



Digitalization as an enabler for the decarbonization and recycling of windows, doors and facades 窓、ドア、ファサードにおける脱炭素化と資源循環の実現に向けたデジタルの有効活用

SengChye Koek

センチャイ コエク

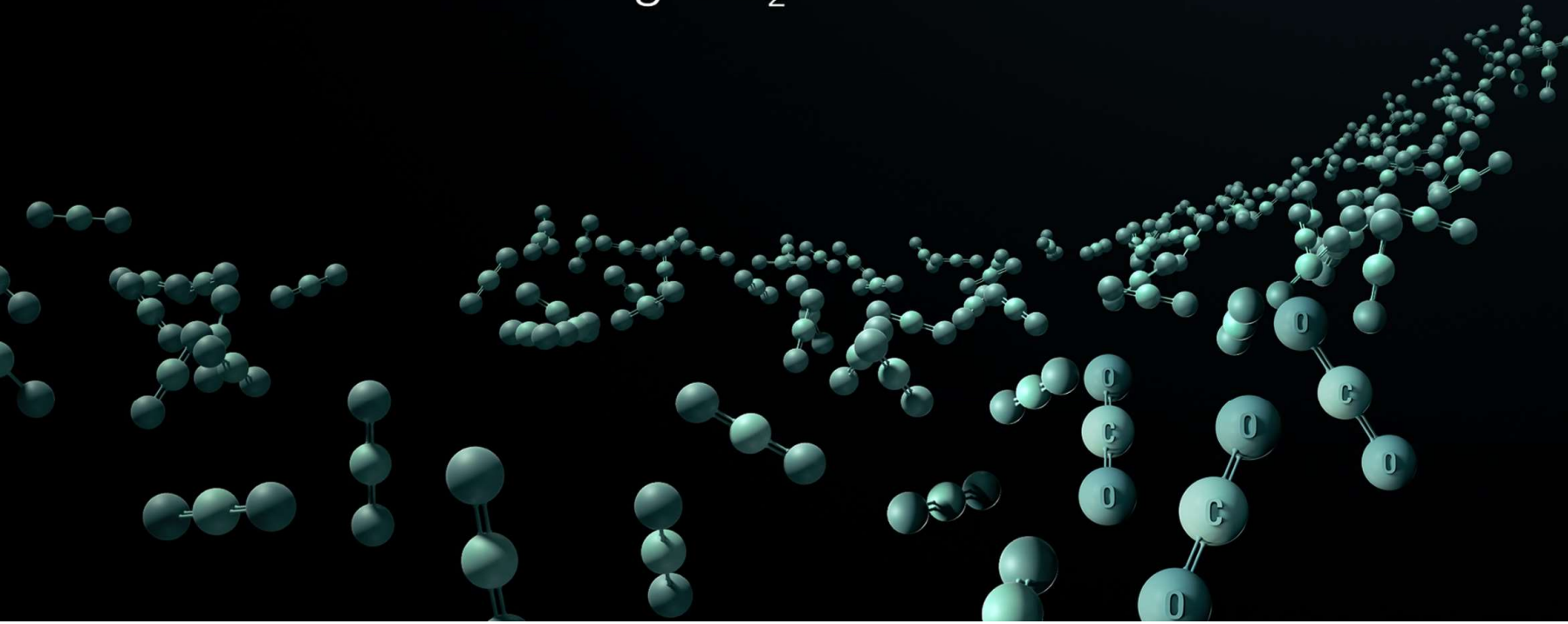
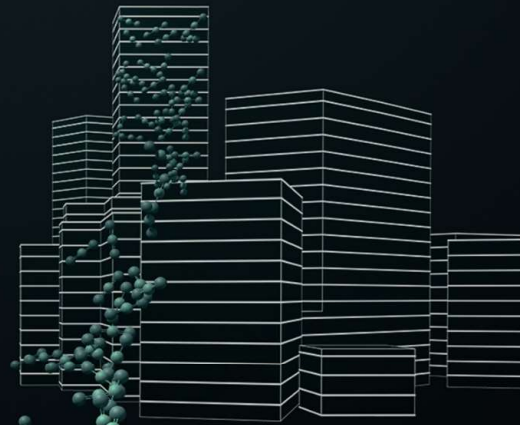
President of Schueco Japan

シューコー・ジャパン株式会社 社長

EEDF Tokyo, 26.1.2024, SCHÜCO Japan

SCHÜCO

Schüco
CARBON CONTROL ∞
Minimising CO₂ in construction.



