

# THERMAL MODERNIZATION of industrial facilities



Solutions aimed at improving  
energy efficiency

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 **ALUCO**











# Improving energy efficiency

In order to reduce energy consumption for heating and cooling a building, improving thermal insulation is considered as top priority

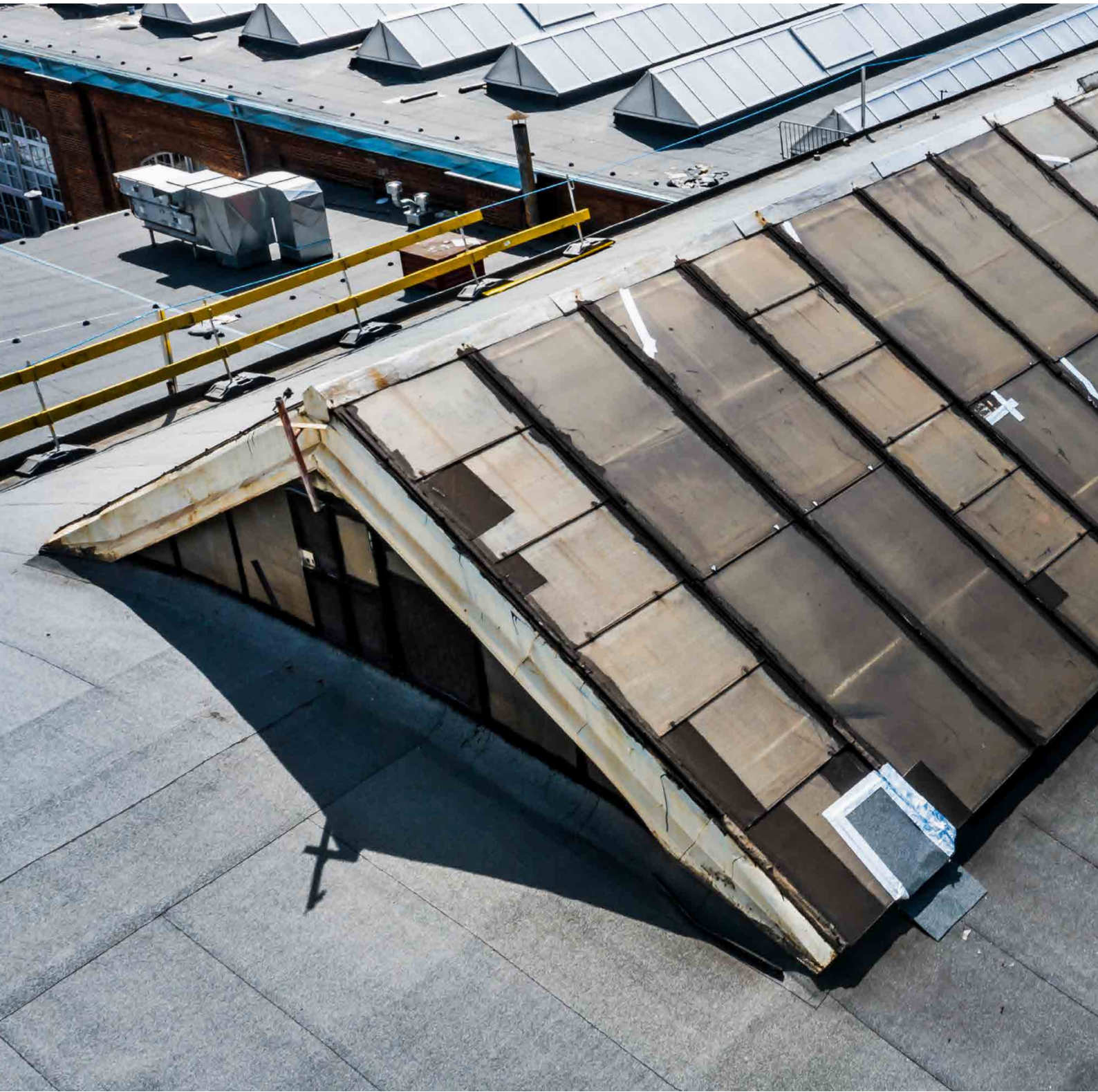
Scientists have carried out a lot of research to improve energy efficiency and develop energy-saving measures in buildings.

