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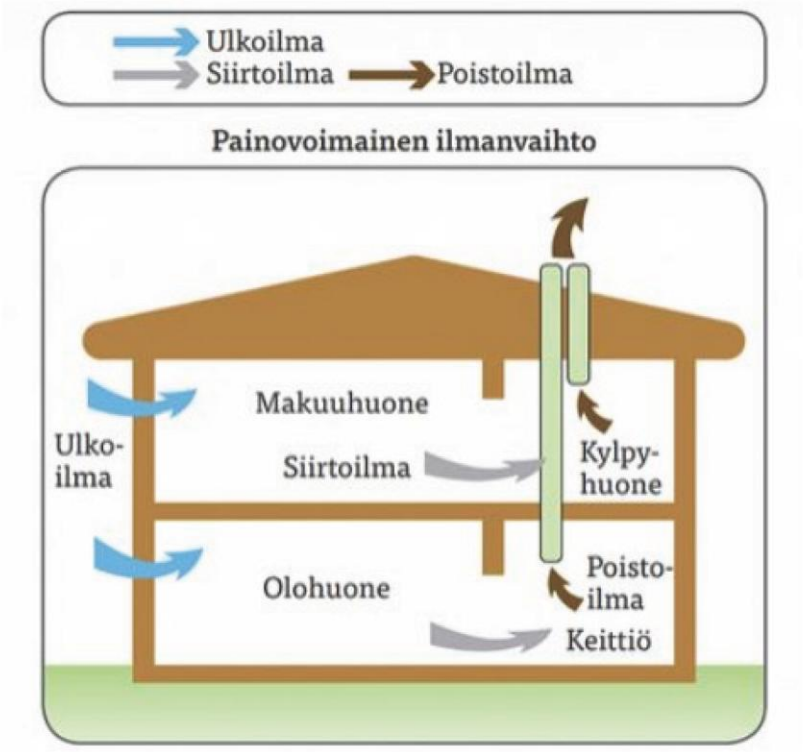
Circular Buildings Innovation Challenge

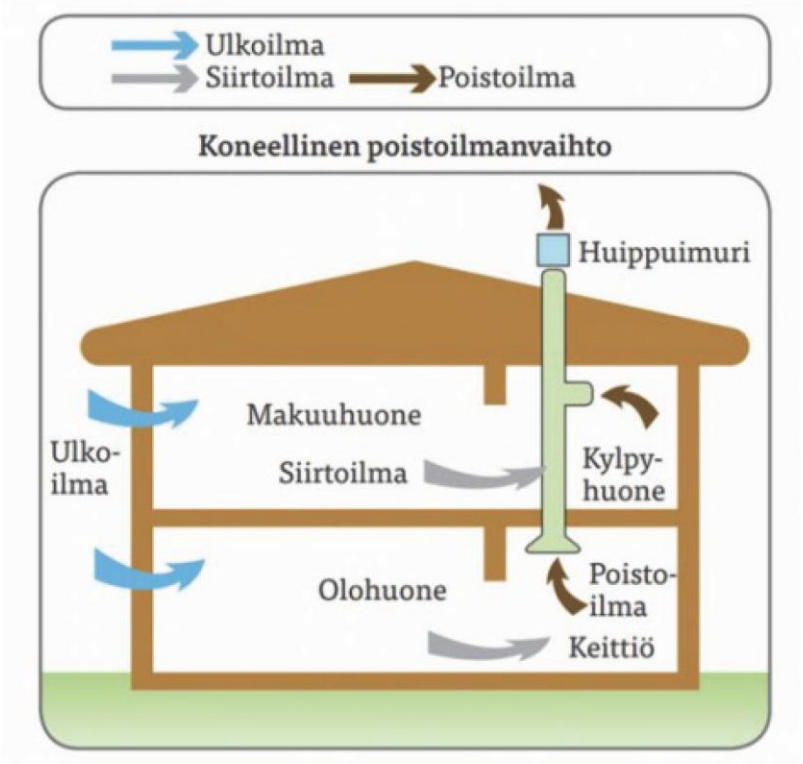
Reusing Glass, Reimagining Airflow

From Concept to Practice

Is Your Home Breathing?



