

Great heating efficiency, thanks to a Thermia heat pump



With Atec, Thermia's air source heat pump, Slovenian family can save up to 2 000 Euro on every heating season.

About

The following case study presents the annual performance of a Thermia air source heat pump installed in a family home in central Slovenia with typical insulation characteristics. The owner has recorded on a daily basis the status of all heat pump meters and temperatures. Based on his regular recordings the final annual results have been calculated. The results speak for themselves and demonstrate a consistent annual efficiency, better than most other heat pumps on the market.

The home and heating demand

The studied property is an average single-family house near Sevnica, Slovenia with a semi-basement ground floor, a second floor and a live in attic. The insulation of the house consists of 7,5 cm thick Styrofoam panels on the facade, the original double-pane windows and 15 cm thick mineral wool insulation in the attic. Before the heat pump installation, the 200 Sqm. premises had been heated with an oil boiler and out of the heating season, hot water was produced by means of solar panels. The annual consumption of the heating system was 1900-2000 liters of oil.

The old oil heating system was replaced with an air source heat pump, a Thermia Atec 13. In addition to the heat pump, an indoor "Plus" kit was installed (Plus: electric auxiliary heater 3-15 kW, Class-A circulation pump, 3-way valve), as well as a 300 liter domestic hot water tank. The owner decided to remove the old solar installation and use the heat pump as the only source of heating and domestic hot water for the house.

Thermia heat pump solutions are equipped with different electronic meters for measuring both the produced and consumed energy:



- Electricity meter, measuring the energy for the entire heat pump system (Countis E20)
- Calorimeter for measuring the obtained heat and domestic hot water with the function of also measuring the energy consumed for defrosting the outdoor unit (Enerkon CF Echo II Klima)
- Meter for measuring the consumption of domestic hot water
- Meter, measuring the operating time for each component of the heat pump
- Thermia Online - accessory for remote control of the heat pump

Day to day measurements

In the period from October 2013 to October 2014, the customer himself and with the help of his family recorded on a daily basis the measurements of sixteen parameters. The collected data gives a complete realistic picture of the functioning of the heat pump system

Fact Box

Location: Sevnica district, Slovenia

Heated area: 200 sq.m.

Heating System: 100% radiators

Heating System before the installation of heat pump:

Old oil boiler + Solar panels for hot water

Energy consumption before installation of the heat pump (oil consumption):
app. 18 000 kWh/year

Room temperature: 20-21°C

Heat pump installed:
Thermia Atec 13 + Atec Plus (indoor kit)

Hot water tank:
HP-SOL 300 (300 L, 4.4 m² the surface area of the coils)



in all operating modes, for each day of the year. Thanks to the diligence and persistence of our customer, we have received high quality, real data to perform a thorough analysis, the summary of which is presented below.

Measurements analysis

The heating in the house was set to ensure maximum comfort (24-hour heating), with the temperature, regulated by a heat curve, automatically adjusting to the fluctuations in the outdoor temperature, and domestic hot water kept at 55-58°C. The heat curve is adjusted for 3 different outdoor temperatures. The minimum flow temperature to the radiators

is set at 30°C when the outdoor temperature is at + 17°C, 40°C at 0°C and 55°C flow temperature at - 20°C. During the whole winter season, the indoor room temperature remains constant in ranging between 22 and 23°C, without night setback. Thanks to the installation of the heat pump, the house has never been so well heated, clearly evident from the data provided below.

SPF matters!

For the calculation of the Seasonal Performance Factor (SPF), we use the total heat produced, by the heat pump over a year: 20 410 kWh and then we divide the number by the total

electricity consumption of the heat pump: 6 135 kWh.

$$20\ 410\ \text{kWh} / 6\ 135\ \text{kWh} = 3,3$$

The seasonal performance factor for the 12-month period in this case equals 3,3 In calculating the SPF, we take into consideration all the energy consumed for the heating of the house, production of hot water, the auxiliary heater consumption, as well as the energy used for defrosting the outdoor unit during cold months. Seasonal Performance Factor (SPF), also known as annual efficiency, is a measure that describes how efficiently a heat pump works over a full year, during both warm and cold periods inclusive of hot water production.

SPF is the best way of measuring the true savings a heat pump provides.' - says Yasin Jodeh from Atlas Trading d.o.o. and added 'The data on the annual SPF as well as the other figures, shown in this case study enlighten any potential customer who is considering installing an air/water heat pump, with what to expect in terms of consumption and savings. The figures shown in this case study are real figures and not marketing figures taken from a datasheet.'

Energy savings with the Atec air source heat pump

Room temperature after installation of the heat pump	22-23°C
Total Heat, generated by the installed heat pump	20 410 kWh
Heat, produced by the heat pump	20 335 kWh (99,6 %)
Heat, produced by the auxiliary heater	75 kWh (0,4 %)
Heat consumption for defrosting	140 kWh (0,7 %)
Energy consumption before installation of heat pump (oil consumption):	6 135 kWh
Cost of electricity consumption of the heat pump	669 EUR
Seasonal Performance Factor (SPF)	3,30
Energy Savings	14 682 kWh (70 %)
Cost savings	2 061 EUR (76 %)

'SPF is the best way of measuring the true savings a heat pump provides... in this case study are real figures and not marketing figures taken from a datasheet'

says Yasin Jodeh, technical manager at Atlas Trading d.o.o.

Atlas Trading – your experienced partner in renewable energy in Slovenia

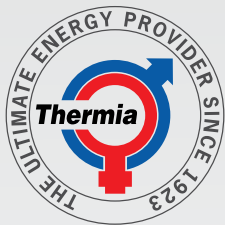
Atlas Trading I.l.c. is a leading Slovenian company in the distribution and installation of energy efficient heating and cooling systems. A family company, it is known for its innovation and finding solutions outside the established frameworks.

'A big advantage is the flexibility of our tailor-made solutions. Since our beginning, in the late 1980's, we have repeatedly launched onto the market innovative, high-quality and efficient products, which remain the reason why we are a pioneer in the industry of heating and cooling. and why we represent some of the most well-known brands for energy-efficient heating and cooling on the market today.' – says Yasin Jodeh, technical manager at Atlas Trading d.o.o.

In order to optimize the final solution being carried out, we keep an eye for detail throughout the entire investment process. The needs and requirements of the investor are always understood from the beginning. Examining the existing situation, we recommend a systemic solution with correct sizing, a comprehensively prepared execution plan, a complete operational test run with all the work carefully supervised to bring the system into full operation. Each step requires experience and expertise, so with the aim of ensuring quality, we employ some of the best experts.



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Thermia – heat pump manufacturer with 40 years of experience



With more than 90 years of history and experience in the energy sector, Thermia Heat Pumps offer renewable energy solutions for any climate, anywhere in the world. All Thermia heat pumps are designed, manufactured and rigorously tested in Sweden where one of the harshest European climates can be found.

Ever since the beginning, the driving force behind our business has been the philosophy of our founder, Per Anderson: “The products one releases must not only be the best of their time, but before their time, over time”.

At Thermia we are driven by this philosophy and our passion to deliver. For us every day is a new opportunity to create, build and serve a bigger purpose, for a greener and healthier planet, not only for ourselves but for everybody around us. Every challenge is Thermia's opportunity to make life a little more comfortable for our customers.

Thermia Heat Pumps

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