Design to Decarb



- Design >
- Function >
- Carbon Control Consulting >
- EPDs for certification >

Build to Decarb



- Material >
- Hybrid Systems >
- Packaging Management >
- Carbon Control Consulting >
- CO₂ footprint at the push of a button >

Recycle to Decarb



- Material Cycle >
- IoF ID - Recycle >
- Re:Core >

Operate to Decarb



- Energy Efficiency >
- Energy Generation >
- Maintenance & Product Upgrades >
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- Global Service Team >



Design to Decarb



We are enabling our customers and partners to lay the right foundations for the carbon footprint of a building at the design and planning stage - for both new construction and renovation projects.





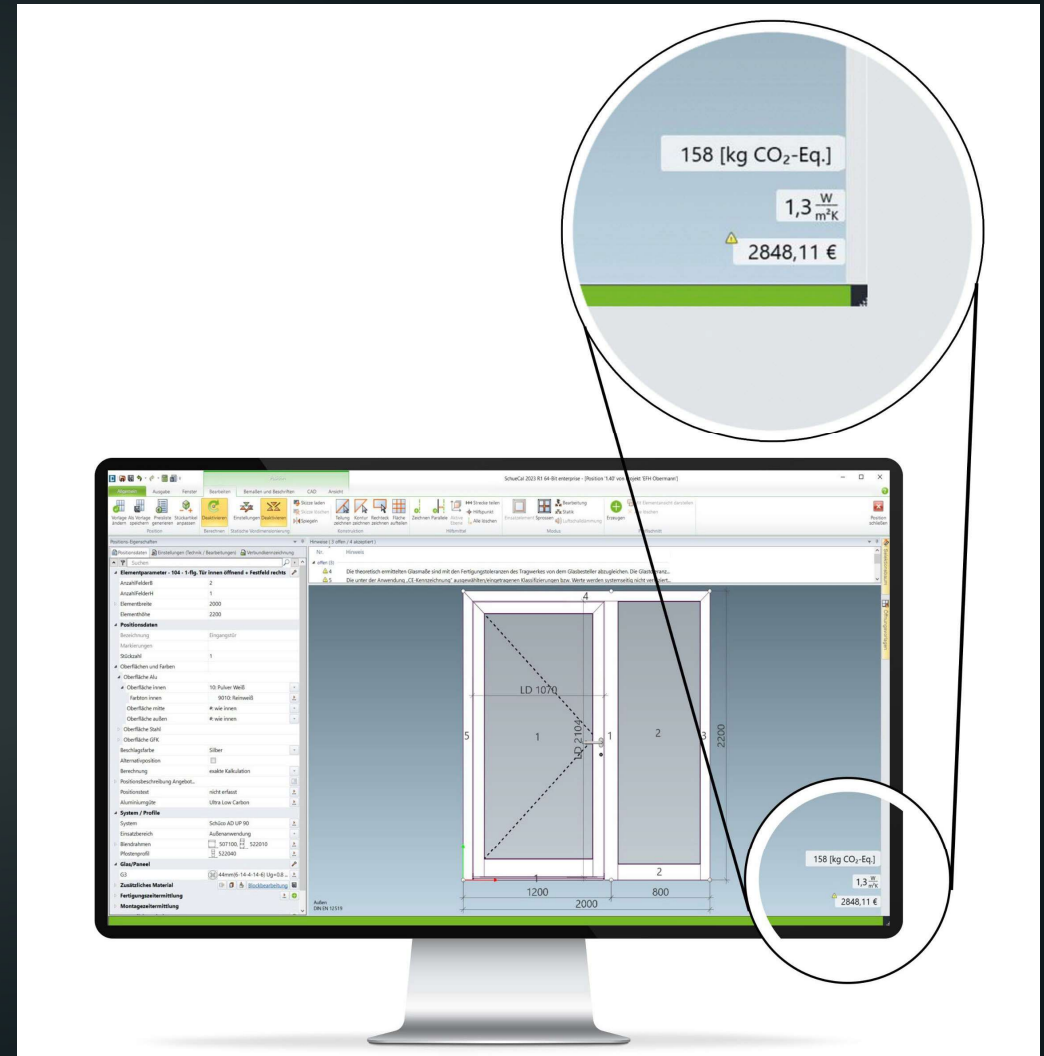
CO₂ values and EPDs direct from SchüCal

In our 3D calculation software, fabricators will, for the first time, enjoy full transparency over the CO₂ values of the materials and structural elements used.

