

From Concept to System: The Development Journey of Our Modular Green Façade Solution



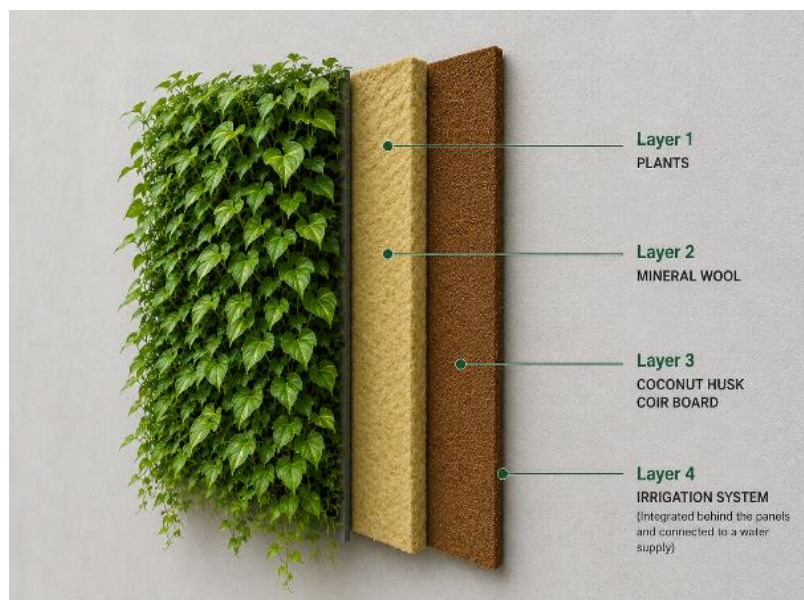
As cities continue to grow denser and buildings become increasingly performance-driven, the role of façades is evolving beyond enclosure and appearance. Today, façades are expected to contribute to sustainability, visual identity, occupant experience, and environmental performance. With that in mind, I have been working on the development of a modular green façade system—a concept that aims to combine plant integration, water management, insulation, and façade design into a structured architectural product.

This journey began with a simple idea: **Can greenery become a true part of the building envelope through a modular system that is both functional and visually expressive?**

Over time, this idea has developed through a series of design and system stages, gradually moving from a layered concept into a more defined façade solution.

1. Initial Concept Modeling- Developing the Multi-Layer Green Façade Module

The first stage focused on building the system as a multi-layer green façade module, integrating plants, mineral wool, coconut husk (coir) boards, and an irrigation layer into a single façade unit. Rather than treating greenery as only a surface feature, the



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objective was to create a modular panel in which planting, water retention, irrigation, and insulation could function together as one coordinated system.

In this concept, the front layer acts as the visible green surface, while the mineral wool layer is considered as the growing and support medium with thermal benefits. Behind this, an additional layer of coconut husk board is introduced to improve water retention, helping the system hold moisture for a longer period and support plant growth more effectively. The irrigation layer is intended to distribute water through the module in a controlled manner, allowing the planted surface to receive consistent moisture across the system.

This stage was important because it established the core logic of the façade module—not just as a planted panel, but as an integrated layered assembly designed around performance, growth support, and modularity.



2. Module Development – Integrating the Multi-Layer System into an Aluminium Frame

Once the layered concept was defined, the next stage focused on converting it into a **practical modular unit**. The aim here was to design an **aluminium frame system** capable of accommodating and holding together the different layers of the façade module within a single structured assembly.

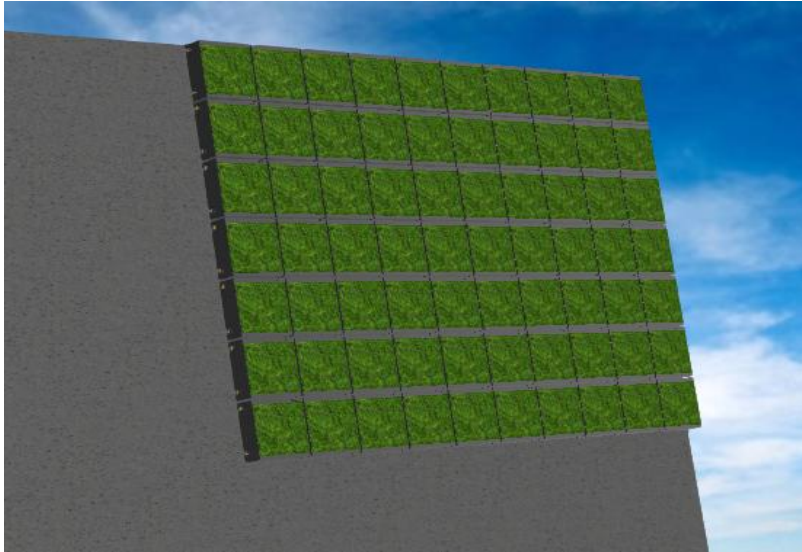
This step was essential in moving the concept beyond a theoretical layered arrangement and toward a buildable façade component. The aluminium frame was envisioned as the structural housing of

the module—providing support, maintaining the positioning of each layer, and creating a repeatable unit that could eventually be installed as part of a larger façade system.

