engesolarbox

We produce heating and ventilation systems that are eco-friendly and use solar energy sources.

FOSSIL FUEL-FREE HEAT & ENERGY SYSTEMS

: 0 380 514 68 28 / 0549 171 00 25
: info@engeenergy.com

enge energy

We are working for a world without fossil fuels.

With our 30 years of engineering experience in the air conditioning sector,
we are pleased to share our solar-powered ENGESOLARBOX® systems, developed as a result of our R&D activities.

- In today’s environment of rising energy costs, we hope that the products and systems we have developed using natural heat sources will provide you with significant savings and a competitive advantage

- Also, we will help you reduce your carbon emissions and
contribute to a clean future for a world less affected by the negative impacts of climate change and global warming.

While developing our products and systems, we also take our social responsibilities into account; we aim to converting a natural energy like the sun into useful energy, and reducing greenhouse gas formation and CO_2 emissions without using fossil fuels.

With our responsibility goals, we will build the future of a clean world together.

zero fuel,
zero waste,
zero carbon.

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A carbon-free future with the world's most natural heating and ventilation systems!

- Solar Thermal Walls
- Solar Hot Air Collectors
- Solar Heat Pumps
- Solar Heat Recovery Devices

1,596 trees reintroduced into the natural environment

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OUR R&D WORKS

Enge Enerji **is promoting its R&D studies on new product and system solutions in its sector day by day. It continues its R&D studies especially on solar energy,ventilation, heating and energy efficiency systems. Enge** Enerji **which develops its own technology and stands out in the competition in its sector, considers R&D as a part of its strategy. ENGE** ENERJI **which has an R&D awareness equipped with innovative technologies, will continue to offer its consumers eco-friendly,new and advanced products and systems by breaking new ground in the heating,ventilation and cooling sector by using solar energy. Our company continues to invest in research, technology, and the development of products and systems.** Since solar energy is a renewable resource and, unlike fossil fuels, poses no risk of depletion, it indicates that ENGESOLARBOX® will continue to stand out as a sustainable heating and ventilation solution in the future. **ENGESOLARBOX® is an important step towards leaving a more livable world to future generations by protecting the ecological balance.**

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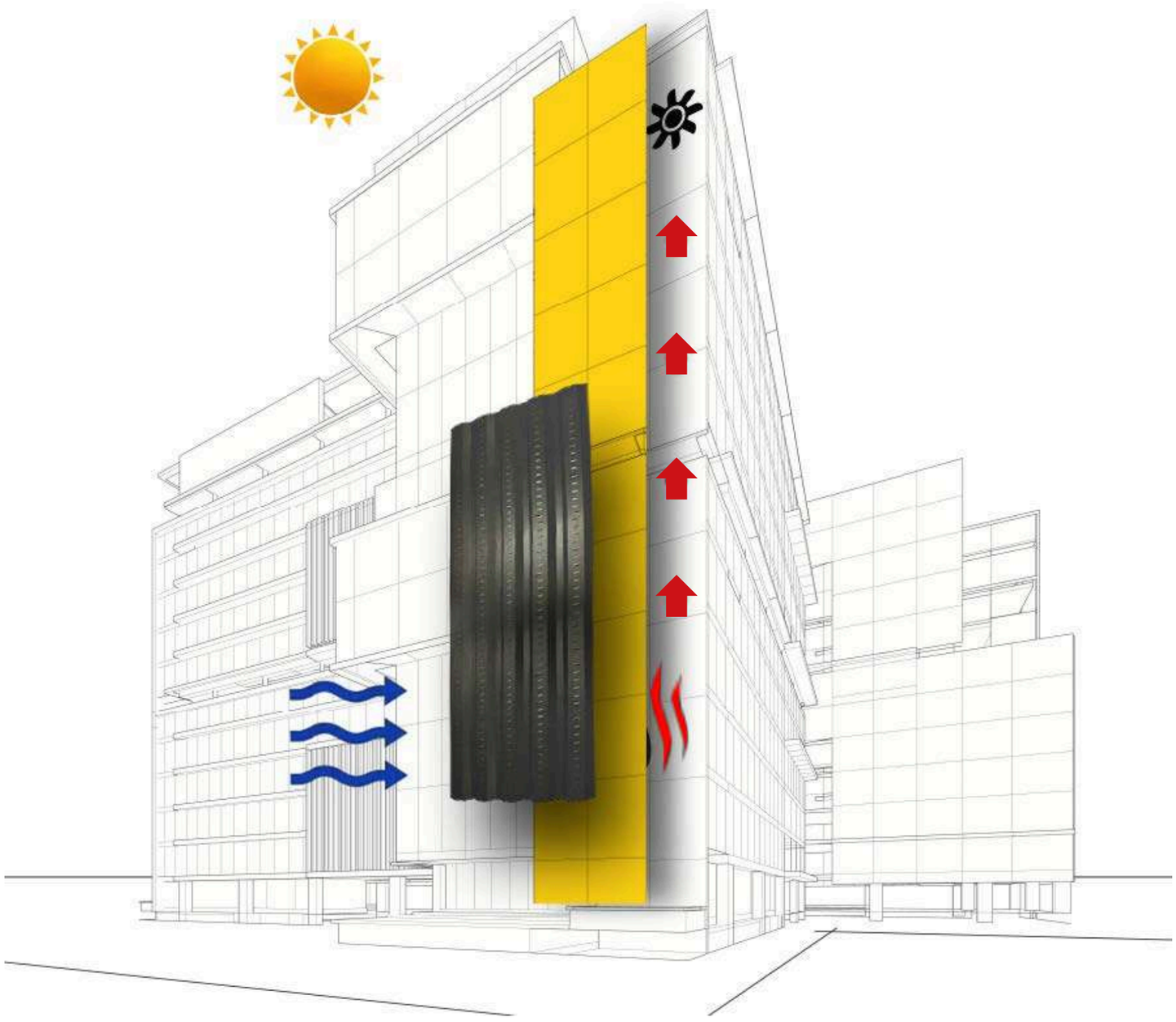
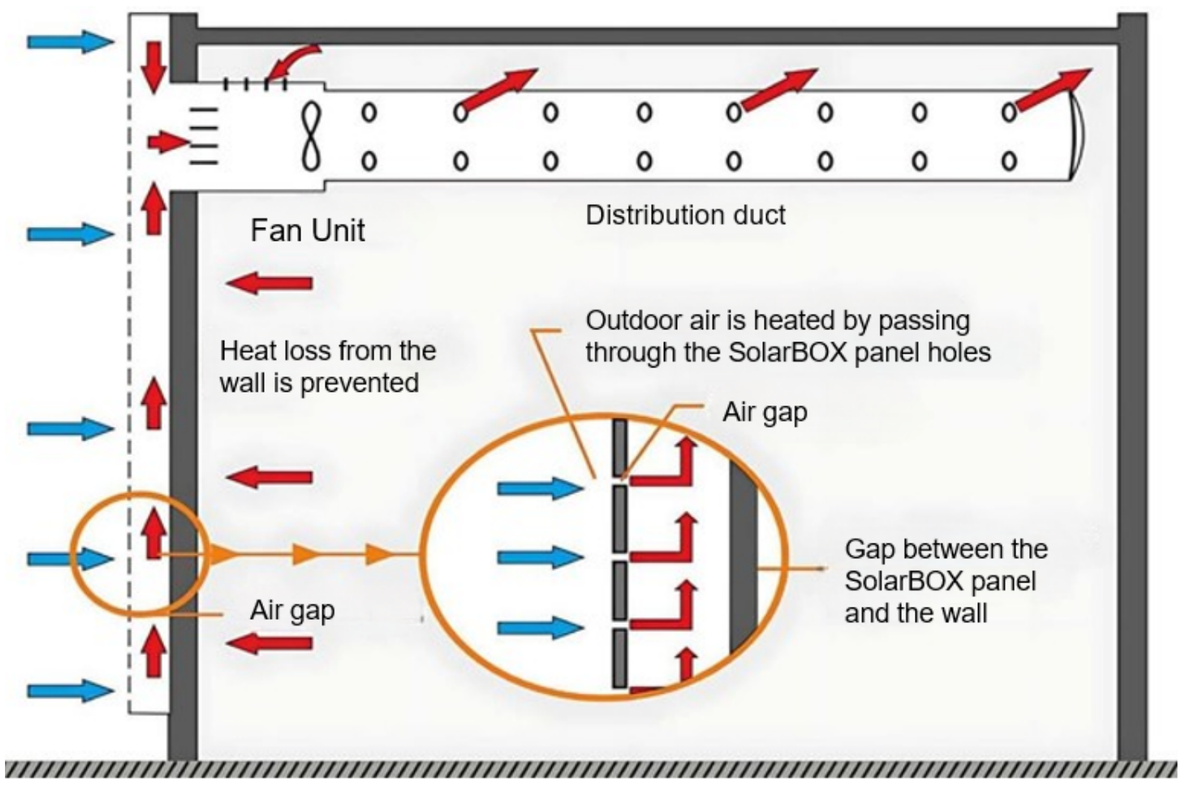
BASIC OPERATING PRINCIPLE OF ENGESOLARBOX® SYSTEMS

HOW DOES ENGESOLARBOX® WORK?

The ENGESOLARBOX®, Solar-Assisted Thermal Wall absorbs sunlight to generate heat, and air in contact with the panel surface circulates through specially designed holes on the panel. Whether integrated into HVAC systems with 100% fresh air or in a closed-loop setup, it can save up to 80% in heating and ventilation energy consumption. Thanks to its material structure, our products have a passive cooling feature in hot weather when there is no sun.





COMPARISON OF ENGESOLARBOX® AND CONVENTIONAL SYSTEMS

Description®	ENGESOLARBOX	Radiant Heater	Air Heater
Space Heating	Yes	Yes	Yes
Ventilation	Yes	N/A	N/A
Cooling (Passive Cooling at Night)	Yes	N/A	N/A
Installation Security Fee	High	Yes	Yes
Energy Savings	Yes	Low	N/A
Investment Cost	Medium	Medium	Low
Installation Cost	N/A	Medium	Low
Heat Control	Yes	Yes	Yes
Architectural Design	Yes	N/A	N/A
Integration with Existing Systems	Yes	N/A	N/A
Bureaucracy (Special Permits, etc.)	N/A	Yes	Yes
Chimney Installation	N/A	Yes	Yes
Risk of Danger	N/A	Yes	Yes
Environmental and Air Pollution	N/A	Yes	Yes
Greenhouse Effect and CO2 Emissions	N/A	Yes	Yes
Dependence on External Sources	N/A	Yes	Yes
Energy Efficiency and Savings	Yes	N/A	N/A
Grant and Support Opportunities	Yes	N/A	N/A
Boiler Room Requirements	N/A	Yes	Yes
Natural Gas Installation	N/A	Yes	Yes
Profit	Yes	N/A	N/A

USAGE AREAS

FACTORY

RESIDENTAL

POULTRY HOUSE

DRYING SYSTEM

GREENHOUSE

SHOWROOM

HANGAR

GYM

"Eco-Friendly, Carbon-Free, Quality Living with the World's Most Natural Heating and Ventilation Systems"

- Renewable Energy
- Fuel Savings
- Lower CO_2 Emissions
- Green Environment
- Clean Environment
- Healthy life

