

Incremental Unitary Envelope System
Modular Smart Integrated Facade System

moduwalls[®] an innovative wall system brand presented by Integra

IUES[®]

The first product of the Moduwalls series: a **modular smart integrated facade system**

Additional products in the Moduwalls series, such as Modusolid and Modubase, will also be launched sequentially soon.

Moduwalls IUES, an innovative product that will change building industry!

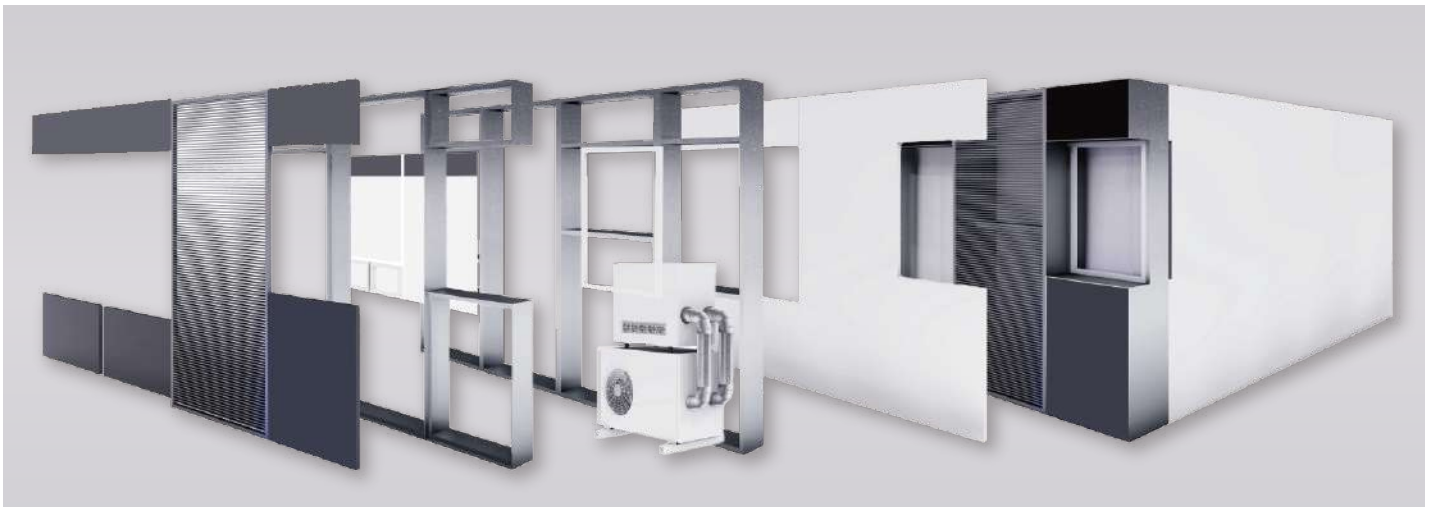


Incremental Unitary Envelope System

IUES

What is IUES?

A modular smart integrated facade system that **incorporates HVAC equipment, solar power generation, and a dual-purpose seismic reinforcement frame.**



01 Pre-fab facade

- Minimizing on-site construction work
- Six facade trades* packaged under a single point of responsibility
- Shortened construction schedule reducing management and labor costs

(* insulation, windows, waterproofing, cladding, BIPV, and HVAC)

02 Structural stability

- Structural stability in terms of weight, wind load resistance, and seismic performance
- Optional seismic reinforcement frame (improves yield strength by 20%)
- Structural analysis of the existing building is conducted for remodeling projects.

03 HVAC integrated

- Minimizing interior HVAC work, enhancing spatial efficiency
- Equipped with AI control based on occupant comfort preferences.
- Reducing energy consumption and improving comfort

04 BIPV exterior cladding

- Dual functions of exterior cladding and renewable energy
- Various color options from BIPV
- Can be replaced with other finishes such as metal panels, stone, and ALC

Only 3 days for exterior

Fast, economical, and safe innovation



Pilot project: Remodeling of the Advanced Lightweight Materials Convergence Technology Center at Gyeongbuk Technopark (Dec 2023)



75% faster construction for exterior walls

- Shortened construction schedule through factory production based on OSC (Off-Site Construction)
- Case 1) School: Reduces conventional 4-month exterior wall construction to just 1 month
- Case 2) R&D Facility: Installed 360 m² of exterior walls across two floors in just 3 days
- Proven performance and applicability through pilot implementation on three buildings,
 - Remodeling of the Advanced Lightweight Materials Convergence Technology Center at Gyeongbuk Technopark
 - New construction of the National Pilot Test Laboratory for Energy Technologies Total Operation Center
 - InnoLab Modular Office Building