By developing the frame around the functional layers, the concept began to take shape not only as a green wall idea, but as a **modular façade product** with defined geometry, structure, and installation potential.

3. System Integration into the Wall Façade

The next stage of development focused on placing the modular units into a **wall-based façade grid system**. Once the layered assembly had been organized within an



aluminium frame module, the next step was to study how these units could be arranged across a building surface as part of a larger façade composition.

This stage helped move the idea from an individual module to a **repeatable façade system**. By integrating the units into a façade grid, it became possible to evaluate the visual rhythm of the wall, the spacing between modules, the relationship between greenery and frame structure, and the overall architectural expression created when the system is repeated across a vertical surface.

At this point, the project began to take shape not only as a modular planting unit, but as a façade element that could contribute to the identity

and appearance of the building envelope.

4. Irrigation System Integration

A separate stage of development focused on how the **irrigation system could be integrated into the modular façade assembly**. Since the performance of a green façade depends heavily on controlled and reliable water distribution, irrigation was considered as a core functional layer of the overall system rather than an external add-on.

This stage explored how water delivery could be incorporated into the module itself and connected across multiple units when installed as part of a façade. The objective was to ensure that the planting layer, mineral wool medium, coir water-

retention layer, and irrigation arrangement could work together as a coordinated system, supporting plant health while remaining compatible with the modular frame design.

Treating irrigation as an integral design stage helped move the concept closer to a more complete façade solution—one that combines **structure, planting, insulation, water retention, and water management** within a single modular assembly.

5. Plant Selection and Planting Strategy

Another important stage in the development process was the selection of suitable plants for the green façade module. Since the system is intended to function as both a planted surface and an architectural façade element, plant choice plays a major role in the overall success of the concept—not only in terms of appearance, but also in terms of growth behavior, maintenance needs, and compatibility with the modular system.

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This stage focused on identifying plant types that could perform well within the layered façade assembly, respond effectively to the irrigation approach, and remain visually attractive when arranged across repeated modules. Consideration was also given to factors such as foliage density, color variation, growth habit, and compatibility with the support medium, as these directly influence the final façade expression.

Plant selection also opens the possibility of using the façade as a designed visual surface rather than only a green covering. By choosing plants with different tones, textures, and growth characteristics, the modular units can be arranged to create patterns, contrast, and graphic compositions across the façade.

6. Visual Façade Composition and Pattern Development

Beyond the technical development of the system, another stage involved exploring how the façade could become a **designed visual element** through the arrangement



of plants within the modular grid. Rather than treating every module as identical, the concept evolved toward using **plant color, density, and placement** as part of the architectural expression of the system.

This development opened the possibility of creating **patterns, feature zones, and even letter-based compositions** using only selected plant tones across the façade modules. Such an approach allows the green façade to function not only as a sustainability feature, but also as a branding, place making, or identity element within a building elevation.

This stage is particularly important because it demonstrates how a green façade system can operate at two levels

simultaneously: as a **functional environmental layer** and as a **composed architectural surface** with its own visual language.

7. Potential Application in Glass Façade Spandrel Panel Areas

Another promising direction for the system is its potential use within the **spandrel panel areas of glass façade systems**. In many commercial buildings, curtain wall and glazing façades include opaque spandrel zones that are typically used to conceal slab edges, structural elements, or service areas. These sections are often visually flat and underutilized from a design perspective.

By integrating modular green façade units into



selected spandrel panel zones, these otherwise inactive areas can be transformed into more visually engaging and sustainable façade features. This creates an opportunity to introduce greenery into glass-dominant buildings without interrupting vision glass areas or affecting the primary transparency of the façade.

From an architectural standpoint, this approach can help soften the appearance of large glazed elevations, add texture and identity to the building envelope, and create controlled green feature bands within the façade composition. It also opens possibilities for using plant patterns, brand elements, or contrasting foliage tones as part of the façade design language.

8. Moving Toward a Practical Façade Product

While the concept is still under development, each stage has helped move it from an idea toward a more structured and practical system. What began as a layered green wall concept is gradually being shaped into a **modular façade product**—one that aims to integrate **planting, insulation, water retention, irrigation, framing, and architectural expression** into a single coordinated solution.

The next steps in development will focus on refining the system further in areas such as:

module detailing and assembly logic, frame and material optimization, irrigation routing and water control strategy, plant/media compatibility and long-term growth behavior, installation practicality and maintenance approach, façade integration for both solid walls and glazed building systems

For me, this process is not only about creating a green wall, but about exploring how **product design, façade engineering, and sustainability** can come together to produce a more meaningful building solution. the goal is to continue developing systems that bring practical engineering and environmental thinking into modern façade design.

About TAEKER

TAEKER is a product development and engineering initiative focused on innovative insulation and performance solutions for the construction and automotive industries, improving efficiency, durability, and real-world application.