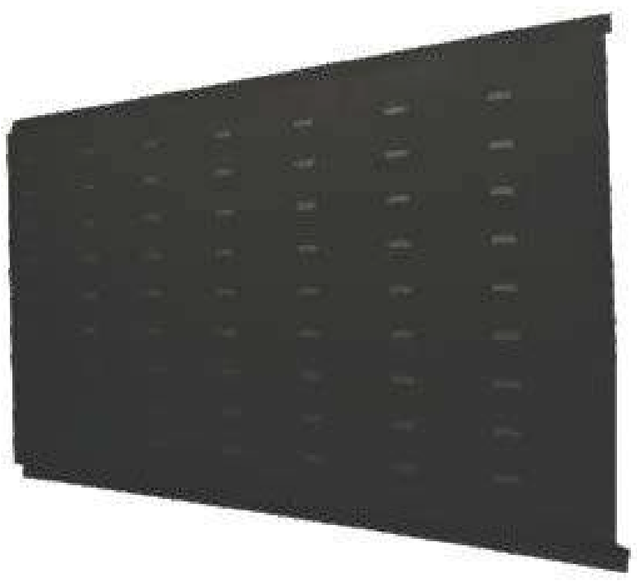
PRODUCTS

SOLAR THERMAL WALL PANELS

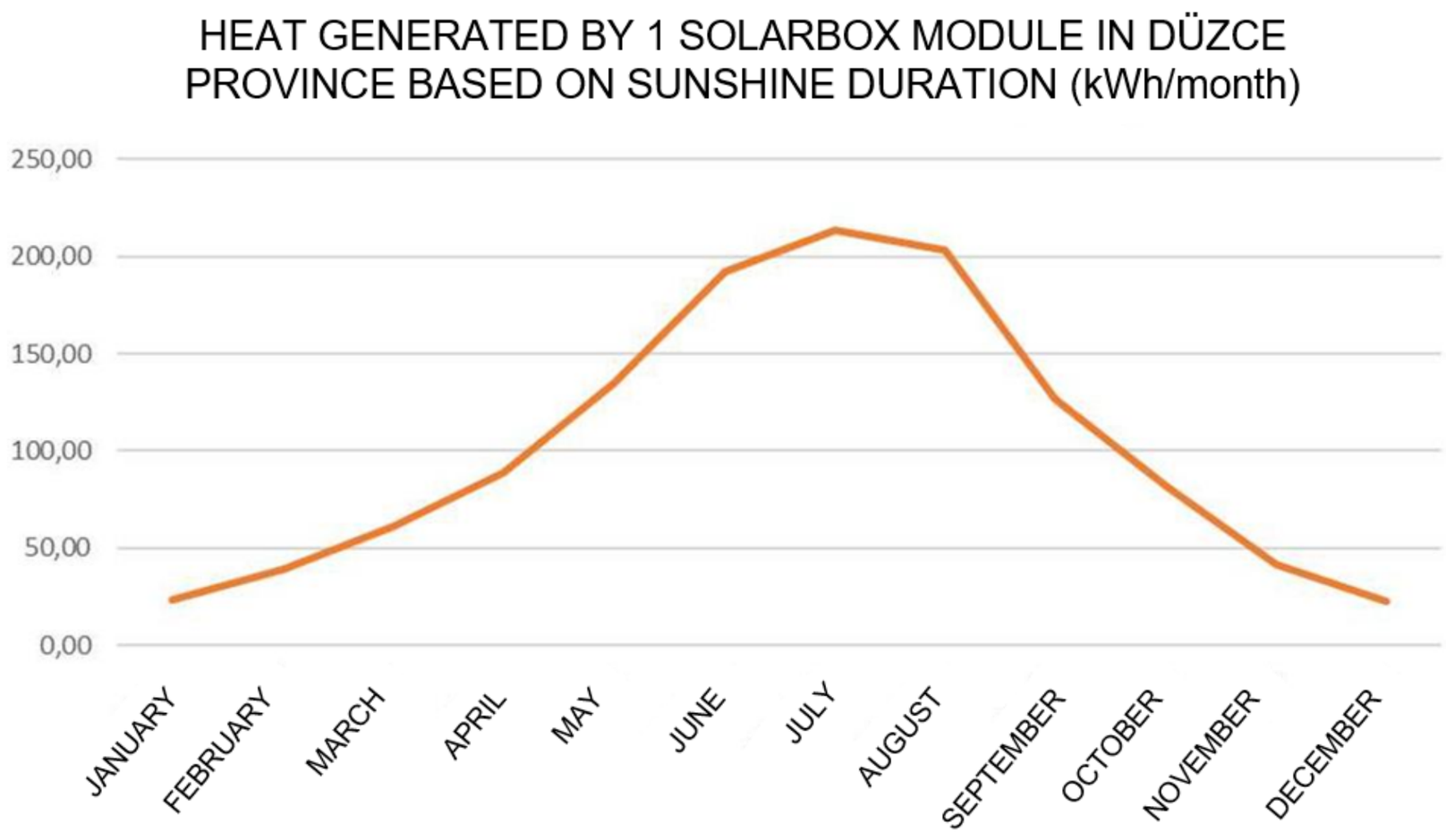
1 - ENGESOLARBOX® SBOM

HEATING AND VENTILATION MODULES WITH SOLAR ENERGY

Omega model solar-assisted hot air panels stand out with their high efficiency and stylish designs. These panels keep your business warm by capturing solar energy. The Omega model combines energy savings and eco-friendly heating. It consumes less energy than traditional methods and helps protect nature.



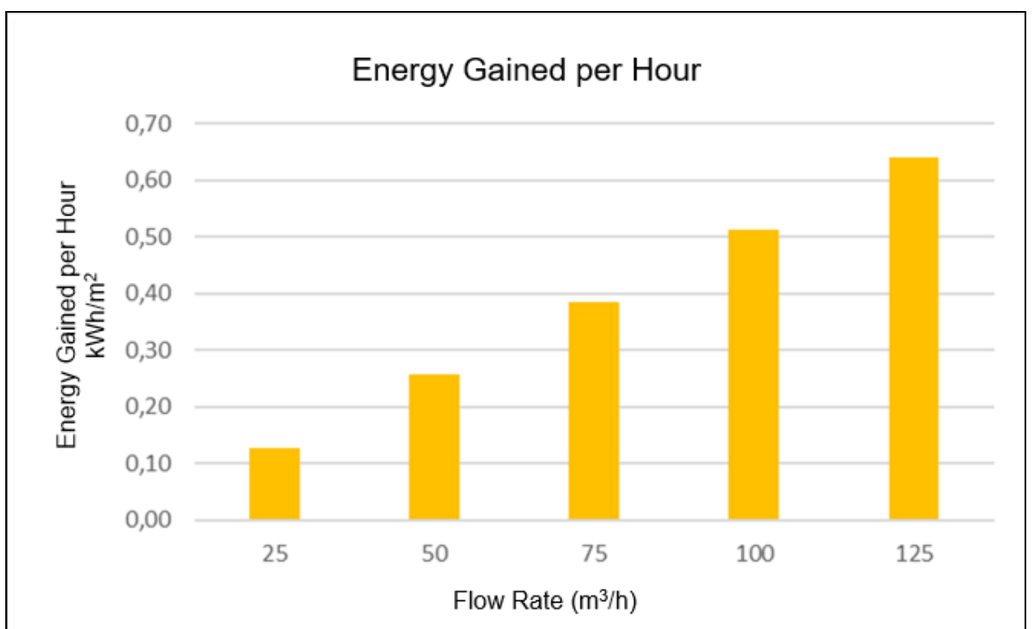
Product Model	SBOM
Energy Generation	680 - 1050 W/m²
Air Flow Rate	35 - 240 m³/h-m²
Temperature Difference	8-40°C
Average Generated Air Temperature	13-55°C
Product Weight	1,7 kg/m²
Absorption Rate	0,94
Material Lifetime	10+Year
Corrosion Resistance	High
Fouling Resistance	High