Source : https://www.hengitysliitto.fi



Source : https://finluft.fi

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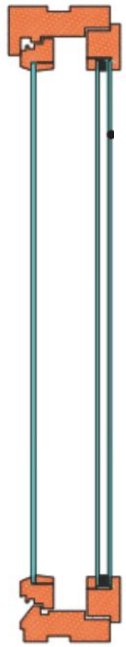
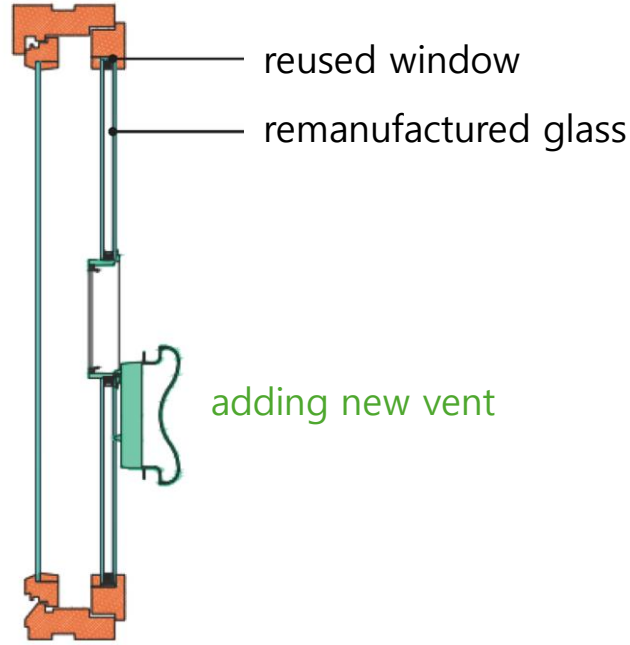
Reusing Glass, Reimagining Airflow



Typical Double Fixed Window



Fixed Window with Vent

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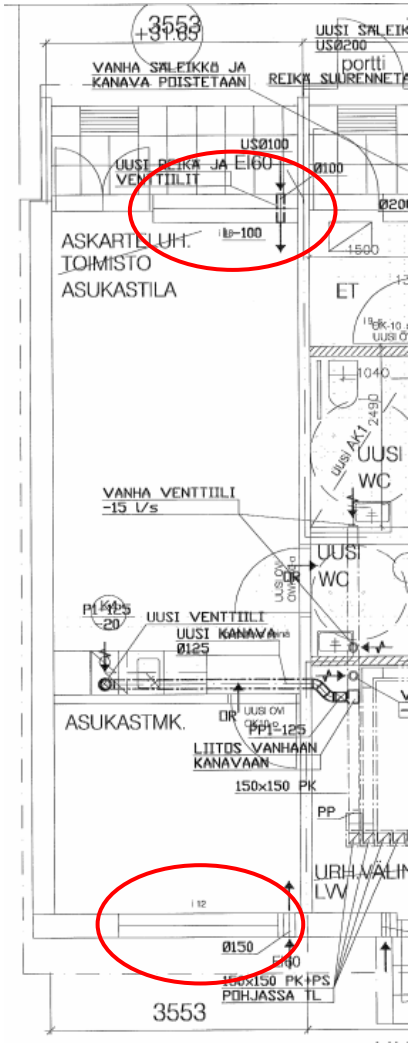
HEKA Residential Building