Cost reduction up to 20%▼

- Proven analysis of cost comparison of walls and HVAC installation, resulting in 20% savings
 - Reduction of construction cost, on-site expenses, and temporary classroom rental fees through shortened construction schedule*
- * Case study on a 27-classroom remodeling project



Cooling & Heating cost reduction 30%▼

- Triple-glazed windows, BIPV cladding, and advanced insulation contribute to enhanced energy performance
- Delivers 30% energy savings compared to conventional curtain wall office buildings (tested by KCL)
- Improving comfort and reducing energy consumption by our smart control algorithm, RISCA



Structural stability Weight, Wind Load, and Seismic

- Performs structural calculations for both installation and the product's self-load capacity.
- Structural stability (weight, wind load, seismic) is ensured by incorporating results from real-case structural assessments.

IUES

Performance



Smart Solution from Thorough Integration



Windows/Insulation

Triple glazing
Insulated Panel Finish

Passive



HVAC

High-efficiency heat pump
Heat-exchange ventilator

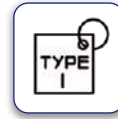
Active



Renewable

BIPV
as cladding

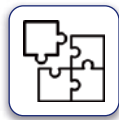
Near zero-energy



Smart control

Optimal range set by
user preferences

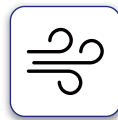
RISCA Control¹
METI²



OSC

Minimal onsite labor
resulting in safety

Pre-fabricated



Wind load

Resistant against wind
pressure $\pm 200\text{kgf/m}^2$

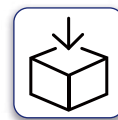
Wind load resistance



Seismic

20% better in
yield strength

Lateral resistance



Weight

Structural analysis on
weight and attachment

Structural stability

1. RISCA : Real-time Indoor Space Control Algorithm / HVAC enthalpy control

2. METI: My Environmental Type Indicator / setting default temperature and humidity via user preference types

IUES

Installation Sequence

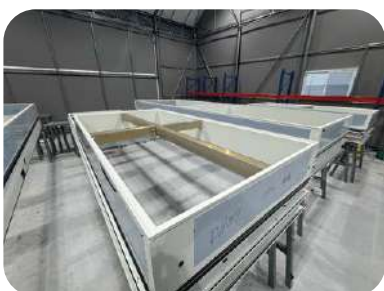
01 Field verification



02 Drawing refinement



03 Fabrication in factory



04 Transport



05 Starter sill installation



06 Unit installation



07 BIPV cable connection



08 Interior insulation panel



09 Facade completion



New Construction of
National Energy Technology Laboratory
Total Operation Center
(March 2025, Saemangeum, South Korea)

IUES

Why needed

News articles



chosunbiz
Green Remodeling Soon To Become Mandatory...
Where are Incentives?



Business Post
Success in Building Emissions Cuts Hinges On Green
Remodeling – ‘Bold Support’ Urgently Needed



JTBC
Playground Taken Over By Excavators...Students Head To
Schools Under Construction



Maeil Economics
Mandatory Green Remodeling For Aging Buildings
To Be Phased In

Problems



Surging demand for remodeling of buildings over 20 years old



Complaints about noise and dust from urban construction



Safety hazards such as falls and the Serious Accidents Punishment Act



Unclear liability due to sequential installation by multiple trades



Stricter seismic codes and regulations to prevent from detachment of non-structural elements



Labor shortage, especially young laborers



Rising construction cost



Stricter Energy Conservation Code & Standards



Inconsistent onsite quality



[Schools]
Disrupted classes and safety concerns due to construction during the school term



[Schools]
Temporary classroom rental cost incurred during in-term remodeling



Solutions



Applicable to new and renovation



Ideal for low floor-to-floor existing buildings due to integrated HVAC



Low onsite accident risk from pre-fab and crane-based installation



Integra D&C takes single-point responsibility for all exterior wall construction



Optional seismic reinforcing frame



Addressing labor shortage by providing stable employment at the factory



Reduced cost from shorter construction period and productive manufacturing



Use the energy-saving design standards for cold regions and thermal bridge prevention details



Thorough quality control and adjustable details to fit field conditions



[Schools]
IUES enables to finish exterior walls and HVAC work during term breaks



[Schools]
Cutting cost of temporary classroom rental and reducing field office cost