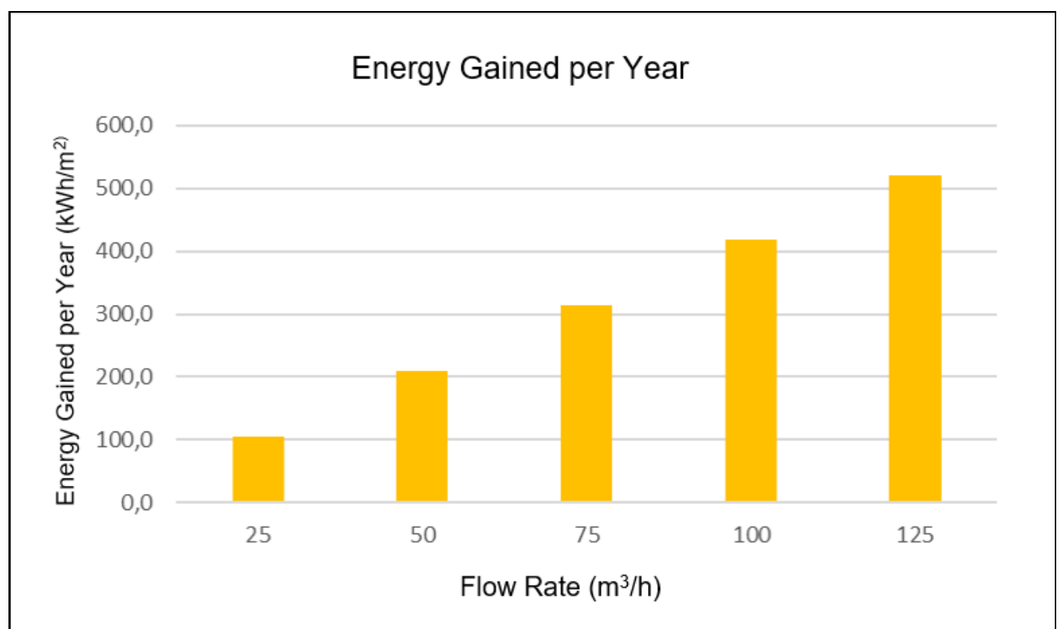


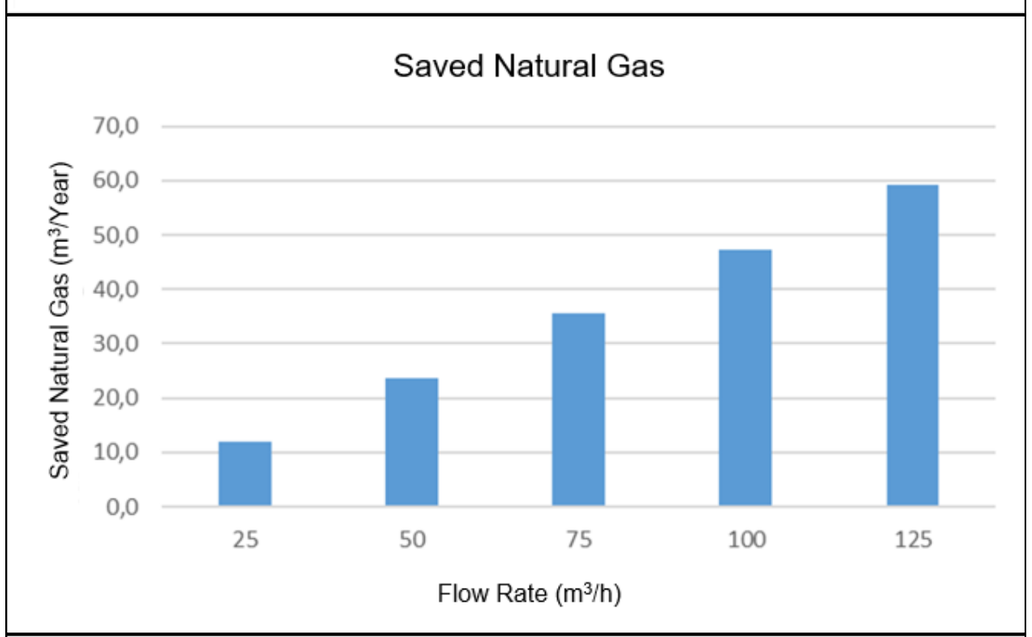
ACROSS TÜRKİYE - SBOM THERMAL ENERGY EFFICIENCY PER 1m²

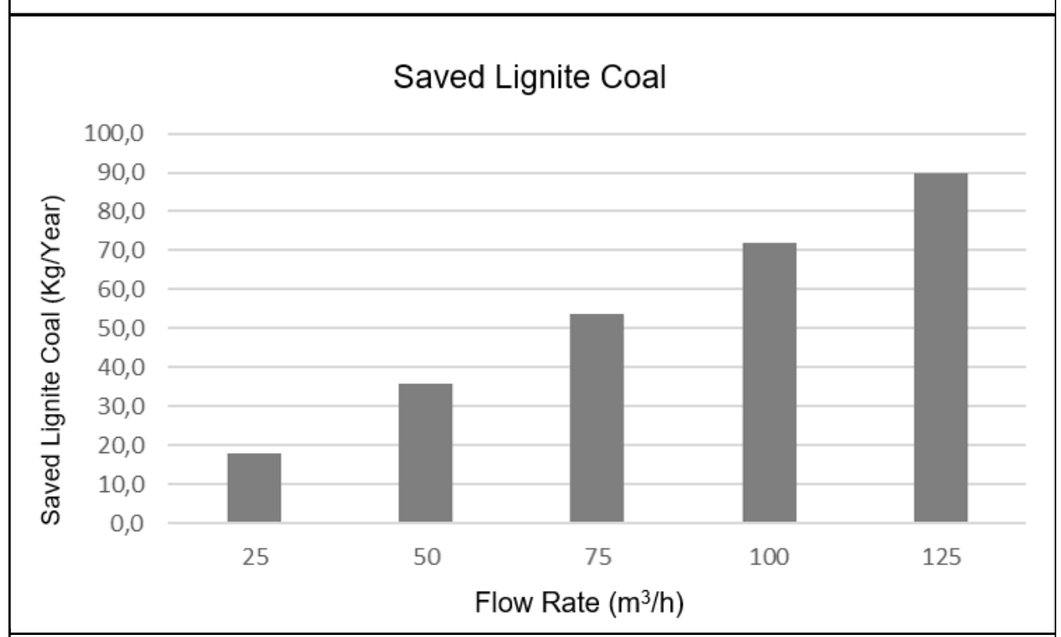
CALCULATED BASED ON JANUARY, FEBRUARY, MARCH, OCTOBER, NOVEMBER AND DECEMBER

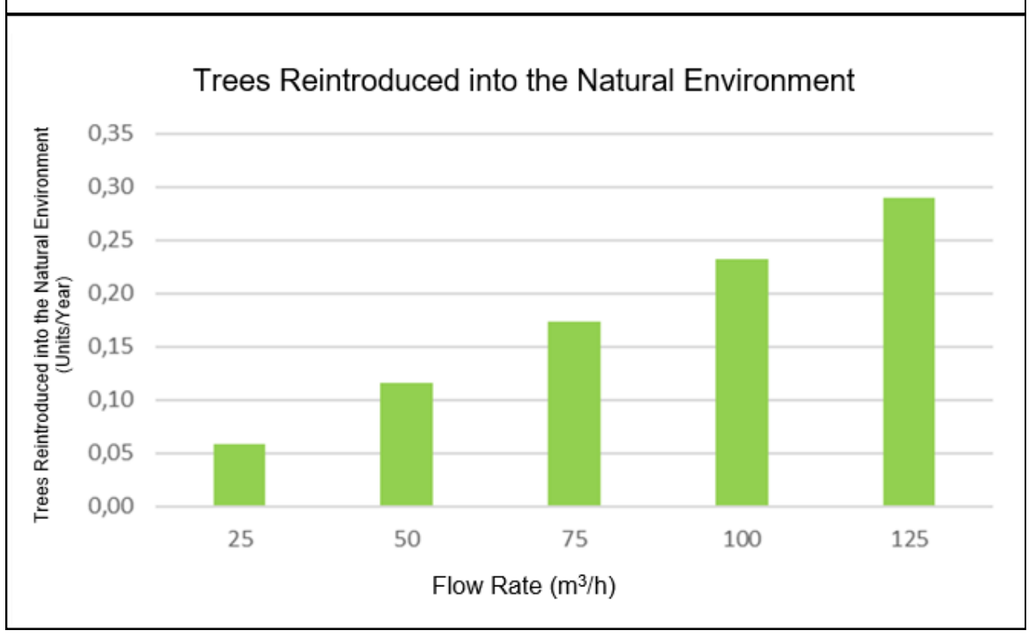
ENGESOLARBOX® Airflow per Module m³/h-m²	Temperature Difference ΔT=°C	Hourly Gained Energy kWh/m²	Total Sunshine Duration Hour/Year	Total Annual Produced Energy kWh/Year	Saved Natural Gas m³/Year	Saved Lignite Coal kg/Year	Prevented Carbon Emission Ton/Year	Trees Reintroduced into the Natural Environment Unt./Year
25	15	0,13	814,06	104,4	11,8	18,0	0,02	0,06
50	15	0,26	814,06	208,7	23,6	35,9	0,05	0,12
75	15	0,38	814,06	313,1	35,5	53,9	0,07	0,17
100	15	0,51	814,06	417,4	47,3	71,8	0,10	0,23
125	15	0,64	814,06	521,8	59,1	89,8	0,12	0,29

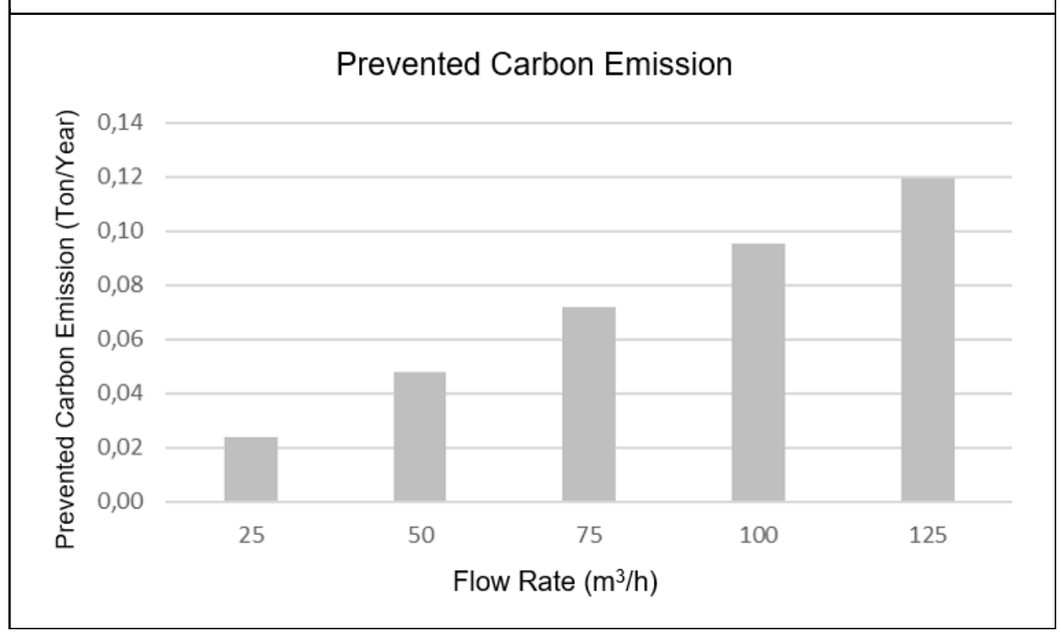










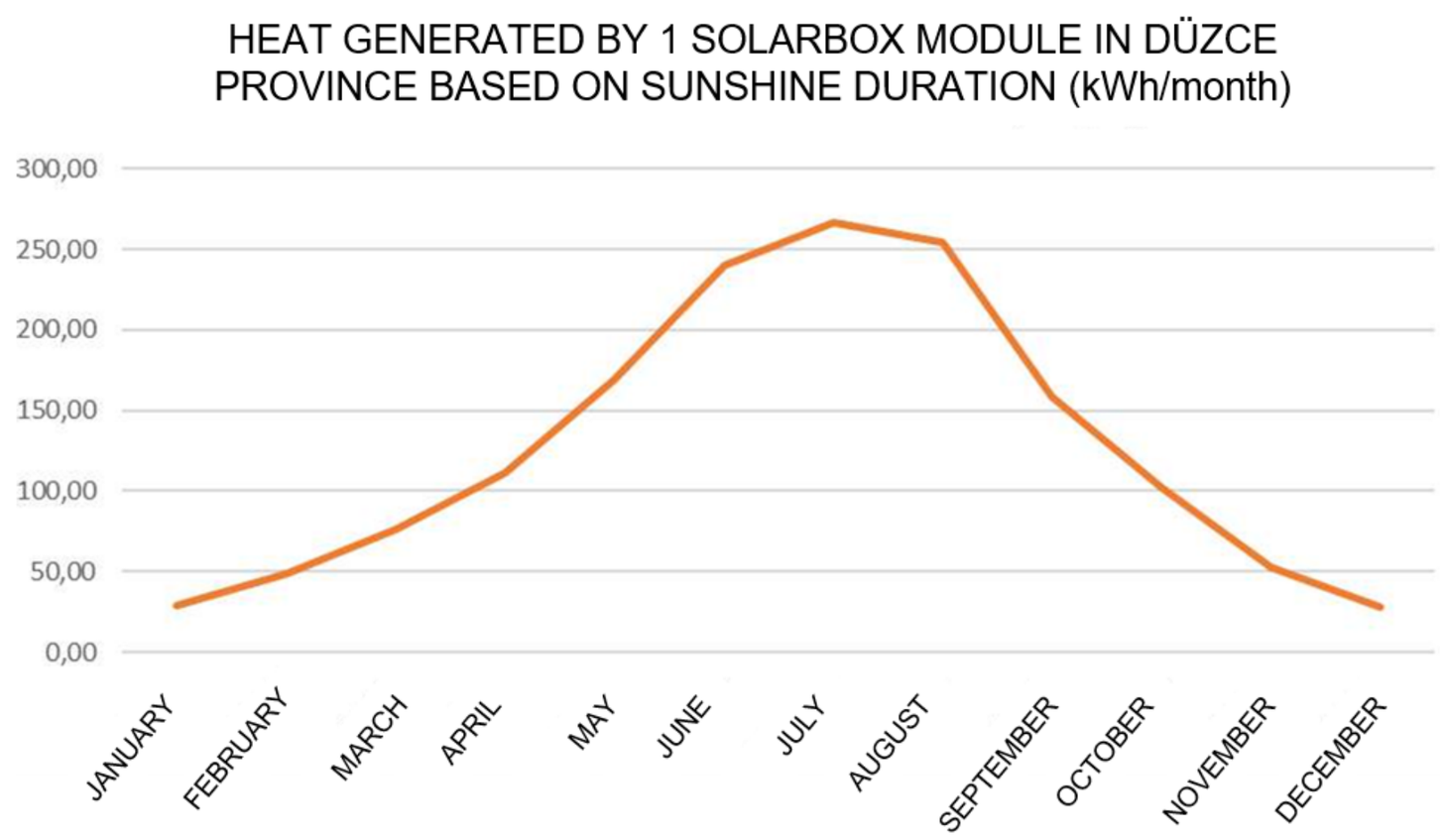


2 - ENGESOLARBOX® SBTM

HEATING AND VENTILATION MODULES WITH SOLAR ENERGY

Trapezoidal solar-assisted thermal wall panels are known for their stylish trapezoidal shape and high solar energy collection efficiency. These panels produce warm air by capturing the sun's light in the best possible way. The Trapezoidal model combines a modern and stylish design with eco-friendly energy. It provides an aesthetically pleasing solution while supporting the comfortable heating of your building.

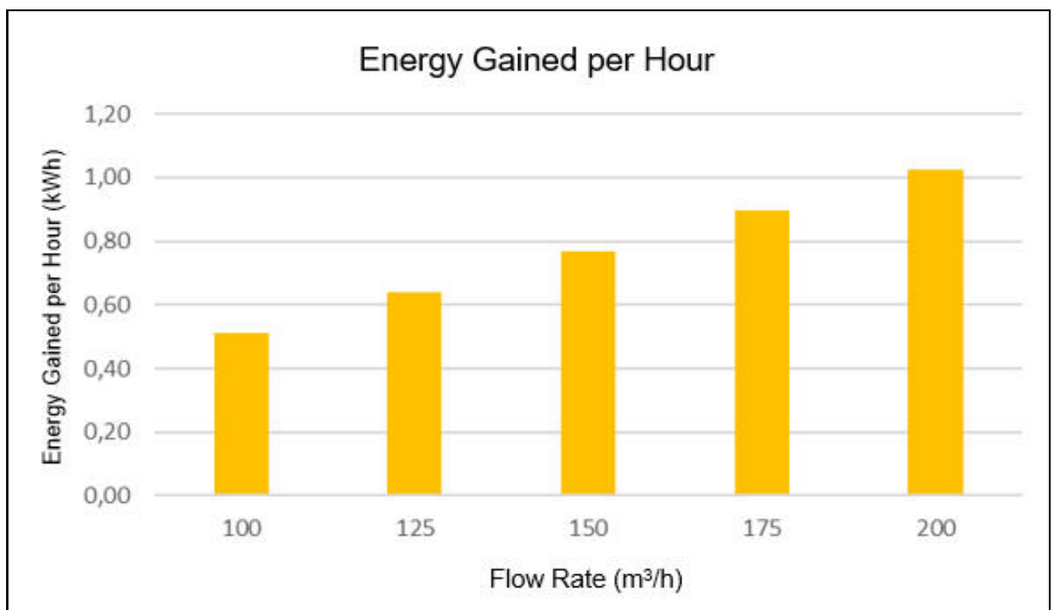
Product Model	SBTM
Energy Generation	700 - 2000 W/m²
Air Flow Rate	35 - 315 m³/h-m²
Temperature Difference	8-46°C
Average Generated Air Temperature	13-65°C
Product Weight	1,7 kg/m²
Absorption Rate	0,94
Material Lifetime	10+Year
Corrosion Resistance	High
Fouling Resistance	High