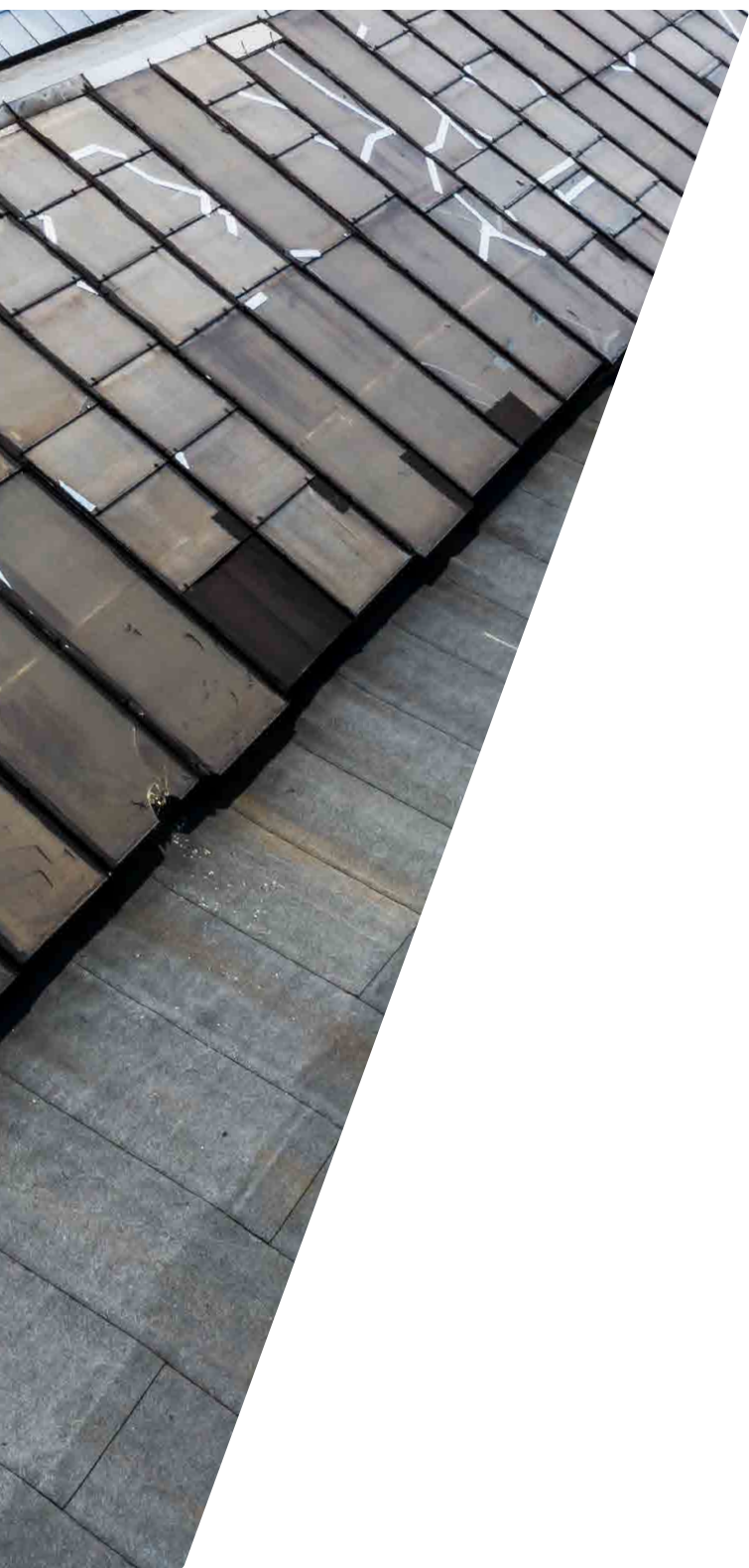
As efforts are being made to reduce greenhouse gas emissions, it is essential to find ways to reduce the energy consumption of buildings.

Generally, most of the energy in a residential building is used for heating and cooling in order to maintain thermal comfort. Therefore, it is necessary to reduce the energy demand for heating and cooling in buildings, so that the total energy consumption can be reduced.

To do this, improvement of the building envelope is considered first. In general, advanced materials such as phase change materials, vacuum insulation panels as well as various types of joinery are used to enhance the thermal resistance of building partitions. In addition, the use of shading devices and improving airtightness can also be effective strategies for reducing heating or cooling costs in buildings.







