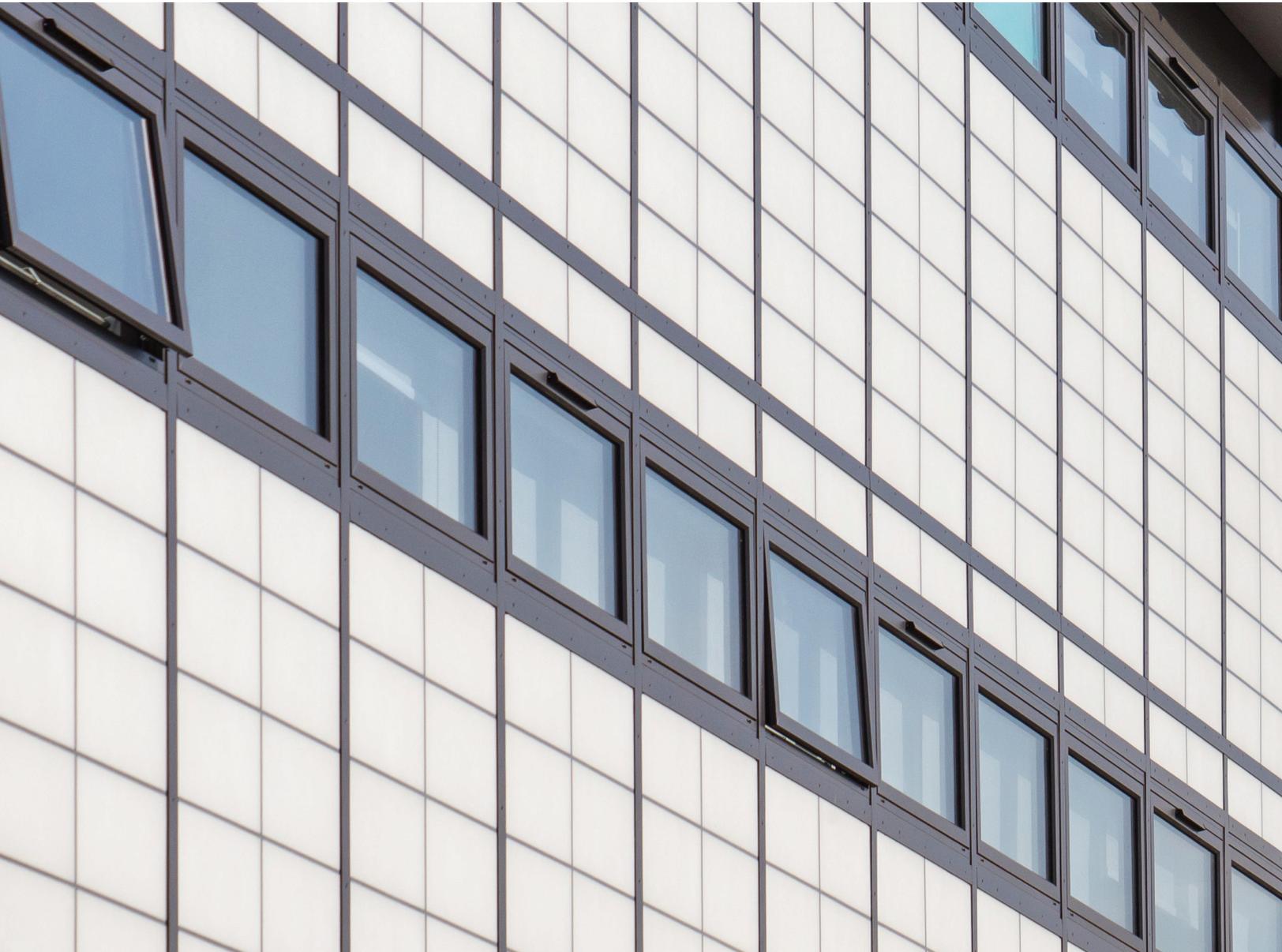


# KALWALL®

high performance translucent building systems



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## Four Challenges of a Retrofit Project

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and How to Overcome Them

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## CHALLENGE 1 Increasing Energy Efficiency

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Artificial lighting  
can account  
for up to

# 25%

of the total  
energy bill

Soaring energy prices along with a heightened awareness of global warming and climate change has made energy efficiency one of the building industry's main drivers, rivalling design and aesthetic considerations. Architects, specifiers and engineers need to incorporate as many energy efficient products into their projects, whether it's a new build or retrofit.

A retrofit project can present a myriad of challenges since many older buildings were not designed with energy efficiency in mind, but the necessary upgrades can result in substantial energy savings.