North Facade

South Facade



communal space Plan

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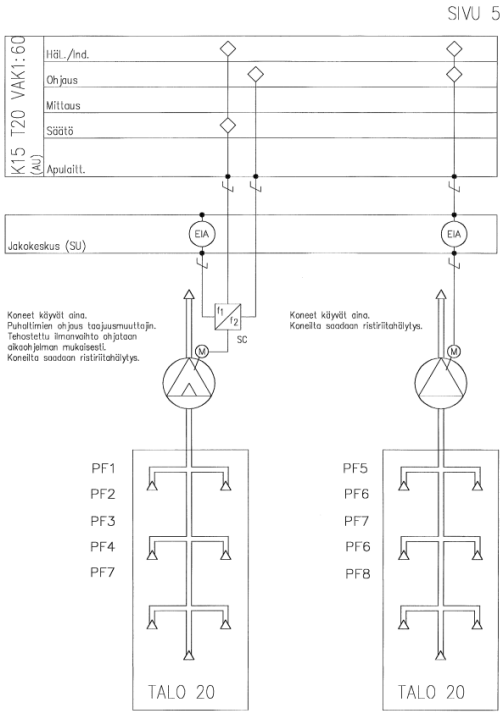
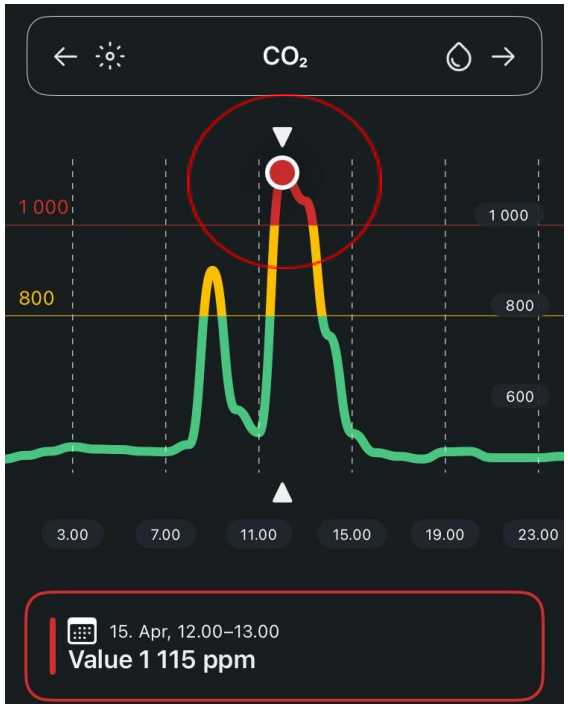
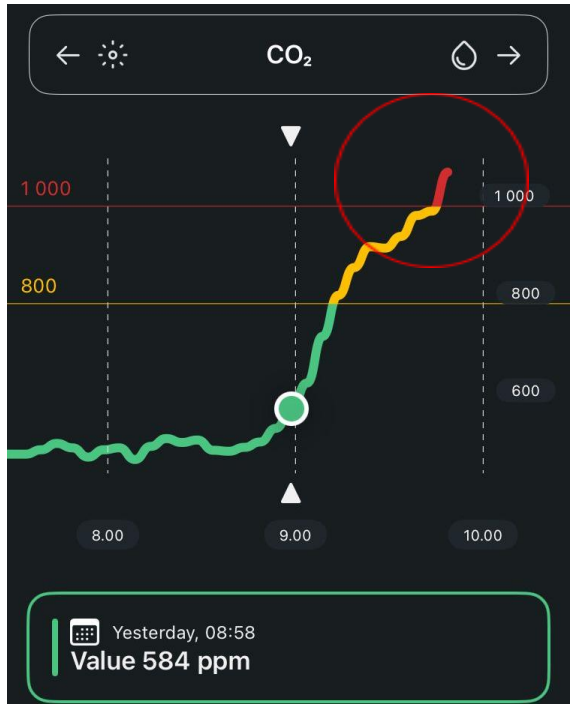
Indoor Air Quality Assessment



Mechanical Ventilation Plan (Air Exhaust)



CO_2 rate during weekly community coffee time (29th April)



CO_2 rate during meeting (15th April)