Using the new quick-access carbon footprint function, the user can find out the component-specific CO₂e contribution to the building at any point during the planning process and share it with specifiers, building certification bodies and investors in the form of an EPD. For the first time, the GWP value (Global Warming Potential = CO₂e value) of the structure and material selection can therefore be viewed and optimised in real time.

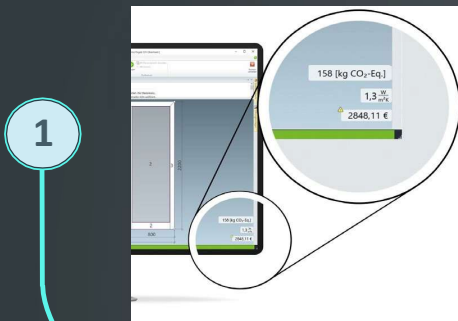
In short:

"The ability to identify the eventual CO₂ value specific to the profile in the calculation software and to try out different material options is truly unique."





We make sustainability measurable through GWP calculation and EPD documentation



Global Warming Potential (GWP)

Calculation of the Global Warming Potential (GWP): SchüCal enables a simple determination of the building component-specific CO₂ input in the building.

Environmental Product Declaration (EPD)

Detailed and officially certified environmental product declarations of Schüco profiles according to the current calculation method at the push of a button for precise CO₂ planning.

ERGEBNISSE DER ÖKOBILANZ UMWELTAUSWIRKUNGEN:
Schüco AWS 75.SI+/AD UP 75 B x H: 1230 mm x 1480 mm

Parameter	Einheit	A1-A3	A4	B6	C3	C4	D
GWP	[kg CO ₂ -Eq.]	239,65	5,82E-2	0,00	17,90	1,61E-2	-73,07
ODP	[kg CFC ₁₁ -Eq.]	1,49E-9	0,00	0,00	4,01E-15	8,85E-17	-9,49E-10
AP	[kg SO ₂ -Eq.]	6,39E-1	1,91E-5	0,00	1,10E-2	1,02E-4	-2,31E-1
EP	[kg (PO ₄) ³ -Eq.]	9,96E-2	4,87E-6	0,00	2,83E-3	1,15E-5	-1,45E-2
POCP	[kg Ethen Eq.]	6,92E-2	-7,39E-6	0,00	6,78E-4	7,76E-6	-1,43E-2
ADPE	[kg Sb Eq.]	2,05E-3	0,00	0,00	5,57E-8	1,62E-9	-1,74E-3
ADPF	[MJ]	3165,32	0,00	0,00	6,18	2,28E-1	-788,66





We provide green windows, doors and facades through Low Carbon und Ultra Low Carbon aluminium

1



Schüco Low Carbon Aluminium

- GWP value below 4,9 kg CO₂ e/kg aluminium

Schüco Ultra Low Carbon Aluminium

- GWP value below 2,7 kg CO₂ e/kg aluminium



2

CARBON CONTROL



Recycle to Decarb

We are enabling our customers and partners to recycle materials as new resources at the end of their useful life.



Systematically towards climate neutrality

Appropriately certified systems meet the requirements of the circular economy, which is ascribed central importance by politicians in the European Green Deal for achieving climate neutrality.

The basis for the certification is that all the materials used in the system can be completely returned to the cycle as new material at the end of their service life.

This makes today's construction products in buildings the raw materials store of the future.

In short:

„The cradle-to-cradle principle and the VinylPlus label ensure that all materials used in production can be returned to the cycle with almost the same quality. This ensures that primary resources are conserved – which helps to save CO₂.“



Cradle to Cradle

With more than 60 certified aluminium systems on offer, Schüco is a trailblazer in the implementation of the Cradle to Cradle principle in the construction industry and is thereby contributing to long-term CO₂ reductions and conservation of resources.



VinylPlus® Product label

Schüco PVC-U products also make a contribution to a circular economy and to minimising CO₂. This is endorsed by the VinylPlus® product label, which Schüco was the first company in the industry to receive.



A small tag with a big impact

The digitalisation of the building envelope with an IoF ID for all units conserves resources over the course of the building's use and safeguards the future availability of raw materials.