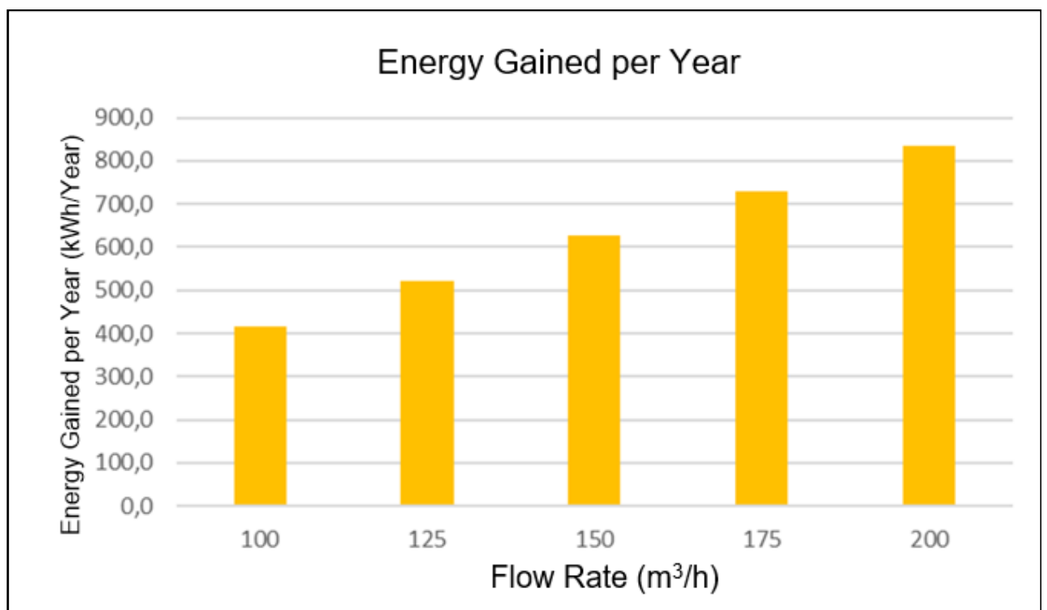


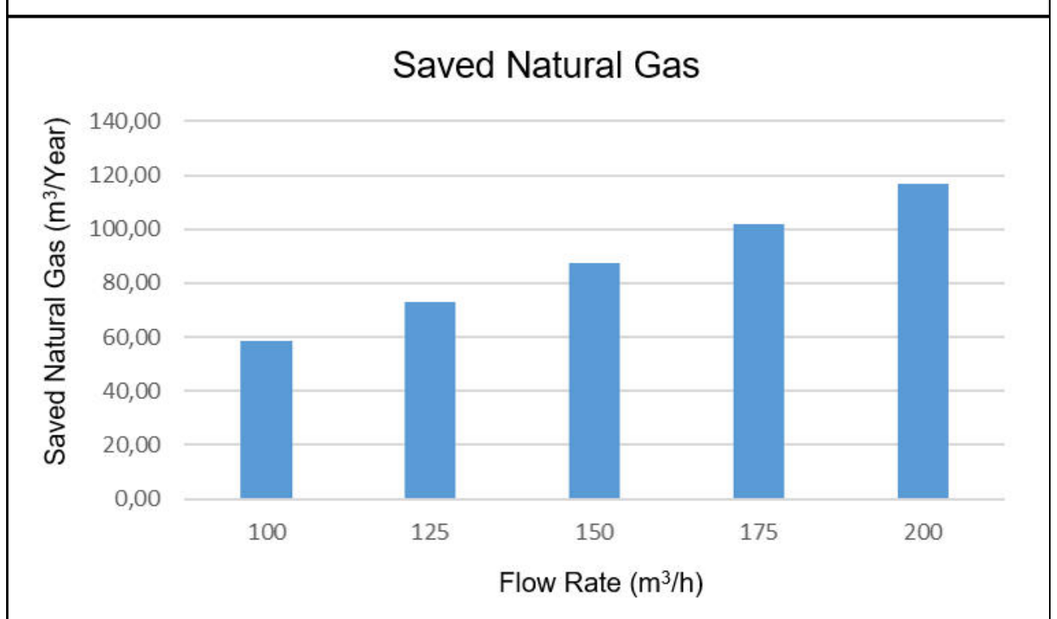
ACROSS TÜRKİYE - SBTM THERMAL ENERGY EFFICIENCY PER 1 m²

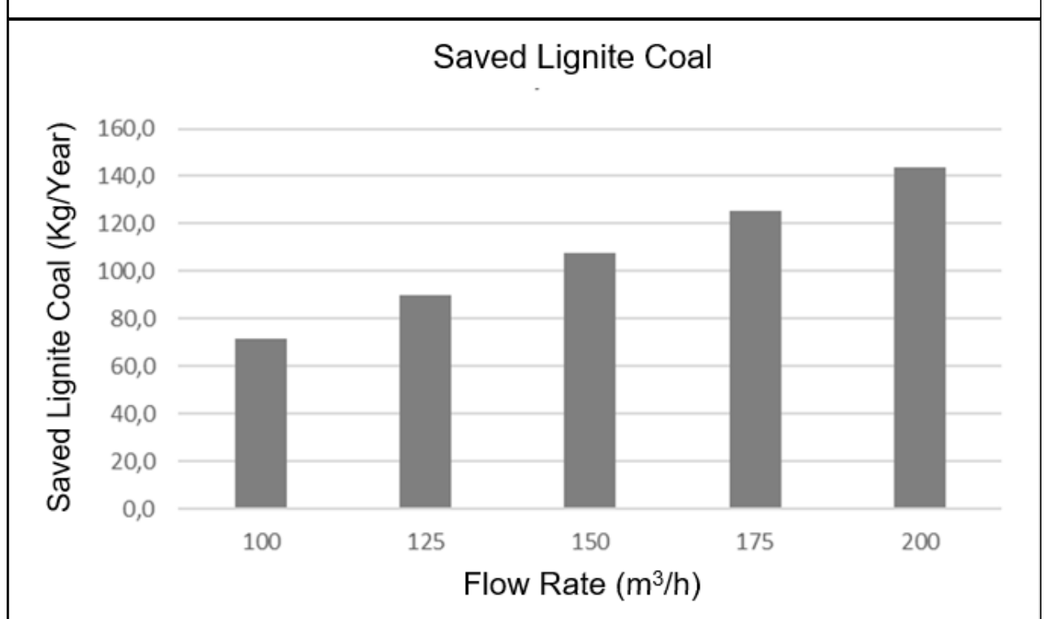
CALCULATED BASED ON JANUARY, FEBRUARY, MARCH, OCTOBER, NOVEMBER AND DECEMBER

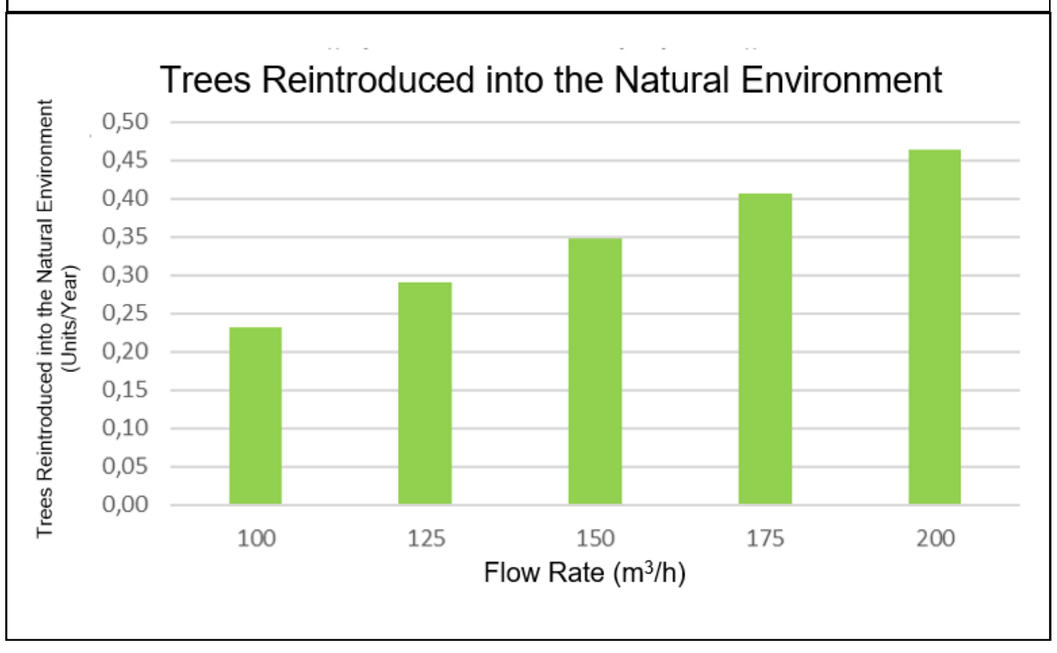
ENGESOLARBOX® Airflow per Module m³/h-m²	Temperature Difference ΔT=°C	Hourly Gained Energy kWh/m²	Total Sunshine Duration Hour/Year	Total Annual Produced Energy kWh/Year	Saved Natural Gas m³/Year	Saved Lignite Coal kg/Year	Prevented Carbon Emission Ton/Year	Trees Reintroduced into the Natural Environment Unt./Year
100	15	0,51	814,06	417,4	47,3	71,8	0,10	0,23
125	15	0,64	814,06	521,8	59,1	89,8	0,12	0,29
150	15	0,77	814,06	626,2	70,9	107,7	0,14	0,35
175	15	0,90	814,06	730,5	82,8	125,7	0,17	0,41
200	15	1,03	814,06	834,9	94,6	143,6	0,19	0,46

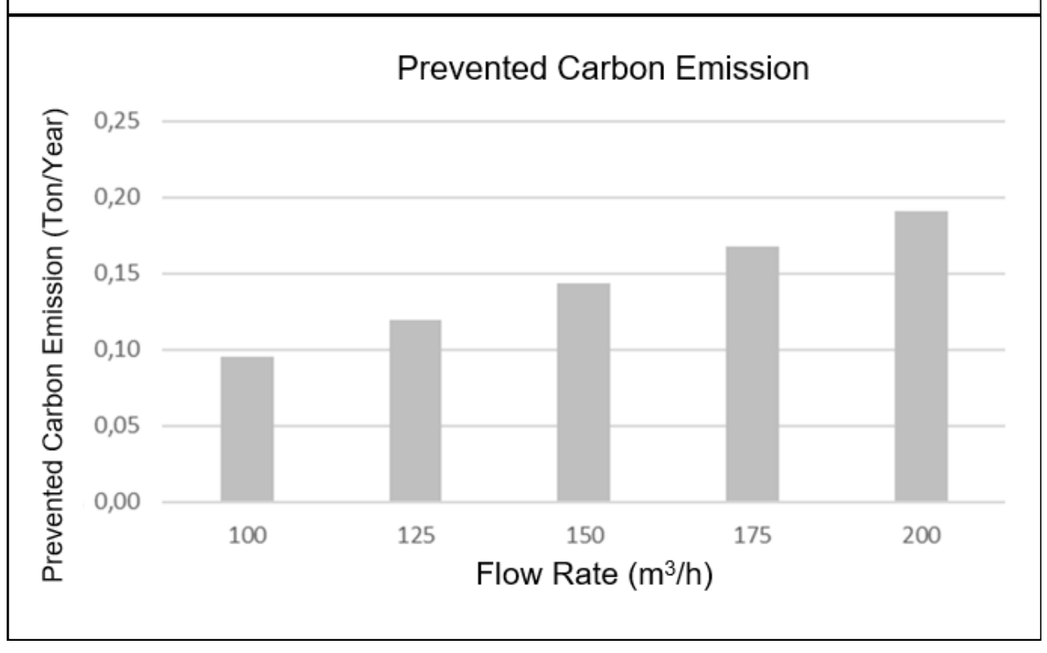












SOLAR HOT AIR COLLECTORS

1- ENGESOLARBOX® SBTCM

HEATING AND VENTILATION MODULES WITH SOLAR ENERGY

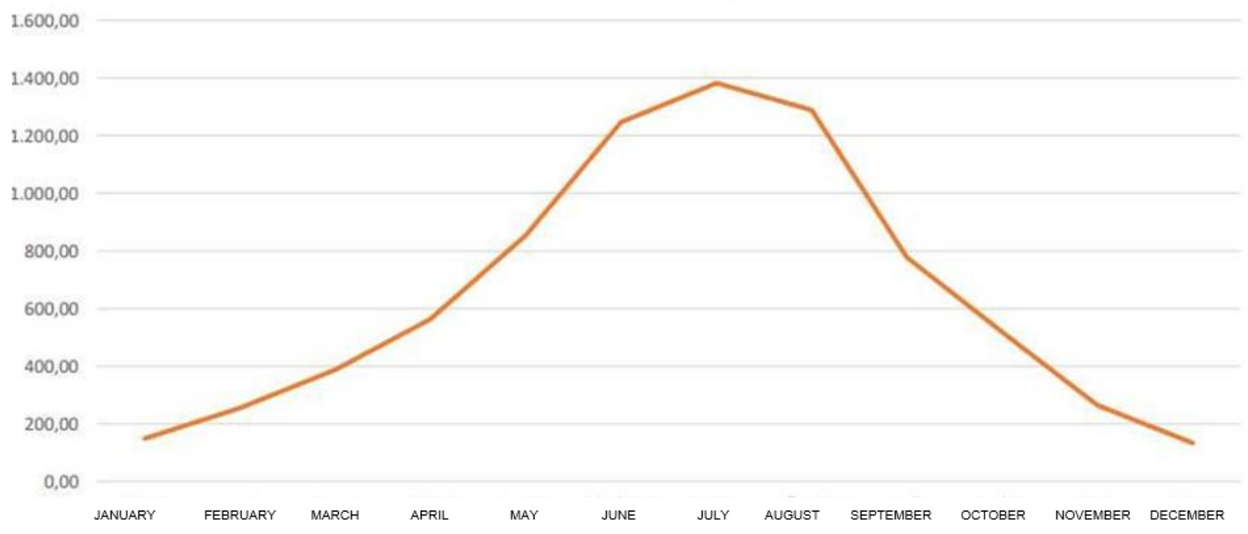
Glazed model solar-assisted hot air panels stand out with their transparent glass surface. These panels offer an aesthetic appearance while having high solar energy collection capabilities. It is an ideal option, especially for modern buildings. The transparent glass surface visually displays the solar energy collection process and adds an elegant touch to buildings.

