

# SUNOMAX2020

## ACTIVE ENERGY BUILDINGS

Zero carbon emission energy system



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May 2021



**SUNOMAX**2020

SUNOMAX has 14 times lower CO<sub>2</sub> emissions than alternative energy systems.

# SUNOMAX

## About

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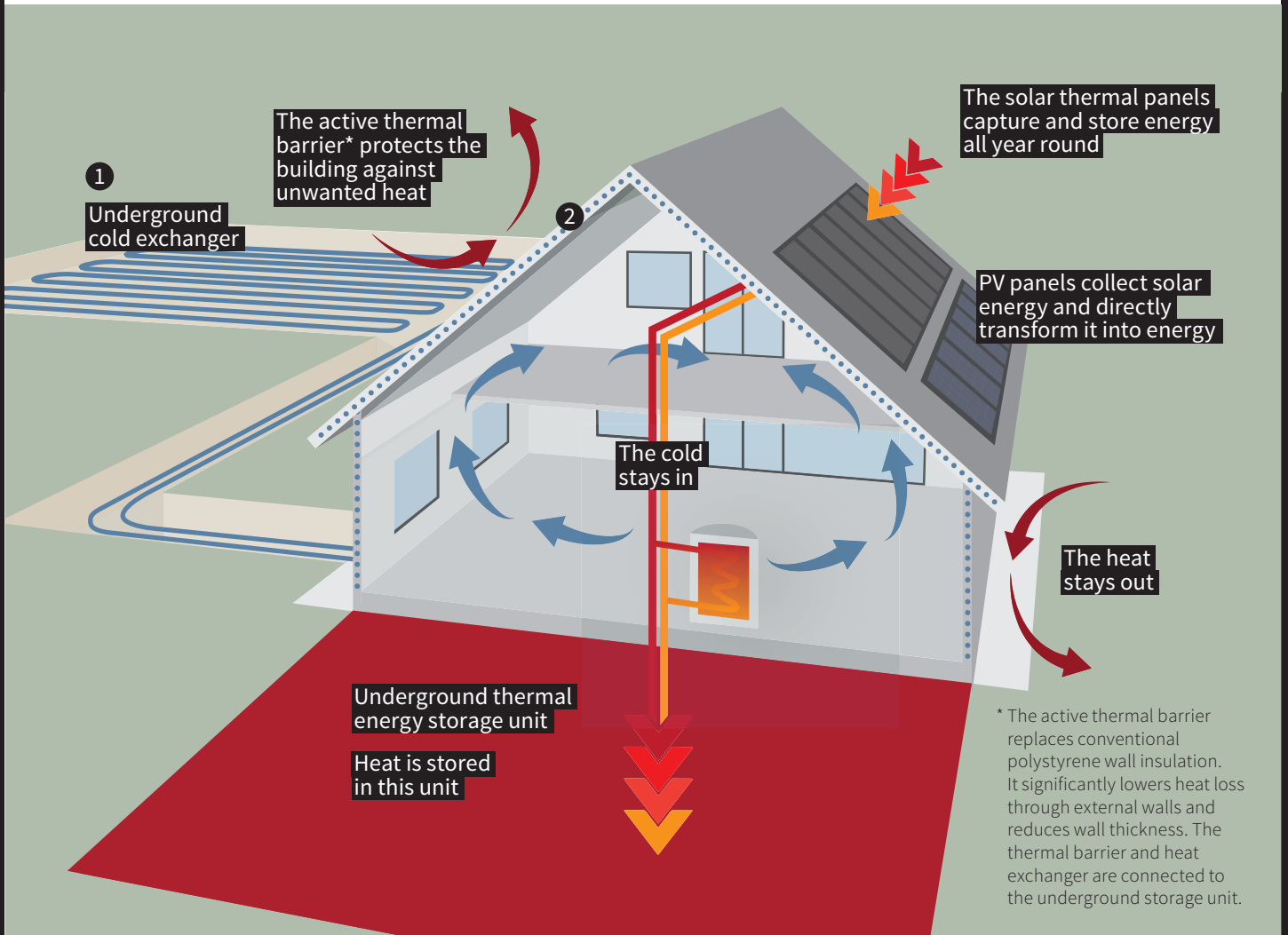
*SUNOMAX is a unique heating and cooling system that leverages solar and geothermal energy, and offers extremely high energy efficiency.*

**T**he system has a COP (coefficient of performance) of between 8 and 11 for heating and between 9 and 13 for cooling. Conventional heat pump systems have a COP of between 3 and 4.

