Office in Leeds Case Study

Supporting EPC Improvement Through High-Performance Reglazing

This case study is provided for general guidance only. EPC references, performance data and indicative savings are based on stated assumptions and should not be treated as guaranteed performance, a guaranteed EPC outcome or guaranteed financial return.

Project snapshot

Item	Detail
Project lead / client relationship	TSK Group
End client	Confidential office client
Client objective	Upgrade the building to support EPC B as part of TSK Group's renovation works
Glazing area	945m²
Building type	Air-conditioned office building
Existing glazing	6mm grey body tint / 12mm argon / 6mm clear
Replacement glazing	6mm grey body tint / 12mm argon / 6mm clear low-E

Office building in Leeds upgraded through targeted reglazing as part of TSK Group renovation works.

Case study overview

This downloadable case study summarises how Dortech Maintenance worked with TSK Group to support the energy-performance objectives of a confidential office building in Leeds through targeted replacement glazing.

The challenge: improving building performance and targeting EPC B

TSK Group approached Dortech Maintenance with a clear objective: to improve the building's energy performance and support the wider ambition of achieving an EPC B rating at an office building in Leeds that TSK Group had been employed to renovate.

TSK Group managed the project requirements and client relationship as part of the renovation works to the office building in Leeds. Concerns were raised regarding the performance of the existing windows. As with many older commercial buildings, the glazing was a key part of the building envelope and had a direct impact on both internal comfort and energy performance.

In air-conditioned commercial buildings, glazing performance is especially important because poor-performing glass can affect the building in two directions. In summer, solar gain through the glass can increase internal temperatures and place additional demand on cooling systems. In winter, poor insulation through the glass can increase heat loss and place additional demand on the heating system.

For building owners and occupiers, this can contribute to higher energy costs, less comfortable working conditions and a poorer overall building performance profile.

Site review and existing glazing assessment

Dortech visited site to assess the existing glazing and identify a practical replacement specification that would support TSK Group's renovation requirements and the project's energy-performance objectives for the office building in Leeds.

The existing insulated glass units were found to comprise: 6mm grey body-tinted glass outer pane / 12mm argon gas-filled cavity / 6mm clear inner pane.

Based on this specification, the existing glass would have had a light transmission value of approximately 0.39, or 39%, and a g-value of approximately 0.47, or 47%. Before the units began to fail, Dortech would have expected them to achieve a centre-pane U-value of approximately 2.8 W/m^2K.

The existing grey body-tinted glass already provided some reduction in visible light transmission and solar gain compared with clear glass. However, the units still allowed a meaningful proportion of solar energy into the building and did not provide the same level of thermal performance as a modern low-E insulated glass unit.

Understanding the technical issue

Three technical measures are especially important when assessing this type of glazing upgrade:

Measure	What it means
Light transmission	The proportion of visible daylight passing through the glass
G-value / solar factor	The proportion of total solar energy passing through the glass into the building
U-value	The rate of heat transfer through the glass; lower is better

The existing light transmission of 0.39 meant that approximately 39% of visible daylight passed through the glass. The existing g-value of 0.47 meant that approximately 47% of incident solar energy was transmitted through the glazing into the building.

The existing centre-pane U-value of 2.8 W/m²K meant that the glass was significantly less thermally efficient than a modern low-E replacement unit. For an air-conditioned building, this combination can lead to higher cooling demand in summer and higher heating demand in winter.

The Dortech replacement glazing solution

Dortech replaced the existing glazed units with upgraded sealed units comprising: 6mm grey body-tinted glass outer pane / 12mm argon gas-filled cavity / 6mm clear low-E inner pane.

This specification was developed to improve the performance of the glazing while working within the constraints of the existing frames and system.

The replacement units provide a light transmission of 0.38, or 38%, and a g-value of 0.35, or 35%. The replacement units also improve the centre-pane U-value to 1.27 W/m²K.

Performance measure	Existing glazing	Replacement glazing	Improvement
Light transmission	0.39 / 39%	0.38 / 38%	Similar daylight level
G-value	0.47 / 47%	0.35 / 35%	Reduced solar gain
Centre-pane U-value	2.8 W/m²K	1.27 W/m²K	Improved thermal insulation

This was an important outcome because the replacement glass maintained a broadly similar daylight level while improving both solar-control and thermal performance.