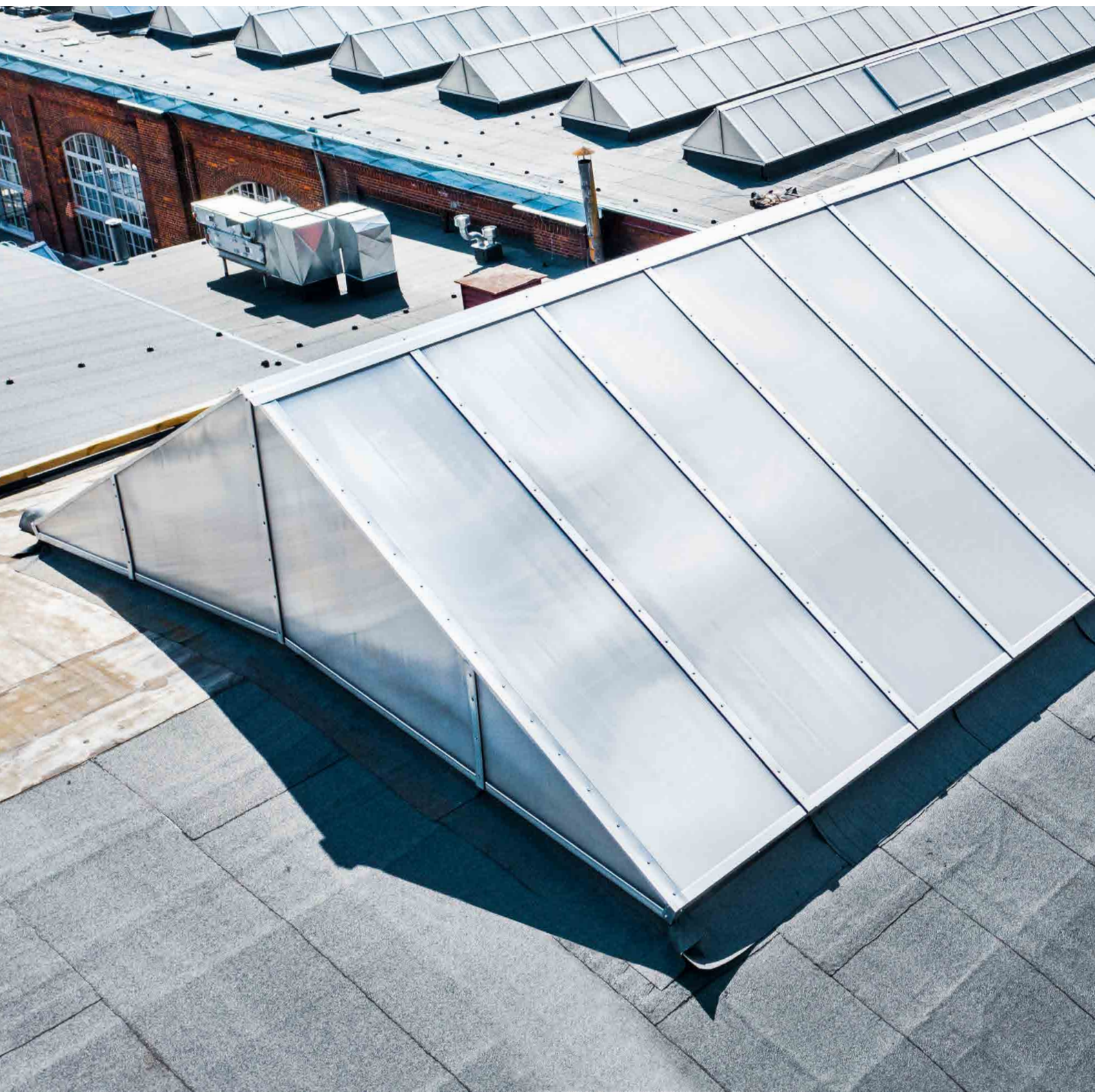
# Problem analysis

The thermal insulation of the building is practically non-existent or insufficient, and the heating systems are outdated

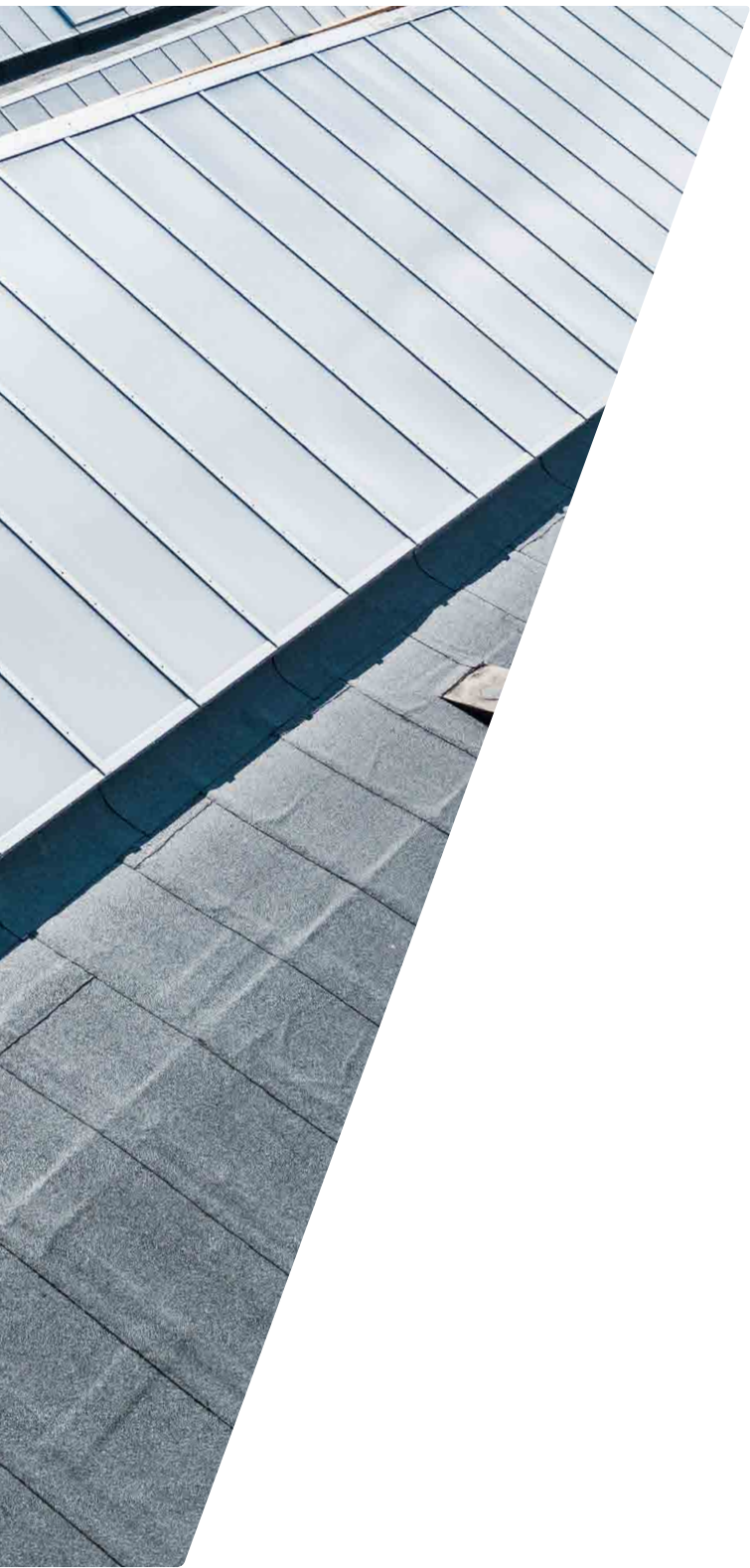
Most Poles work in insufficiently insulated and lit buildings. About 70% of industrial buildings are affected. The thermal insulation of the building is practically non-existent or insufficient, heating systems are outdated, and daylight is not supplied to the workplaces or is inadequate.

