ENVIRONMENTAL ADVANTAGES OF CELLULOSE

A SAMPLE CALCULATION

ISOCELL

BASICS OF GREENHOUSE EMISSIONS

GWP (GLOBAL WARMING POTENTIAL)

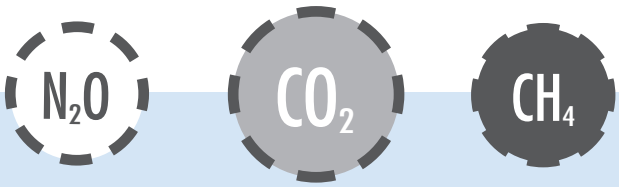
The emission of gases relevant to the climate intensifies the so-called greenhouse effect. This effect is responsible for heat radiation emitted by the earth, not immediately being radiated into space, but that gases in the atmosphere are reflected back to the earth. Depending on the gas this reflection behaviour varies greatly in certain frequency ranges of radiation.

For the purpose of compiling the impact of the gases, the so-called GWP factor (global warming potential) was identified for every gas. This enables the equivalent representation of the sum of greenhouse gas emissions in kilograms of CO_2. If more greenhouse gas emitted into the atmosphere than is immediately bonded, the greenhouse gas effect is intensified and global warming increases.

Every construction project requires varying amounts of energy in production. If thermal processes are needed, as for example, for glass wool, the energy requirement rises rapidly and is met by fossil fuel due to the necessary temperature conditions. As soon as the energy used does not come from renewable sources, climate-relevant emissions arise. Consequently, different quantities of greenhouse gas are emitted in the production of each construction product. For example, for the production of cellulose no energy-intensive processes are required in principle. The resulting energy requirement, as for example, operation of the mill, is met 100 % from renewable sources.

In an Environmental Product Declaration based on international standards the various life cycle phases of a product have been examined. Besides the energy requirement for production of a product, the GWP (global warming potential) is identified. Taken into consideration is usually the production phase from A1-A3, which takes into account the supply of raw materials, the production and the transport of a product.

VARIOUS GASES – VARYING CLIMATE EFFECTIVENESS:



These are always converted with the appropriate GWP factor to CO_2 equivalents (kg CO_2 eq.)

→ Example: CH_4 (methane) → GWP Faktor of 22*
→ Emission 1 kg methane = 22 kg CO_2 eq.

GWP of a product = sum of the emissions of individual gases, measured by means of the corresponding GWP factor

*United Nations Climate Change (06 2022 – https://unfccc.int)

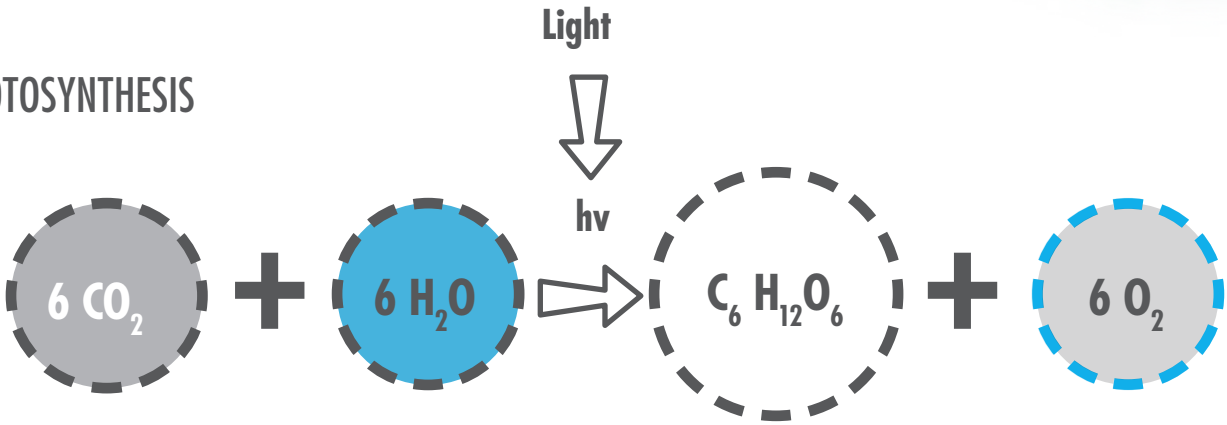
NEGATIVE GWP?