The IoF ID makes it possible to store data on every unit for carrying out maintenance and product upgrades in an efficient, methodical manner. This lengthens the useful life of the systems and ensures long-term sustainable operation. Moreover, units provided with an IoF ID are clearly documented for recycling at a later date and can be separated, sorted and fed back into the cycle.

In short:

"When data relating to a façade unit with an IoF ID is stored in the cloud, the installer knows whether maintenance or retrofitting work will be required at a later date and how to carry out this work. Ultimately, the data will also allow raw materials to be recycled in a clearly structured way."





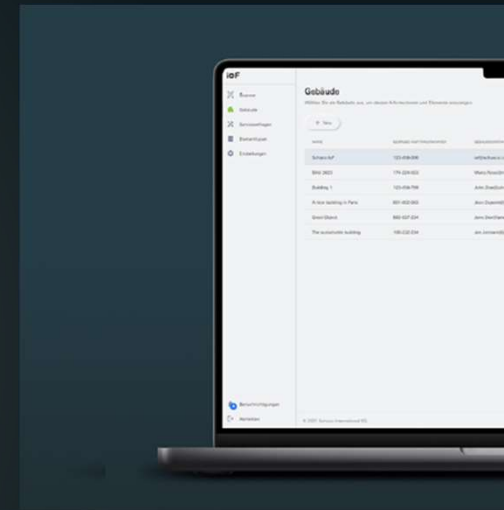
IoF ID

Affixed to every Schüco unit and connects the unit to the digital world



IoF App

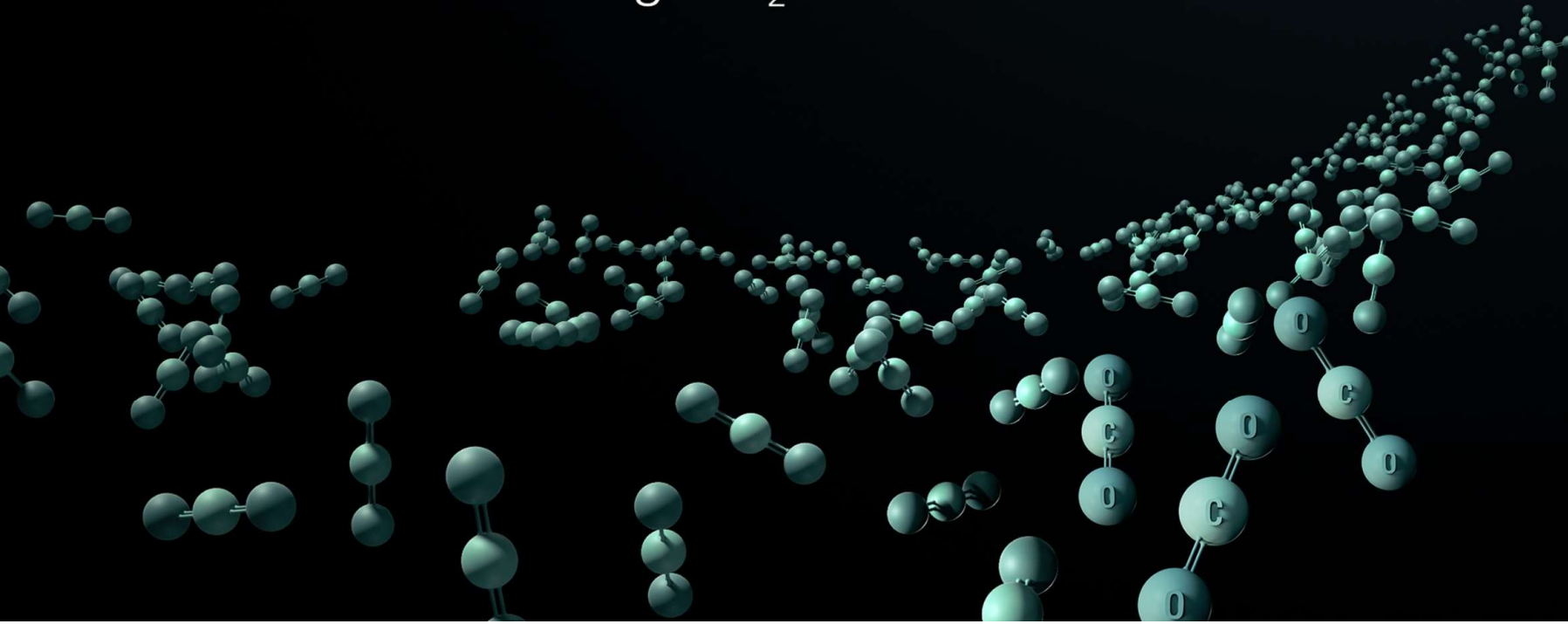
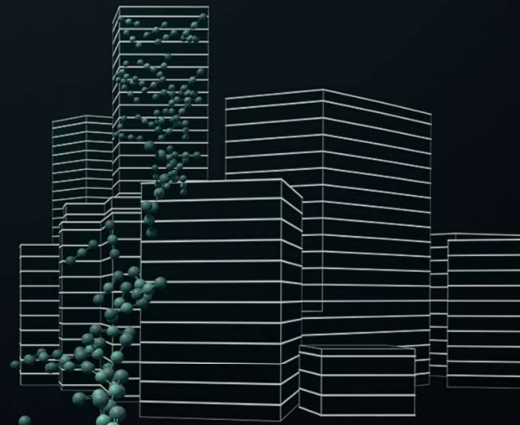
Enables all information to be read and used directly at an item



