



BEST PRACTICES for your house

Heat synergy - the benefits of combining solar thermal collectors and a condensing gas boiler

Investment in Patrycja's house

Under the technical supervision of Prof. Andrzej Szlęk, Ph.D. (Eng)

#SilesiaBlueSkyRestored



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ABOUT THE “SILESIA. BLUE SKY RESTORED” PROJECT

Starting from January 1st, 2022, the Silesian Voivodeship has been implementing a LIFE integrated project called “Silesia. Blue Sky Restored” whose main goal is smooth and effective implementation of the air protection programme for the Silesian Voivodeship and the anti-smog resolution.

The scope of the project covers the whole Silesian Voivodeship and all residents, engages 84 partners, including as many as 74 Silesian municipalities and cities. The total value of the project is € 16 515 020. The activities related to the project have already been recognised twice - the Silesian Voivodeship was awarded the title of the Energy Transformation Leader and won the 2022 WPROST Innovator Award.

The project includes both soft activities and investments, including the ones aimed at improving the energy efficiency of public buildings or increasing green areas by developing post-industrial areas.

ENVIRONMENTAL CONSULTANTS IN THE SILESIA. BLUE SKY RESTORED PROJECT

As part of the project, a group of 74 representatives of municipalities was created, the so-called environmental consultants, who work locally within a municipality. In the municipalities that do not have their own environmental consultant, residents are supervised by sub-regional environmental consultants. Their role is to provide consultancy services for residents and initiate and coordinate local activities aimed at improving air quality.

The scope of the environmental consultants’ activities is broad and includes:

- assistance in obtaining funding - they help residents receive funding for replacing the heating source and improving the energy efficiency of buildings,
- technical consultancy - they provide professional advice on the replacement of the heating source improvement of energy efficiency,
- education in society - they educate residents on the improvement of air quality,
- initiating eco-friendly activities - they initiate and coordinate local activities and investments aimed at improving air quality and reduction of greenhouse gas emissions,
- inspections and compliance with regulations - they actively participate in the inspections of furnaces for compliance with the anti-smog resolution and the prohibition of waste disposal by burning,
- supporting local administration - they assist in obtaining external financial support for municipalities within the scope of environmental activities.

The full list of environmental consultants can be found at:
przywracamylekit.slaskie.pl/ekodoradcy

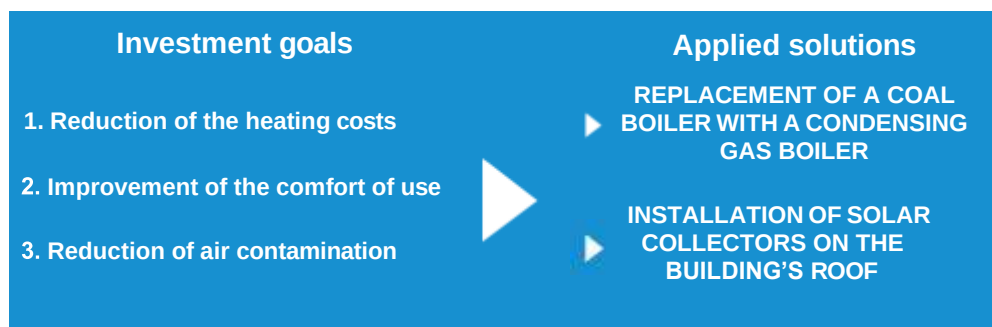
INVESTMENT IN PATRYCJA'S HOUSE

Patrycja lives in Wodzisław Śląski. The previous method for heating the house and utility water using a coal boiler generated significant costs encumbering the home budget. It was also very uncomfortable to use – it required manual coal loading, ash removal, and the coal ash penetrated into the adjacent rooms, making it harder to keep the house clean. Finally, the importance of air contamination in the process of coal burning could not be ignored, which motivated Patrycja, who is sensitive to the issues related to environmental protection, to consider the replacement of the heating source,



Technical conditions before the investment	
Building type	single-family detached house
Year built	1965
Usable floor area	270 m ²
Estimated annual building heating needs	± 54 000 kWh (180-220 kWh/m ² x 270 m ²)
Number of floors	3 (including the basement)
Basement	full, unheated basement
Exterior walls construction technology	masonry brick walls, uninsulated
Roof area	90 m ²
Roof construction	flat roof
Roofing material	concrete covered with tar paper
Roof insulation material	Styrofoam with tar paper 10 cm thick
Window technology	PVC single-chamber windows
Heating source prior to the investment	classless coal-fired boiler with the power of 24 kW
Room heating type	radiators
Utility water heating method prior to the investment	coal boiler
Number of residents	2
Average daily amount of utility water used	0.045 m ³ (45 litres) per person
Average air temperature in the building during winter	22-23 °C

The factors affecting a building's energy efficiency, heating costs and residents' comfort include heating needs. Heating needs include many variables and the most important ones are: heated area, thermal insulation (exterior walls and roof construction technology, including the type and thickness of the insulation material used), window and door area and their technology, condition of the heating equipment, air temperature, building ventilation type. In the case of older, uninsulated buildings, such as Patrycja's house, building's heating needs are estimated at 180-220 kWh/m².



