

VERDE SW1
LONDON / UK



TISHMAN SPEYER

GLASS FROM GLASS

Leading by example: Setting a
precedent in the construction industry





OVERVIEW

ABOUT VERDE SW1

Verde SW1 is a major refurbishment project in the heart of central London comprising more than 282,000 sq. ft. of Grade A office space. Completed in 2016, Tishman Speyer placed occupant comfort, health and wellbeing at the heart of the renovations. As a result, the building benefits from abundant natural light, exceptional views, and excellent amenities and services.

With its proximity to Victoria Station, Verde SW1 is easily accessed by public transport. Active travel modes are encouraged with 440 bicycle spaces, dedicated cycle access, showers, lockers and changing facilities.

LIFE CYCLE ASSESSMENT

The starting point for the refurbishment was a carbon life cycle assessment (LCA) that analyzed the materials in the existing building and the refurbishment process. The LCA identified the existing glass façade as a key contributor to the carbon calculation.

In the UK, most waste glass from renovation and demolition works is crushed into aggregates for use in road building, or sent to landfill. Although turning glass into aggregates is categorised as 'recycling', its benefits are limited. Conversely, closed loop recycling, where glass is turned into other glass products, delivers far greater environmental benefits and carbon savings.

APPROACH

As a result of the findings of the LCA, Tishman Speyer proposed that the old façade should be recycled back to glass to maximize carbon savings. As this was not common practice in the construction industry, Tishman Speyer worked closely with the recycling company to define the process. The process was then embedded into contracts and throughout the refurbishment program.

OUTCOMES

The refurbishment, which achieved BREEAM (Building Research Establishment Environmental Method) 'Excellent' rating, has extended the lifespan of the building from ten to sixty years. Tishman Speyer's approach, reusing the original concrete structure and careful choice of materials, reduced the embodied carbon of the building by approximately 21,500 metric tons of carbon dioxide equivalent (tCO₂e). This is in line with the emissions from 4,600 return flights from London to Hong Kong. 340 metric tons of façade glass was recycled; this saved a further 100tCO₂e in the downstream production of container glass.

The lessons learnt will be applied to future Tishman Speyer projects and used to influence the approach in the UK in collaboration with British Glass.

9,880
tCO₂e REDUCTION IN
EMBODIED CARBON
DURING CONSTRUCTION

+

11,600
tCO₂e REDUCTION IN
EMBODIED CARBON
ACHIEVED BY REUSING
ORIGINAL CONCRETE
STRUCTURE

=

21,480
tCO₂e REDUCTION IN
EMBODIED CARBON OF
THE BUILDING



55,000
SQ. FT. OF FAÇADE
GLASS RECYCLED

100

tCO₂e SAVED BY
RECYCLING FAÇADE

Recycling Process

1

How to recycle glass into new glass products

TECHNICAL PROCESS OVERVIEW

The process of turning waste flat glass into cullet (crushed waste glass for recycling) is classified as a waste recovery operation and is therefore subject to waste management legislation. This is deemed to be more of a burden to the property sector than an opportunity for environmental and economical savings. As a result, waste glass is seldom recovered in building projects.

When a building is refurbished, end-of-life façade glass is usually crushed and used as aggregates in road construction. Whilst this is better than sending glass to landfill, the most effective use is to turn glass into new glass products: it can be recycled in this 'closed loop' indefinitely.

With 55,000 sq. ft. (5,100 sq. m.) of glass in the old façade at Verde SW1, comprising an estimated 1,700 tCO₂e, Tishman Speyer was keen to ensure this opportunity was not wasted.

Tishman Speyer's engagement and careful monitoring were crucial throughout the project, both in establishing the overall process and in driving key messages during the demolition process.

Onsite 'toolbox talks' provided a forum to explain the key dismantling stages to the demolition team to avoid contamination of the glass.

WHY RECYCLE GLASS INTO GLASS?

