty years later, this vision is beginning to take shape. Topic 33 outlines Fassada's fully robotized production line.

Looking ahead, Fassada aims to be the first to enable android-driven assembly.



Fassada hybrid: engineered for performance.

35. Geometric surveys: precision by a professional and cost savings

In façade construction, every curtain wall system ultimately needs to be installed on site.
Today, installation is still to be carried out manually.

To minimize risks and optimize quality control, everything starts at the very beginning!

A timely and well-prepared start on-site is crucial, and therefore several key issues must be considered:

1. Primary structure tolerances:

Each primary structure has inherent tolerances. These tolerances, in the x-, y-, and z-directions, are critical for the execution design of the curtain wall, as they define the maximum and minimum envelope and clearances within which the curtain can be installed. These tolerances should be confirmed in advance with the general contractor.

Before installation begins, the primary structure must be **accepted as fit for façade installation**.

In practice, the earlier it is confirmed that

the primary structure has been correctly constructed, the better it is for all parties involved.

2. Curtain wall alignment:

Proper alignment of the curtain wall is essential, not only for aesthetic reasons but also to ensure correct system functionality. Achieving this requires skilled personnel, who are often difficult to find.

3. Reasons to start site work as early as possible:

- Financial: to manage cash flow effectively.
- Technical: as mentioned in point 1, any tolerance issues should be identified early to avoid potentially costly consequences.
- Schedule management: the earlier site work begins, the easier it is to adhere to the project timeline.

All of these issues are managed and resolved by entrusting a crucial part of the installation to an expert - a geometric surveyor - rather than to the installation teams responsible for the grid and infill elements.

Referring to Topic 34: Task 1, the alignment of the façade using the fixing anchors is preferably carried out by the surveyor. The task is straightforward: to mark, along the building perimeter and on each floor at the slab edges, the reference points indicating the corner positions of the anchor plates (part of the smart Fassada anchor system).

Once these cross points are marked on the concrete slab which constitutes the key part of the installation, i.e., the main alignment, the façade installers simply position the anchors between the cross points and secure them to the concrete slabs.

Because the hybrid system is installed entirely from within the building, the surveying process becomes faster, safer, more accurate, and significantly more cost-effective. Surveyors no longer need to work outside the structure; instead, they operate in a controlled interior environment, benefiting from better lighting, improved visibility, and zero exposure to wind, rain, or unstable platforms.



Fassada hybrid: when precision isn't just a goal—
it's built into the process.



Sustainability and circularity

36. Sustainability by deeds, not words

The word *sustainability* undoubtedly belongs in the top three buzzwords of the past decade. The daily dose of sheer political nonsense and greenwashing we are exposed to is unprecedented.

In the age of climate responsibility and resource awareness, sustainability in construction can no longer be treated as a side note; it must be embedded in every decision, from production to installation to lifetime performance. Curtain walls, as one of the largest and most material-intensive building envelope elements, have a crucial role to play in minimizing both embodied and operational carbon emissions.

Built to last

Fassada aims to leave the world bigger, better, and more grandiose than we found it. By reducing our CO2 emissions, developing energy control solutions, and streamlining our business model, we make a radical commitment to the future.

Sustainability spans a wide range of issues; one of the most fundamental, though frequently neglected, is the material flow and its immediate impact.

A traditional curtain wall production is featured by a fragmented, carbon-heavy chain.

A typical production journey of just the profiles looks something like this:

1. Profiles are extruded by Company A
2. Then shipped to Company B for surface coating
3. Then to Company C, the curtain wall brand's warehouse
4. And finally to Company D, the contractor's fabrication workshop
5. Only then are they ready to be delivered to site

Each leg of this journey means:

- More transportation, with repeated loading, unloading, and warehousing
- Higher fuel consumption and CO₂ emissions
- Increased handling and risk of material degradation
- Greater need for buffer stock, adding to waste and inefficiencies

This traditional model is outdated and is anything but sustainable.

The Fassada hybrid LEAN model: streamlined, smart, sustainable

The hybrid system eliminates this logistical complexity entirely by adopting a LEAN, vertically integrated production model:

- Extrusion, coating, and thermal break assembly are all done in a single location

- Finished profiles are shipped directly to the contractor, ready for fabrication
- If preferred, final fabrication can also be completed, and the system delivered in “mecano” format, prefabricated and site-ready

The benefits are immediate and measurable:

- Fewer transport movements
- Lower fuel use and CO₂ emissions
- No unnecessary packaging, storage, or re-handling
- No oversized stockpiles with aging material
- Fewer delays, tighter quality control, and less waste

It's the shortest, cleanest, and most efficient route between material and building.

But as mentioned already, there is much more to Fassada's vision on sustainability, such as:

- Embodied versus operational carbon emission: the bigger picture
- Keeping the sun out
- Sense or no-sense of circularity

These aspects are addressed further in the present chapter.



Fassada hybrid, we don't ripple the surface.
We rock the boat.

37. Hybrid redefines eco-responsibility at every level

Preserving our planet

In everything we do, we aim to leave this world better than we found it.

We reduce our ecological footprint, and real reduction of the embedded CO₂

Our natural resources are precious and finite, so we discard anything that won't stand the test of time.

- We drastically reduce the need for accessories of different materials (plastics, stainless steel, etc.) and use environmentally friendly TPE gaskets.
- We never use silicone.
- We have less aluminium as hybrid has a lighter weight/m² compared to all conventional systems thanks the monolithic profiles
- We use low carbon aluminium
- At the end, we use light weight cold rolled steel profiles having a CO₂ footprint 5 times less than aluminium

We focus on energy control, and real reduction of operational CO₂ footprint

See also topic 38 “the real challenge” We find smart thermal isolation, solar control, and ventilation solutions to tackle the inevitable consequences of our changing climate, such as

- Smart external sun shading devices
- Smart glazing
- Night cooling
- Semi-ventilated façade systems
- Double skin façades
- The integration of ABIPV-panels
- Best-ever thermal insulation performance of a curtain wall

We’ve streamlined our business model.

We ensure maximum efficiency and eco-friendliness in every layer of our organization.

- We are the first-ever system supplier to set up a fully integrated e-commerce platform for the sales and distribution of customized B2B products.
- The production (extrusion, crimping and coating) of our profiles is handled by a one-stop-shop, eliminating the need for in-between transport.
- We don’t keep stocks, which further reduces transportation needs and helps us cut back on energy waste.

We care about all our people

See also topic 42 “Social sustainability” We care about the people who might one day live or work sleep in the buildings we create, but also the people creating them. That’s why we develop straightforward solutions that are simple and risk-free to install for unskilled and low-skilled workers.



Fassada hybrid: Sustainability isn't our side project, it's our blueprint for the future.

38. The real challenge: drastic reducing of operational CO₂, not just embedded carbon

It is well known that the construction sector accounts for roughly 40% of total global CO₂ emissions. This 40% can be divided into two parts: about 20% comes from embedded carbon, while the remaining 80% results from operational carbon.

In most debates and media coverage, the spotlight falls almost entirely on embedded CO₂, while the far greater emissions from a building's operational use are rarely discussed. The reason is simple: addressing them is neither convenient nor profitable and only a few have found a smart, affordable solution.

Considering that the façade is the physical barrier between the inside and outside of a building, it directly determines the need for cooling and/or heating. When the performance of this "skin" is insufficient, energy consumption and thus operational carbon emissions inevitably rise.

In other words: so-called green products are nice, but they are little more than a side debate. The real challenge is to tackle the 80% of emissions caused by operational carbon.