Patrycja achieved the planned investment goals by installing a modern condensing gas boiler and solar collectors. Selection of the applied technological solutions included the availability of a gas installation in the house and was preceded with an assessment of the costs and possibility of achieving the planned investment goals.

Each technology selected by Patrycja has a particular use. The condensing gas boiler, as the basic heating source, is high-performance heating equipment ensuring heating comfort even on the coldest days. It is distinguished by its high efficiency thanks to adjusting to the current weather conditions. It is easy and safe to use and eco-friendly. The use of solar collectors is a great addition to the house's heating installation based on a condensing boiler. Their installation allows for production of fully eco-friendly heat necessary to heat up utility water, without contaminating the environment and can also support the central heating system in the house.

Learn more about the benefits of using this type of solution in your house.

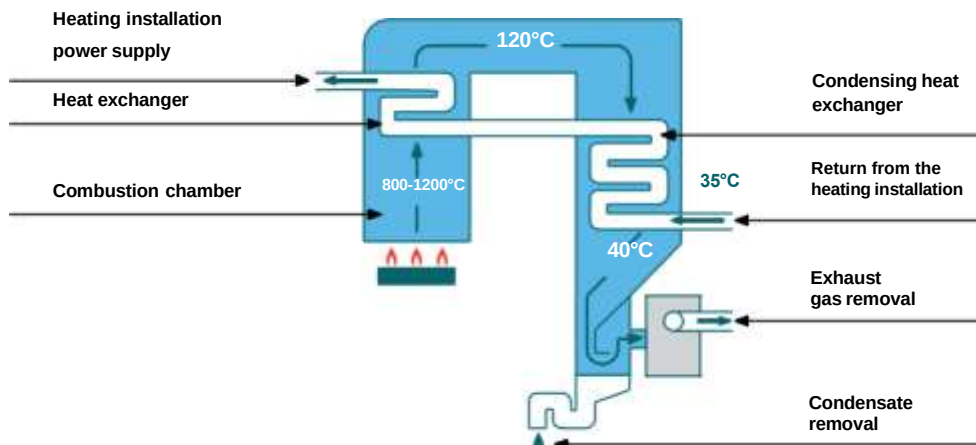
APPLIED SOLUTIONS

Condensing gas boilers

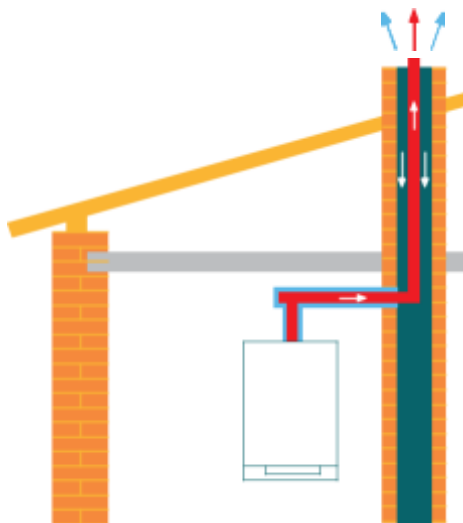
The heating equipment selected by Patrycja was a condensing gas boiler. Apart from their building heating function, such boilers can also be used to heat up warm utility water. Unlike traditional (non-condensing) boilers, condensing boilers take the heat from the steam in exhaust gas which in traditional boiler vanishes through the chimney. By recovering the heat from the steam coming from exhaust condensing gas boilers ensure higher performance (up to 109% compared to approx. 90-92% in the case traditional boilers), which in turn results in lower heating costs.

How does a condensing gas boiler work?

- The gas is burned in the combustion chamber generating hot exhaust gas, including steam.
- Efficient transfer of the heat produced by the flame is possible thanks to a heat exchanger in the gas boiler. The heat is exchanged between the exhaust gas and the water from the heating system. The hot exhaust gas produced in the boiler flame burner flows through the narrow gaps between metal tubes, on the coil pipe while heating the water inside.
- The exhaust gas is removed through the chimney. As a result of their cooling, the steam condenses forming liquid droplets which are then removed to the sewer system. In the case of the boilers with power exceeding 25 kW, the droplets must be neutralised due to their acidic reaction and only then they can be removed to the sewer system. For this purpose special neutralisers, the so-called condensate neutralisers, are used which turn the acidic droplets from the boiler into pH neutral water. Thanks to this device they can be safely restored to the environment.



A condensing boiler is a device with a closed combustion chamber which determines the method for supplying air to the boiler. In the case of a closed combustion chamber the boiler can collect air directly from the outside of the building, e.g. through a pipe going out through an exterior wall, from the chimney shaft. Usually, exhaust gas is led through a steel pipe placed centrally in a ceramic chimney, and the air flows through the ceramic space around the exhaust gas pipe.



If a house is heated with natural gas, intake ventilation in the boiler room in the form of a ventilation grille in an exterior wall of a building through which the air from the outside gets inside a room is not necessary. Thanks to that, **the room where the boiler is located is not cooled by the cool air flowing from the outside**, which is particularly important if the boiler is in the bathroom, for example. A boiler with a closed combustion chamber prevents the exhaust gas from getting into the room where it is located, which makes the device safe to use.