IoF Manager

Overview of all buildings, units, data, documents and services that are equipped with IoF

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THANK YOU!



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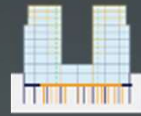
"The ability to identify the eventual CO₂ value specific to the profile in the calculation software and to try out different material options is truly unique."



The design stage presents an early opportunity to significantly influence the carbon footprint of a building - for both new construction and renovation projects:

In short:

"Architects and specifiers can use the design of a building to significantly influence the carbon footprint of a building. Our solutions for the form factor, unit sizes, circular economy and material selection provide the scope for carbon-cutting designs."



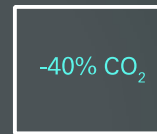
2.5



1.5

Factor 1: System choice and form factor

The shape of a building (form factor) and the choice of a suitable system play an important role in the embodied carbon and operational carbon. The smaller the form factor, the better.



-40% CO₂

Factor 2: Unit sizes

Through appropriate planning, the material requirements for aluminium profiles and components in larger façade units can be actively reduced.



Factor 3: Circular economy

The use of C2C or VinylPlus-certified systems ensures that the used materials will be fed back into the raw material cycle in the future.



Factor 4: Material and surface finish

The surface finish influences the CO₂ value of the façade. Anodised coatings have a significantly higher carbon footprint than powder coatings (ten times higher). LC and ULC materials reduce the GWP value.



By incorporating smart solutions from the outset, buildings can be planned so that they are run sustainably in the long term and cut carbon:

In short:

"Using efficient operational blueprints, architects and specifiers can actively influence the carbon footprint of the building. This includes photovoltaics integrated into the building and efficient maintenance plans thanks to loF ID, in addition to systems for automated building control."



Factor 1:
Energy-efficient systems

Energy-efficient thanks to automated building control (e.g. night-time cooling, heat-recovering ventilation systems) and highly thermally insulated building envelope units.



Factor 2:
Energie generation

Energy generated using photovoltaics integrated into the building.



Factor 3:
Maintenance and product upgrades

Efficient maintenance and product upgrades thanks to loF ID (Internet of Façades).



EPDs for certification

Even in the planning process, participants in the construction process will be able to take advantage of the newly added quick-access carbon footprint function in SchüCal, which will allow them to display all data for the environmental building assessment and building certifications in the form of an EPD.

The fabricator can find out the component-specific CO₂e contribution to the building at any time and share it with specifiers, building certification bodies and investors in the form of an EPD. The GWP value (Global Warming Potential = CO₂e value) of the structure and material selection can be viewed and optimised in real time in SchüCal.

In short:

"SchüCal now offers a quick-access carbon footprint function – this allows the fabricator to actively assist specifiers, building certification bodies or investors in the planning process by giving them a component-by-component CO₂e contribution in the form of an EPD."



EPDs for the path to zero-emissions buildings

The EU calls for carbon-neutral and -optimized buildings to reduce greenhouse gas emissions in the EU by 55% by 2030 and to be climate neutral by 2050. From 1 January 2027 Member States will have to ensure that the 'Life Cycle Global Warming Potential' is disclosed as a GWP value in the building's energy performance certificate. EPDs are required for the calculation..