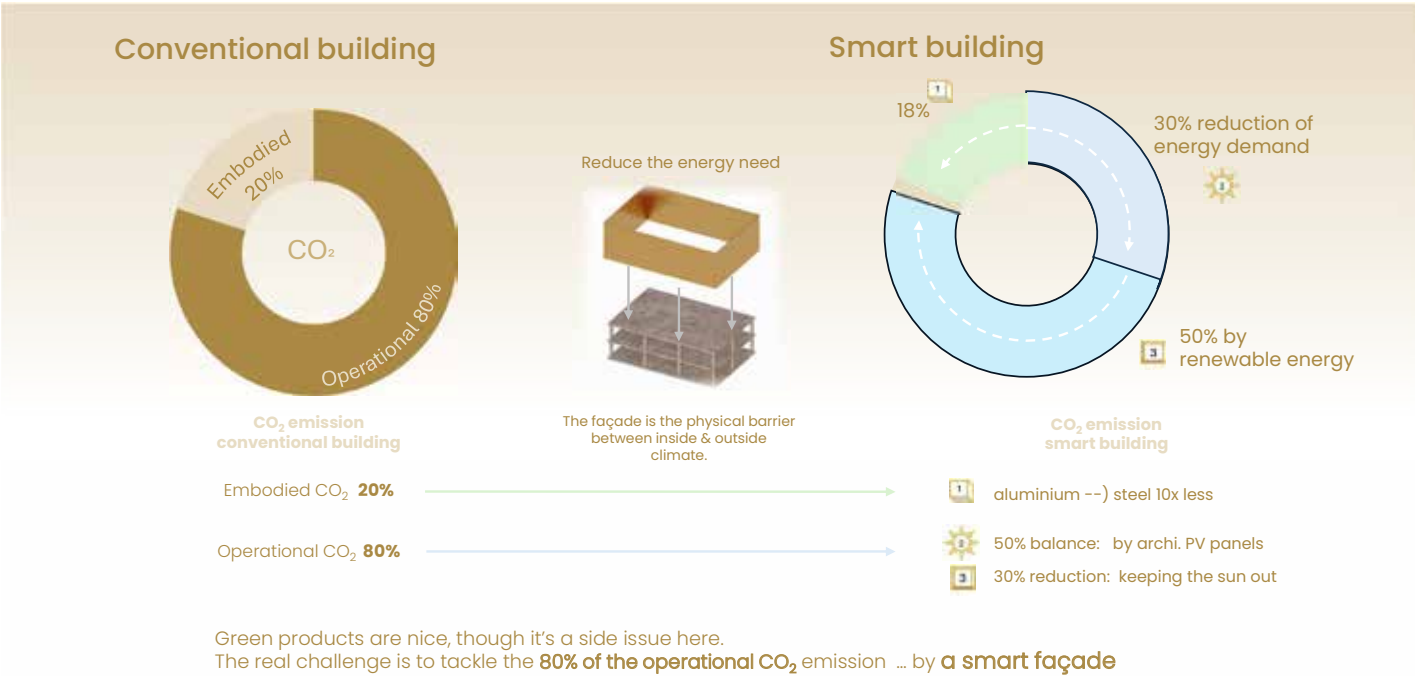
Fassada hybrid has focused on this issue and managed to solve it in a cost-effective way through a combination of measures:

1. Keeping the sun out (see also topic 41: cost effective smart shading devices). The greenhouse effect caused by glazing is well known. Everyone has surely experienced the heat when sitting in a veranda on a sunny day. The greenhouse effect occurs when sunlight penetrates through glazing, the heat is absorbed by interior surfaces, and then gets trapped inside, causing indoor temperatures to rise. How can one possibly speak of a "sustainable" building when it is fully glazed? By definition, such buildings are energy-

hungry glass boxes. In countries with limited financial resources, this issue is often solved in a far more pragmatic and efficient way. For reference: the best-performing glazing has a g-value of 0.20. A well-designed dynamic shading device can achieve values at least 10 to 20 times lower, which can reduce cooling demand by up to 50%.
2. Replacing "dead mass" cladding materials with energy-generating materials.
3. Reducing cooling and heating capacity through a curtain wall-integrated HAC-system (see topic 48).

Fassada hybrid smart skin reduces operational carbon emissions — responsible for 80% of a building's footprint — to nearly zero.

Fassada cold-rolled steel curtain wall lowers embedded carbon from 20% to just 4% (see topic 46).



Fassada hybrid:
Less talk, less CO₂, more future.

39. The best circularity is no circularity

The debate on circularity in construction is a non-debate.

After all, it's a problem we create ourselves by building with poor quality. It's an issue that can easily be avoided.

Compare it to a Porsche 911. The first 911 hit the market in 1964. Since its introduction, roughly 1.2 million Porsche 911s have been sold. It's estimated that about 70% of them are still active on the road. In other words, over 60 years, only about 30% (around 350,000 cars, or fewer than 6,000 per year) are no longer in circulation. For Porsche, circularity simply isn't a problem.

Circularity is a problem created by humans themselves and by questionable consumption patterns. The same story applies to all conceivable goods, for instance clothing (cheap fabrics can't be recycled due to short length fibers), toys (in the past, toys were only made of wood and metal), furniture (high-quality pieces last a lifetime), and so on.

This reasoning is identical for a building and certainly for a glazed curtain wall!

A curtain wall is not a disposable product.

The best circularity is no circularity.

But here lies the real challenge: the mismatch in lifespan between its core elements.

1. The grid, the profile system, if of good quality, easily has a lifespan of 50 years.
2. The lifespan or rather the service life of the glazing:
 - The lifespan of DGU or TGU

(including warranty) is typically around 20 years.

- Rapid technological advances (e.g., PV see-through glazing) and stricter standards like ESG regulations mean glazing will often need to be upgraded even sooner.

In practice, this means that over the lifespan of a curtain wall, at least two major upgrades will be needed not of the structure itself, but of the glazing.

Fassada hybrid: the key for upgrading in the future

Hybrid is the only façade system on earth with the patented ability to replace glazing from the inside, completely analogous to an ordinary window.

In a conventional stick façade, replacement must be carried out from the outside, from scaffolding, and the entire outer skin must be dismantled.

In a conventional unitized façade, in theory, the glazing could be replaced, but in practice this is unworkable. Leaving only one solution: dismantling and replacing the entire façade with a new one. This in turn leads to additional costs due to the need for all-new interior connections on one hand, and costs due to temporarily vacating the building and renting another location on the other.

In a structural glazing unitized façade, the only option is full dismantling and replacement with a new façade, with the aforementioned extra costs.

Indicative figures for the cost scenario are quite confronting: if we assume that the total project cost is 100, then as a rule of

thumb the façade component accounts for 20 (for Fassada it will be closer to 15, for unitized closer to 25), of which 5 is for the glazing.

The, the following indicative figures then apply:

• Initial construction cost	100
• Initial façade cost	20
• Upgrade with Fassada, total cost	8
• Upgrade with stick system, total cost	15
• Upgrade with unitized glazing, total cost	20
• Upgrade with unitized replacement, total cost	50

During the lifespan of the "metal grid," this process will need to be carried out twice.