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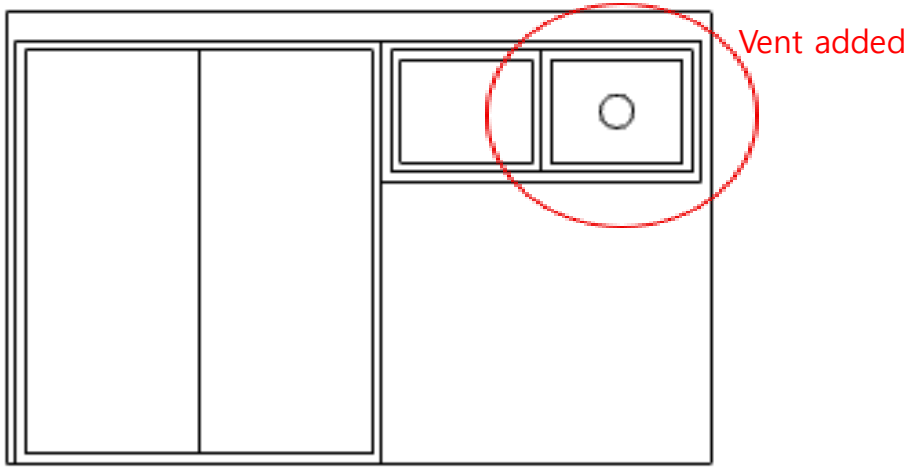
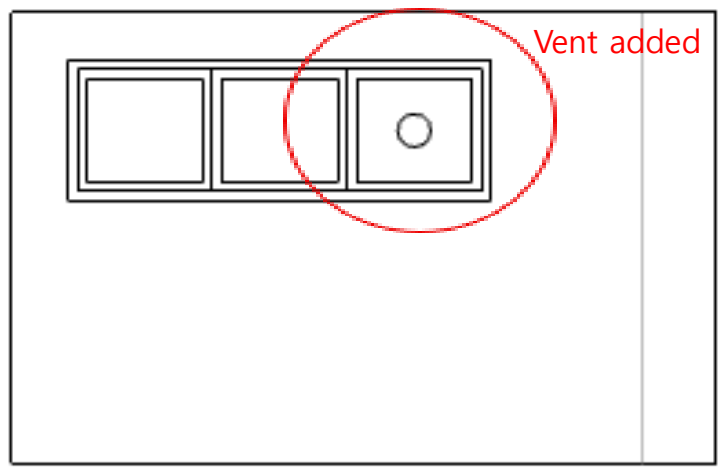
Ventilation with Minimal Intervention