AI-based Smart Control



Before

After

01 Integra's RISCA

Real-time indoor Space Control Algorithm

Controls Heat Pump and HEX Ventilator

AI algorithm to optimize IEQ and energy efficiency

02 Integra's METI App

My Environment Type Indicator

Temperature & Humidity ranges per occupant's METI types

Combined with RISCA

Patented

Case Study: Middle School (27 classrooms)

Renovation



Conventional	Comp	IUES
1.52 M USD	Cost	1.25 M USD
120 days	Period	30 days
6 trades	Trades	Sole trade (Integra)
Barricades, safety net	Fall Protection	Unnecessary
Rental needed	Tempor. Classroom	Unnecessary (during break)
Different workers per job site	Labor	Same workers at factory
On-site Waste	Waste	Minimal (standardized at factory)
Mechanical Room Plenum Construction	Space	No Mechanical Room Minimal plenum construction

OO Middle School Renovation HVAC & Envelope Remodeling

- 27 Classrooms (Net Floor Area = 1,850 m²), 3 Stories
- Exterior Wall Area = 875 m²

Item	IUES Case	Conventional
Period	30 days	120 days
Temporary Facilities	12,500 USD	50,000 USD
Demolition	30,900 USD	30,900 USD
Exterior wall	1,169,000 USD	872,000 USD
HVAC		157,000 USD
Temp. CR Rental	0	266,600 USD
TOTAL	1,212,400 USD	1,376,500 USD

20% Reduction

OO Business Office Building New Construction

- Rental Office 1,800 m² per floor
- Exterior Wall Area = 6,336 m²
- Max. Height = 36 m

Item	IUES Case	Conventional
Stories	11	10
Floor-to-Floor	3.2 m	3.5 m
Bldg. Height	35.2 m	35 m
Exterior Wall	6,336 m ²	6,300 m ²
Rental Area	19,800 m ²	18,000 m ²
Rental Monthly Income	366,000 USD	333,000 USD

10% More Income!

Frequently Asked Questions

FAQ

Q1 Is IUES a patented product?

A. Yes, IUES is protected by intellectual property rights, including a registered patent for its modular facade system design, along with 10 patents and 9 registered trademarks. Unauthorized reproduction or design infringement is strictly prohibited.

Q2 Is IUES designed for new construction or remodeling?

A. Yes, IUES can be applied to both new construction and remodeling of existing buildings. For new buildings, it is possible to coordinate design elements such as dimensions and structure during the design stage to accommodate IUES. For remodeling projects, we assess the current condition of the building to determine whether IUES can be applied. Applying IUES to new buildings eliminates the need for centralized HVAC systems, which can reduce ceiling space requirements and overall costs. It also allows an additional floor to be built within the same building height—for example, 11 stories instead of 10—thereby increasing usable or leasable area. It also allows an additional floor to be built within the same building height—for example, 11 stories instead of 10—thereby increasing usable or leasable area. For existing buildings with low ceiling heights, traditional centralized HVAC systems can lower the ceiling even further, but with IUES, this is no longer necessary.

Q3 What types of interior and exterior finishes are available for IUES?

A. The standard exterior finish uses colored BIPV panels. However, for north-facing or shaded areas where solar generation is not needed, dry construction materials such as stone cladding, metal panels, or terracotta can be used as alternatives. For interior finishes, color-coated metal sheets are applied over insulated composite panels, and a wide variety of colors can be selected. If you wish to customize the interior finishes, please contact us at www.moduwalls.biz

Q4 How much does an IUES unit weigh, and does the building require additional structural reinforcement to support it?

A. The unit weight varies depending on its size and configuration, but the standard (IUES-V-F) unit weighs approximately 400 kg. For typical reinforced concrete (RC) or steel structures, additional structural reinforcement is generally not required for IUES installation. However, for older buildings undergoing remodeling or structures with long spans, structural reinforcement may be necessary. Please contact us with your project details, and we will perform a structural analysis to determine the specific requirements.

Q5 One of IUES key advantages is fast installation, which shortens the construction schedule. But if parts of the exterior wall that do not use IUES cannot keep up with its speed, can the overall schedule still be shortened? Can windowless wall sections also be installed using similar modular methods?

A. Yes. As of 2025, Integra D&C is developing modular panel systems that can be rapidly installed on windowless exterior walls, complementing IUES units. Additionally, we collaborate with other companies to co-install products that offer similar performance and functionality, ensuring consistent speed and quality across the entire facade.