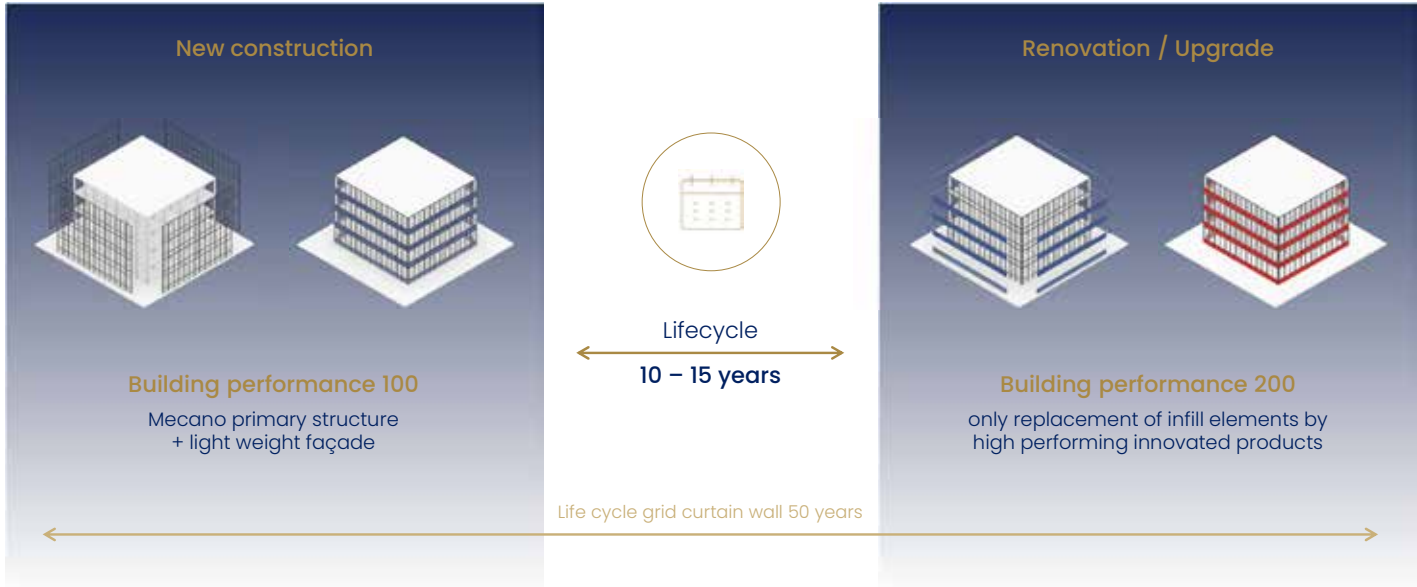
The conclusions are clear.

Win-win in "built-to-sell" developments

Contrary to what a "built-to-sell" developer might typically think in terms of "not my problem," this situation offers a unique opportunity to create exceptional added value through pure value creation. The developer can sell this unique asset — thanks to the predictable, unavoidable future upgrade costs — to the client at a market-compliant yield, provided that a discount is applied. This makes the entire operation a win-win for both the developer and the buyer.

With Fassada hybrid, tomorrow's upgrade is today's smart decision.

The best circularity is no circularity



40. Structural glazing: it couldn't be worse

Structural glazing, a technology that emerged in the 1980s undoubtedly had its merits.

Many iconic buildings have been realized with it, such as The Gherkin in London, the Hong Kong Financial Centre, the Fondation Louis Vuitton in Paris and many others. However, times have changed.

From the perspective of sustainability and circularity, and all related, prohibitive costs — arguably key topics in contemporary architecture — structural glazing has failed to keep pace and is, in fact, best avoided.

- 1. **Circularity and cost:** The inevitable need to upgrade façades over time leads to extremely high costs and poor circularity performance (see topic 39

- “The best circularity is no circularity)
- 2. **Sun-shading performance:** A structural glazing façade is by definition a fully glazed surface. From a sun-shading perspective, this is inherently problematic (the so-called greenhouse effect), which even high-performance glazing cannot resolve, resulting in excessive cooling demands and correspondingly high operational CO₂ emissions.
- 3. **Dependence on silicone:** The system relies heavily on silicone, adding another layer of complexity and environmental concern.

For all these reasons, structural glazing should be regarded as a solution of the past.

Not a product for the future of contemporary, sustainable architecture.

Fassada hybrid, because times have changed.

41. The key: low cost smart shading devices via the monolithic mullion

Climate change – energy control: the huge impact on curtain walls

The ever-increasing demand of energy consumption and harmful CO₂ emission, which caused by global warming necessitate the urgent need for energy conservation particularly in buildings.

These are one of the biggest energy consuming sectors.

The most vulnerable building parts to heat gain and loss are windows, which counts for substantial cooling and heating needs consequently. An enormous amount of energy is being consumed to run air conditioner devices to adjust the temperature of living spaces and inside buildings, while proper glazing technologies and materials should be utilized to reduce the energy consumption.

Knowing this everyday increasing energy requirements of the buildings worldwide and the inevitable evolution to green, passive & energy neutral buildings, the strengthening regulations for energy performance conditions and energy management systems (EMS), the performances of the façade need to increase to have better control on the indoor environment independently from the outside climate. As the façade is the barrier between inside and outside climate (controlling heat gain and loss). It is the façade that determines for a large part the performance of the building.

Passive cooling is a building design approach that focuses on heat gain control and heat dissipation in a

building in order to improve the indoor thermal comfort with low or no energy consumption. This approach works either by preventing heat from entering the interior (heat gain prevention) or by removing heat from the building (natural cooling).

Thus in winter, the cold has to be kept outside (isolation). This requires a low U-value.

Thus in summer, the warmth of the sun has to be kept outside (sunscreens, smart glass). This requires a low g-value. To minimize the solar heat gains – “keeping the sun out” – the amount of solar radiation that induces overheating in both indoor spaces and buildings’ structure need to be reduced.

The hybrid monolithic mullion is the starting point of a new era of “keeping the sun out”

- There are only 2 ways to keep the sun out:
- Whether by the use of exterior sun shadings (vertical slats, horizontal slats or sunshading)
 - Whether by the installation of special dynamic glass, so-called smart gazing

External sunshadings

A properly designed shading system can effectively contribute to minimizing the solar heat gains. Shading both transparent and opaque surfaces of the building envelope will minimize the amount of solar radiation that induces overheating in both indoor spaces and building’s structure. By shading the

building structure, the heat gain captured through the windows and envelope will be reduced.

Therefor one needs to hold down the sun before it touches the façade, so sun screens need to be installed on the outside.

In all conventional curtain wall systems, who would want to install sunscreens, this causes a problem on multiple levels:

- Installation from the outside;
- Installation onto the curtain wall means puncture of the aluminium systems, causing perforation of the rain and water screen of the building and creating thermal bridges;
- Visually, a box on top, which is undesirable for all architects;
- Maintenance from the outside.

Hybrid systems solves these issues in an ingenious way, trough the combination of

- The semi-ventilated configuration;
- With the unique feature of the monolithic mullion which allows to fix any kind of external structure – such as sun screens – WITHOUT perforating the rain barrier of the curtain wall, NEITHER creating any thermal bridge;
- With the final result of a state-of-the-art concealed sun screen.

Using venetian blinds, the g-value can be reduced to 0,01 !!!! or 20 times less that the best performing solar glass!! Energy control from another era!

Smart glazing

With the advancement of glazing technology, smart glazing is developed



... to considerably decrease buildings energy demands while improving indoor environment.

Such smart glazing tints the shades of the glass from neutral to grey to deliver sun blocking (down to solar factor of 2% !!), anti-glare protection and privacy – automatically or on demand – while looking as ordinary glass. These products will usher a new era of interactive windows and walls for homes and commercial buildings.

Smart glazing comes with a data cable that must be connected to the Building Management System.

However, this cable and its connectors introduce complications. In conventional curtain wall systems, installation is done from the outside. To bring the data cable inside, the installers must perforate the rain and water barrier of the curtain wall system to route the cable into the building. However, the first objective of a curtain wall is to create a wind- and watertight screen between the outside and the inside. A curtain wall can have hundreds even thousands of glass units, when installed from the outside this implies that all the obligatory punctures for smart glazing make a “gruyere” from the façade. This breaches the main function of a curtain wall.

Fassada hybrid system is the first and only system worldwide, who makes fool proof installation of “cabled” glazing, such as smart glazing, from the inside of the building possible.

Let’s break it down with a simple, yet eye-opening example:
Imagine a façade with 1,000 glass units. If each one includes an external shading

device or smart glazing element, that means 1,000 cable entries and therefore 1,000 individual silicone seals. Even assuming near-perfect workmanship, if just 3% of these cable seals fail (which is optimistic), you’re left with 30 potential leak points, each one capable of compromising the façade’s primary purpose: to protect the building from air and water infiltration.

Add to this the fact that:

- Silicone must be applied in clean, dry, and controlled conditions
- Cable movement during or after installation can tear the seal
- The seal is often hidden and inaccessible once the system is complete

...and it becomes clear that this approach is both technically flawed and operationally risky.

The Fassada hybrid solution: cable routing reimaged

The Fassada hybrid system offers a patented, purpose-built solution that eliminates this entire category of risk whilst preserving performance, safety, and installation efficiency.