Typically, savings can be categorized into three areas:

### Thermal – U Values

Upgrading the insulation in a building is the most common way of improving heat retention and reducing the impact from the exterior. This typically takes the form of cavity wall insulation, loft/roof void insulation and efficiency enhancements to glass and glazing. Preventing drafts is also important, with studies citing this as a cause for between 15-25% of heat loss.

### Solar Heat Gain

Heat gain is widely recognized as a major problem in buildings. Designers need to maximize the benefits of sunlight while controlling unwanted solar heat gain. With traditional glazing systems, this is normally accomplished via the introduction of expensive external sunshades (brise-soleil), shutters or internal blinds, curtains or light shelves.

### Daylighting Autonomy

Significant savings and increased energy efficiency can be achieved by reaching peak daylighting autonomy, which measures a person's ability to work in a space without the use of artificial light. Depending on the application and environment, artificial lighting can account for up to 25% of the total energy bill. Utilizing daylight modelling will accurately predict if the space has been properly designed.

Another financial drain caused when natural daylighting is not properly used is the burden put on an HVAC system. According to the Arlington-based Center for Climate and Energy Solutions, 41% of total energy usage is from HVAC, making the challenge of controlling artificial cooling or heating and temperature regulation a formidable one for building designers. Solar heat gain and hotspots should always be kept in mind when retrofitting an older building with vision glazing.

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# 41%

of total energy  
usage is from  
HVAC

## Kalwall Case Study

### Featherstone High School

London, UK

Photography: Alex Upton  
Architecture: DSP Architecture

**CHALLENGE:** This 1958 concrete framed building was failing due to decay and ingress of water. The school needed a solution that would save time and money, cause minimal disruption and meet current energy efficiency requirements.

**SOLUTION:** Kalwall Unitized Curtain Walls were assembled and glazed at the factory, allowing for rapid installation. The system also allows for simplicity by doing away with the need for blinds, curtains or solar control. And because Kalwall is highly insulating, energy costs are reduced.



## CHALLENGE 2 Meeting Installation Requirements

Installation is always the most challenging aspect of a renovation. The slightest hiccup can cause delays, added cost and client dissatisfaction.

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# 93%

of AEC professionals report having used offsite methods<sup>1</sup>

With financial penalties, liquidated and ascertained damages (LAD) contracts in place and the subsequent effect that a small delay can have on the overall project, it is essential to keep schedules on track and installation targets on point to minimize delay and added cost. Shorter lead times also provide clients a faster ROI.

Here are two methods to help meet strict installation requirements.

### Pre-assembled and unitized construction

Any prefabrication or pre-assembly which can be completed at the factory is ideal. The ability to keep materials off-site and minimize the amount of preparation needed upon delivery can be key when working to meet installation requirements. Likewise, a building envelope or façade that is factory unitized offers numerous benefits, such as:

- Improved quality control through more precise engineering, testing and assembly.
- Reduced handling and storage requirements and therefore reduced risk of damage on-site.
- Labor savings through a reduction in the number of different trades needed on site.
- A cleaner and safer work environment due to a reduced need for scaffolding and prolonged working at height.
- Less disruption for occupiers staying in place throughout a renovation.

### Lightweight material

Lightweight materials are easy to work into existing structures. As energy efficiency demands grow and more insulating materials are specified, the weight of double- or triple-glazing can often exceed the structural limits of the existing substrate that was designed to be load-bearing for old glass and technology. This causes major headaches with more disruption, wasted time and additional cost needed for support or stabilization. The use of lightweight materials that are easy to handle means a reduction in manpower and less preparation for quick and easy recladding over any existing building skeleton.

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<sup>1</sup>2014 Off-Site Construction Industry Survey

<sup>2</sup>Expecting Growth to Continue: The 2018 Construction Industry Hiring and Business Outlook

## Kalwall Case Study

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### Newington Power Station

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Newington, NH

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**CHALLENGE:** After 40 years, Kalwall panels were due to be replaced at this power-generating station, but the facility did not want to hire a general contractor.

**SOLUTION:** Kalwall's project coordinator worked directly with the facility's ownership. Factory unitized panels were installed quickly and easily. The end result is that Kalwall completed the project on time in 2016 and gave the facility a much-needed facelift.



## CHALLENGE 3 The Balance of Practicality and Aesthetics

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Workers with access to daylight are

18%

more productive<sup>1</sup>

There is a fine line between maximizing the benefits of natural daylight and the problems direct daylight can cause to an interior space. Combining artistic and architectural visions with practicality and user-friendly results is the real art in design. Understanding that fine line can be an even greater challenge when working within the restrictions of a retrofit project.

