

ENERGY SAVING METHODS AND SYSTEMS

In response to your frequently asked questions "what will you do to keep warm on the cheap" you will I wanted to contact you with some opinions.

If there was something magical you would already know it and you wouldn't have to search still.

You hear different things from different people. Do you want to put an electric boiler, a heat pump, a pellet boiler, pellet or wood stoves, wood boilers... I got tired and still did not write the ion boilers the marble panels the radiators or individual oil unit, gas boiler but because you don't have natural gas then gas boiler, infrared radiators, air conditioners, electric underfloor heating... Now even I am confused... and wood boilers that are simple or with a fan, gasification, or pyrolysis with a storage tank or not ???... Your only criterion. Your neighbor and friend in the village who... put it and saved...

Okay do something! But with what suits you and what you can afford. You want to put pellets. Good decision. Do you have storage space? Or you will pay it "in oil". Because if you go to buy pellets in December and in January...you will just regret it but it will be too late. So you want storage space for pellets and much more for wood.

You are away often and leave your pregnant wife with the children at home and want to put in a wood boiler. You should probably think of something else as the woman will give birth prematurely if she goes downstairs 3-4 times a day to load the "wood boiler".

I will try to give you an idea below about the ways and means of heating so that you can see if it suits you and if you can afford it.

First, if your house is old and uninsulated, don't ONLY change the heating system. You must first shield your home with insulation and window frames. If your money is not enough for the insulation and the change-modernization of the heating system then (not in our favor, of course) but we suggest you proceed to the first part: closing the "hole", the energy-consuming heat loss that comes from poor or non-existent insulation.

So, when you take the first step and close the "hole", then we can also discuss the alternative heating cases and systems performance improvement and energy saving.

Who are they:

THERMOSTATIC SWITCHES-HEADS-THERMOSTATS

The simplest thing to do is to change your body switches and put in thermostats. You achieve this at a cost of €50 (including VAT) per body. At the same time, you can install a thermostat with a PID system (€100-200 depending on the model) which can even out the temperature difference between the opening and closing of common thermostats (there is a relevant informative PDF file at SIEMENS). So with a cost of 300-400€ depending on the number of radiators that will be installed (NOTE THAT NOT ALL THE PANELS YOU HAVE) thermostatic switches-heads you have significant savings and essentially amortization from the first year.

ELECTRIC BOILERS. IS POWER GOOD TODAY?

Many people ask what savings you will make if you install electric boilers. **WRONG QUESTION.** First ask: Is it possible for the power supply from the PPC in our house to "raise" such power as to cover with (generally) electric power devices, the power required by my radiators?

The answer from our experience is that if the apartment is over 50-60 sq.m. and depending on its location and its properties (external walls, insulation, ceilings, floors, etc.) **NOT COVERED BY ELECTRIC BOILERS, HEAT PUMPS** and other related things that cannot handle single-phase current, so 3-phase is required.

This is because it requires energy of more power than 6-8 kw and a conversion that only PPC can do (you can apply to PPC for an autopsy). **CAUTION:** All power products that are used for heating (electric boilers, ion boilers, radiators, heat accumulators, marble panels, infrared radiation, electric underfloor and I don't know what else) **EXCEPT FOR AIR CONDITIONERS AND HEAT PUMPS, OUR COMPANY'S VIEW IS THAT THE RELATIONSHIP OF PERFORMANCE TO CONSUMPTION IS 1KW : 1 KW THAT IS:** for every KWH you buy from PPC, it gives you 1KW for heating your home. Only your air conditioners that have a coefficient of performance (COP) 3 and 4 yield respectively 3 or 4KW for every KWH you buy from PPC. For anything to the contrary that they inform you, it is good to ask for **PERFORMANCE CERTIFICATES** and not assurances from sellers and manufacturers.

Electric boilers from our experience, and from the calculation below, had last year savings of around 15-20%

But let's do an example: Apartment 80 sq.m. in Thessaloniki with 5 panels 9,000kcal/h requires a 10kw boiler: 3-phase is required, and nighttime is also understood. Let's assume that the fluctuating kwh in collaboration with the night, gives us an average price of €0.12/kwh. Therefore for 8 hours operation per day with 70% active operation of the thermostat: $10\text{kw} * 8\text{h} * 0.12\text{€}/\text{kwh} * 0.70 = 6.72\text{€}/\text{day} * 30\text{ days} = 202 * 6\text{ months} = 1210\text{€}$

HEAT PUMPS AND PANELS. MYTHS REALITIES AND... LOTS OF WOOD!

If you visit the RADSON site, there is a very good video that explains in a very nice and illustrative way why heating with heat pumps is now compatible with radiators that were designed for high temperatures:

WHY DID THE INSULATION OF HOUSES CHANGE

A body that works with a supply temperature of 80°C and produces 1000 Kcal/h, when I change the supply temperature to 55°C its efficiency drops to 50%, i.e. it produces 500 kcal/h. If the installation of the panels is correct (humor this is) and it's based on the study (humor again) of the engineer you paid to do it for you (here you can laugh out loud) then the panels need to be replaced **IF YOU DON'T PROTECT THE HOUSE AND INSULATE IT** (we're back to square one of the article we were talking about the "hole"). If you insulate, yes, there will be heat pump and radiator compatibility **ACCORDING TO AN ENGINEER'S STUDY**.