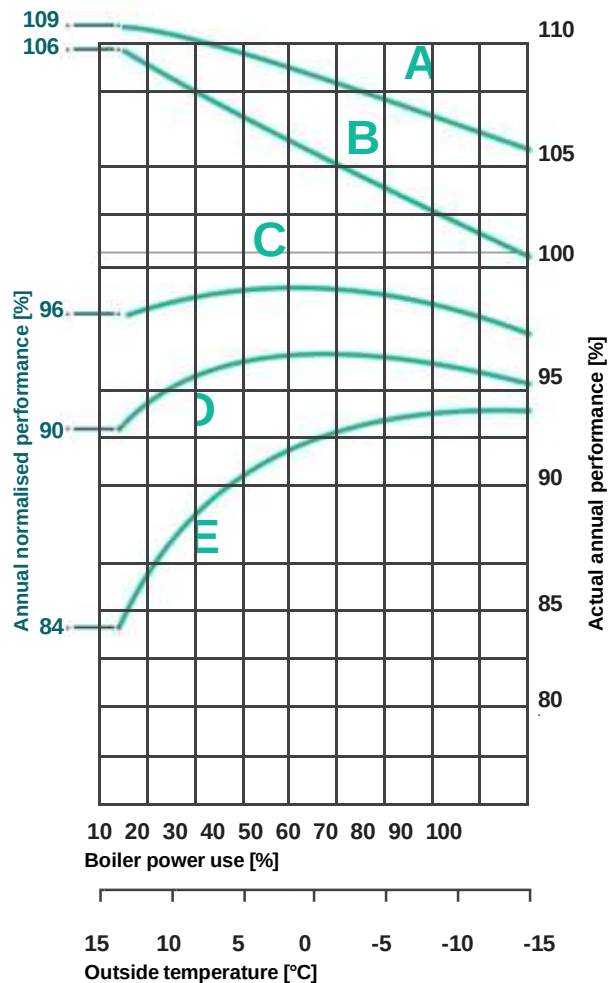
➤ This quality of a condensing boiler has another advantage, which is the **possibility to (subject to the requirements specified in the Ordinance of the Ministry of Economic Development and Technology of 27 March 2024 - Journal of Laws of 2024, item 474 - on the technical conditions that must be met by buildings and their location) install it in a room other than a boiler room** – e.g. in the bathroom or kitchen. Therefore it is not necessary to have a separate room in the house for a boiler room and if a condensing boiler replaces an outdated heating device used earlier in a boiler room, the old boiler room can be used for other purposes.

➤ Modern heating systems allow for **significant savings thanks to the optimisation of the supplied heat, enabled by advanced automation**. The optimal boiler performance ensuring appropriate heat comfort for household members is possible thanks to boiler control using a heating controller which monitors the weather outside the building and a room controller ensuring that the air temperature set by the user is maintained in the room.

➤ The exhaust gas in condensing boilers are cooled to such an extent that the steam in the exhaust gas is condensed. As a result more energy is obtained – the heat from steam condensation.

➤ Condensing boilers **are compatible with any type of heating system in the house**. The best effects of its performance are achieved with low-temperature heating (underfloor, wall heating).

➤ Condensing boiler performance is higher than the performance of traditional low- or fixed-temperature devices and can reach 109% (in relation to the fuel heating value) thanks to using the extra energy from condensation of the steam contained in exhaust gas, which is shown in the figure below.



A - a condensing gas boiler in an installation designed for heating water temperature of 40/30°C

B - a condensing gas boiler in an installation designed for heating water temperature of 75/60°C

C - a traditional (non-condensing) boiler without required minimum heating water temperature

D - a traditional boiler requiring maintenance of minimum heating water temperature of 40°C in the boiler

E - a heating boiler from 1974 - fixed high temperature of the boiler water 75°C

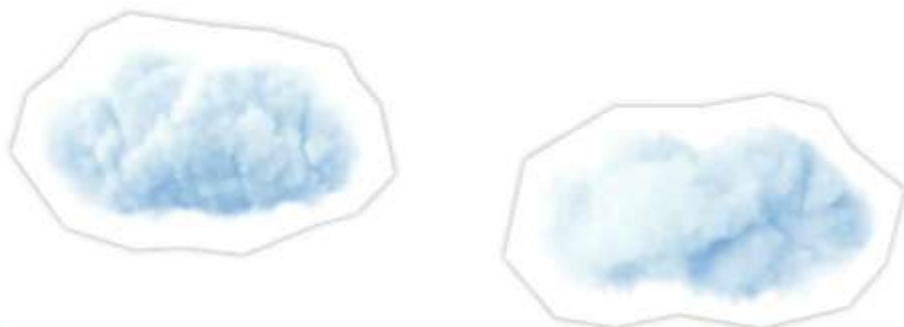


What to look for when choosing a condensing gas boiler

When choosing a boiler it is important to select its performance parameters, including the boiler power. Its power should correspond to the heating needs, including primarily the house area to be heated, heat comfort and the building's thermal insulation. It is worth taking into consideration the possibilities of supplying utility water, depending on the residents' habits, e.g. the ones related to using the bathroom.