Solar Hot Air Collectors

- ENGESOLARBOX® SBTCM completely converts solar energy into useful heat energy.
- With this product, solar energy is used for heating and ventilation.
- Thanks to their ability to collect solar energy, these products can meet the heating and ventilation needs of buildings in winter without using fossil fuels.
- The desired temperature in the spaces to be heated is automatically turned on and off depending on the thermostat.
- According to climatic conditions, it produces heat in sunny weather without the need for any fossil fuels and meets your ventilation needs.
- It is an excellent savings provider.
- Maintenance and service needs are very low.
- It improves the indoor air quality in the spaces.
- It protects the environment from harmful factors such as humidity and fungus.

Product Model	SBTCM
Thermal Energy Generation	2,5-4,75 kWh/Unt.
Air Permeability	120-600 m³/h
Passive Temperature Difference	18-63 °C
Passive Temperature Generated	98 °C
Active Temperature Difference	10-48 °C
Maximum Blowing Temperature	68 °C
Product Weight	48 kg/unt.
Absorption Rate	0,94
Material Lifetime	10+Years
Corrosion Resistance	High
Fouling Resistance	High
Dimensions (WxH)	2300x1000 mm
Gross Thermal Area	2 m²
Temperature Control	Termostat
Heat-Absorbing Area	15-55 m²
Hot Air Outlet	200 mm

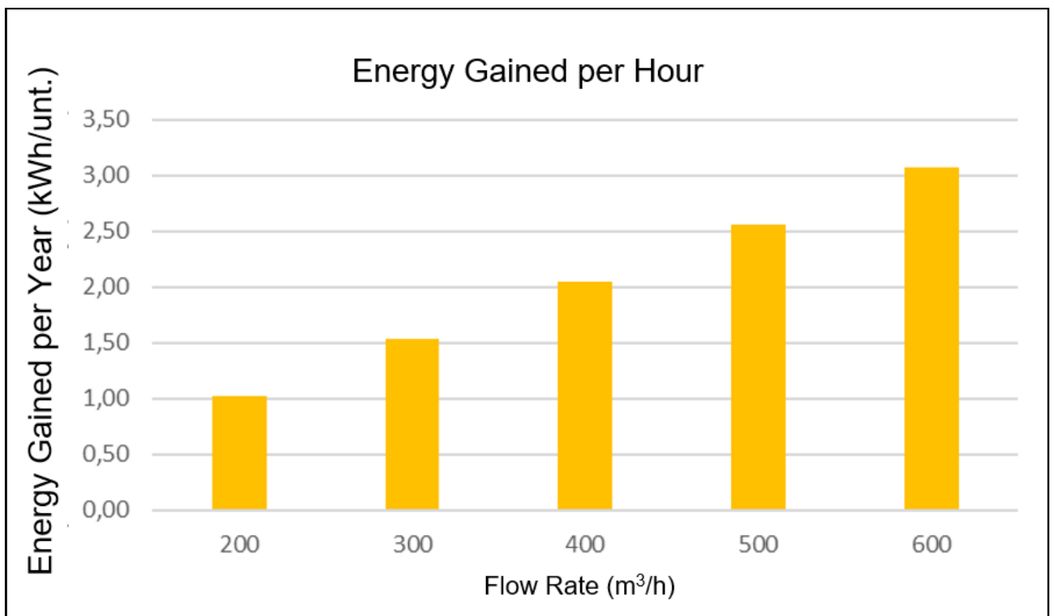
HEAT GENERATED BY 1 SOLARBOX MODULE IN DÜZCE PROVINCE
BASED ON SUNSHINE DURATION (kWh/month)

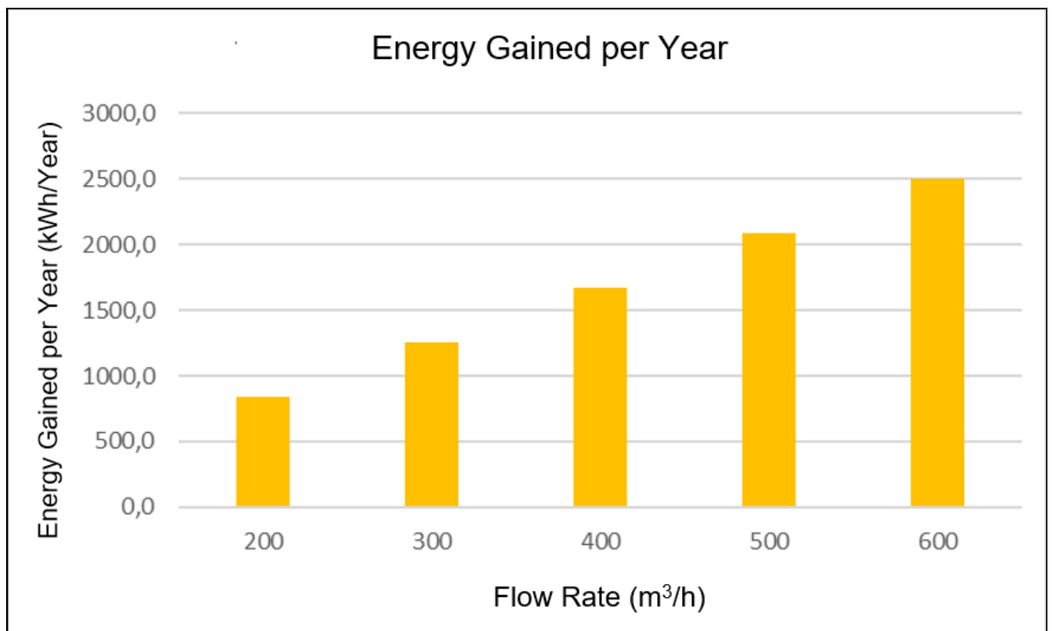


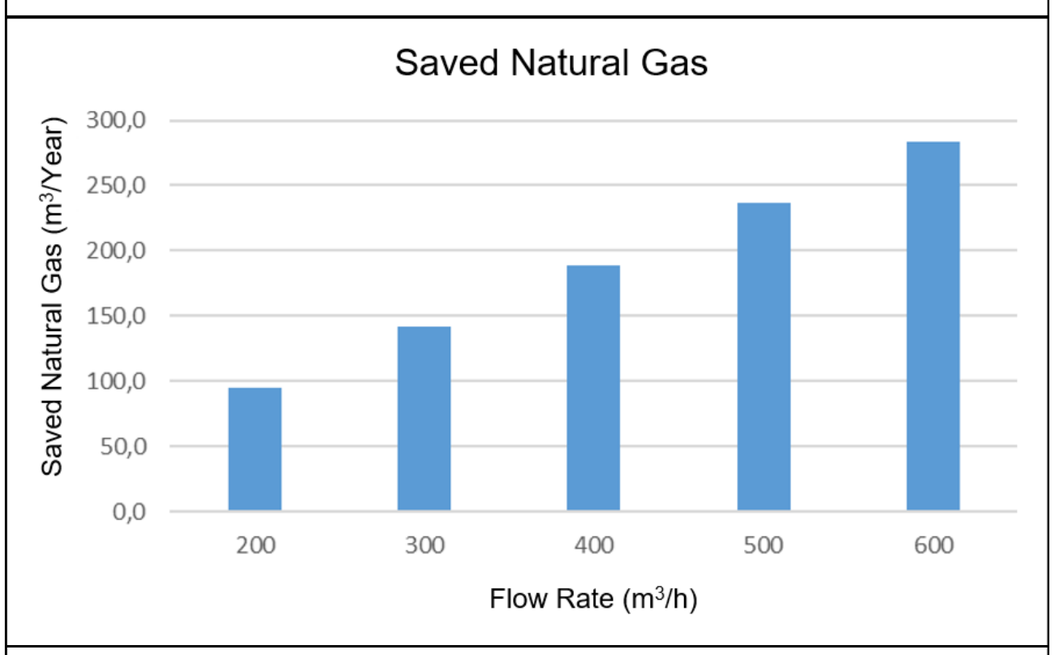
ACROSS TÜRKİYE - 1 SOLAR HOT AIR COLLECTOR SBTCM2000 THERMAL ENERGY EFFICIENCY

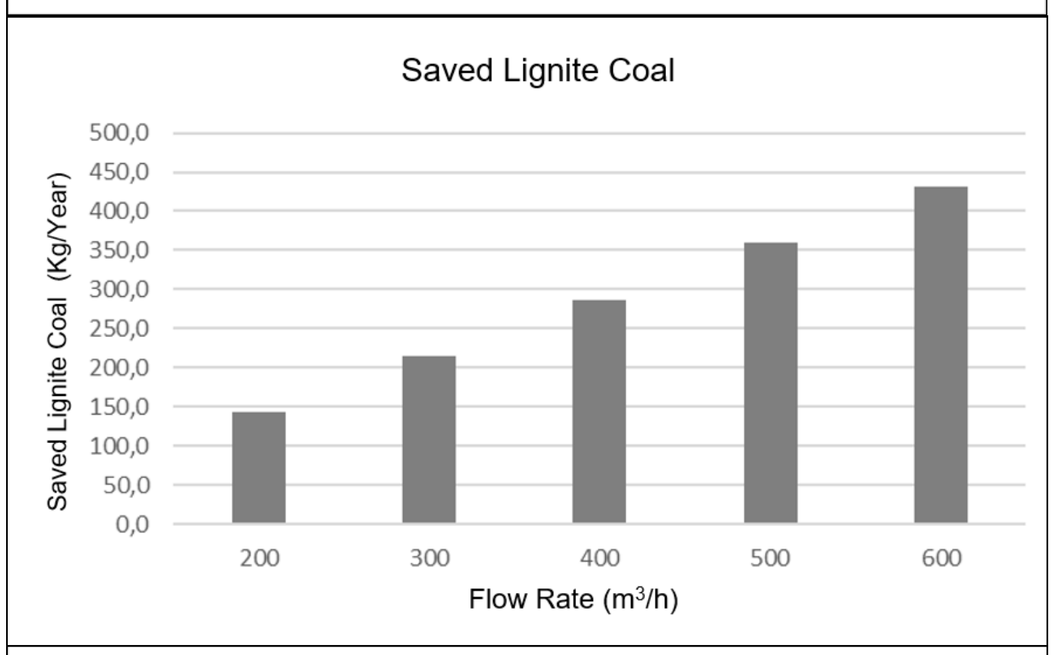
CALCULATED BASED ON JANUARY, FEBRUARY, MARCH, OCTOBER, NOVEMBER AND DECEMBER

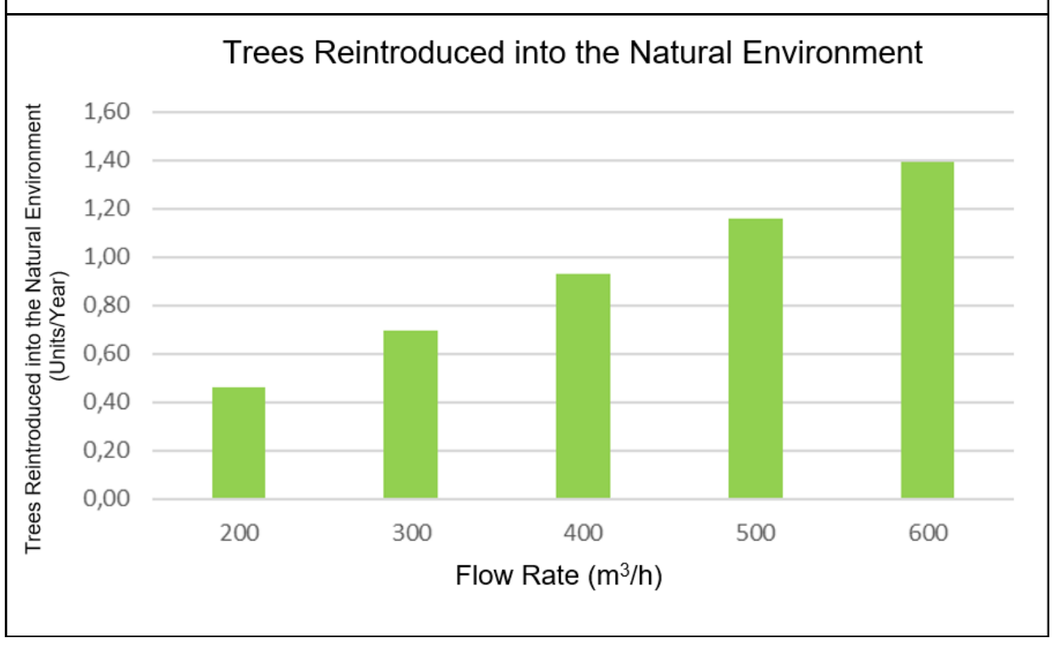
ENGESOLARBOX® Airflow per Module m³/h-m²	Temperature Difference ΔT=°C	Hourly Gained Energy kWh/m²	Total Sunshine Duration Hour/Year	Total Annual Produced Energy kWh/Year	Saved Natural Gas m³/Year	Saved Lignite Coal kg/Year	Prevented Carbon Emission Ton/Year	Trees Reintroduced into the Natural Environment Unt./Year
200	15	1,03	814,06	834,9	94,6	143,6	0,19	0,46
300	15	1,54	814,06	1252,3	141,9	215,4	0,29	0,70
400	15	2,05	814,06	1669,8	189,2	287,2	0,38	0,93
500	15	2,56	814,06	2087,2	236,5	359,0	0,48	1,16
600	15	3,08	814,06	2504,7	283,8	430,8	0,57	1,39