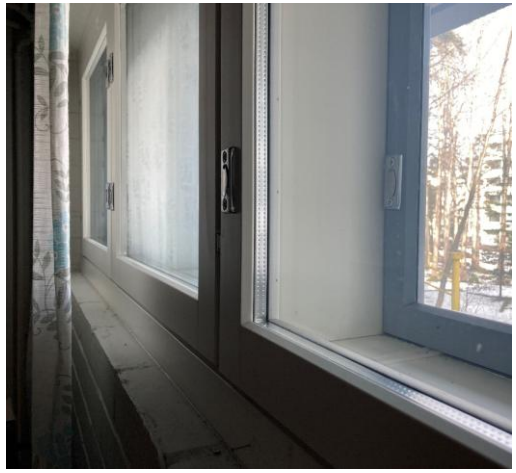


South Interior Façade Elevation



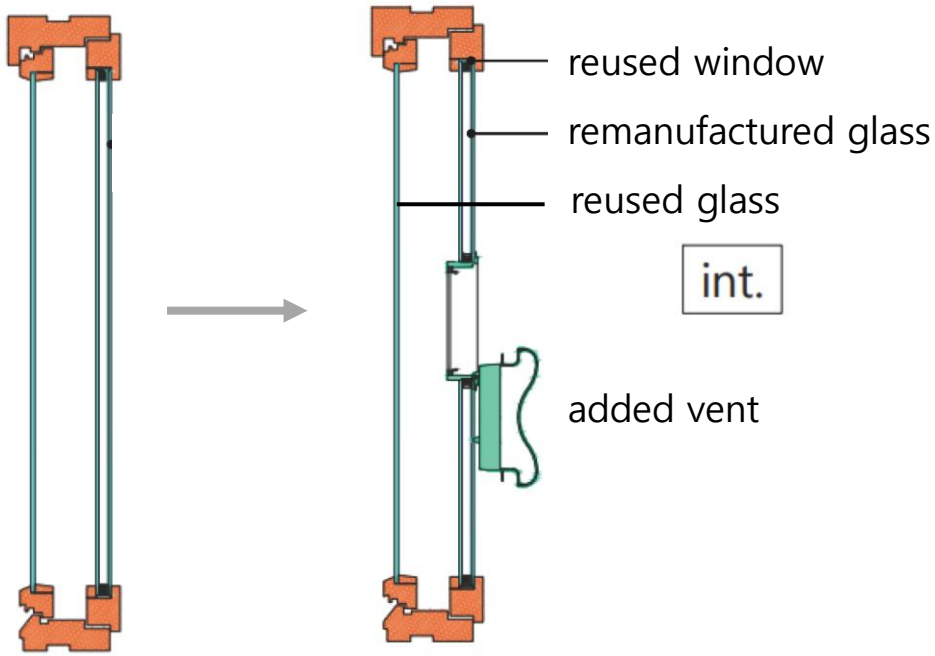
North Interior Façade Elevation

South Façade Window

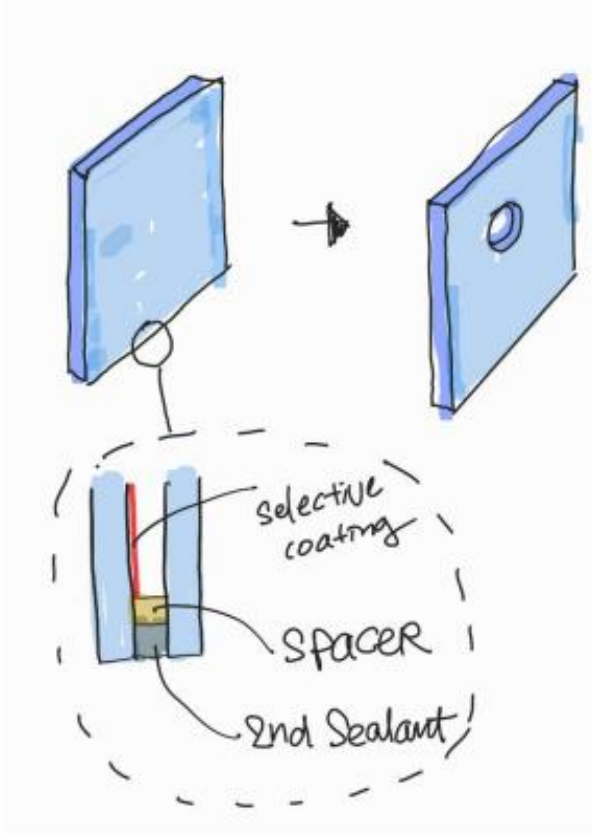


North Façade Window

Reuse & Remanufacture



Circular Diagram of Double Window



Remanufacturing Glass Diagram

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Three Retrofit Solutions

A. Natural Ventilation

Manually operated
(in North Façade)

B. Automatic Ventilation

CO_2 sensor controlled
(in South Façade)

C. Mechanical Ventilation

Portable AC plugged
(Summer in South Façade)

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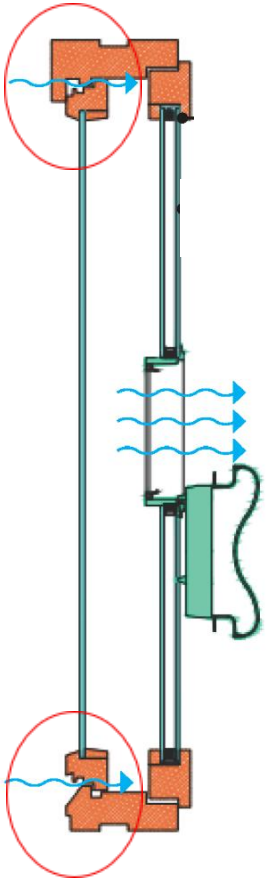
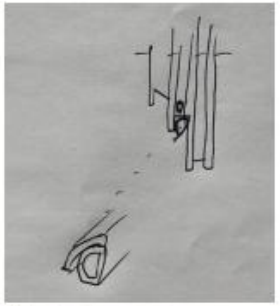
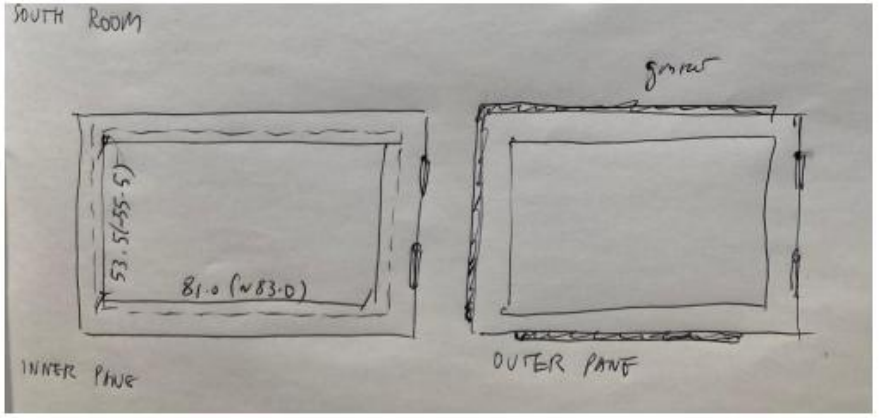
Integrating Ventilation