When choosing a boiler, especially for a house with low heating needs, the scope of heating power modulation should be considered. It is the boiler's power range, in which it adjusts the amount of heat produced to the building's heating needs, depending on the outside temperature. The greater the heating power range, the better the boiler adjusts to the heating needs, the less frequently it turns off, and the less gas it uses.

In the context of the residents' comfort related to the boiler maintenance and the "cleanliness" of its performance, it is also worth mentioning the possibilities of instant supply of hot utility water, which is related to its circulation. In traditionally used solutions, pipes with hot and cold water run from boiler rooms to bathrooms and kitchens. If a tap with hot water is not tuned on for a long period, the water in the pipes will cool down. Depending on the distance from the boiler room to the place where the water is used, the wait time for hot water can be tens of seconds resulting in increased water use. The solution to this problem is the use of utility water circulation. The hot water circulation system requires installation of an additional circulation pipe with a small diameter (14-16 mm), connected to the most distant hot water intake points (taps). In the boiler room a pump is fixed to the pipe which turns on from time to time and forces the flow of hot water in the pipes. As a result, a steady supply of hot water to taps is ensured.



Selection of a specific type of boiler should consider its characteristics presented in the table below.

Boiler type	Characteristics:
Single-function gas boiler	• Water used in the central heating system and hot utility water is heated in one device. • It heats up water using the flow-through method (only when it is collected), making its activity related to the preparation of hot utility water more efficient • Heating utility water using the flow-through method, when large amounts of water are collected in a given moment, may result in insufficient water temperature. • The available amount of hot water depends on the boiler's heating power. • More expensive models with built-in hot water reservoir can ensure a shorter wait time for hot water after turning on a tap. • Smaller size as compared to a single-function boiler.
Dual-function gas boiler	• Heats up the water powering the heating system in a building, while utility water is heated in a separate storage heater attached to it, hanging next to a boiler or placed under it. • The available amount of hot water depends mainly on the capacity of the heater. • Uncollected hot water stored in the reservoir cools down, causing inactivity heat losses. • The cost of purchasing a system ensuring both functions (central heating and hot utility water), i.e. with a heater, is higher compared to a dual-function boiler. • Storage of hot utility water in a separate reservoir requires more space.



Benefits of using a condensing gas boiler

Operation specifics	Description	Benefits
High performance	A condensing boiler uses the heat from steam contained in exhaust gas which is not used in traditional (non-condensing) boilers and evaporates through the chimney.	Bigger fuel savings, lower heating bills, reduced environmental pollution.
Working based on a closed combustion chamber	By supplying the air from the outside of the building through an appropriate pipe, a condensing boiler is a device which is safe to use, as compared to heating devices operating based on an open combustion chamber. Closed combustion chamber eliminates the risk of exhaust gas outflow to rooms resulting from a reverse internal combustion assembly and exhaust gas sucking in from open furnaces (e.g. a fireplace).	Safe to use.
Possible installation in a room other than a boiler room	Unlike the heating devices that require dedicated rooms (boiler rooms), condensing boilers can be installed in any location (e.g. in the bathroom, closet, kitchen).	Possibility of using a boiler room for other purposes
Clean operation	The operation of a condensing boiler is not inconvenient for its surroundings, it does not create any ash, unlike coal burning process.	Comfort of use, reduced environmental pollution.
Optimisation of the supplied heat	Advanced automation regulating the boiler's mode allows for an adjustment to the actual thermal needs, which cannot be ensured by an old boiler without automation.	Bigger fuel savings, lower heating bills, reduced environmental pollution.
Particularly good compatibility with low-temperature heating	The best results of the boiler operation are achieved with low-temperature heating (underfloor, wall) heating, however, even with radiator heating using higher temperatures (60-75%), its performance is higher than that of traditional boilers.	Bigger fuel savings, lower heating bills, reduced environmental pollution

Solar collectors

Solar collectors are devices which convert solar energy into heat which is then used to heat utility water (hot utility water) in a house. Moreover, solar collectors can be used to support central heating system. The whole process is based on special panels usually placed on the roof of a building, but can be also installed on a wall or on the ground.

Solar collectors are often confused with photovoltaic panels, although they work completely differently. Solar collectors (commonly referred to as the “solar panels”) transport solar energy in the form of heat to heating systems. Photovoltaic panels in turn enable production of electricity which can be used for any purpose.