Among the components of the building envelope, window systems are the main contributor to heat loss, and their energy performance essentially depends on the thermal properties of glazing and frames. In addition, the use of shading devices reduces the energy demand to cool buildings, obviously only in the summer. However, this solution reduces the transmittance of visible solar radiation by 20% and forces the use of artificial lighting, which is associated with additional electricity consumption and limiting the comfort of using the rooms.









# Solution

Thermal modernization results in a reduction in energy demand thanks to thermal modernization of the facade, roof or joinery

Thermal modernization results in a reduction in energy demand thanks to improving thermal parameters of the facade, roof or joinery. A good solution in the case of joinery modernization is the use of skylights, which, apart from a good heat transfer coefficient, supply evenly diffused light to the interior of the buildings. A well-made thermal modernization with properly selected skylights increases the comfort of work while increasing the efficiency of employees. The frequency of absenteeism is also reduced, and the costs of improving the quality of the internal environment are even approx. 4 - 40 times lower than labor costs.



## ALUCO SYSTEM

*How can we help?*

We manufacture and supply highly insulating skylights and facades - lightweight, durable and economical solutions that improve the energy balance and increase production efficiency.

The change in the provisions of the resolution on technical conditions to be met by buildings and their location, forced a change in design and material solutions aimed at ensuring better thermal insulation of buildings. These changes will significantly contribute to increasing the

ALUCO SKYLIGHT THERM – the highest quality, efficiency and innovation in barrel vault and roof top skylights

comfort of users, reducing operating costs and the decreased pollution generated in the production of heating energy. For this reason, we have designed a modern ALUCO SKYLIGHT THERM system that meets the above-mentioned requirements.





## Skylights with excellent thermal insulation

The idea of this innovative solution is to eliminate thermal bridges in the connections of the infill in barrel vault and flat skylights. Their characteristic feature is the infill with elements made of transparent or partially transparent plastics. For most skylights, as well as in the case of ALUCO SKYLIGHT THERM, polycarbonate panels are the basic infill. The differences between individual panels may include their thickness and their internal structure. Optionally, chamber polycarbonate panels with aerogel infill, which have excellent thermal insulation properties. The structure of the skylights is made of system aluminum profiles with modern thermal spacers whose task is to eliminate thermal bridges which with the use of appropriate polycarbonate panels

and results in a very low heat transfer coefficient for the entire partition.

Innovative skylight systems increase the availability of natural light wherever productivity is of utmost importance.

The presence of daylight in the workplace creates a natural and pleasant atmosphere. This positive effect is primarily based on psychological factors.

Natural light not only provides a better working climate and the resulting increase in employee productivity, but also saves energy as it replaces artificial light.




**Aesthetic value of  
workmanship. High  
quality and durability**





## How much can you save?

In order to easily select skylights and determine the heat transfer coefficient, the Kielce University of Technology has developed a dedicated calculator. Correct determination of the heat transfer coefficient allows you to calculate the amount of saved energy.



Heat transfer coefficient U  
for ALUCO SKYLIGHT THERM SL

Kielce University of Technology  
Faculty of Environmental Engineering, Geomatics and Power Engineering  
Department of Building Physics and Renewable Energy