Build to Decarb



We are enabling our customers to actively manage the carbon footprint of the planned building during its construction and to comply with the regulations.



CO₂-reduced materials for all systems

By choosing the right material, the fabricator can actively influence the built-in emissions. In addition to VinylPlus-certified PVC-U units and standard aluminium, Schüco offers two new grades of aluminium, which means that profiles with a particularly low CO₂ value can be offered and calculated in SchüCal, depending on the project specification. This is all possible thanks to the use of recycled materials as a raw material and green electricity in the production of the aluminium.

Basis for a transparent GWP value

The GWP (Global Warming Potential = CO₂e value) of the installed product is relevant to the calculation of the CO₂e footprint of a building. Schüco values transparency and identifies the CO₂e footprint for the actual planned profile. This is because the extrusion of aluminium billets increases the GWP value of the profile by up to approx. 30%. Therefore, GWP values indicated for the billet only are inaccurate.



ULC – Schüco Ultra Low Carbon Aluminium

Ultra-low-carbon aluminium profiles will have a GWP value of below 2.7 kg of CO₂e per kilogram of aluminium for the year 2023. In subsequent years, the carbon footprint for ULC will keep falling.



LC – Schüco Low Carbon Aluminium

Low-carbon aluminium profiles will have a GWP value of below 4.9 kg of CO₂e per kilogram of aluminium for the year 2023. In subsequent years, the carbon footprint for LC will keep falling.



VinylPlus®

PVC-U units and components (bars, isolators, gaskets, etc.) made of recycled material can already be purchased with the approved VinylPlus® product label.



Combined for greater CO₂ efficiency

The combination of different functional units or materials may be particularly CO₂-efficient as an all-in-one solution. This means that, for example, an aluminium add-on construction with long-lasting weather resistance can be combined with a timber structure (renewable raw material), or a unitised façade can be combined with a green façade system. The plants reduce energy consumption on the inside thanks to natural cooling and sequester additional CO₂ on the outside.



In short:

"Using our hybrid systems, we are combining the best properties of different materials to produce solutions that reduce the CO₂ value even further."



From manufacture to use on the building site

We have rigorously optimised the packaging of our products with a view to cutting down on CO₂.

In short:

"It is not just about the construction materials – our sustainable packaging is also allowing us to make a positive contribution to reducing the CO₂ value."



Cardboard packaging

Packagings can be recycled free of charge by Schüco customers via Zentek.



Films

The polythene bags that Schüco provides already consist of up to 80% post-consumer recycled material (PE). This is just one of many examples of how we are making our packaging more sustainable.



Reusable containers

The reusable packaging is more complex from a logistical point of view and is being tested on high-volume products with certain customers with a view to an optimised roll-out.

CARBON CONTROL



Operate to Decarb

We are enabling our customers to run their buildings in a way that is highly efficient and minimises their CO₂ emissions and to protect the value of their building through simple maintenance.