But because you put the panels rich and over-dimensioned (here you laughed probably because you also remembered the over-dimensioned boiler that today you overpay for fuel) **IN MANY CASES THEY DON'T NEED A CHANGE**. But in other cases, because even here a study is needed today, to find out what is the degree of oversizing that was done, based on the elements of your house and if this oversizing can cover the house with a low temperature system. But in any case: **ARE YOU WILLING TO PAY €5,500-7,000 FOR A 100 SQM APARTMENT WITH 4-5 YEARS AMORTIZATION?** Because what they don't tell you is that the efficiency of heat pumps is 1.8-2.2 at ambient temperatures around 0°C and supply temperature at 55°C. Therefore, the payback time for low temperature installations (underfloor heating, fan coils) is different from installations with radiators. **IN ANY CASE DO NOT MAKE THE MISTAKE: IT SUCCEEDS THE NEIGHBOR SO IT WILL SUCCEED ME TOO** (here goes the ... a lot of wood).

Each house, each installation has its particularities, and you must turn to engineers who know the subject. I mention this because, like all branches, ours is often defamed by "bad professionals". In our area in recent years due to of the new systems, new "entrepreneurs" also entered. They used to sell shoes and clothes but today they don't have ... bread. So, they started their new activity of importing ... pellets and various things like that. You cannot know them, but we discover them every day.

I don't want our profession to be "closed", but I also don't want "fruit sellers" in the field to be played by experts (otherwise I have nothing against this noble class). I did an investigation because you were coming into my store and saying "strange" things to me. I don't know if it's unethical, but I did the client in one instance. The dialogues below are real and took place with a seller of heat pumps and even conventional ones (not inverters) without performance certification:

"customer": hello. Is this a heat pump?

seller: indeed.

"customer" How much does it cost?

seller: How many square meters is your house?

"customer": 105

seller: You want it together with this container (but how did he know, I didn't tell him where it is or the floor...!!!) and it costs €4500. (The container was given again because the pump was conventional)!

"customer": Is it also given for panels?

seller: Of course. Grab it to see how hot it gets. (He had put a sample in the shop connected to the outdoor unit to work inside the shop and not in the environment!!!)

"customer": Yes. It really burns. What temperatures does it work and what degree of efficiency does it have?

seller: Performs at 55°C. Efficiency rating is about 4 (meaning COP all serious companies have COP above 4 at 35°C supply)

"customer": My house is in Amyntaio and you know we have low temperatures there.

seller: Don't be afraid. It also performs at -15°C. We put her in a house in Lagyna of 240 square meters and she burned €1200 all year.

"customer": Yes, but what degree of performance does it have below -5°C

seller: At least 2.5 (let me inform you that HITACHI which I consider to be one of the top KAI EINAI INVERTER has below 2 at 55°C BUT IT HAS EUROVENT i.e. performance certificate)

"customer" Yes, very nice (so I didn't hide my excitement). My panels (I meant heaters) won't need augmentation (I meant oversizing)

seller: Of course not. Already the panels in our homes are 30-40% bigger.

COMMENTS: ... A LOT OF «WOOD»!

Our company does not have such good salesmen. But it has know-how, responsibility and good engineers. We won't set sales records or... save money. We won't play with your money, we never have, let alone these days. But we will last, we will continue to do this profession (with all the adversities), we will expand our knowledge daily (otherwise it is not possible) and we want to have (the ones we have) happy customers.

Conclusion. The heat pump in combination with panels is used in well-insulated houses, it is beneficial, but the payback time is longer compared to low temperature installations (e.g. underfloor), possibly some panels need to be changed and installed larger, an INVERTER WITH EUROVENT heat pump is required which is proven to work in 55°C and a very capable backup (resistors or boiler) is required especially in places with extremely low temperatures.

The installation cost, depending on the pump, its power, and its type, in a 100 square meter house in Thessaloniki without changing panels can start from €5000.

HEAT PUMPS AND LOWER INSTALLATIONS TEMPERATURES = ONE WAY

Those of you who have had the luck, the update or for whatever reason have already installed floor heating or fan coils calculated for low temperatures the heat pump is ONE WAY. If your heating is oil-based, visit us to find an economical way to install a HEAT PUMP. If according to the old data, the payback was 3 to 4 years, today we are talking about even less (and let's increase the current by 10 and 20%).

HEATING WITH AIR-AIR AIR CONDITIONERS. THE BEST SOLUTION FOR THOSE WHO CAN STAND IT

The well-known splits. We have installed thousands. We have sold tens of thousands. But not for 100% heating, especially in our areas (Northern Greece) but for cooling and heating assistance. Not because they don't or because they won't perform but because I (personally) don't like air heating. But it doesn't stop being something personal. Let's land.

Today, unfortunately, we first look at our pocket and what we will do to keep warm. Unfortunately, it has gone to the second stage is well-being. Really, how many of you or your acquaintances and friends went out last year with the thermostat at ... 16°C?

How many kept the rooms "closed" and slept together in the living room with the fireplace so as not to keep the radiators on? Last year with €1000/ton. This year with 1400€/ton? (I will not continue so as not to politicize the issue).

For the moment, heating with air conditioners (inverter of course) is the most economical. With a COP that starts from 4-4.5 (at 7°C outside temperature) and a cost for a house of 80-100m² 1500-2500€ (3-4 FUJITSU OR GREE machines) the consumption is incomparably lower than anything else.

Let's make an example.

A 9-car consumes 0.7kw/h

An 18-gauge consumes 1.5kw/h

If in a house, we install two 9 air conditioners and one 18 air conditioner with 10 hours FULL operation per day then with an average electricity value of €0.12/kwh: $(2*0.70+1*1.5) \text{ kw} * 10\text{h} * \text{€}0.12/\text{kwh} = \text{€}3.48/\text{day} * 30 = \text{€}104/\text{month} = 626 \text{ €}$ in 6 months.

MELETIS KATSOULIS