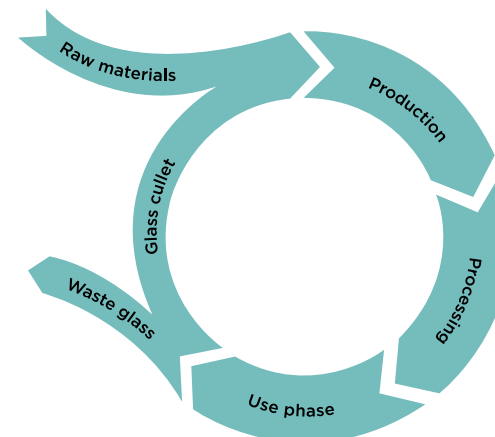
It preserves natural resources: Glass recycling saves significant amounts of raw materials. Every metric ton of crushed waste glass (cullet) used to make new glass reduces the need for 1.2 metric tons of virgin raw materials (sand, lime, soda and additional minerals).

It saves energy and reduces carbon emissions: Cullet melts at a lower temperature than virgin raw materials, hence less energy is used and the carbon impact reduced. Substituting one metric ton of cullet for raw materials saves 322 kWh gas and approximately 0.3 metric tons CO₂. A large proportion of raw materials (35% or more) can be replaced by cullet/ recycled materials if they are available at the right quantities, quality and price.

STANDARD PRACTICE (LINEAR)



IMPROVED APPROACH (CIRCULAR)



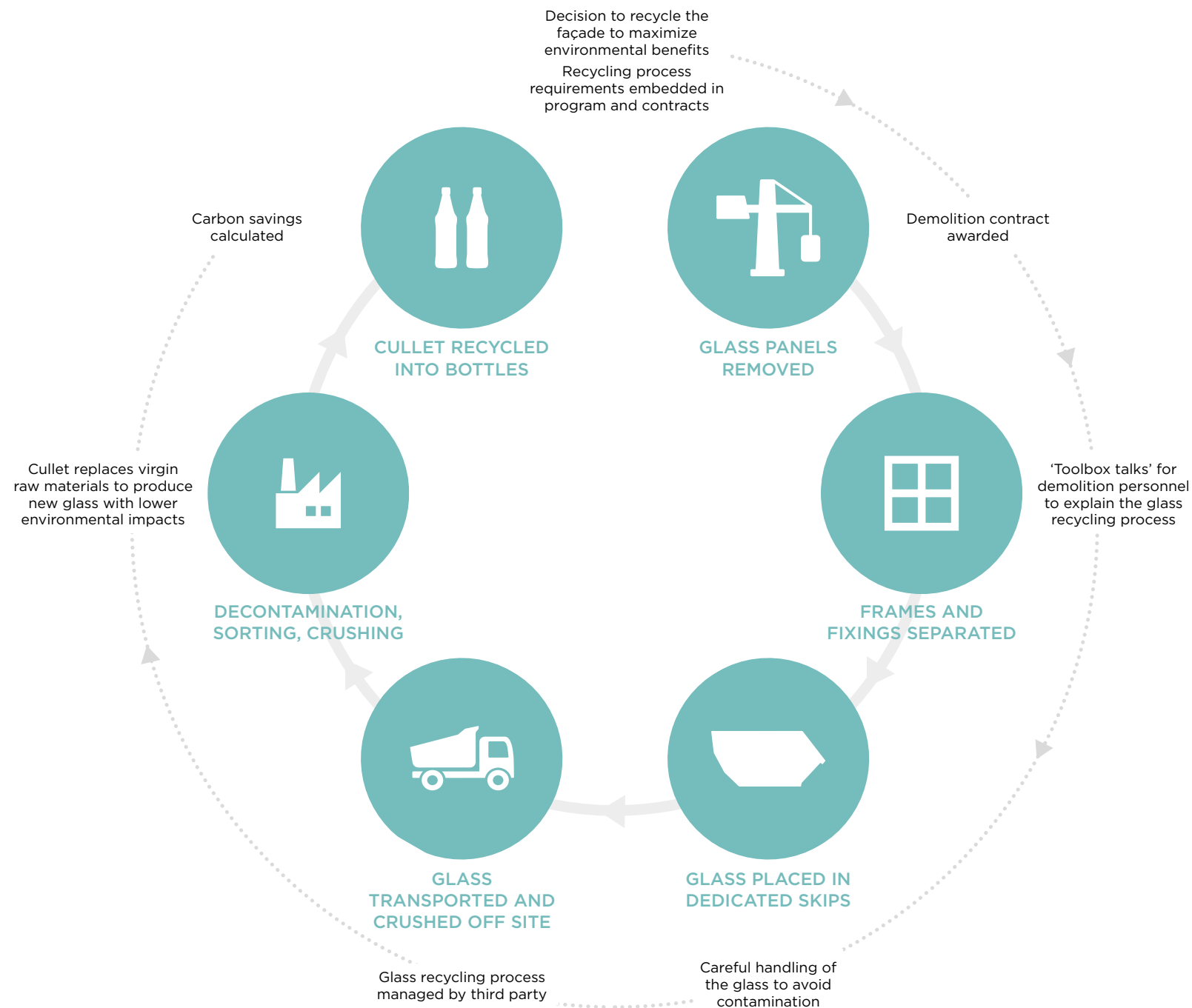
340 metric tons of glass from the old façade was recycled