Here’s how the Fassada Hybrid approach redefines the process:

- *No perforation of the mullions*
The water barrier integrity of the façade remains fully intact. No holes, no weak spots through the water barrier.
- *No silicone used*
The installation is completely independent of weather conditions, surface cleanliness, and installer variability.
- *No risk of leakage*
Without perforations and silicone,

there are no pathways for air or water ingress—eliminating a critical source of long-term failure.

- *Installation from the inside*
All connections are made from the safe, dry interior of the building, not from precarious external platforms. This also means:
 - Work can continue in any weather
 - Quality control is easier and more precise
 - The BMS (Building Management System) integration is done in optimal conditions
- *Cables and connectors stay dry*
Unlike traditional systems where connectors often sit in the wet glazing pocket, the Hybrid system ensures that all electronic components are housed on the inside of the building envelope, far from moisture and condensation risks.
- *Easy maintenance and repair*
In case of technical failure, whether it's a damaged cable or faulty connector, access and replacement can happen entirely from the interior. There's no need to deconstruct panels or deploy expensive external access equipment.
- *Glass replacement? Also done from the inside.*
Even if the panel must be changed due to breakage or failure, the entire operation is done internally, reducing cost, time, and risk.

Smart systems deserve smarter façades

A high-performance building deserves a façade system that is as intelligent as the technology it supports. With Fassada hybrid, you don’t just install a shading or glazing system. You install it for life, without compromise.

Fassada hybrid: because smart features require smarter engineering.

42. Social sustainability

At Fassada, sustainability isn't only about CO₂ and materials.

It's also about people.

Innovation is meaningless if it can't be executed safely and simply by the people on site. After all, who would we be without those executing our vision?

That's why social sustainability is built into our DNA.

- **Accessible installation:** Our façade systems are designed to be installed by low- or unskilled workers, without

compromising safety or performance.

- **Safer work, fewer risks:** Everything can be installed from the inside of the building, eliminating the dangers of scaffolding or cradles.
- **Straightforward logic:** Stripped-down, foolproof connections reduce complexity, error, and stress protecting both workers and investors.

For us, social sustainability is not a buzzword.

It's about respecting the people who bring projects to life, ensuring they can work safely, confidently, and with dignity.



Fassada hybrid: because true innovation respects not just the building, but the hands that bring it to life.



**Light weight cold rolled steel
the product of the future**

43. Making the impossible possible by smart engineering: same weight as an aluminium curtain wall

Notwithstanding the dozens of criteria that must be considered when developing a new curtain wall technology in a holistic way, two factors stand out above all:

- 1. **Fabrication:** by keeping the wall thickness of the cold-rolled profiles below or equal to 1.2 mm, all conventional machines used for aluminium systems remain the same. Only other tools are required.
- 2. **Installation:** the challenge was to engineer a lightweight steel system with a weight comparable to an aluminium system. Not primarily for material cost reasons, but to simplify the installation. After all, every curtain wall ultimately

needs to be installed on site, and installing conventional steel systems is often a logistical nightmare for workers due to the loads of the profiles.

It became clear that a thin-wall system could address both challenges effectively.

The approaches available to tackle these challenges were:

- 1. Leveraging the material characteristics of steel vs aluminium
- 2. Smart design and engineering

Steel has a density roughly three times that of Aluminium (7.85 vs. 2.70 g/cm³). However, steel's modulus of elasticity is

also approximately three times higher than Aluminium's (210 × 10⁹ Pa vs. 71 × 10⁹ Pa).

The rest was solved by smart engineering and common sense.

The HS75-hybrid steel curtain wall **achieves a system weight of approximately 7.0 kg/m² for a typical 1.20 m × 3.60 m grid—virtually identical to its Aluminium counterpart**, the H75-Hybrid. Steel has a dead mass about 3 times higher than aluminium (7,85 vs. 2,70 g/cm³).



Belgian engineering

Swiss manufacturing

Fassada hybrid cold rolled steel: a revolution heralding the start of a new era.

44. Corrosion on coast lines or aggressive environments: for once and for all of the past

The problem: corrosive environments

Corrosion is a well-known challenge in aluminium constructions.

The primary environmental causes - excluding other causes such as poor maintenance, inappropriate alloys, or incorrect applications such as galvanic corrosion - include:

- **Salt (chlorides):** in coastal regions or areas where de-icing salts are used, chloride ions can attack aluminium, leading to pitting corrosion.
- **Chemical substances:** aggressive cleaning agents or acid rain can damage the protective oxide layer.
- **Accumulation of dirt and moisture:** urban air pollution and other environmental deposits can accelerate corrosion.

The situation is unlikely to improve in the future, as pollution levels are expected to rise in industrial zones and urban areas.

The 3-part solution: Fassada hybrid stainless steel

In architectural applications such as curtain walls, aesthetic and performance requirements must be balanced against budget considerations to ensure cost-effective material specifications.

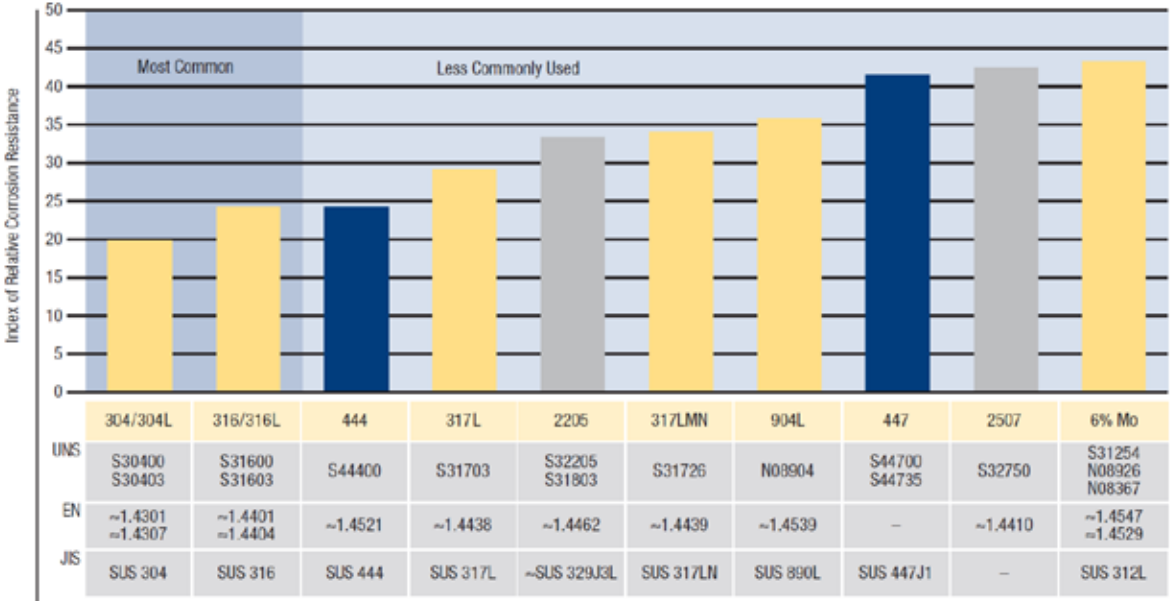
Fassada offers a 3-part approach:

- **Part 1: Stainless steel :** A range of alloys (austenitic, ferritic, duplex, lean duplex, etc.) can be selected depending on the specific application. Stainless steel forms the first part of the solution.
- **Part 2: Lightweight Fassada hybrid :** Since the cost of the profiles is directly influenced by their weight, using a lightweight hybrid design reduces material costs without compromising performance.
- **Part 3: Fassada monolithic mullion :** The material cost for the same weight varies depending on the alloy used. Fassada allows the exterior shell to be made from a higher-quality alloy than the interior, optimizing both performance and cost.

All Fassada cold-rolling fabrication tools for hybrid steel are specifically developed and built for stainless steel.