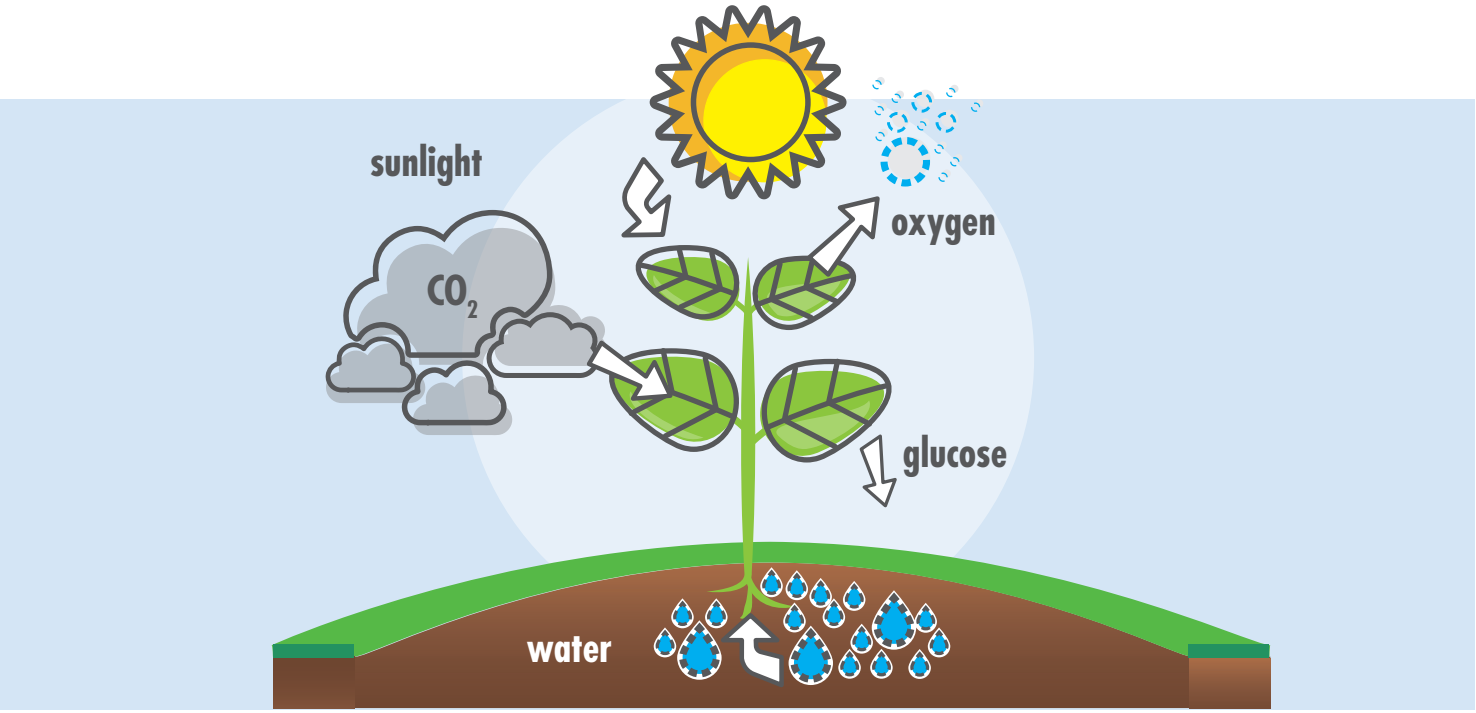
Compared with non-organic products, organic products retain carbon. This carbon was taken from the air in biomass production (photosynthesis).

For this reason it may be, in the case of organic products, that the product itself stores more carbon than was emitted during production in the form of CO_2. In this case the result is a negative GWP.

If this product is installed into a construction, the original CO_2 from the air is absorbed in this and the house becomes a CO_2 storage.

PHOTOSYNTHESIS





CALCULATION EXAMPLE

INSULATION OF A NEWLY BUILT SINGLE-FAMILY HOUSE

COMPARISON OF INSULATION MATERIAL, using the example of a new single-family house

CELLULOSE:			
Area insulated	**300**	**m²**	
Insulation thickness	**0,24**	**m**	
Proportion of insulation	**90**	**%**	
Volume insulated	64,8	m^3	
Density	**55**	**kg/m³**	
Cellulose installed	3564	kg	
GWP	-1,27	kg CO_2 eq/kg	EPD ISOCELL