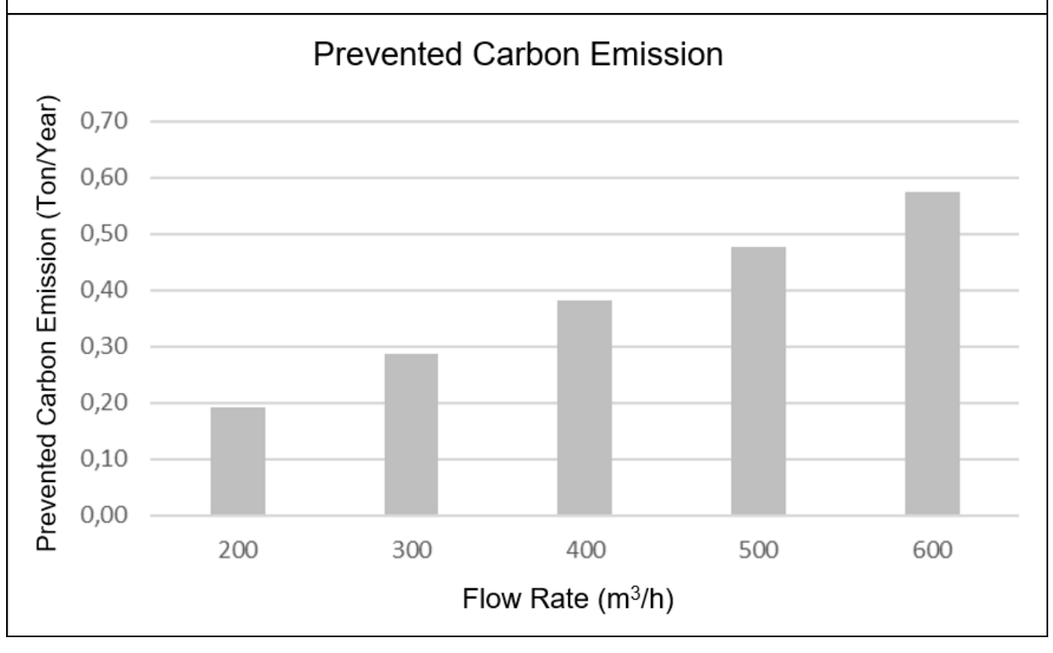












SOLAR HEAT RECOVERY AND HEATING UNIT

SWITC**H** TO FOSSIL-FUEL-FREE AN**D** ECO-FRIEN**D**LY **H**EATING SYSTEMS

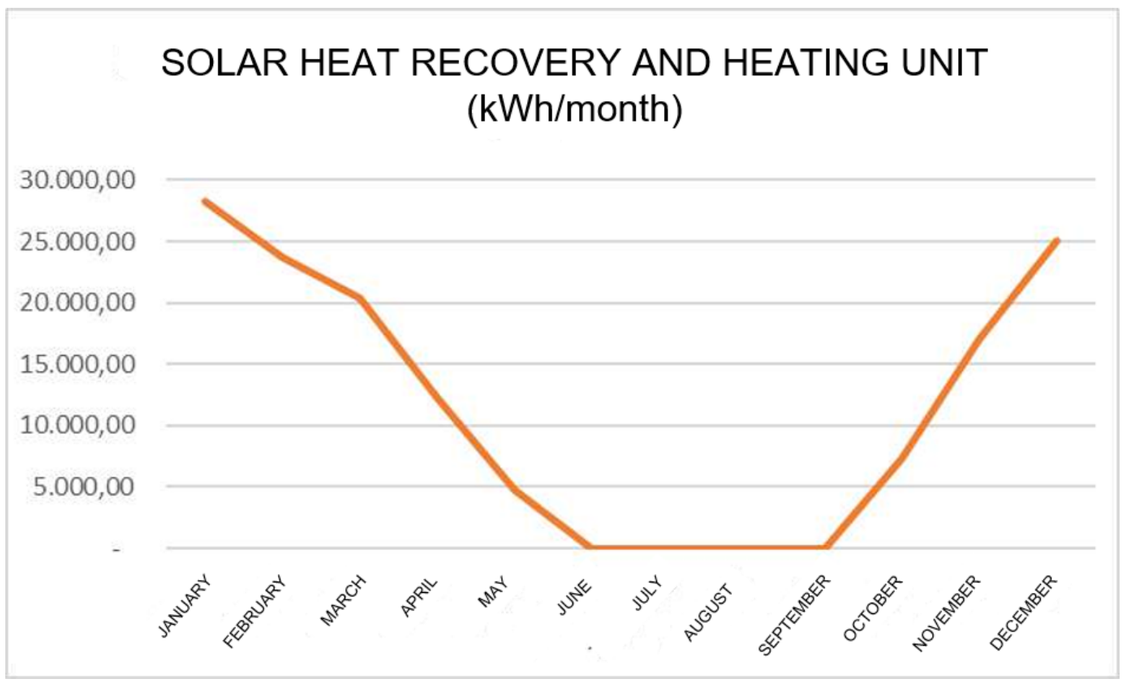
ENGESOLARBOX® systems reach a maximum efficiency level of approximately 60-80% in heating applications, depending on the location and area. The most important benefit is that a wide range of air flow rates with high performance is achieved. Special R&D production can be made according to the need. This device can meet the heating and ventilation needs at the same time.

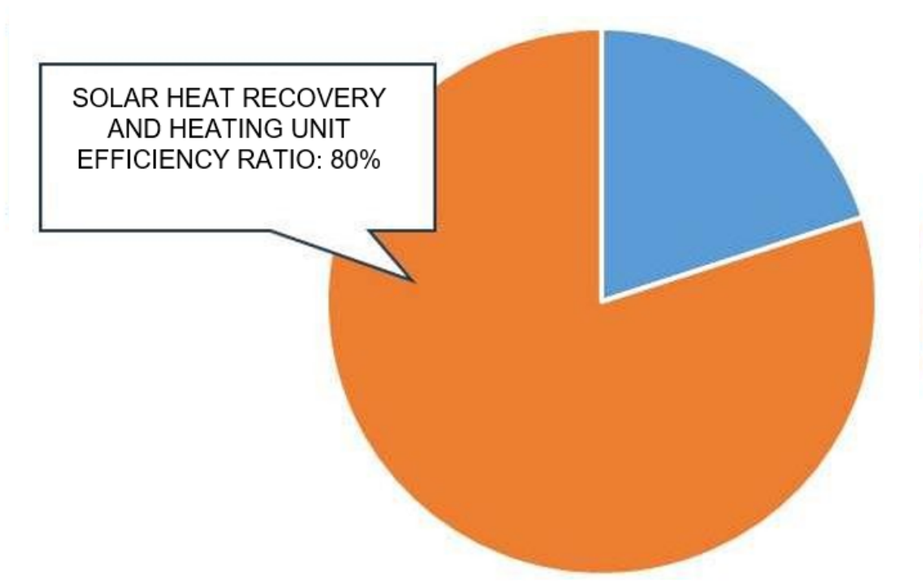
Product Model	AIGK
Air Flow Rate	1.000 - 10.000 m³/h.ad.
Total Fan Power	1-8 kW
Maximum Sound Power Level	78 dBA
Heating Source	Yes
Heating Power	1,5-90 kW
Dust Particle Trap Filter	Yes
Frequency Inverter	Yes
Energy Recovery	Yes
100% Fresh Air	Yes
Proportional Working	Yes
Mixture Air	Yes

Below reference values taken for calculations;

- Operating temperature = 20 °C
- Air flow rate = 10,000 m³/h

The climate data has been taken across Türkiye.





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SOLAR HEAT PUMP

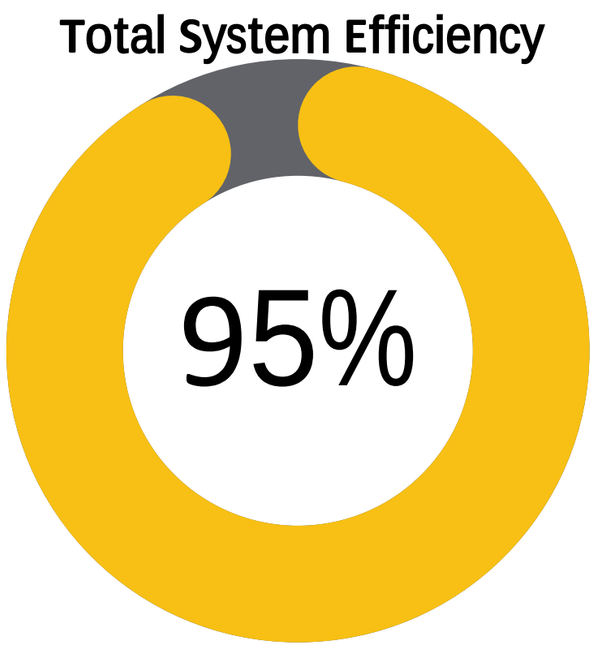
No	Technical Specification	Enge SolarBox
1	Solar Energy Support	Yes
2	Heating Capacity	5-90 Kw
3	100% Fresh Air Usage	Yes
4	Mixed Air Usage	Yes
5	Closed Air Cycle	Yes
6	Waste Energy Recovery	Yes
7	Dust and Particle Filter	Yes
8	Average Power Consumption on Sunny Days (Daytime)	0 kW
9	Average Active Power Consumption (Night-time)	1-20 kW

- The Enge Solar Heat Pump is a heating and ventilation system that integrates solar hot air collectors and a solar heat recovery unit.
- On sunny days, fossil fuel consumption is minimized thanks to the solar hot air collectors. When there is no sun, the solar heat recovery unit is activated to save on fossil fuels.
- Enge Solar Heat Pump systems operate with up to 95% efficiency in heating applications, depending on the usage area and location.
- Fresh air and mixed air ratios can be adjusted as needed.
- Hot exhaust air is recovered by the system to achieve energy savings.
- The system provides homogeneous ventilation, ensuring that the entire area is heated and ventilated evenly.
- The World Health Organization (WHO) has set a daily limit of 1000 ppm for CO_2 in indoor air. Being in an environment with CO_2 levels above 1000 ppm can lead to health problems. Our systems significantly reduce the CO_2 ratio by providing effective ventilation, creating a healthier indoor air environment.

ZERO FUEL, ZERO WASTE, ZERO CARBON

Enge Solar Heat Pump and Other Heat Pumps Comparison Table

Description	Enge Solar Heat Pump	Standard Heat Pump
Heating Capacity	2-90 kWh	6-75 kWh
Space Heating	15-70 °C	15-25 °C
Energy Savings	95%	40%
Solar Energy Usage	Yes	N/A
Energy Source	Sun + Air	Air Water Ground
Energy Consumption	Low	Medium
Space Ventilation	Yes	N/A
Space Cooling	Passive Cooling (Night)	Yes
Dehumidification of Ambient Air	Yes	N/A
Investment Cost	Low	High
Service Requirement	N/A	Yes
Maintenance Cost	N/A	Yes
Fluid Circulating in the System (Gas, Water, etc.)	N/A	Yes
Gas Leak Risk	N/A	Yes
Fire and Explosion Risk	N/A	Yes
Fossil Fuel (Electricity)	Low	High
Carbon Emission	N/A	Yes
Harm to Nature	N/A	Yes
Indoor Air Quality	Yes	N/A



APPLICATION METHODS OF THE ENGE SOLAR HEAT PUMP SYSTEM

1. Field Type Installation:

- Field type installation is ideal for large and open areas. In this type of installation, solar hot air collectors and solar heat recovery units are fixed to the ground, ensuring efficient use of the area. It is particularly preferred for large-scale commercial buildings, industrial facilities, and houses with large gardens. Field type systems provide maximum energy efficiency on sunny days and offer energy savings by heating and ventilating a large area homogeneously.