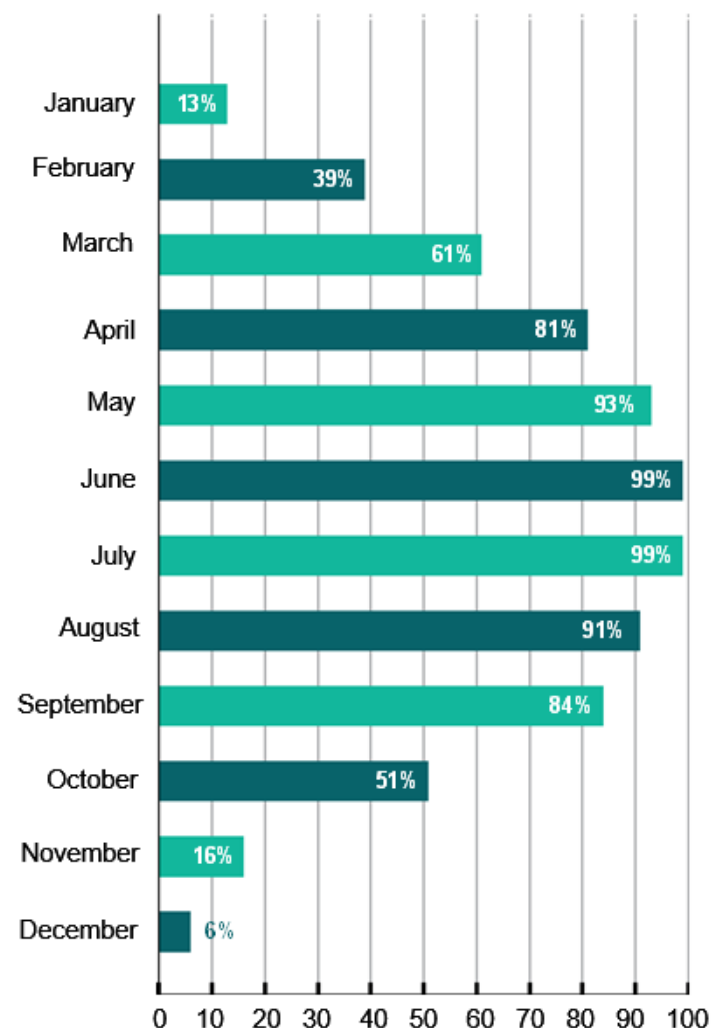
To ensure maximum efficiency of solar collectors it is very important to position them relative to the ground and the cardinal points. They must be installed in a well sunlit placed, preferably where sunrays are not blocked by barriers, such as chimneys, trees or other buildings.

The climate data on insolation in the latitude where the Silesian Voivodeship lies shows that most solar energy throughout the year falls on the surface tilted at a 30° angle to the south. However, selection of this tilt of collectors is not optimal. The most favourable tilt of a collector is at 40-45°, which supplies more energy in spring, summer and autumn.



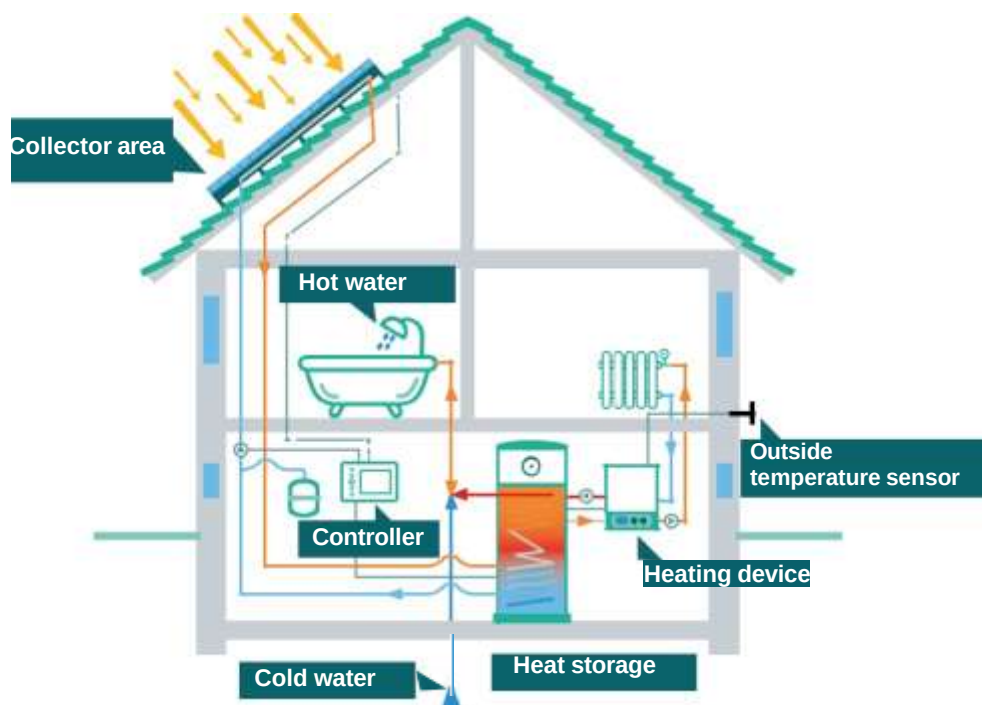
Proper positioning of the collectors allows for efficient conversion of solar energy to heat energy and can ensure fulfilment of up to 80-100% of a house's needs for hot water during the period of high insolation from April to September.

Estimated fulfilment of a building's hot water needs in individual months by solar collectors, selected to fulfil hot utility water needs in the months when insolation is the highest



How does a solar collector work?