The SUNOMAX system stores heat from solar energy for use when the sun is not shining. It reduces primary energy consumption by up to 80 % compared to conventional energy systems.



# HOW DOES IT *work* \_\_\_\_\_ *in summer*

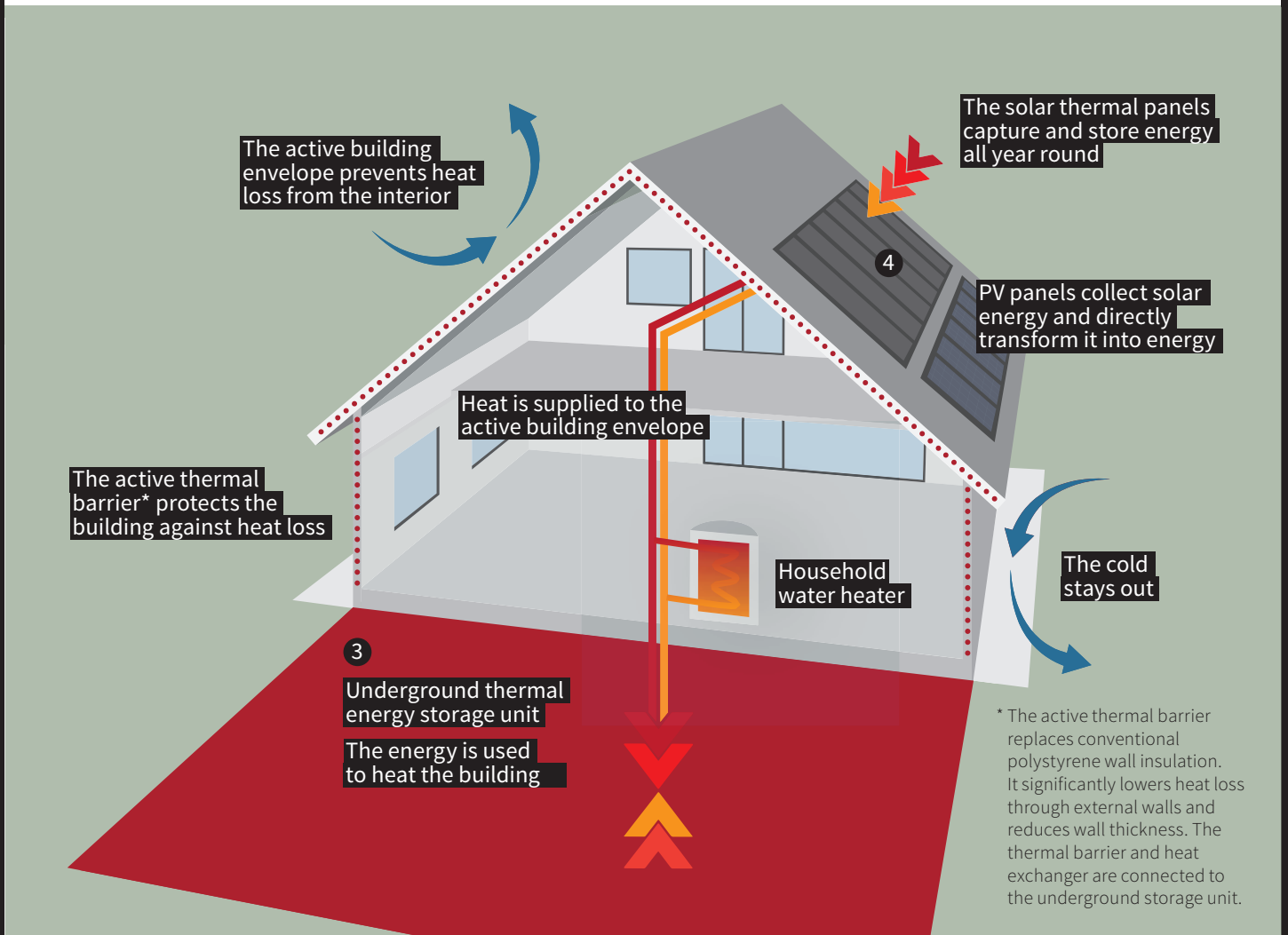


**1** Underground cold exchanger in ground



**2** Active thermal barrier against heat

# HOW DOES IT *work* \_\_\_\_\_ in winter



3 Underground thermal energy storage unit




4 Solar thermal panels

# SUNOMAX

## *Benefits*

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- up to 80% lower energy consumption compared to conventional energy systems
- zero carbon emissions
- very long service life and low operating costs
- there are no expensive components that need replacement during the system's service life
- we can manage system operation via an app for smartphones/tablets
- rapid investment payback (5 years)



SUNOMAX reduces costs  
for energy up to 80%



# WHY *now?*

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*New buildings must achieve nearly net zero energy status by 31 December 2020.\**

- The European Union directive requires all new public buildings to be zero net energy by 2018, and all new buildings generally to be zero energy after 2020.
- Net zero or active energy consumption can be achieved by efficient, high-quality thermal insulation and by using renewable energy sources in or near the building.

\*Directive (EU) 2018/844 of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency.



\*School in the west of Slovenia,  
close to the Italian border

# CASE

## *School in Nova Gorica\**

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**5.200 m<sup>2</sup>**

three upper floors +  
ground floor + basement

**89.658 €**

annual cost savings

**439.324 €**

increased cost due to  
investment in SUNOMAX  
technology

**4,9 YEARS**

for investment payback

**6,6 kWh/m<sup>2</sup>**

energy  
consumption  
per year

**4.593 €**

energy costs  
per year

# RESULTS/ *Case*

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## **COSTS EXPECTED**

### **For heating per year**

Expected heating costs for the original project (using district heating system)

= 58.252 €

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### **For domestic hot water per year**