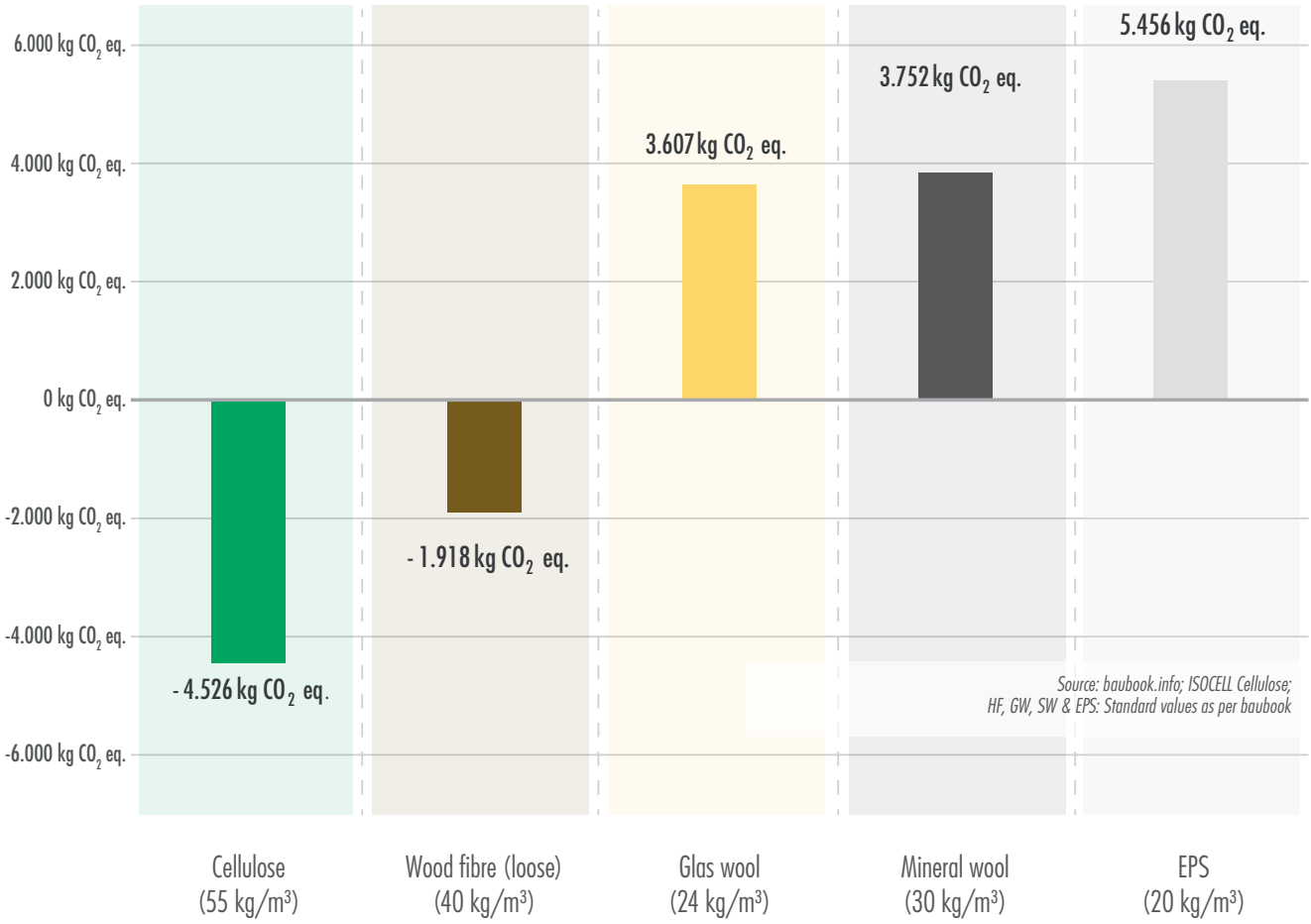
COMPARED WITH PRODUCT*:

GLASS WOOL			
Density	24	kg/m³	
GWP	2,45	kg CO_2 eq/kg	baubook: glass wool 036 guideline value
MINERAL WOOL			
Density	30	kg/m³	
GWP	1,93	kg CO_2 eq/kg	baubook: mineral wool 040 guideline value
EPS „Styrofoam“			
Density	20	kg/m³	
GWP	4,21	kg CO_2 eq/kg	baubook: EPS 040 guideline value
WOOD FIBRE loose			
Density	40	kg/m³	
GWP	-0,74	kg CO_2 eq/kg	baubook: wood fibre loose 038 guideline value

*different insulation values were considered in the insulation thickness.