- The collector panels feature the so-called absorber, a special element made from copper or aluminium, or – what has become a standard in the market – from their combination, i.e. an aluminium sheet and copper pipes. Its purpose is to absorb solar radiation.
- Solar radiation is converted into heat energy which is transferred to a fluid (propylene glycol) flowing through the system of pipes in the solar panels.
- The heated fluid circulating in the system flows through the coil pipe of the reservoir where heat is transferred to the utility water reservoir.
- By releasing heat, the fluid cools down and returns to the collector to start the process over.



What to look for when choosing solar collectors?

Out of the available technological solutions the following main types of solar collectors can be distinguished:

Vacuum collector



Flat-plate collector

The table below presents the benefits of specific types of solar collectors.

Collector type	Elements	Benefits
Flat-plate solar collectors (most frequently selected and the most common ones)	• Transparent cover made from glass or plastic that protects the inside of the collector from weather conditions. • Black absorber which absorbs solar energy and converts it into heat. • Pipes through which a transfer fluid (most frequently a combination of water and glycol) flows transporting heat to the reservoir with hot water.	• Simple construction and easy installation. • Low price compared to vacuum collectors • High efficiency, even with direct insolation.

Collector type	Elements	Benefits
Vacuum solar collectors	- Glass pipes with absorbers inside. - Vacuum between the glass layers which isolates heat and minimises energy loss. - Absorbers which gather solar energy and transfer it to the transfer fluid in the pipes.	- Higher efficiency compared to flat-plate collectors. - efficient, even at lower temperatures.

Benefits of using solar collectors

Operation specifics	Description	Benefits
Possibility to heat utility water and rooms.	Solar collectors are used mainly to heat warm utility water. During the period of high insolation, from April to September, they can ensure fulfilment of up to 80-100% of a house's needs for hot water. They can also be used to heat rooms, supplementing the main heat source.	Lower bills for heating.
Eco-friendly conversion of solar energy into heat	Solar collectors do not emit carbon dioxide or other harmful substances. This helps reduce greenhouse gas emissions and improves air quality.	Reduced environmental pollution.
Use of free solar energy	Solar energy is free and not dependent on the changes of fossil fuel prices.	Not dependent on fossil fuels.
Long lifespan and low maintenance costs	Longer lifespan compared to traditional heating systems.	Low operation costs.

Technical solutions used in Patrycja's house

Solar collectors

Patrycja decided to choose flat-plate solar collectors. On the roof of her house she has two solar collectors installed, directed towards the south, with the following parameters:



It is estimated that 1m² of a flat-plate collector can produce around 350-550 kWh annually, which in the case of Patrycja's installation means estimated annual energy gain (savings in the form of saved energy which should be used to heat up warm utility water) of approx. 1 660 kWh in total (approx. 450 kWh/1 m² x approx. 1,85 m² of active surface x 2 collectors). The purchased collectors come with a 10-year warranty.

Condensing gas boiler

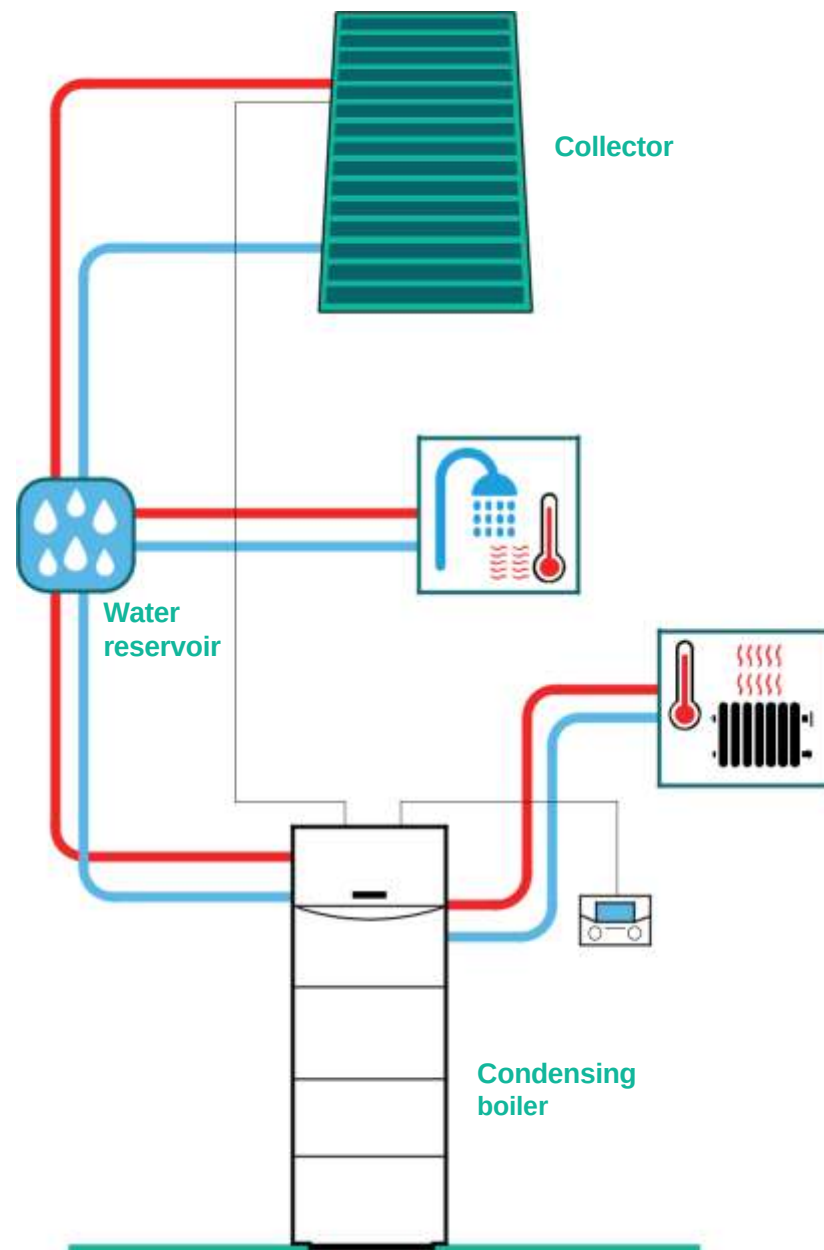
Patrycja installed a single-function condensing boiler in her house which works together with solar collectors. Its main purpose is to supply heat to central heating. The solar collectors were also connected to the hot water reservoir. Proper cooperation between the solar collectors and the gas boiler required installation of a hot utility water reservoir with two coil pipes. Moreover, the old 100-litre reservoir was replaced with a bigger one of 200 litres.