The ultimate product developed for off-shore applications

Duplex stainless steels are highly suitable for offshore constructions due to their excellent combination of high strength and superior corrosion resistance, particularly against chloride stress corrosion cracking and pitting in seawater. Commonly used in applications like pipework, manifolds, and risers in the oil and gas industry, grades such as UNS S31803 (2205) and the more advanced super duplex grades like UNS S32750 and UNS S32760 offer enhanced mechanical properties and better resistance to aggressive offshore environments than traditional austenitic stainless steels.



Fassada hybrid stainless steel:
corrosion belongs to the past.

45. Grenfell fire catastrophes: for once and for all of the past

The Grenfell catastrophe will never fade from our memory. What happened there was horrifying and should have prompted regulators to take every necessary measure.

Although numerous new rules have been drafted - arguably more than desirable - their true effectiveness and adequacy remain questionable. A closer look, guided by common sense and technical understanding, shows that several 'reputable' products on the market, even when supported by extensive certification and attestations, are unable and will never be able to meet their claimed performance.

The reason is simple, and we've said it before: a real building is not a laboratory. It behaves differently, and fire never follows theoretical conditions. This truth is both painful and infuriating, laying bare a blatant hypocrisy. A 'tick-the-box' paperwork culture has swept ethics off the table.

The challenge of fire safety extends far beyond product certifications. Several aspects must be carefully considered:

- Many aspects need to be considered:
- 1. Structural elements: melting point of materials**
 - Aluminium: common construction-grade aluminium alloys melt at around 500–640 °C (932–1184 °F), depending on alloy and temper.
 - Long before melting, aluminium loses its strength: structural aluminium can start softening and losing load-bearing capacity at just 200–300 °C.
 - Steel, by comparison, melts around

1370–1510 °C but weakens significantly above ~500 °C.

- 2. Non-structural elements**
- These (such as architectural panels, insulation, ...) must carry fire resistance ratings of at least A1 or A2.
- 3. Changing use of mid- and high-rise buildings**
- In the past, most mid- and high-rise buildings were office spaces. They were used during the day and left empty at night. In case of a fire during the day, occupants could usually evacuate. At night, the risk was minimal because the buildings were empty.
- Today, however, most mid- and high-rise towers serve as residential housing. This creates an entirely different risk profile:
 - During the day, they are largely empty.
 - At night, they are fully occupied, with people asleep and far more vulnerable in case of fire.
- 4. Two approaches to fire protection**

There are essentially two strategies to achieve a fire-safe building:

- Active fire protection:** installing a sprinkler system.
- Passive fire protection:** ensuring each floor is separated by a fire-resistant shield (EI60 minimum) to prevent fire and flames from spreading vertically.

- Sprinklers have advantages, but they also come with significant drawbacks:
- High Upfront Cost : Installation is expensive (materials + labour).
 - Ongoing Maintenance : Heads may clog, break, or misalign; leaks waste water.
 - Excess Water Use : Older or poorly

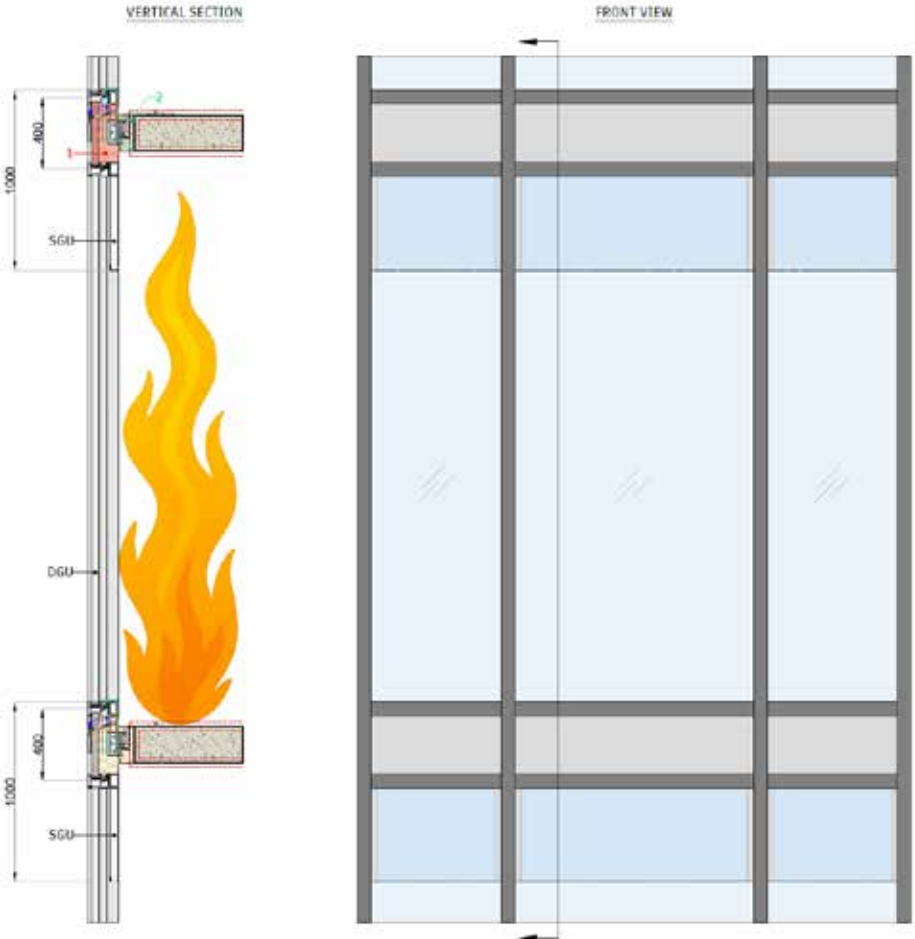
- designed systems can drive up utility bills.
- Climate Sensitivity : In colder regions, winterization is required to avoid pipe damage.
 - Unnecessary Watering : Without smart controls, sprinklers may operate even after rain.
 - Complex Installation : Requires technical knowledge of piping, zoning, and hydraulics.
 - Low Flexibility : Landscaping or structural changes often require costly system adjustments.
 - Hidden Problems : Underground leaks can remain undetected, causing damage and high costs.

The Fassada solution – Keep it simple

Taking all these issues into account, and following the philosophy of “keep it simple,” Fassada has developed a unique solution: the Fassada hybrid steel curtain wall with integrated 1.0 m fire barrier shield. This innovation addresses all the challenges outlined above:

- Constructed in steel, not Aluminium.
- Uses only A1 or A2 fire-rated, non-combustible products.
- Eliminates the need for sprinklers.
- Architecturally elegant and visually refined.

Fassada hybrid, because we care.



46.CO₂ footprint: 10x less

Low carbon Aluminium: a reality real or just greenwashing?

With “low carbon” being such a hot topic, it’s crucial to take a holistic approach to get a clear picture. Especially given the power of aggressive marketing. Low-carbon aluminium refers to aluminium produced with a lower carbon footprint than the global average, typically achieved through a combination of recycled content and/or the use of renewable energy in production.

However, there is growing concern about greenwashing, where companies make misleading or exaggerated claims about the sustainability of their aluminium. Understanding the different levels and claims is essential to separate fact from marketing hype.

What makes aluminium low carbon?

- Recycled content: Using secondary aluminium (recycled scrap) significantly reduces the carbon footprint, as remelting requires much less energy than primary production. However, Some companies might overstate the recycled content or use misleading terms like “carbon-free” without proper justification. There is also the carbon footprint of all the scrap transport.
- Renewable energy: Sourcing electricity from renewable sources like hydropower or solar power for Aluminium production lowers the overall carbon emissions.
- Reduced emissions in primary production: Even primary Aluminium production can reduce emissions through process improvements, like using inert anodes or capturing emissions from the smelting process.

- Third-party verification: Look for certifications and verification from reputable organizations like DNV and ASI to ensure claims are credible.

No doubt there is a lot of loophole exploitation: some producers exploit loopholes in carbon border adjustment mechanisms to sell low-carbon Aluminium with inflated claims.

On the other hand, low-carbon Aluminium is a real and increasingly important product category. However, consumers and businesses need to be discerning and look for verifiable claims and certifications to ensure they are purchasing genuinely low-carbon products and avoid falling victim to greenwashing.