Dimensions of skylight

A=	3300	mm	max 6500 mm	U* = 0,497 W/m <sup>2</sup> K
B=	30000	mm		

Calculate

Filler of skylight

d=	2x25mm+LUMIRA	mm
U <sub>wypehienia</sub>	0,47	W/m <sup>2</sup> K

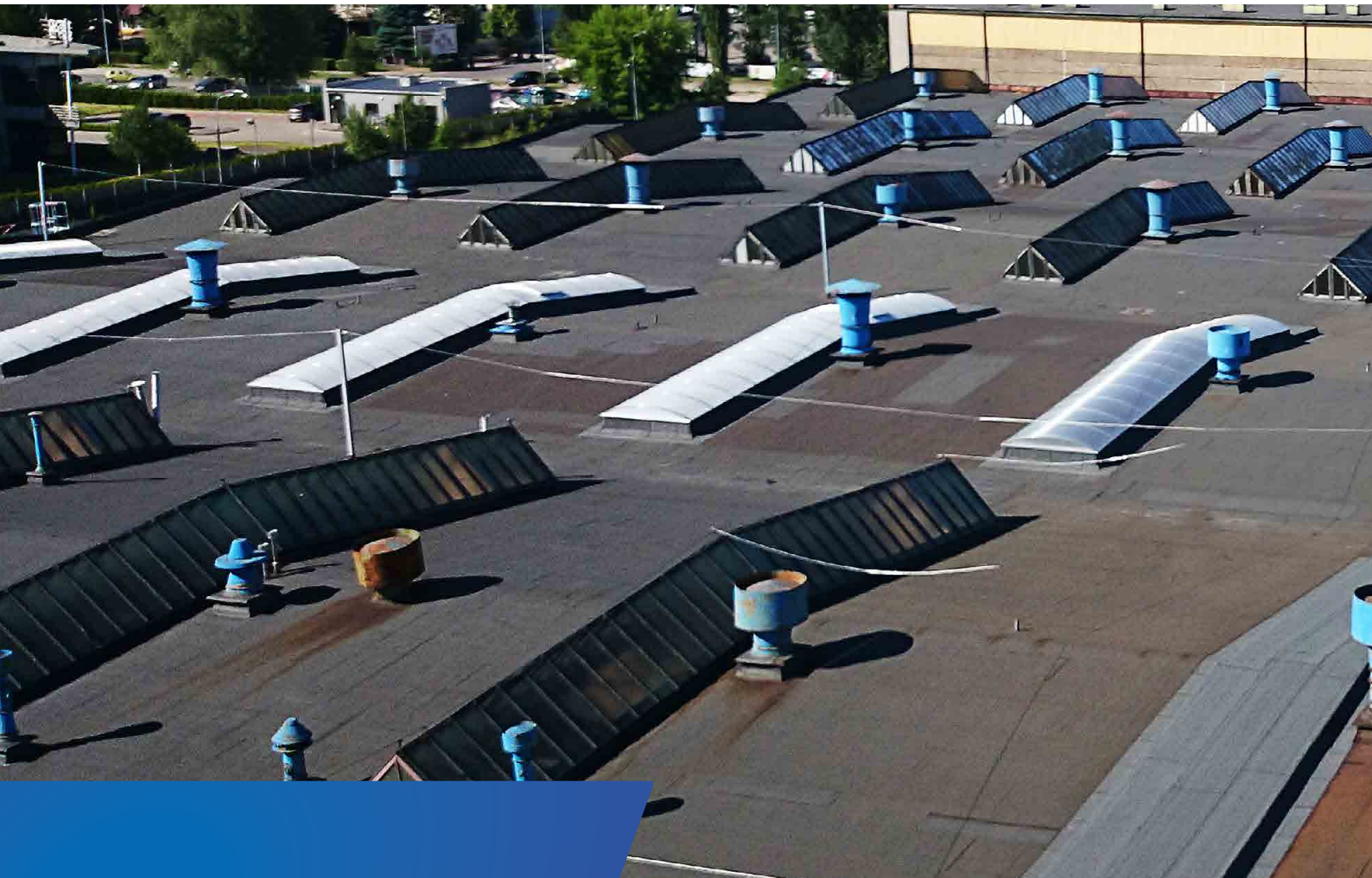
Mounting base

h=	500	mm
d <sub>ocieplenia</sub>	100	mm
d <sub>otuliny</sub>	0	mm

designation: A - width (max 6500 mm), [mm]  
 B - length  
 h - height of mounting base, [mm]  
 d<sub>isolation</sub> - thickness of isolation, [mm]  
 d<sub>lagging</sub> - thickness of lagging, [mm]  
 d - filler of skylight thickness, [mm]

\* - according to the PN EN 10077, PN EN 6946

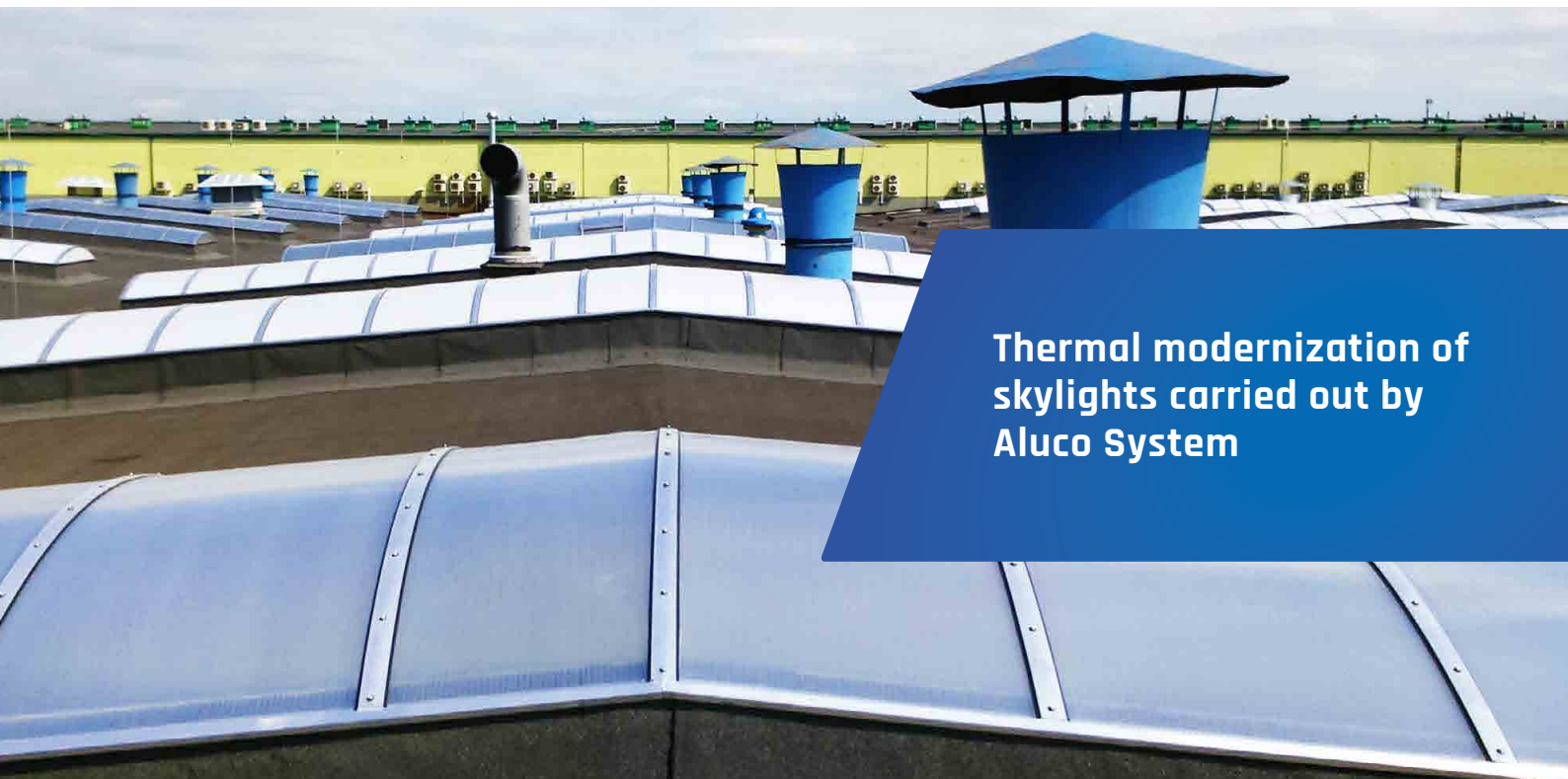
The calculation of the heat transfer coefficient in the calculator meets the requirements of the PN EN 10077 and PN EN 6946 standards. It takes into account the thermal properties of the frame and skylight infill, as well as linear thermal bridges. The user enters the dimensions of the skylight they plan to install and obtains the value of the heat transfer coefficient.