Patrycja's condensing gas boiler has the following technical parameters:

Device energy efficiency class	A
Rated output	23 kW
Seasonal energy efficiency of room heating	105%
Electricity consumption for own needs with full load	18 W
Electricity consumption for own needs with partial load	15 W
Nitric oxide emission	23 mg/kWh

How does combination of a condensing gas boiler and solar collectors work?

Integration of solar collectors and a condensing gas boiler in one heating system allows for optimisation of house and utility water heating. Patrycja can enjoy permanent access to hot utility water, mostly thanks to the solar collectors. And the house is heated mainly by a condensing gas boiler. If the solar collectors do not produce enough heat to heat up warm utility water, the condensing boiler turns on and heats up the water in the reservoir.



EXPERT'S VIEW: ON GREEN HOME TECHNOLOGIES

"A condensing boiler allows for the best use of natural gas energy that is possible at home. In the boiler exhaust gas is significantly cooled down, so not only the heat produced by the exhaust gas during cooling is transferred to the heating water, but also the heat produced by the steam during condensation. Exhaust gas from the boiler can be removed through the chimney in which combustion air flows around the exhaust gas pipe. This allows for continued heat exchange resulting in the exhaust gas undergoing further cooling, and the heat produced in this way is transferred to combustion air. However, it is important to remember that in order to achieve good exhaust gas cooling the water returning from the house heating installation must be adequately cool. Particularly good conditions are present in the case of underfloor heating.

Solar collectors allow for acquisition of heat from solar radiation. The heat is most frequently used to heat up warm utility water which is stored in the reservoir. In recent years, we have been seeing less interest in collectors because of their competitors – photovoltaic panels allowing for generation of electricity. The price of photovoltaic panels has been dropping very quickly in recent years. Solar collectors have the highest energy performance, so from one square metre they obtain more energy than photovoltaic panels. However, this energy is less universal than electric energy. For instance, electric energy can be used to drive a heat pump. The choice between photovoltaic panels and solar collectors should be subject to an analysis in each case. Especially in the case of gas heating installation using heat pumps, photovoltaic panels can be a better solution."

Prof. Andrzej Szlęk, Ph.D. (Eng)

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INVESTMENT COSTS, SAVINGS I FUNDING

Investment costs

Technical conditions before the investment	Costs in PLN
Purchase and installation of the condensing gas boiler	16,000
Purchase and installation of the steel chimney liner	2,000
Purchase and installation of the solar collectors	15,000
Purchase and installation of the water reservoir	3,000
TOTAL	36,000



How much money did Patrycja save on bills thanks to the investment?

2023 was the first full year the new central heating and hot utility water installation was used. The savings are shown in the comparison of the costs that would be generated if the coal boiler was still in use and the actual costs incurred while using the modernised heating system.

Cost type	Hypothetical costs that would be incurred in 2023 if the old installation was still in use (in PLN)	Actual costs incurred in 2023 while using the new installation (in PLN)
Coal cost (7 tonnes x PLN 2,137/tonne – averaged price for 2023)	approx. 15 000	-
Cost of heating utility water during the heating season (October-March)	- (included in the coal cost)	- (included in the gas cost)
Cost of heating utility water after the heating season (April-September)	- (included in the coal cost)	- (included in the gas cost)
Building heating costs during the heating season (gas cost)	-	7,000
Boiler maintenance cost	300	400
TOTAL	15,300	7,400



Thanks to the investment in 2023 Patrycja

reduced the bills for heating the building and utility water by PLN 7,900.