Expected costs for domestic hot water for the original project (using district heating system + electric heater)

= 2.040 €

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## **COST SAVINGS**

(winter 2018/2019)

### **Actual costs for the SUNOMAX system**

(28 % heat pump operation,  
20% operation of underground thermal energy storage,  
52% operation of solar panels)

= 1.347 €

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**Savings 56.905 €**

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### **Actual costs for the SUNOMAX system**

(84% operation of solar panels +  
16% heat pump operation)

= 150 €

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**Savings 1.890 €**

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# RESULTS/ *Case*

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## **COSTS EXPECTED**

### **For cooling per year**

Expected costs for cooling for the original project (434 kW chiller)  
= 27.440 €

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### **For ventilation per year**

Expected costs for ventilation for the original project (ventilation systems with 60% waste heat recovery)  
= 6.520 €

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## **COST SAVINGS** (summer 2019)

### **Actual costs for the SUNOMAX system**

(groundwater free cooling)  
= 1.037 €

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**Savings 26.403 €**

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### **Actual costs for the SUNOMAX system**

(using ventilation systems with 90% waste heat recovery and retrofitted CO<sub>2</sub> sensors)  
= 2.060 €

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**Savings 4.460 €**

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# ENERGY *Consumption*

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- ventilation
- heating
- cooling
- hot water
- pumps
- control systems

**6,6 kWh/m<sup>2</sup>** per year

original project	231,218 kg CO <sub>2</sub> per year
SUNOMAX	14,717 kg CO <sub>2</sub> per year

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<b>Savings</b>	<b>215,501 kg CO<sub>2</sub> per year</b>
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EU-directive: net zero energy  
by 31. December 2020





# SUNOMAX2020





**SUNOMAX2020**



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