CO_2 – BALANCE OF INSULATION OF A SINGLE-FAMILY HOUSE

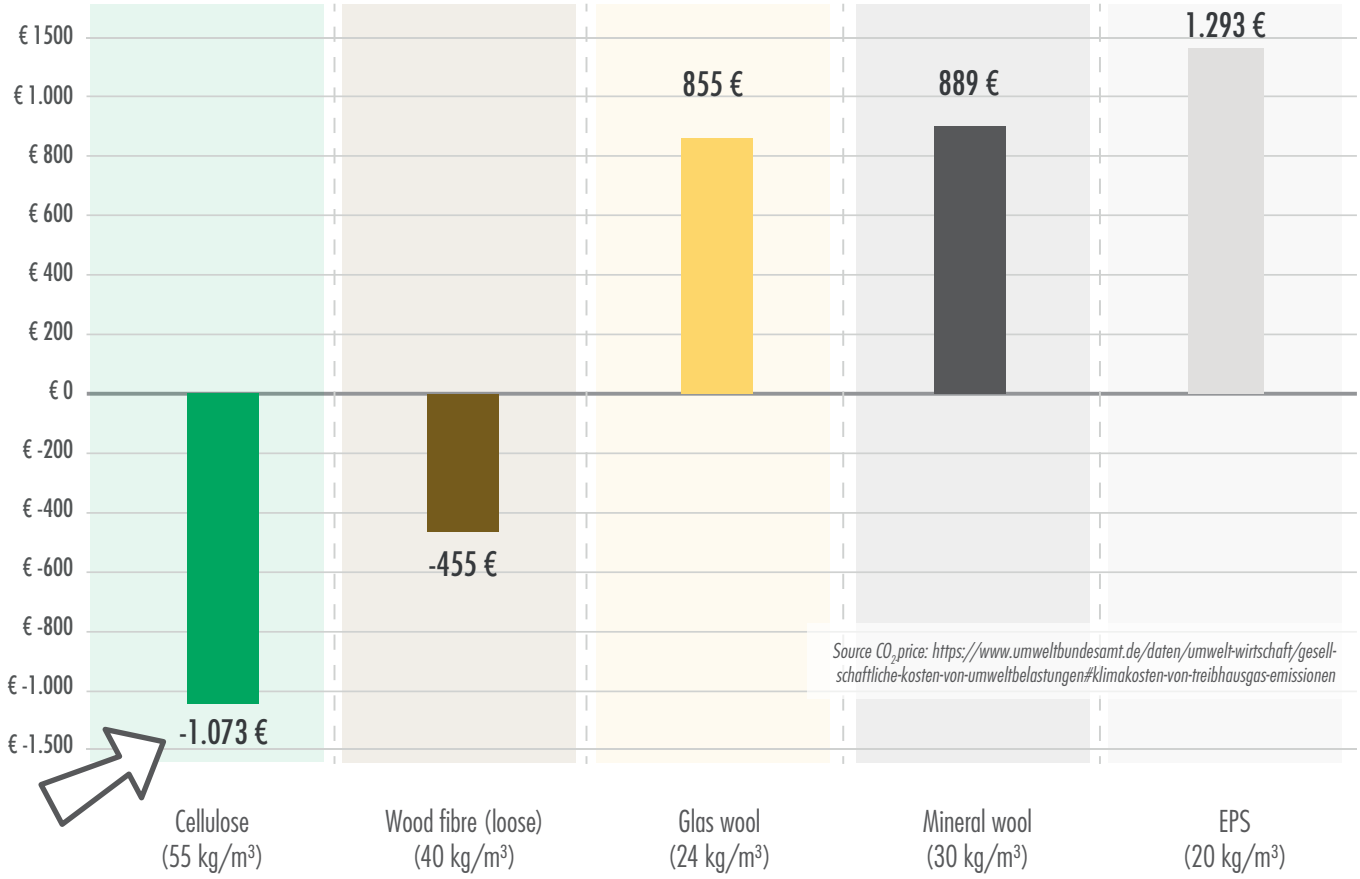
INSULATION VOLUME 65 m³



CLIMATE CHANGE COSTS FOR INSULATION

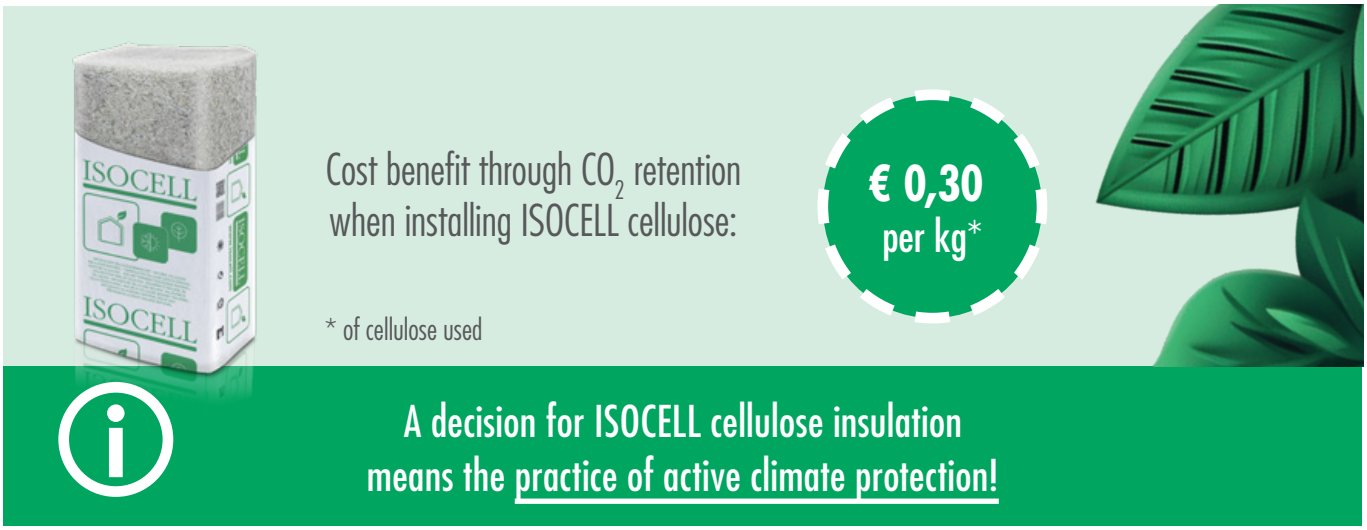
OF A SINGLE-FAMILY HOUSE

Insulation volume 65m³
Costs according to UBA Germany € 237/t CO_2 eq.



Source CO_2 price: https://www.umweltbundesamt.de/daten/umwelt-wirtschaft/gesellschaftliche-kosten-von-umweltbelastungen#klimakosten-von-treibhausgas-emissionen

SPECIFIC 'CLIMATE BONUS'



By using cellulose the resulting cost of climate impact can be avoided. At the same time, with every kilogram of cellulose used the emission of CO_2 is compensated to the extent of 1,27 kgkg, whereby a specific 'climate bonus' arises. No provision is (yet) generally made for the compensation of this bonus in the taxation system, depending on nation, (with the exception of country-specific aid for ecological construction), which is the reason why in this case only an indirect financial effect can be referred to. The costs are carried at the moment by the general public in the form of taxation.