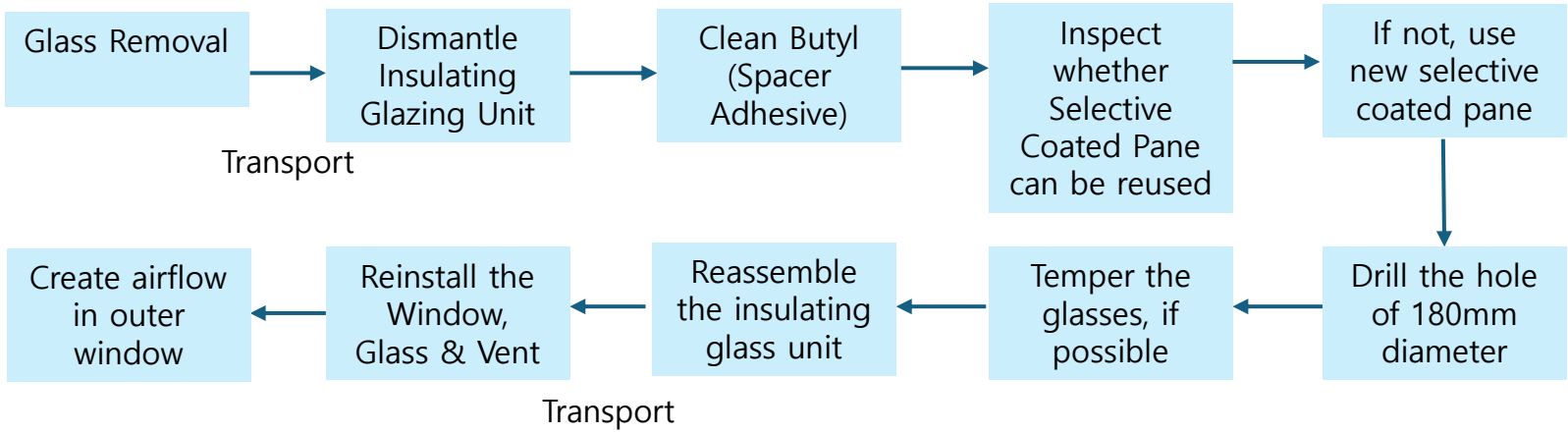


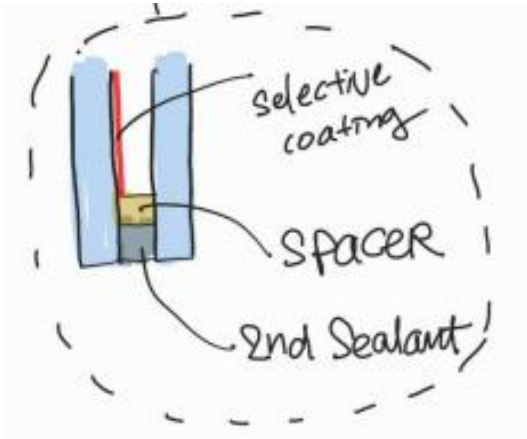




Air Flow Design through Outer Window (between frame & glass)