2. Wall Type Installation:

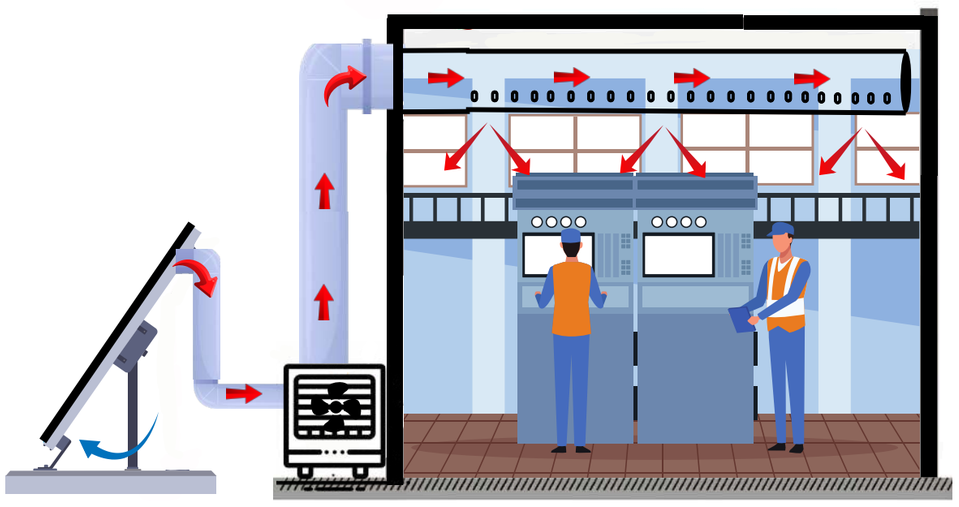
- Wall type installation is suitable for structures with more limited space. This installation type saves space by being integrated into the building walls and offers an aesthetic solution. Wall type systems effectively perform both heating and ventilation functions. They improve indoor air quality by reducing CO2 levels and protect the health of users.

3. Roof Type Installation:

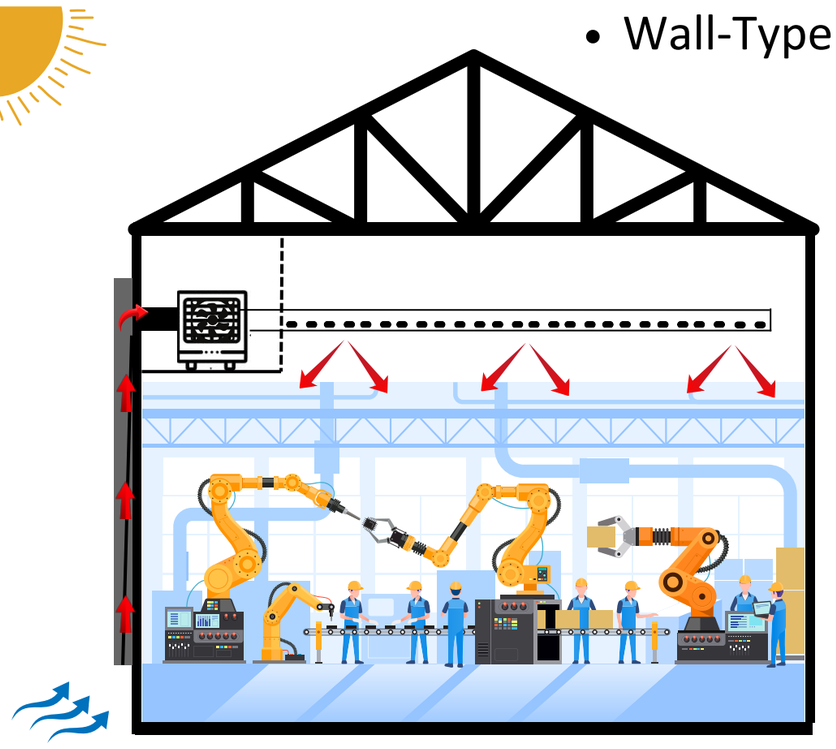
- Roof type installation involves systems mounted on the roof of the structure and is especially preferred in urban buildings and buildings with limited outdoor space. This type of installation is an excellent solution for collecting solar energy from the roof. While high efficiency is achieved through solar hot air collectors on sunny days, the solar heat recovery unit is activated when there is no sun, providing energy savings. Roof type systems significantly reduce the CO2 ratio and provide clean air by heating the air inside the building homogeneously.

All three installation types operate with up to 95% efficiency depending on the characteristics of the usage area and minimize fossil fuel consumption by providing energy savings.

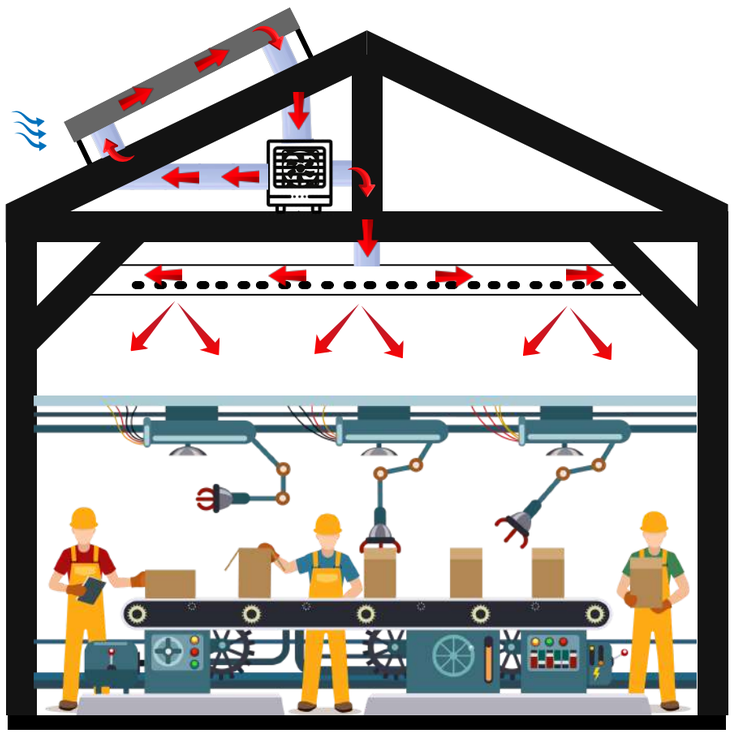
- Field-Type Installation



- Wall-Type Installation



- Roof-Type Installation



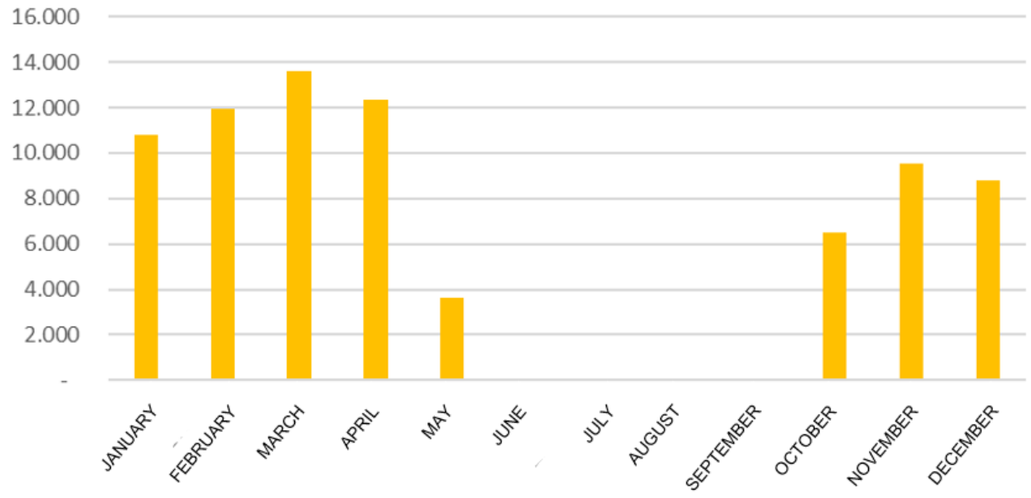
ENERGY EFFICIENCY OF ENGE SOLAR HEAT PUMP

SOLAR HEAT PUMP SYSTEM EFFICIENCY

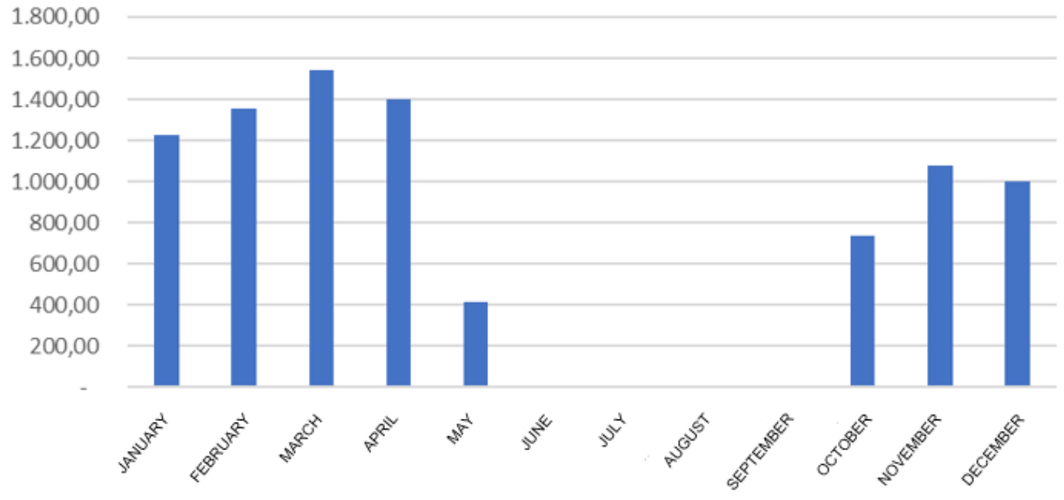
The table below has been prepared based on a factory area of 2,500 m² and a height of 10 m. The calculations were based on the general climate data for Turkiye. The operating temperature was assumed to be 20°C.

ACROSS TÜRKİYE	Total System Savings (kWh/month)	Saved Natural Gas (m³/Year)	Saved Lignite Coal (kg/Year)	Prevented Carbon Emission (Ton/Year)	Trees Reintroduced into the Natural Environment (Unit/Year)
JANUARY	83.989,26	9.516,57	14.446,15	19,22	46,65
FEBRUARY	81.055,83	9.184,19	13.941,60	18,55	45,02
MARCH	85.401,23	9.676,56	14.689,01	19,55	47,43
APRIL	71.072,79	8.053,04	12.224,52	16,27	39,48
MAY	27.659,93	3.134,06	4.757,51	6,33	15,36
JUNE	-	-	-	-	-
JULY	-	-	-	-	-
AUGUST	-	-	-	-	-
SEPTEMBER	-	-	-	-	-
OCTOBER	41.966,79	4.755,13	7.218,29	9,61	23,31
NOVEMBER	68.783,46	7.793,65	11.830,76	15,74	38,20
DECEMBER	74.840,24	8.479,92	12.872,52	17,13	41,57
TOTAL	534.769,54	60.593,12	91.980,36	122,40	297,03

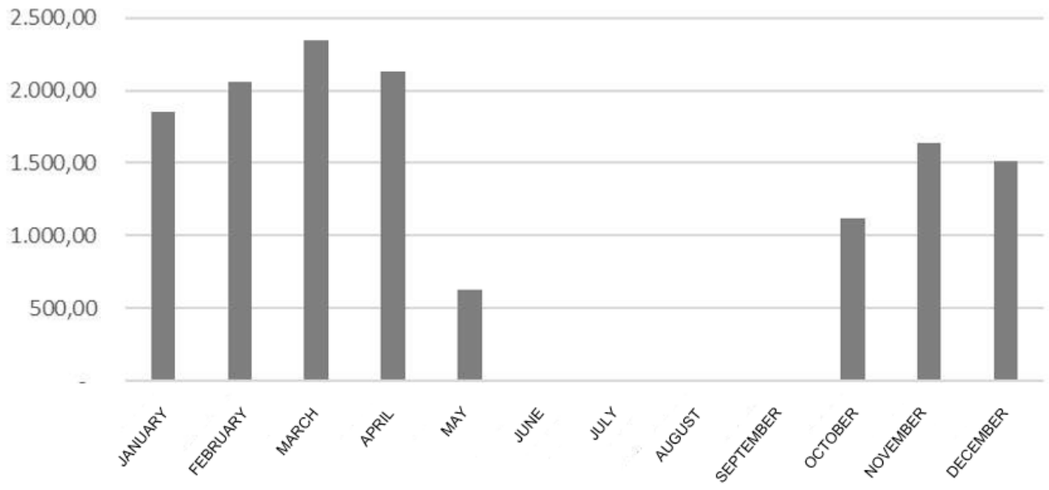
Total System Savings (kWh/month)