**Old type polygon skylights**







**Thermal modernization of skylights carried out by Aluco System**

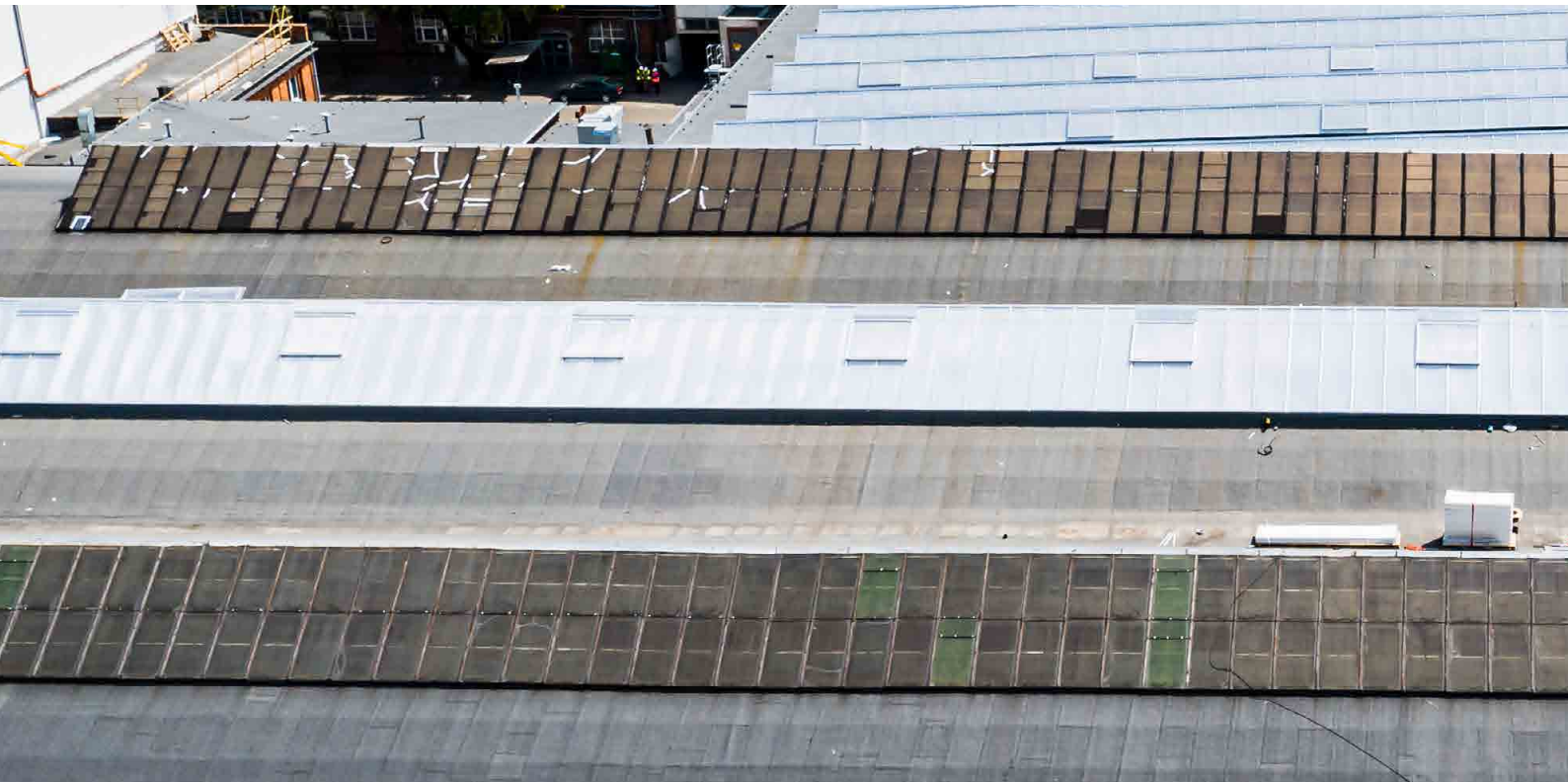




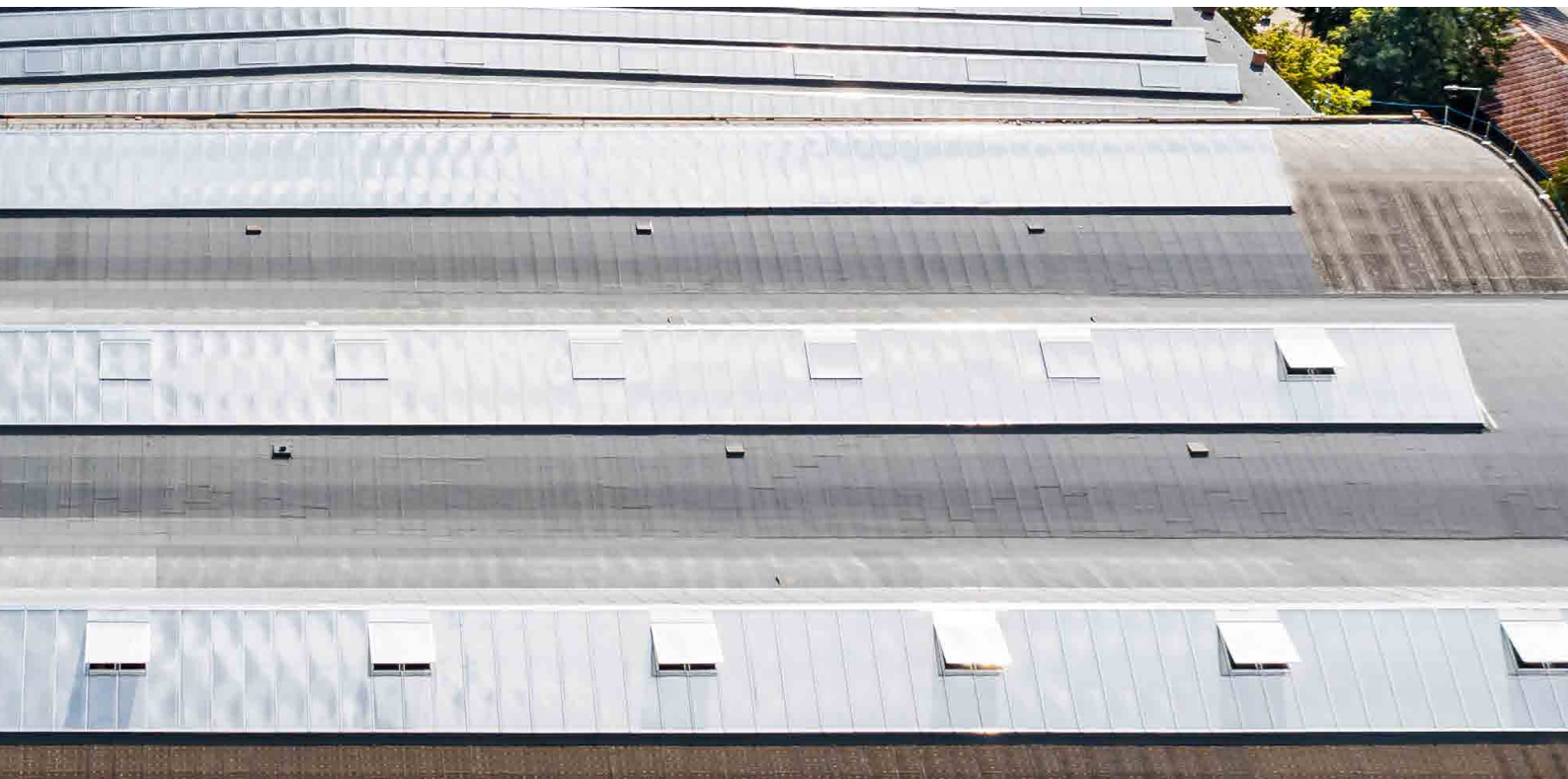
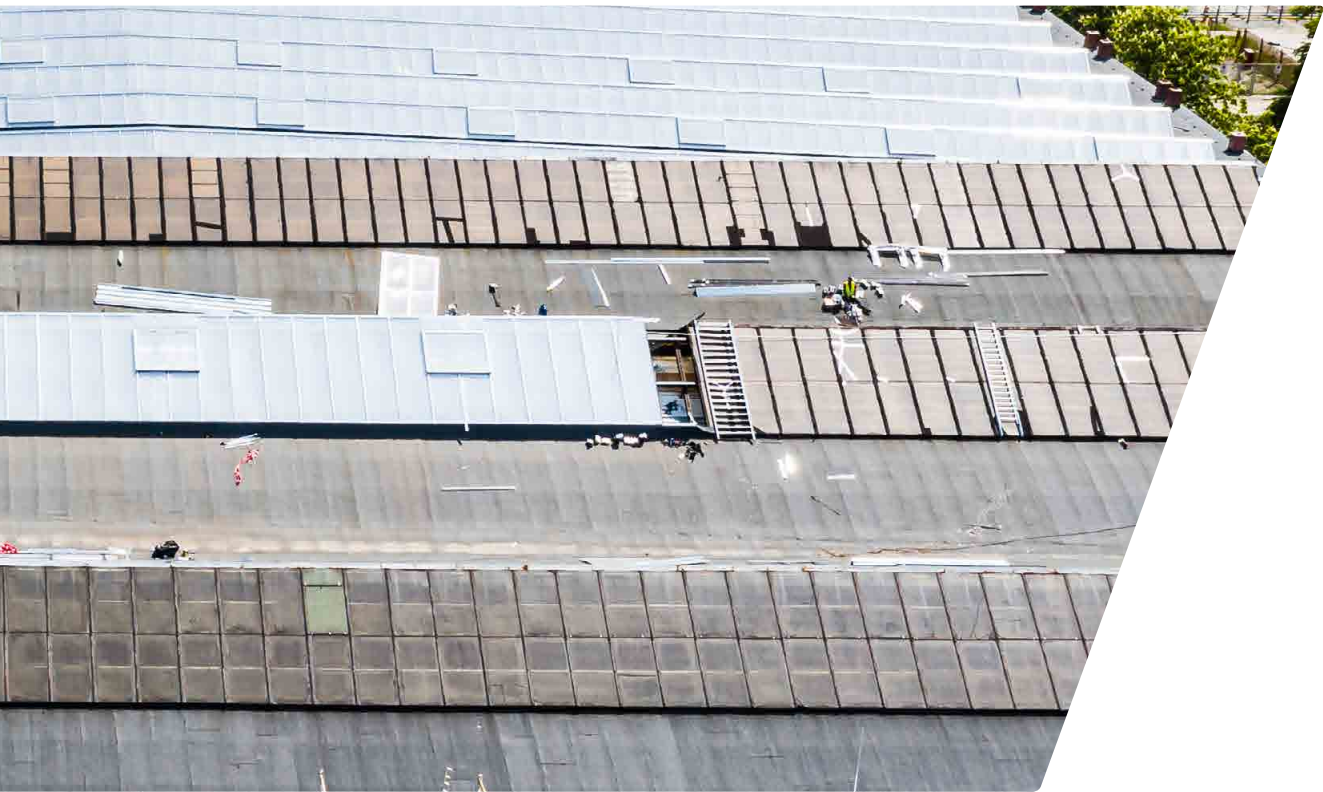