Funding for heat source replacement and other eco-friendly installations

In 2022 Patrycja used the support as part of two programs funding installation of eco-friendly solutions for houses. Those programs include “Clean Air” and the municipal Low-Emission Reduction Program (PONE). PONE is a local program implemented by the municipality where Patrycja resides. During a meeting with an environmental consultant on the “Silesia. Blue Sky Restored” program you should check what support programs related to various environmentally friendly and thermal modernisation activities are currently available.

Funding source	Funding amount (in PLN)	
	For purchase and installation of a condensing gas boiler	For purchase and installation of solar collectors
Clean Air Program	4,500	4,500
Low Emission Reduction Program	8,000	4,000
TOTAL	21,300	

Although the actual investment cost was PLN 36,000, nearly 60% of the costs incurred were refunded to Patrycja in the form of funding. The actual expense was PLN 15,000 (PLN 36,000-21,000), which in the light of the savings obtained (PLN 7,900) means that the investment costs paid off in half after the first.

THE PROS AND CONS OF THE INVESTMENT

Financial aspect

Pros	Cons
• Use of free solar energy contributing to lower bills for heating water (in the case of solar collectors). • High efficiency thanks to recycling heat from hot exhaust gas, contributing to reduced gas use (in the case of the condensing gas boiler). • Heating optimisation thanks to a high level of automation which means reduced use of gas (in the case of the condensing gas boiler). • Possibility to decide not to build a chimney, contributing to lower house construction costs. • Higher value of the building related to the use of modern technological solutions. • Possibility to obtain funding for the investment. • Higher rating of the tourist attractiveness of a given location which may contribute to increased tourism revenue of a municipality.	• High initial cost (purchase and installation of a condensing gas boiler and solar collectors). • High dependency of energy production on weather conditions (in the case of solar collectors). • High dependency of the costs of use on gas prices (in the case of the condensing gas boiler).

Environmental aspect

Pros	Cons
• Possibility to obtain heat energy without polluting the environment (in the case of solar collectors). • Lower CO2 emissions compared to coal burning (in the case of the condensing gas boiler).	• Gas is a fossil fuel and its extraction has a negative impact on the environment (in the case of the condensing gas boiler).

Health aspect

Pros	Cons
• Contributing to reduction of the level of pollution in the environment, which will result in lower incidence rate for conditions caused by air pollution. • Protection against the risk of carbon monoxide while using a coal boiler (in the case of the condensing gas boiler).	• (in the case of the condensing gas boiler) Potential threat to health in case of a gas installation leakage, requiring regular inspections and maintenance (in the case of the condensing gas boiler).

Financial aspect

Pros	Cons
• Perfectly complete each other in serving two basic functions: heating the house and supplying hot utility water. • Cleanliness in the building resulting from the use of a clean heat source (in the case of the condensing gas boiler). • Great comfort of use related to the high level of automation and no need to perform physical maintenance of the device (in the case of the condensing gas boiler). • Possibility to install it in a place other than a boiler room, provided that the formal requirements are met (in the case of the condensing gas boiler).	• When installed on the roof, with a low level of roof load capacity, it may be necessary to strengthen the roof construction (in the case of solar collectors).



STEPS REQUIRED TO COMPLETE A SIMILAR INVESTMENT

Step	Description	
1	First contact with an environmental consultant on the "Silesia. Blue Sky Restored" project who: - assess the building's needs for heat energy, - presents possible technological solutions including the investment goals, - specifies estimated costs related to the investment while using different technological solutions, - specifies available funding resources.	☐
2	Independent review of the advantages and disadvantages of individual technological solutions in relation to the cost of the investment and selection of the technological solution.	☐
3	Second contact with the environmental consultant who adjusts the parameters of use of the selected technological solution to the needs of the household.	☐
4	Market research on the companies offering the selected technological solutions, including initial verification (among family members, friends, etc.) and their reliability.	☐
5	Collecting quotations from the companies for installation, an analysis of the agreement and warranty terms and conditions.	☐
6	Selection of the best proposal.	☐

Step	Description	
7	Contacting the company that presented the best proposal and informing it about the decision.	☐
8	Following positive results of the verification of the reliability of the selected company, signing an agreement with the company on completion of the investment.	☐
9	Third contact with the environmental consultant who helps prepare proper documents that must be submitted to the entity providing funding (before the investment is completed, during or after its completion).	☐
10	After the investment is completed, thorough review of the conditions of use and maintenance of the installation, explanation of possible doubts in this matter.	☐
11	Submission of documents enabling funding for the completed investment to the entity providing the funding.	☐
12	Within 14 days of launching the installation, application submitted to the Central Emission Register of Buildings (https://ceeb.gov.pl/).	☐
13	If the costs related to the thermal modernisation were not funded from a different source, deduction from personal income tax (PIT), in the calendar year following completion of the investment, of the costs incurred in relation to the investment as part of the tax relief for thermal modernisation.	☐



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Learn more about how we restore blue sky in the Silesian Voivodeship at

 przywracamyblekit.slaskie.pl



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#SilesiaBlueSkyRestored

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Województwo
Śląskie

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