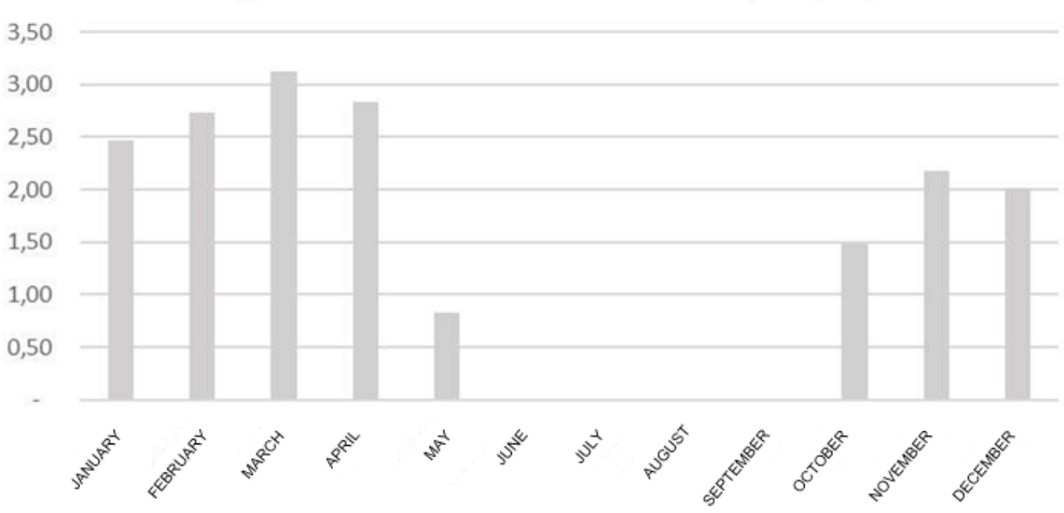
Saved Natural Gas (m³/Year)



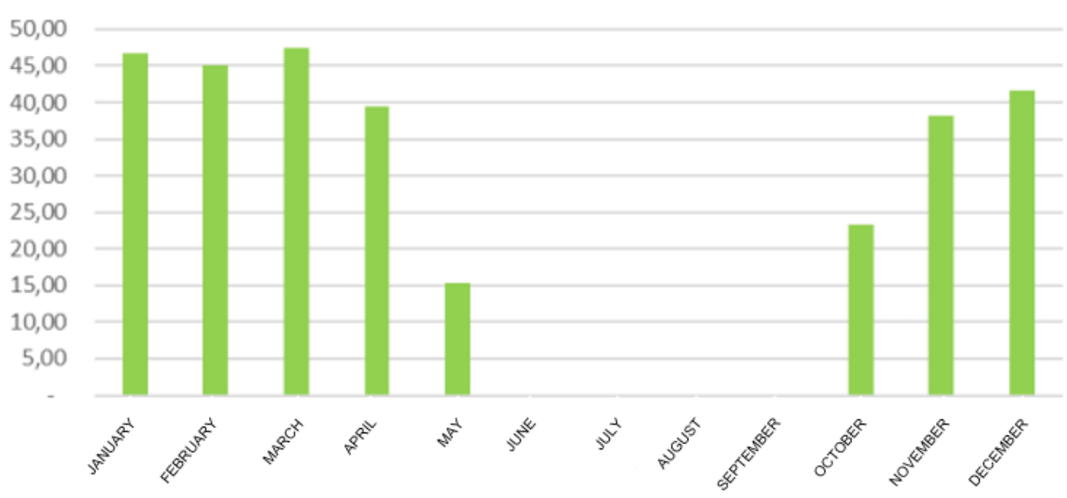
Saved Lignite Coal (Kg/Year)



Prevented Carbon Emission (Ton/Year)



Trees Reintroduced into the Natural Environment(Unit/Year)



The table below has been prepared based on the reference to a factory area of 2,500 m² and a height of 10 m. The calculations were based on the general climate data for Turkiye.

Total System Savings	**€21.207/Year**
Trees Saved Per Year	**297 Units**
Prevented CO_2 Emissions Per Year	**122 Tons**

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USAGE AREAS OF ENGE SOLAR HEAT PUMP

- **Automotive**

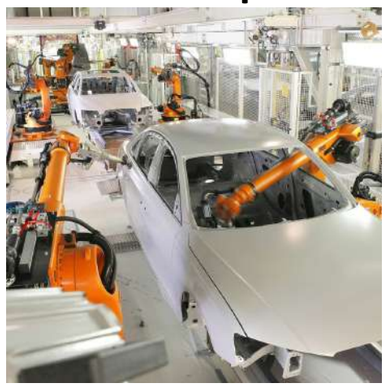
- **Machine**

- **Drying** Food

- **Residental**

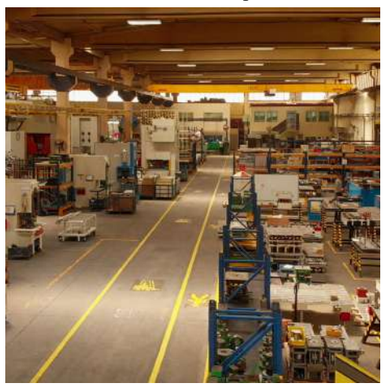
- **Greenhouse**

- **Paint Shop**



- **Curing**

- **Workshop**



- **Ceramics**

- **Showroom**

- **Pumice**

- **Tiny House**

- **Hospital**

- **Wood Drying**

- **Mining**

- **Food Processing**

- **Textile**

- **Paper**

- **Chemistry**

- **Hangar**

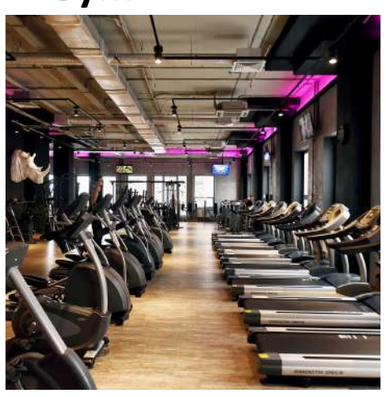
- **Leather Drying**

- **Construction**

- **Brick**

- **Hotel**

- **Gym**



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PROJECTS

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FORD OTOSAN

Heating and ventilation of Gölcük assembly building with Solar Thermal Wall

PROJECT INFORMATION

Project Volume: 2624 m²

Project Flow Rate: 477.568 m³/h

Trees Saved Per Year: 62 units

Prevented CO_2 Emissions Per Year: 25,23 tons

Thermal wall applications around the world by application area:

1st in Turkey

2nd in Europe

3rd in the World

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SARSILMAZ SİLAH SANAYİ

Heating and ventilation of the manufacturing section
with the Solar Thermal Wall

PROJECT INFORMATION

ENGESOLARBOX® Trapezoidal module-SBTM

Proje**ct Volume **120 m²

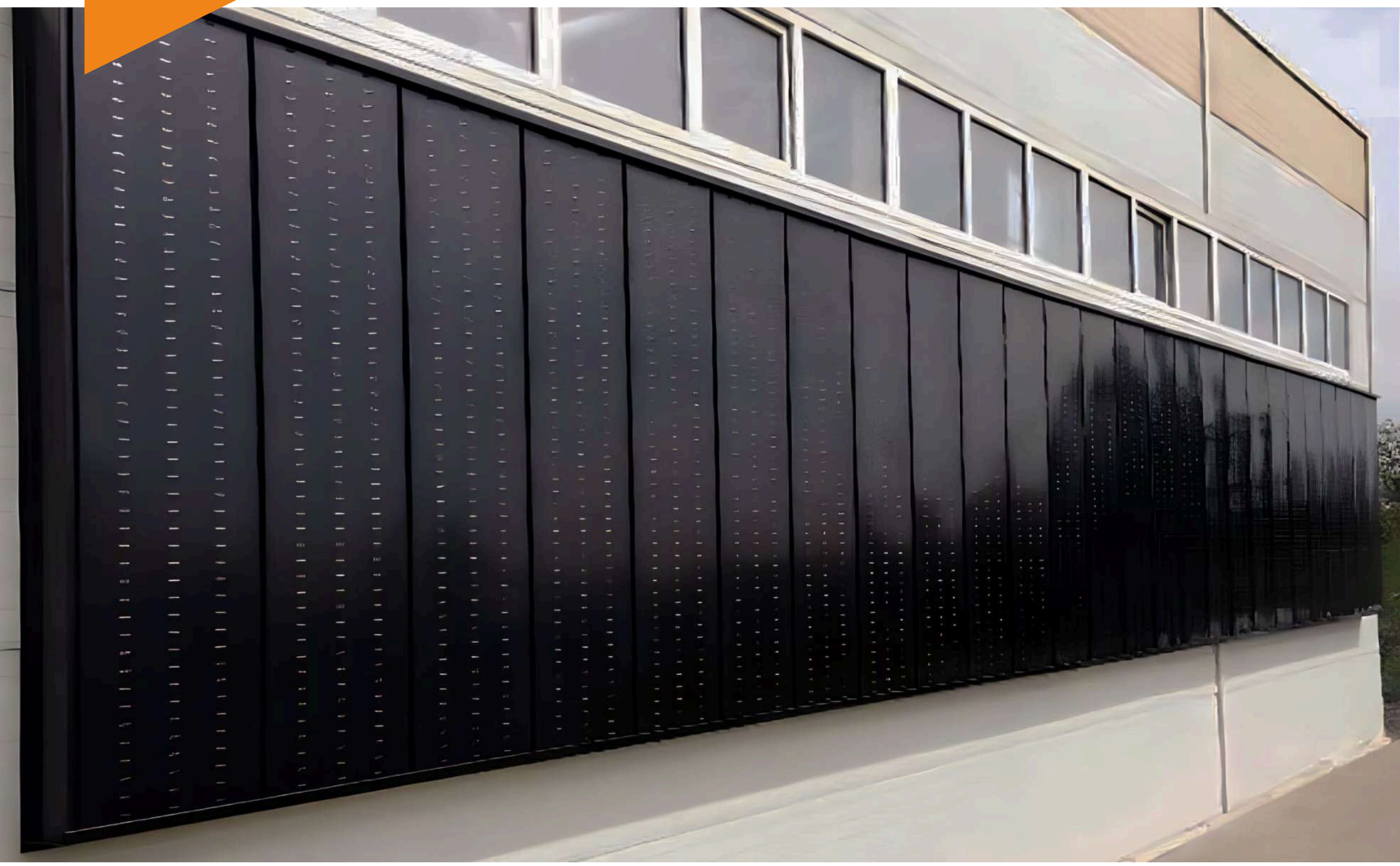
Proj**ect Flow Rate: **24.000 m³/h

*Trees Saved Per Year**: 62** units*

*Prevented CO_2 Emissions Per Year: **25,23 ton**s*

TURNA AHŞAP

TURNA AHŞAP



Heating and ventilation of the packaging section with the Solar Thermal Wall

PROJECT INFORMATION

ENGESOLARBOX® Omega Module-SBOM

Project Volume 48 m²

Project Flow Rate: 9.600 m³/h

*Trees Saved Per Year: **25** units*

*Prevented CO_2 Emissions Per Year: **10 tons***

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NEZUK

nezuk
GÜNEŞTEN GELEN DOĞAL LEZZETLER

Installation of a Natural Fruit and Vegetable Drying Facility with a Solar Heat Pump System

PROJECT INFORMATION

ENGESOLARBOX® Trapezoidal Glass Module-SBTCM

Project Volume: Average 1,000 kg/day of fresh produce

Operating Temperature: 40-65 °C

Project Flow Rate: 5,000 - 10,000 m³/h

Annual Number of Trees Saved: 127

Annual CO2 Emissions Prevented: 52 tons

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İBN-İ SİNA MESLEKİ VE TEKNİK ANADOLU LİSESİ

Heating the greenhouse of Ibn-i Sina Vocational and Technical Anatolian High School with a Solar Hot Air Collector

PROJECT INFORMATION

ENGESOLARBOX® Trapezoidal Glass Module-SBTCM

***Proje**ct Volume: **2** modules*

Proje**ct Flow Rate: **600 - 1250 m³/h

*Trees Saved Per Year**: 16** units*

*Annual CO_2 Emissions Prevented: **6,5 ton**s*

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