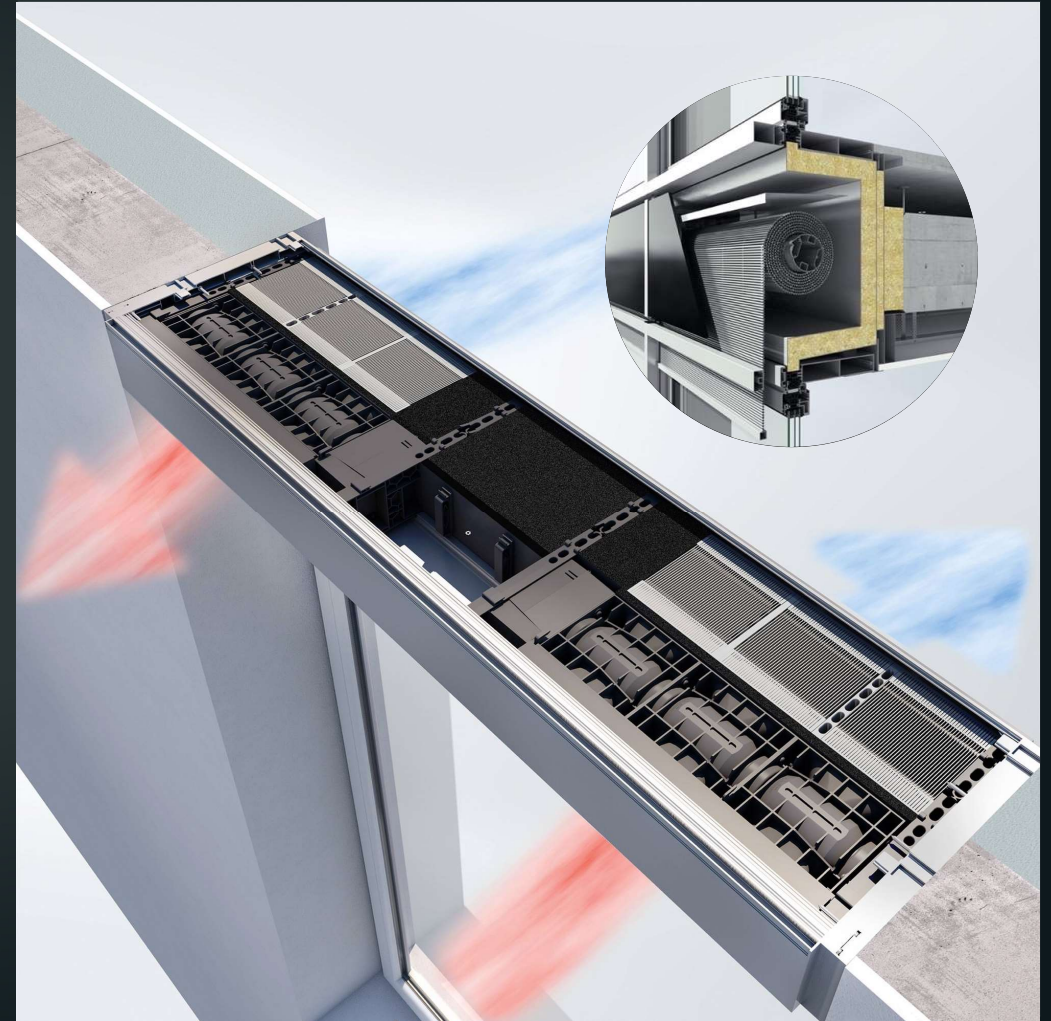
Less energy means less CO₂

Running a building highly efficiently is a key factor in minimising CO₂ emissions and therefore in its cost-effectiveness. CO₂ emissions have been taxed since 2021 and will be used in the assessment of buildings through their energy certificates in the future.

Solutions for smart building control, automatic night-time cooling, resource-conserving heat recovery, effective sun shading or efficient thermal insulation help users and investors to actively control the amount of operational carbon.

In short:

"Less energy and therefore less CO₂ is good not only for the environment but also has a positive impact on the cost-effectiveness of a building. This is why our range has always included the most efficient solutions for our customers and partners."





A building that produces its own energy reduces CO₂ emissions attributed to its operation.

Photovoltaics integrated into the building are an efficient solution for future-proofed properties that pays off for investors, owners and the environment.

With regard to the energy certificate, the electricity generated in the modules may be subtracted from the calculated power consumption within the context of the German energy-saving regulations (EnEV), which results in a primary energy consumption that is as low as possible.

In short:

"The use of BIPV modules is a cornerstone of low-energy, zero-energy or positive-energy buildings."





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Digitized back to the material future

When a building is demolished, IoF IDs allow units to be reused in the best way possible.

This is facilitated by data stored in the cloud via IoF, including the Cradle to Cradle and VinylPlus certifications, which encourage the re-use of all the materials consumed.

This avoids waste and allows materials to be separated, sorted and re-used as a raw material.



In short:

"IoF gets the best out of the individual units, even at the end of their life cycle, not only for the benefit of the material cycle and therefore the environment, but also to boost profitability: the building is a raw material deposit."



Creating a closed PVC-U material cycle

Looking to make new products from recycled material without any notable loss of material?

We set up Re:Core for this very purpose. Its purpose is to collect raw materials worldwide, allowing us to significantly reduce damage to the climate and the environment from the extraction of primary resources.

Our aim is to create our own closed PVC-U material cycle and to offer Schüco partner companies an exclusive recycling service for profile offcuts from window fabrication, as well as old windows.

In short:

"Cutting down on CO₂ starts with reusing what is already there, which is why we are collecting existing materials and using them as a raw material for our new products, without any notable loss of quality."