But what about the CO₂ footprint of steel vs. extruded aluminium? This question needs a clear breakdown.

1. Carbon footprint per kg of material (primary production)

- Aluminium (extruded, primary production): ~ 8–12 kg CO₂ per kg of aluminium. (Very energy-intensive due to electrolysis in smelting.)
- Steel (primary production, blast furnace route): ~ 1.8–2.5 kg CO₂ per kg of steel. (Much lower per kg compared to aluminium.)

On a per-kilogram basis, Aluminium’s footprint is 4–6x higher than steel.

2. Recycling impact

Both materials are highly recyclable, but the effect is stronger for aluminium:

- Recycled aluminium: ~ 0.5 kg CO₂ per kg (95% lower than primary).
- Recycled steel: ~ 0.5–0.7 kg CO₂ per kg (about 60–70% lower).

So, if a project uses recycled aluminium, its carbon profile can come close to steel.

3. Structural efficiency / weight factor

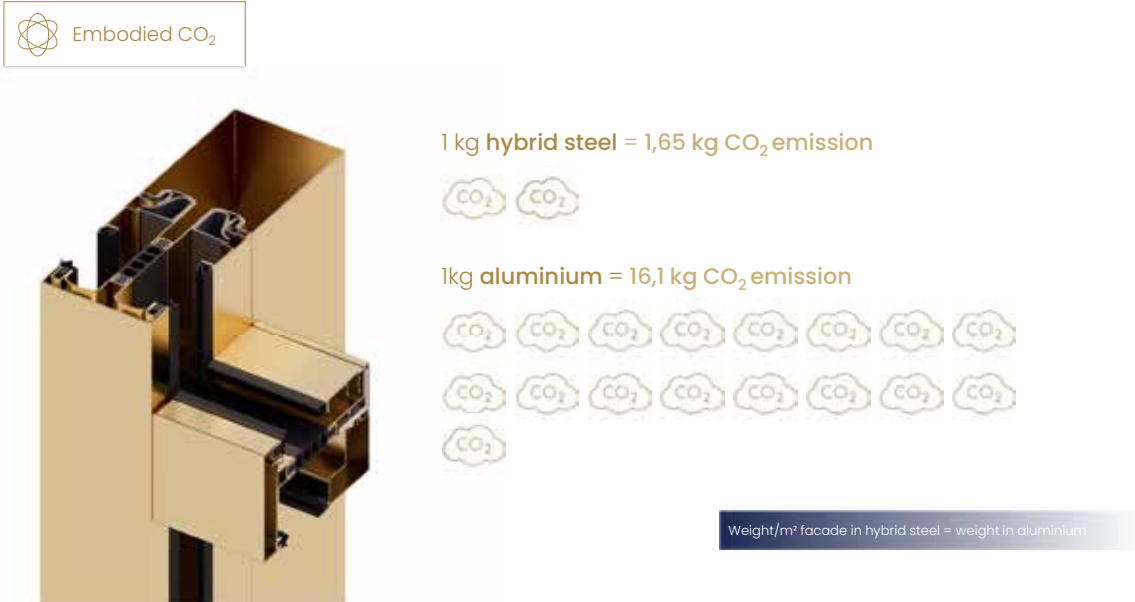
- Aluminium is about 3x lighter than steel for the same volume.
- In façade and curtain wall applications, Aluminium is often more efficient structurally, meaning less total mass is required **BUT NOT FOR FASSADA hybrid cold rolled steel hybrid**

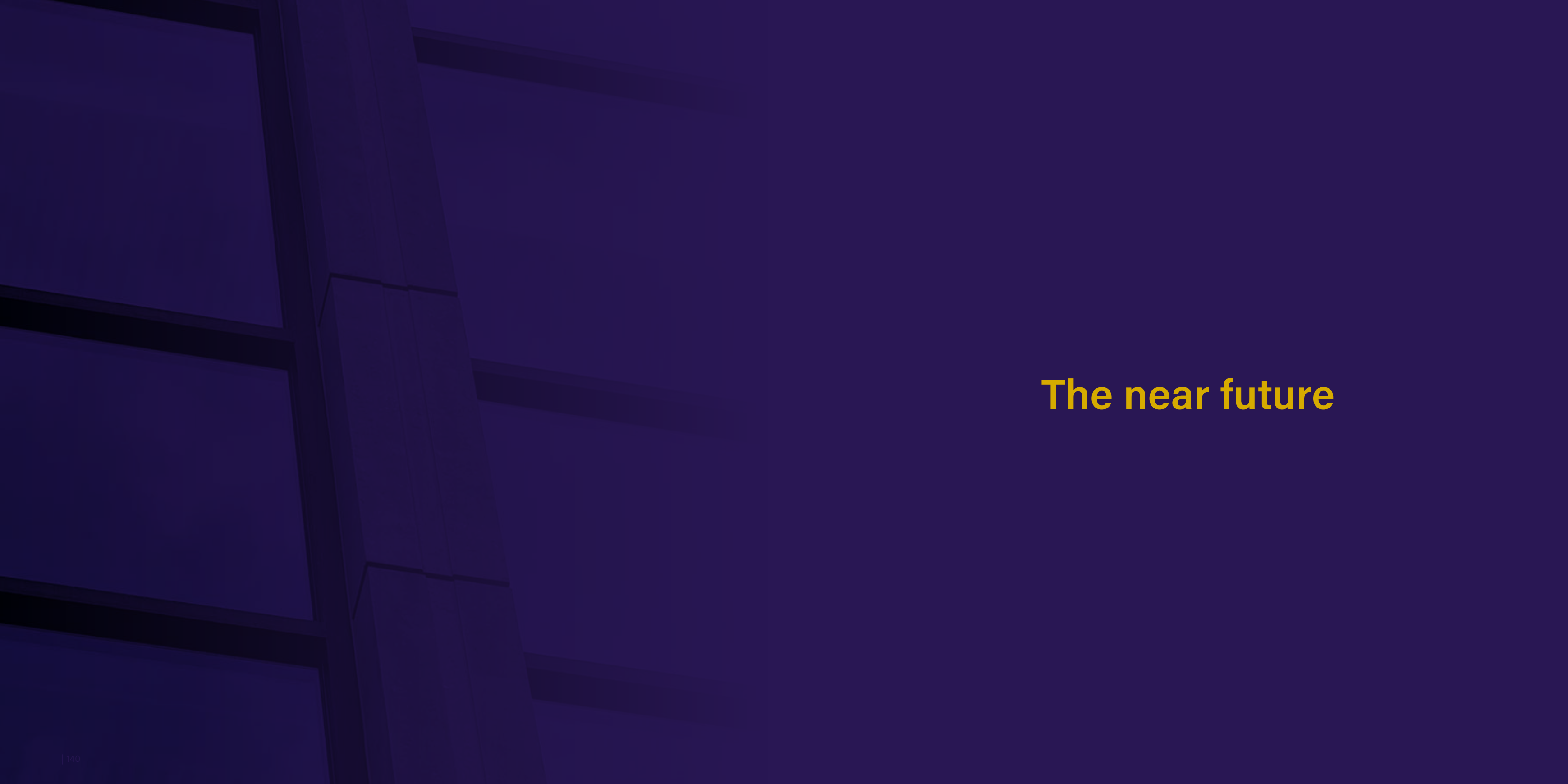
See topic As Fassada managed to engineer/develop a smart solution having about the same weight/m² as for a conventional aluminium stick curtain wall and even significantly lower weight than a unitized aluminium system. By contrast of any other steel curtain wall, Fassada hybrid has a unique lower footprint

Fassada steel has redefined the rulebook:

In conventional façade systems, Aluminium’ s lighter weight and high recyclability significantly reduce its effective carbon gap with steel, especially when recycled Aluminium is used. However, in the case of the lightweight Fassada hybrid, the carbon footprint is about five times lower than that of conventional Aluminium systems.

Fassada hybrid steel: because CO₂ exhaust matters!