CONSTRUCTION TECHNOLOGY HOTLINE: +43 6216 4108-0

CONTACT PERSONS

JOSEF PUTZHAMMER
Dipl.-Ing. (FH)
Construction technology
Tel. 43 6216 4108-616
josef.putzhammer@isocell.at

CHRISTIAN NÖHAMMER
Dipl.-Ing. (FH)
Construction technology
Tel. +43 6216 4108-622
christian.noehammer@isocell.at

MARTIN SCHABER
Mag. BSc
Construction technology
Tel. +43 6216 4108-42
martin.schaber@isocell.at

MORITZ STIEGLER
M.Eng.
Construction technology
Tel. +43 6216 4108-631
moritz.stiegler@isocell.at

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YOUR DEALER:

ISOCELL GmbH & Co KG
Gewerbestraße 9
5202 NEUMARKT AM WALLERSEE | Österreich
Tel.: +43 6216 4108
office@isocell.at

ISOCELL SCHWEIZ AG
Herbergstrasse 29
9524 ZUZWIL | Suisse /Schweiz
Tel.: +41 71 940 06 72
office@isocell.ch

ISOCELL FRANCE
170 Rue Jean Monnet | ZAC de Prat Pip Sud
29490 GUIPAVAS | France
Tél.: +33 2 98 42 11 00
contact@isocell-france.fr

ISOCELL BUREEL BELGIË
Außenborner Weg 1 | Schoppen
4770 AMEL | Belgique
Tel.: +32 80 39 90 58
office@isocell.be

ISOCELL Sverige AB
Torshamnsgatan 35
164 40 KISTA | Sverige
Tel.: +46 10 130 25 00
info@isocell.se

WWW.ISOCELL.COM