Q6 What types of buildings can IUES be applied to? Can it also be used for apartments, neighborhood facilities, or commercial buildings?

A. Due to its modular nature and factory-based production method, IUES is most cost-effective when applied to buildings with repetitive facades, such as schools, government buildings, offices, knowledge industry centers, and data centers. Integra D&C is currently developing a version of IUES specifically for multi-family residential buildings.

Q7 How long does it take to manufacture and install IUES units?

A. IUES units are manufactured in the factory while the structural construction is underway. Once the structure is complete, the units are transported to the site and installed. The production timeline depends on the building size, complexity, and whether custom specifications are required. For example, in the case of a school building with 27 classrooms (162 units), manufacturing typically takes about 6 to 8 weeks, and on-site installation takes around 7 to 10 days. As production facilities expand in the future, this timeline is expected to become even shorter.

Q8 What happens if the BIPV panels, heat pump, or windows included in the IUES system malfunction or break?

A. The BIPV panels are mounted on the outside of the frame and can be easily removed and replaced independently. Even in the event of glass or window damage, each component can be separated and individually replaced. The heat pump and heat recovery ventilator can be accessed from inside the building by removing the interior insulation panel, allowing for easy filter cleaning, component replacement, or full system replacement.

Q9 Does IUES meet the required performance standards for exterior walls, such as fire resistance, water tightness, air tightness, impact resistance, and energy-saving design criteria?

A. Yes. IUES was developed through a national R&D program and meets all mandatory performance standards required for building envelope systems. It has passed tests for water tightness, air tightness, and thermal transmittance (U-value), and all components are made of materials with at least semi-noncombustible performance. During installation, inter-floor fire-blocking construction is carried out to prevent the spread of fire. IUES also uses windows and insulation materials that exceed the U-value requirements for the coldest zone of South Korea, complying fully with energy-saving design criteria.

Q10 Is IUES design limited to a predefined set of product options, or can it be customized?

A. IUES units come with standard design configurations. However, various custom designs can be accommodated upon request from architects during the design phase. The earlier this coordination happens in the design process, the easier it is to implement custom fabrication, and it also helps reduce additional product development costs.

Q11 How much is the unit cost per square meter?

A. Due to the flexibility of IUES in terms of building use, floor height, finish options, and other customizable combinations, there is no universal unit price that can be applied across all projects. We recommend referring to our school remodeling case study for reference. For a detailed quote, please contact us with your project specifications.

Q12 What is the warranty period for IUES?

A. All components included in the IUES system, as well as installation quality, are covered for one year after completion. For specific products embedded in each unit (such as heat pumps or windows), the warranty is provided according to the respective manufacturer terms and warranty period.

Q13 Where can I download IUES materials? How can I request a project quotation?

A. To request IUES-related materials or a project quotation, please fill out the “Resources & Inquiries” form at the bottom of our website: www.moduwalls.biz. You can also contact us directly via phone at +82-31-504-4847 or email at info@integradnc.com, and one of our team members will get back to you.

Sustainability

1. Ideal not only for new buildings but also for remodeling existing buildings with low ceiling heights.
2. Capable of meeting lifecycle carbon assessment (LCA) requirements for green building certifications such as LEED.
3. A simple EPD of IUES can cover the entire envelope.
4. With 30% savings in heating and cooling energy, a school with 27 classrooms can save approximately \$9,000 USD per year in energy costs and reduce 40 tons of CO₂e emissions annually.