The near future

The near future

In today's world, curtain wall development faces two undeniable challenges:

1. Addressing the shortage of skilled workers for installation.
2. Becoming a driving force in achieving the Green Deal through reducing CO₂ emissions, lowering energy demand, and improving air quality.

1. The workforce challenges

The global shortage of skilled and even unskilled construction workers is not a temporary problem. It will only intensify over time. No matter what, a curtain wall ultimately needs to be installed on site.

This reality has shaped Fassada's vision since the very beginning. When we started developing the Fassada hybrid system, we made it one of our core engineering principles: not just to design and reengineer a façade system that requires minimal tools, minimal accessories, and fully installed from the inside, but also to pursue a clear goal : preparing for a future where installation is carried out by androids.

2. From green talk to green action

The second challenge is just as urgent: transforming façades from passive surfaces into active assets that contribute to sustainability goals.

Let us pose a question:
Why is one of the largest, most visible, and most expensive elements of a building—its façade—still just a lifeless shell, just a dead mass?

Why does it merely exist, instead of contributing?

At Fassada, we believe the time has come to demand more.

- What if façades could:
- Generate oxygen through integrated natural systems?
 - Produce renewable energy via advanced photovoltaics?
 - Store heat and regulate air in real time, adapting to occupant needs?

These ideas are no longer futuristic fantasies. They are possibilities and we are determined to make them reality.

Beyond convention

For too long, the industry has settled for façades that separate inside from outside, built from glass, metal, and insulation alone. Fear of breaking tradition has slowed innovation. But change does not come from caution. At Fassada, we move beyond traditional profiles and curtain wall systems. We design and deliver solutions that transform façades into living, functional assets, systems that reduce energy costs, add tangible value, and bring buildings to life.

And here's the best part: all of this can be achieved without sacrificing architectural freedom and without incurring additional costs, quite the opposite. Your façade can remain iconic, expressive, and stunning—while also being smarter, more sustainable, and designed to work for you from day one.

The ultimate dream: a curtain wall so smart that the building becomes a business model instead of an investment cost.

- The solution is obvious:
- A façade that generates the maximum possible solar energy.
 - A façade that drastically reduces the building's energy consumption.
 - The amount of energy generated exceeds the energy required to operate the building.
 - The surplus energy can be sold on the market (e.g., to electric vehicle charging stations).
 - The cost of the HVAC system is drastically reduced through maximum integration into the curtain wall.
 - The total cost of the façade—even with the added cost of HVAC integration (compensated by the HVC budget), which will always be only a fraction of a fully autonomous system—should not cost more than a conventional façade tod

Final result: the physical box of the building making money instead of costing money!

Fassada did it as a combination of several solutions explained in the present manifesto.



47. Hybrid smart skin as a power plant

A curtain wall is built by two main components:

1. A metal grid (in aluminium or steel)
2. The infill elements, being the vision glazing and the opaque panels

It is, after all, perfectly logical and the technology is already available to enable both transparent glazing and opaque panels to generate solar energy.

PV vision glazing refers to building integrated photovoltaic (BIPV) systems that incorporate solar cells into transparent or translucent glass, allowing for energy generation while maintaining a clear view. These systems combine the benefits of traditional glazing with the ability to produce electricity, offering a sustainable and aesthetically pleasing solution for building facades, roofs, and other applications

In essence, PV vision glazing provides a way to harness solar energy without compromising the architectural design or visual appeal of a building.

The technology is still in a rather early stage of development.

On the other hand, opaque PV-panels are used since quite some time. ABIPV panels, or architectural building integrated

photovoltaic panels are fantastic and proven technologies.

But what about the cost? Fassada made a real breakthrough on this point: stop the no-sense sophisticated ROI calculations with unknown key data such as evolution of interest rates & energy costs.

Fassada hybrid doesn't just make the correct account at start of the project, but it generates an upfront profit at start!.

he solution hereto is simple: the cost of a PV-panel is composed of 2 parts: firstly the panel itself, secondly the cost of installation. Hybrid decimated the cost of installation in a way the full cost of the installed panel is in the same range, or even lower, as a simple aluminium cassette (see also topic 17).

On top of that, Fassada has a patented solution for installation of cabled glazing or panels. From a technical perspective, it is preferable by far that "cabled glazing "

is installed from inside of the building. The main reason is that every glass or panel volume is equipped with a data cable. When installed from the outside a puncture has to be made in the curtain wall to conduct this cable into the inside of the building to be connected to the Building Management System. Placement from the outside is currently the case with all conventional curtain wall systems. Meaning to get the data cables to the inside, installers need to perforate the rain and water screen of the curtain wall system to get the cables in.

However, the first objective of a curtain wall is to create a wind- and watertight screen between the outside and the inside. A curtain wall can have hundreds even thousands of glass units, when installed from the outside this implies that all the obligatory punctures for smart glazing make a "gruyere cheese" from the façade. This breaches the main function of a curtain wall. The phenomenon is well known...

Fassada hybrid is the first and only curtain wall system worldwide, who makes fool proof installation of cabled glazing from the inside of the building possible.

Fassada hybrid, more than a smart curtain wall, but a real sustainable solution.



48. Hybrid smart skin with integrated heating and cooling

If the building envelope fails to prevent cold coming in during winter, or heat entering in summer, the HVAC systems have to work overtime. And it's not just the indoor air that needs conditioning—it's the building's structural mass itself. Floor slabs, columns, and internal partitions absorb and re-emit heat when the thermal barrier isn't strong enough.

- This means:
- Wasted energy
 - Higher running costs
 - Higher emissions—every single day the building is in use

Dynamic modelling has shown that up to more than 50% of a cooling and heating system's capacity of a building is used simply to cool or heat the building's interior walls and slabs.

Think about it: an HVAC system is placed inside a building to cool or heat the rooms because heat or cold enters through the façade. In other words, we first allow the outside climate to penetrate, only to compensate for it mechanically afterwards with the HVAC system.

From this perspective, we all know that sun shading is a highly effective way to reduce cooling demand.

Yet, the conventional approach to HVAC seems far from common sense: "First let it in, then take it away."

Now imagine a dynamic building skin—adaptive to the external climate—where the "let in" is reduced to an absolute minimum.

Considering that the supporting grid of a building largely consists of metal tubes required for structural reasons, these very

- tubes could also serve two additional functions:
- Acting as a medium for radiant heating.
 - Housing the cooling and heating systems of the building.

Fassada hybrid with integrated heating and cooling: a façade that works harder, so the building doesn't have to

The Fassada hybrid system was not only designed for optimized manufacturing and logistics—it was also engineered to deliver exceptional thermal performance, reducing operational carbon from day one. By maintaining a reliable, continuous thermal envelope, it protects the building from unwanted thermal transfer and supports passive energy strategies.



Fassada hybrid: the real answer to the energy challenge.

49. Hybrid semi-ventilated façade with bio reactor leaves

Air pollution in cities is a complex challenge caused by various factors, including industry, traffic, and heating. The consequences are severe, with negative impacts on human health, the environment, and the climate.

Facades can play an important role to tackle this challenge.

Bioreactor algae leaf technology, also known as algae facades or photobioreactor facades, integrates algae-filled panels into building facades like curtain walls, creating living walls that generate energy and improve building performance. These systems act as a bioreactor, using algae to absorb carbon dioxide, produce oxygen, and convert solar energy into heat and biomass.

How it works:

- **Bioreactor panels:** Algae are cultivated in transparent panels filled with a nutrient-rich liquid, acting as a bioreactor.
- **Energy generation:** The algae photosynthesize, consuming CO₂ and producing oxygen while also converting solar energy into heat and biomass that can be harvested.
- **Dynamic façade:** The algae's density can be adjusted, allowing for dynamic shading and visual effects on the building's exterior.
- **Integration:** These panels can be integrated into curtain walls, creating a sustainable and visually interesting building envelope.