**ALUCO SKYLIGHT TR THERM**  
is an ideal solution for  
thermal modernization of  
historic industrial facilities



















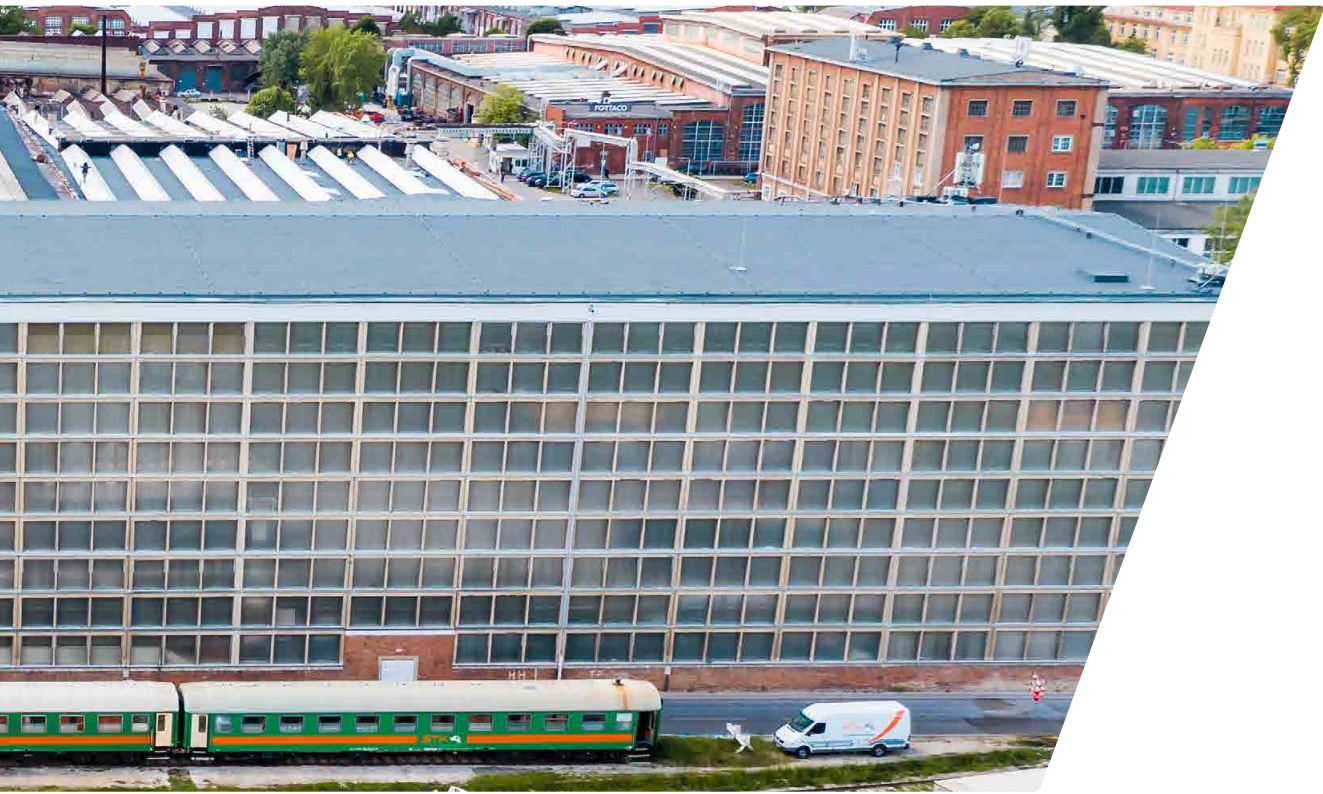




**The ALUCO PANEL polycarbonate facade is easy to install and maintain. Eliminates the problem of thermal bridges. Allows the installation of tilt windows.**















# About us

We help our customers  
take full advantage of  
natural light

At Aluco System, we have been helping our customers to make the most of the benefits of natural daylight for over 20 years.

Our company's product range includes:

- roof skylight systems,
- natural smoke exhaust systems,
- polycarbonate facades,
- aluminum joinery,
- industrial ventilation,
- Lumira aerogel,
- thermal modernization.

Our priorities are technological development, energy efficiency and top materials. Our solutions have been used in dozens of facilities throughout Poland, both in industrial buildings and architectural projects with a bold concept.

We perform orders all over the European Union and beyond.

**Selected customers:** Fiat Chrysler Automobiles, Skanska, Volkswagen, LOT, PKP CARGO, MAN, Eiffage, Budimex, Castorama, Cersanit, MediaMarkt, Rockwool, Echo Investment, Targi Kielce, DS Smith, Cerrad, Forte, Browary Tyskie.

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