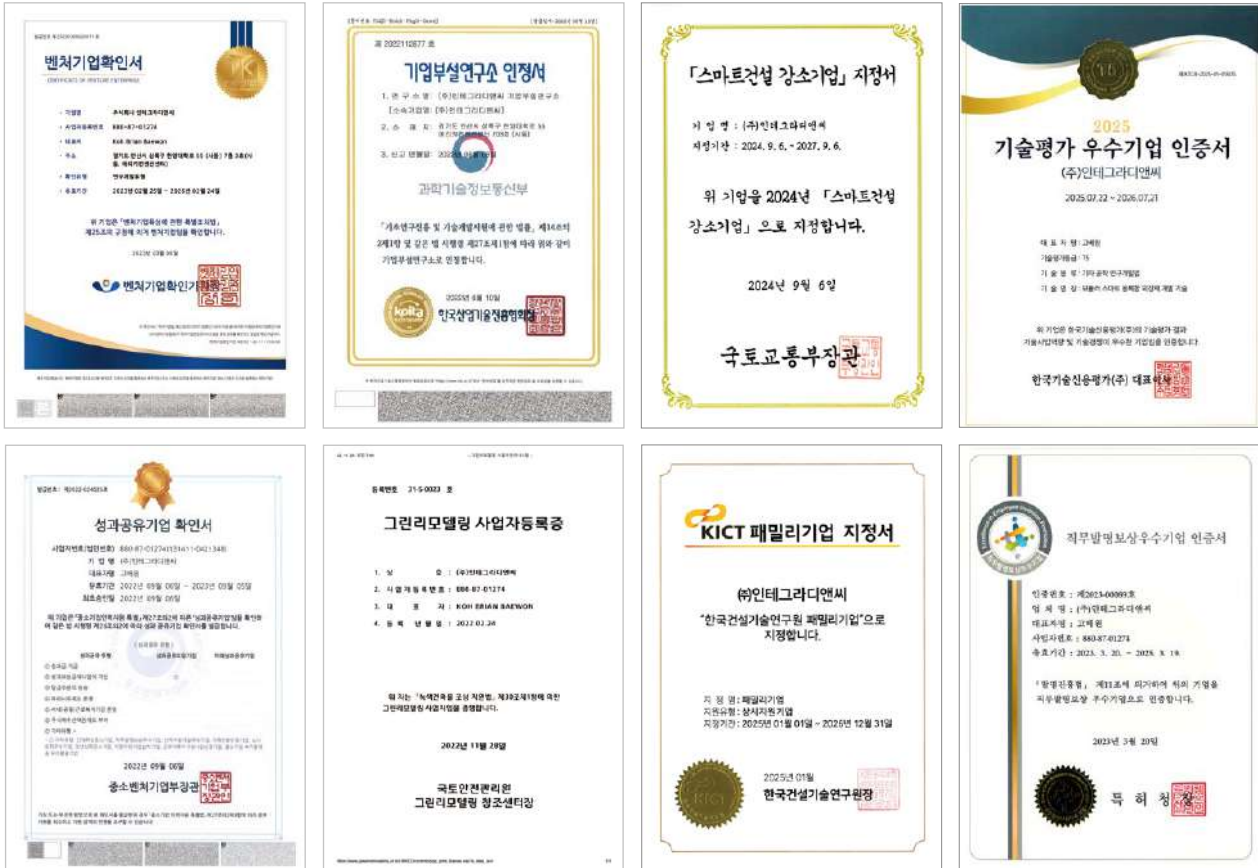
To Be Sustainable Enterprise

ESG

Integra is a carbon-neutral company that has been achieving net-zero emissions since 2020 by calculating carbon emissions up to Scope 3 and purchasing carbon credits.

Environment Social Governance

Certificates



Patents and Test Reports

IUES is a certified Innovative New Product by the Public Procurement Service and a recognized New Excellent Technology (NET) by the Ministry of Land, Infrastructure and Transport of South Korea. (2025)



Resources

Watch IUES on Youtube.



IUES Intro



IUES Installation



Integra Youtube Channel

Technical resources of IUES can be found at www.moduwalls.biz.

- AutoCAD and Revit files
- Specification
- Certificates and test reports
- Project cases
- Cost estimate for your project
- Shop drawing

IUES has been introduced in the media.



Daehan Economics



Engineering Journal



KHARN

Company

- 2018** Established
- 2019** Venture Company certified
R&D Department
- 2020** IUES R&D funded and initiated
- 2022** iCAP R&D funded and initiated
D-archi R&D funded and initiated
Green Remodeler registered
R&D Center
Good Governance Company selected
- 2023** iCAP service launched
Employee Reward Excellence certified
HRD-Certified Small Business
- 2024** Watt2Save R&D funded and initiated
Green Marine Bridge R&D funded and initiated
Selected as **Top 20 Smart Contech Startup**
Selected a Smart Construction PoC for NET
Selected as a Cheon-An City Star Emerging Startup
- 2025** PC Modular R&D funded and initiated
Selected as Global Accelerating Startup
moduwalls brand launched
Selected as a small business R&D by KICT
Excellence in Technology Evaluation Certificate

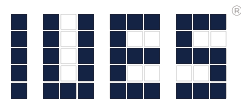
MISSION

INTEGRATIVE

INTEGRITY

INNOVATIVE

INCLUSIVE



moduwalls[®] series

by