Benefits:

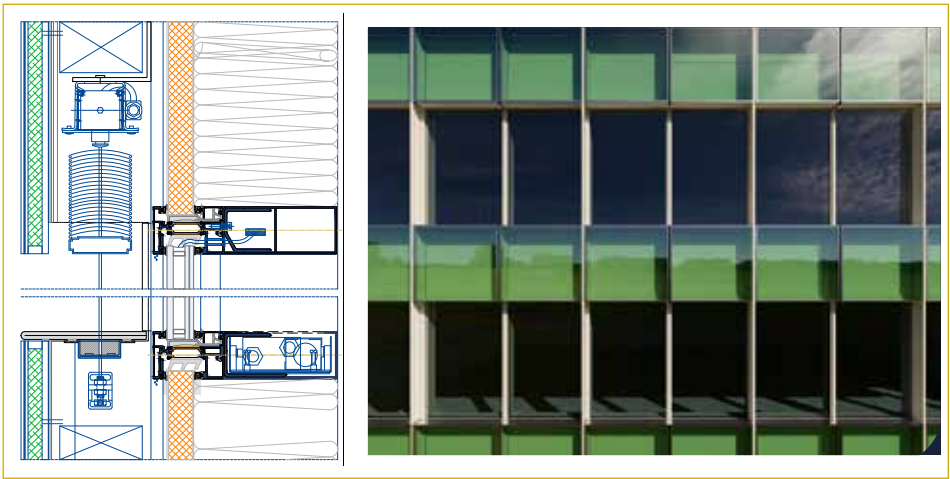
- **Renewable energy:** production of biomass and heat for building energy needs.
- **CO₂ sequestration:** algae absorb CO₂, helping to mitigate air pollution.
- **Improved indoor climate:** algae can help regulate temperature and provide natural ventilation.
- **Aesthetic value:** dynamic and unique aesthetic appeal with changing algal density.

- **Reduced energy consumption:** by providing shading and potentially reducing the need for artificial heating and cooling.

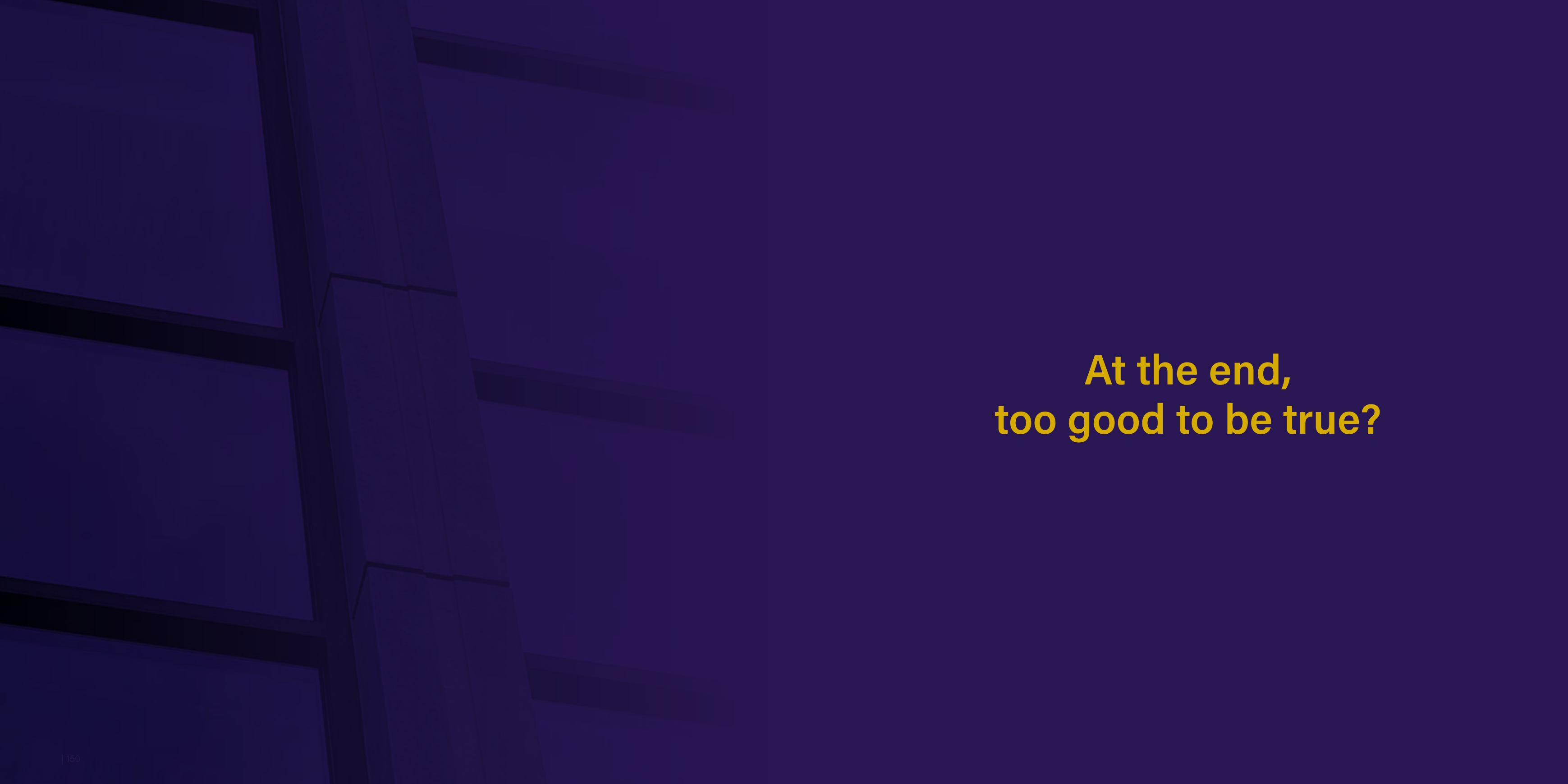
From the perspective of the curtain wall construction, there are 2 main challenges for which **Fassada hybrid has 2 unique solutions:**

- **The cost:** compared to traditional curtain walls, the installation cost of the panels is decimated with the semi-ventilated hybrid system (naturally ventilated opaque zones).
- **Maintenance of the bioreactor panels:** requires ongoing maintenance and monitoring of the algae cultures. Again the semi-ventilated system is the perfect solution for that.

The future potential is important: algae-based bioreactor technology has the potential to significantly contribute to sustainable building design by providing a renewable energy source, improving air quality, and offering unique aesthetic qualities. Further research and development are needed to overcome the current challenges and make this technology more widely accessible and cost-effective.



Fassada hybrid, because healthy air is important



**At the end,
too good to be true?**

50.A final reflection: the courage to rethink everything: plain common sense above all

After reading this manifesto, we invite you not only to consider the Fassada hybrid system—but to reflect on something deeper:

Why the façade industry been stuck in the past half century?
Have we, as an industry, become too comfortable?

For decades, we’ve clung to artisanal working methods, products and techniques—not because they’re the best options, but because they’re the ones we’ve always used.

But if there’s one message we hope resonates, it’s this:

We are not obligated to build the future using yesterday’s logic.

We’re allowed to ask:
“Why does a façade do nothing more than just hang there?”
“Why can’t installation happen from the inside by androids?”
“Why not challenge the very concept of a curtain wall?”

“Why not changing the entire value chain?”
“Why not create a bold, exciting new industry?”

The answers are no longer theoretical. They are tangible. Built and delivered.

If Fassada hybrid technologies stands for anything, it’s two things

The belief that better is not only possible—but necessary. It always seems impossible until it’s done” (Nelson Mandela)



Thank you for reading.
Let’s build something better—together

Meet Fazzi

Fazzi is more than just our mascot. You'll see him pop up as a guide in our fabrication and installation processes, and sometimes simply as a reminder of who we are and what we stand for.

Whether he's helping explain complex details, pointing the way on site, or just bringing a smile, Fazzi represents the same values as our technology: smart, practical, and built to make life easier.

So when you see Fazzi, you'll know you're in good company.

On the path to building something better, together.





Aluminium - cold-rolled
Passion for innovation into



steel - stainless steel
the classics of tomorrow.



www.fassada.com