Solar-gain improvement

The reduction in g-value from 0.47 to 0.35 represents a g-value improvement of 0.12. This equates to approximately 26% less solar energy transmission through the glass.

For an air-conditioned building, this is commercially relevant because reduced solar gain can reduce the burden on cooling systems during warmer periods. Where cooling systems are required to maintain an ambient internal temperature, any reduction in unwanted solar heat gain can help reduce cooling demand, improve comfort and support better building operation.

Thermal-performance improvement

The replacement glazing also delivered a significant U-value improvement. The centre-pane U-value improved from 2.8 W/m²K to 1.27 W/m²K, giving a U-value improvement of 1.53 W/m²K.

This means the replacement units substantially reduce conductive heat loss through the glazing during colder periods. For buildings targeting improved EPC performance, this is a key benefit because reduced heat loss through the building envelope can help lower heating demand and improve the overall energy profile of the property.

Indicative heating-side energy saving

The heating-side calculation is based on the reduction in conductive heat loss through the glazing during the heating season.

Assumption	Value
Glazing area	945m²
Existing centre-pane U-value	2.8 W/m²K
Replacement centre-pane U-value	1.27 W/m²K
U-value improvement	1.53 W/m²K
Heating degree days	2,000 K·days/year
Assumed heating efficiency	85%
Assumed gas rate	5.16p/kWh

Using these assumptions, the indicative useful heat reduction is approximately:

69,401 kWh per year

Allowing for 85% heating system efficiency, this equates to approximately:

81,648 kWh of avoided gas input per year

At an assumed gas rate of 5.16p/kWh, the indicative heating-side saving is approximately:

£4,213 per year

Indicative cooling-side energy saving

Because the building is air conditioned, the cooling-side saving is also relevant. The cooling calculation is based on the reduction in solar heat gain through the glass.

Assumption	Value
Glazing area	945m²
Existing g-value	0.47
Replacement g-value	0.35
G-value reduction	0.12
Assumed effective solar irradiation	552 kWh/m²/year
Assumed electricity rate	22.19p/kWh

The theoretical annual reduction in solar heat entering the building is approximately:

62,597 kWh per year

Not all solar heat gain occurs at times when mechanical cooling is active or required, so the model applies a cooling coincidence and system-efficiency allowance.

Using a low-to-high range, this could represent an indicative avoided cooling electricity demand of approximately:

5,216 to 14,084 kWh per year

At an assumed electricity rate of 22.19p/kWh, this equates to an indicative cooling energy saving of approximately:

£1,158 to £3,125 per year

Indicative total annual energy saving

Combining the indicative heating and cooling benefits gives a total annual energy saving range of approximately:

Saving category	Indicative annual saving
Heating-side saving	£4,213/year
Cooling-side saving	£1,158–£3,125/year
Combined indicative saving	£5,371–£7,338/year

Important: The energy and cost savings presented are indicative only and are based on the assumptions stated within this case study. They should not be interpreted as guaranteed performance or financial savings.