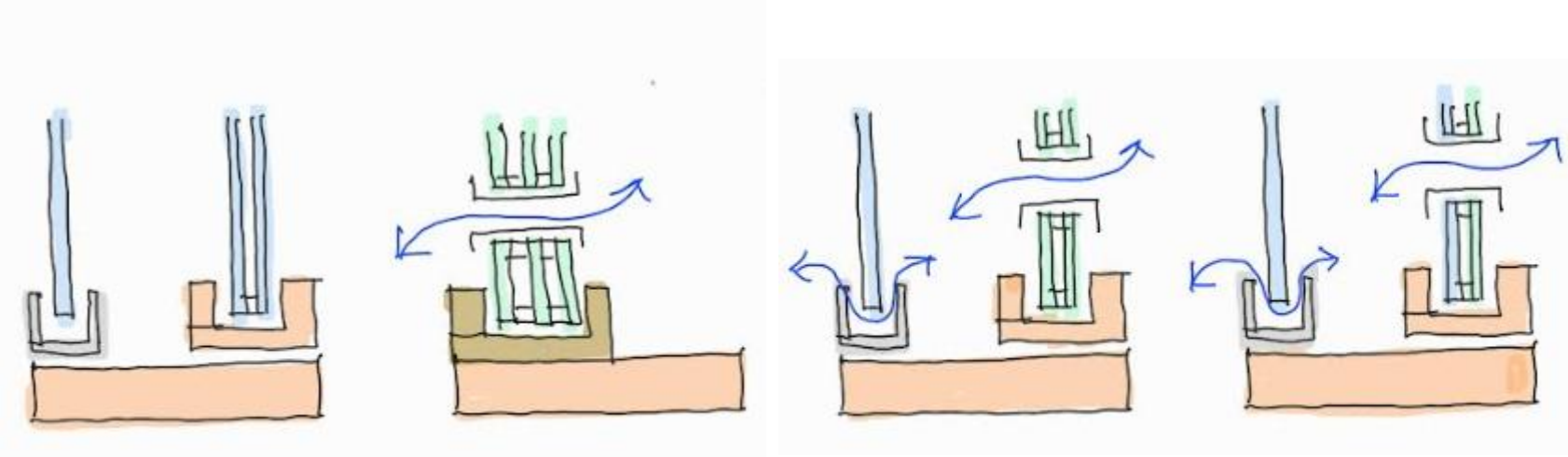
Fabrication & Installation





Inner Glass & Window Removal in 11th June

Carbon & Circularity

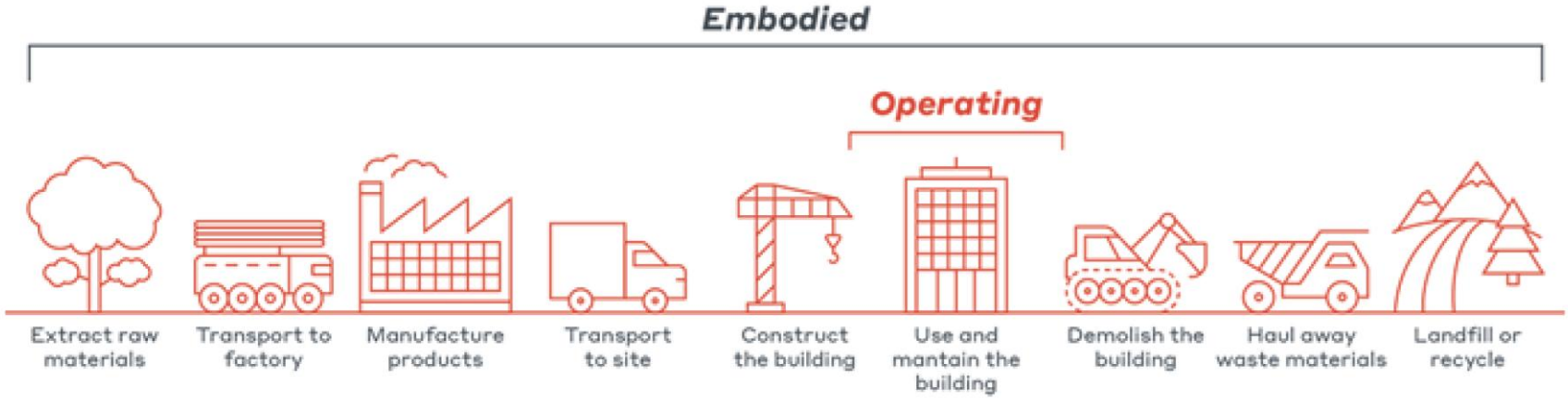


Existing Window

New Window & Glass

Reused Window & Glass + partially New glass

Reused Window & Glass



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From Theory to Practice

Recurring Challenges in Practice, Remanufacturing insulated glazing,
paper by Esther Geboes, Ruben Van Vooren, Waldo Galle & Niels De Temmerman

- behavioural (e.g., perception of old material);
- uncertainties (e.g., on costs, on technical approach);
- organisational (e.g., accessibility, timing);
- technical (e.g., dangerously sharp, fragile, and bulky to transport, hard to disassemble due to glued connections);
- legal (e.g., warranties, certificates);
- and financial challenges (e.g., commodity product, labour-intensive processes).

IMPACT

Prolonging the Life of Windows

- Improving existing glazing can enhance ventilation, insulation, and airtightness.

- Reuse extends building lifecycles and supports a sustainable built environment.