### Cost controlling natural daylight

Solar gain, glare, hotspots and contrasts between light and shadows can outweigh the benefits natural daylight brings. Sunshades, solar controls, blinds or curtains can control these problems, but impact the overall design and can be costly to deploy (auto controls, dimmers). Translucent sandwich panels meet the challenge and reduce cost by introducing diffuse natural daylight. A space that has proper natural daylighting avoids the cost of using excessive artificial light.

### Increasing production

Properly done, natural daylight introduced into the work space creates a restful light that stimulates circadian rhythms and has been proven to increase productivity. Diffuse and glare-free daylighting that reaches deep into an interior space is a perfect solution for maximizing natural daylight and visual acuity.

Keeping glare off computer screens and rooms free from sharp shadows and contrast, avoids eye fatigue from forcing the eye to continually adjust. Removing glare and hotspots eliminates the need for solar control while maintaining constant lux levels.

Diffuse natural daylight is preferred in museums and art galleries to negate degradation of direct sunlight onto paintings and other valuable works of art, minimizing the bleaching, cracking and fading.

And, while diffuse natural daylight can also block harmful UV-A and UV-B rays, it transmits the full spectrum of visible light for perfect color rendition within interiors – even allowing for plant growth and photosynthesis.

<sup>1</sup>World Green Building Council

## Kalwall Case Study

### Crouch End PictureHouse

London, UK

Photography: Alex Upton

Architecture: Panter Hudspith Architects | James Jeremiah

**CHALLENGE:** The architect was charged with reviving an old 1950s building that was once home to a turn of the century theater.

**SOLUTION:** Both sustainable and eye-catching, Kalwall panels create a dynamic Picturehouse facade that gives the building a gentle glow at night. The design was one of four cited when Panter Hudspith was named Architect of the Year for Sports & Leisure by Building Design.



## CHALLENGE 4 Maintaining Cost Efficiencies

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70%

of projects are over budget and delivered late<sup>1</sup>

Keeping costs to a minimum throughout the life of a structure requires high performance and low maintenance. Trying to do that for a retrofit project is even more of a challenge.

Cradle-to-grave or whole-life cost analysis is a relatively recent advent in a construction industry that previously focused on supply and installation costs. However, as demands for sustainability, renewability and recyclability grow, building owners are focusing more on the long-term viability of products. Priorities are now placed on how products perform, how long they last and the benefits they bring.

### **“All-in-one” product – no add-ons or interior finishing required**

One-stop-shop products - products which can be installed quickly and easily, with as much offsite pre-assembly as possible - are now being favored over traditional components that are individually specified. These all-in-one products minimize the time needed on site, installation time and remedial work post-install.

### **Low maintenance costs – field tested**

Product durability is key to maintaining cost efficiencies. Rugged products offer a wide range of benefits, including:

- Low maintenance
- High levels of impact
- Abrasion and vandal resistance
- Weatherability
- Resistance to chemical and environmental exposure

Surfaces which include a low-coefficient friction coating can utilize rainfall as the primary source of self-cleaning, allowing water and dirt run-off to keep cleaning requirements to a minimum and reduce costs on labor, materials and equipment.

<sup>1</sup>Lean Construction Institute

## Kalwall Case Study

### Elgin Artspace Lofts

Chicago, Illinois

Photography: Kate Joyce  
Architecture: BKV Group

**CHALLENGE:** Transform a 1908 Sears building into an Artspace - a community space for artists and small businesses. Part of the Artspace mission is to provide artists with accessible and affordable housing.

**SOLUTION:** Kalwall® translucent sandwich panels were retrofitted into an original skylight, bathing the main floor's artist gallery in museum-quality daylighting™. In addition to providing the ideal daylight, the panels also fit the projects goal of cost efficiency, offering low maintenance and better weatherability than glass.



# KALWALL®

high performance translucent building systems

## Retrofit Project Advantages

### Installation

Rapid installation translates to quicker building occupancy  
Replacement systems are factory unitized to save field labor  
Shipped to site prefinished on both interior + exterior faces  
Roughly one third the weight of glass systems  
Increased span capabilities compared to polycarbonate + glass  
Custom + standard sizes to fit any existing rough opening  
OSHA fall through compliant without guardrails or safety cages

### Performance

Harvests glare-free, balanced daylight + boosts productivity  
Saves energy by reducing HVAC loads + artificial light usage  
Enhances building safety + security through visual privacy  
Minimizes air infiltration + increases condensation resistance  
Lightweight systems minimize the need for additional supports  
Explosion venting (EV) + blast-rated (ATFP) systems  
Windborne resistant translucent + vision glazing systems

Want to know more  
about using Kalwall  
in your project? We'd  
love to talk to you.

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