Glass transported off site for decontamination, sorting and crushing

Glass recycling process for Verde SW1

2



CLOSED LOOP RECYCLING HELPS TO CREATE A CIRCULAR ECONOMY

Glass is 100% recyclable, and can be melted down and remoulded an infinite number of times. The glass industry has the potential to be a perfect example of a scalable circular economy in action. Tishman Speyer is now working to change the perception of glass recycling within the construction community.

1,700

tCO₂e in old façade

55,000 sq. ft.

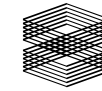
(5,100 sq. m.) glass removed

340

metric tons of glass recycled

100

tCO₂e saved by glass recycling



Leading by example

Changing the status quo requires knowledge, commitment and tenacity. When Tishman Speyer decided to recycle the old façade at Verde SW1 back into glass, there was only one known precedent within the construction industry in the UK. Through careful management of the recycling process, Tishman Speyer successfully minimized the environmental impacts of the refurbishment.

CIRCULAR ECONOMY IN CONSTRUCTION

Setting embodied carbon reduction as a goal within the refurbishment process led to a number of decisions: retention of the existing structure, materials analysis and façade recycling.

Recycling end-of-life building glass back to glass is currently outside best practice in the construction industry. Tishman Speyer quickly realized that relevant experience and guidance was not available within the sector. Consequently, Tishman Speyer approached British Glass to assist in the façade recycling process and identifying appropriate partners.

KEY LESSONS LEARNT

The application of a carbon life cycle assessment allowed a new level of understanding of the major elements of the existing and refurbished building, enabling the project team to make informed decisions about how to reduce the environmental impact of all phases of the development and subsequent operation of the building.

Close collaboration with partners from the outset ensured that Tishman Speyer's sustainability principles were embedded in their processes: contractor, demolition contractor, recycler, LCA analyst.

Early and ongoing engagement with the glass reprocessing company was critical in the success of the project.

Embedding requirements in the process pre-tender ensured inclusion in the demolition contract.

Appointing a recycling champion to oversee the process was particularly important during the glass removal stage. This helped prevent contamination of the glass from the old façade.

Tishman Speyer also went to great lengths to make sure that the process was agreed by all parties as buy-in was essential to the overall success of the project.

NEXT STEPS

Tishman Speyer is working with British Glass to encourage other commercial property firms to recycle their end-of-life building glass. Doing so can drive the increase of construction glass waste recycling, therefore reducing virgin raw material use and reducing the carbon intensity of glass manufacturing.



A series of six terraces provide outdoor green space for tenants



NEW
FAÇADE

85%
RECYCLED
GLASS

100%
RECYCLED
ALUMINIUM

80%
RECYCLED
STEEL



Winner - National Federation of Demolition Contractor's Most Sustainable Construction & Demolition Project Award in the Chartered Institution of Wastes Management's (CIWM) Sustainability & Resource Industry Awards, 2016



Winner - Gold Award, Green Apple Awards for Built Environment and Architectural Heritage, 2017



Finalist - National Recycling Awards, 2016, Construction Recycler of the Year

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