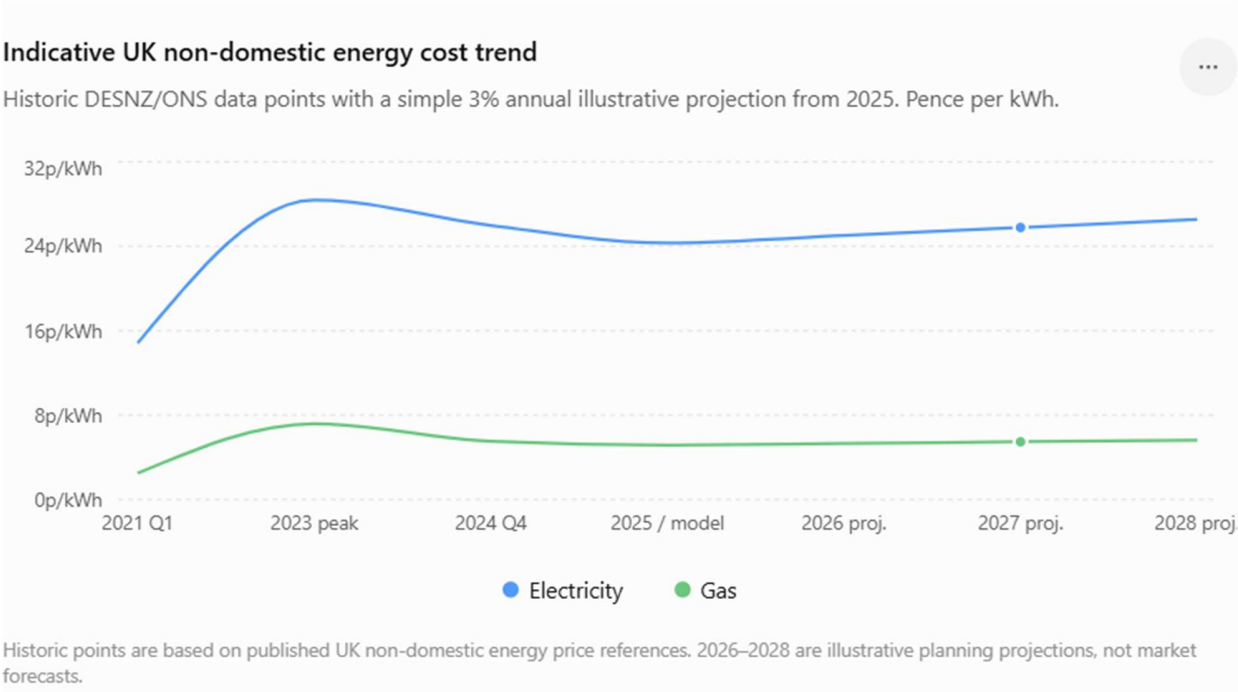
These figures should be treated as indicative, because actual savings will depend on building orientation, occupancy, HVAC settings, internal gains, weather conditions, shading, maintenance condition and how the building is operated. However, they demonstrate the clear performance benefit of the glazing upgrade.

Supporting the pathway to EPC B

For commercial property owners, EPC performance has become an increasingly important issue. Improving the building envelope is one practical way to support better energy performance, particularly where existing windows or glazed areas are underperforming.

At this office building in Leeds, the glazing upgrade helped address both summer and winter performance issues. In summer, the reduced g-value helps limit unwanted solar gain and reduce the load on air-conditioning systems. In winter, the improved U-value helps reduce heat loss and improve the thermal performance of the façade.

Together, these improvements support TSK Group's renovation requirements and the wider objective of upgrading the building and improving its energy performance.



Project information

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Conclusion: improving energy performance through targeted reglazing

This office building in Leeds demonstrates how targeted reglazing can help improve the performance of an existing commercial building without necessarily replacing the full window or façade system.

By upgrading the glazed units, Dortech Maintenance helped reduce solar gain, improve thermal insulation and support TSK Group's renovation requirements together with the wider ambition to improve the building's EPC rating.

The replacement units maintained a similar level of visible light transmission while delivering a meaningful reduction in g-value and a significant improvement in centre-pane U-value.

For commercial buildings with large areas of ageing glazing, this type of upgrade can provide a practical route to improving aesthetics, internal comfort and energy performance.

Related information

To assess the potential energy-saving benefits of upgrading windows, doors and glazed screens, Dortech Maintenance has developed a commercial glazing energy-saving model.

Commercial glazing energy-saving model: https://dortechmaintenance.co.uk/commercial-glazing-energy-saving-model/

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Replacement glass light transmission	0.38 / 38%
Existing glass g-value	0.47 / 47%

Replacement glass g-value	0.35 / 35%
G-value reduction	0.12
Existing centre-pane U-value	2.8 W/m^2K
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Assumed heating efficiency	85%
Assumed gas rate	5.16p/kWh
Assumed electricity rate	22.19p/kWh

Calculation assumptions used in this case study

Disclaimer

This case study is provided for general guidance and illustrates the potential benefits of upgrading commercial glazing.

Performance data and energy savings are indicative only and are based on the assumptions stated within this document together with recognised industry data. Actual results will vary depending on building design, occupancy, HVAC systems, operating conditions, weather, maintenance and energy costs.

References to improving EPC performance or supporting an EPC B rating do not constitute a guarantee of any specific EPC outcome. A qualified EPC assessor should be consulted for project-specific assessments.

This document should not be relied upon as a guarantee of performance, energy savings or financial return, and should be used as an early-stage decision-support tool only.

Contact Dortech Maintenance

For further information about commercial glazing upgrades, reglazing strategies and energy-saving modelling, please contact Dortech Maintenance.

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