

How to lower  
carbon footprint  
and increase  
energy efficiency  
of your heating  
system

2

REPLACEMENT  
OF  
HEATING SYSTEMS



# GUIDELINE

These guidelines were developed within the BB-Clean project to help the end user. 4 guidelines are focused on the important topic of reducing emissions, especially when heating with biomass (PM – particulate matter).

The decision for a heating system for the next 15-20 years is often a difficult task. A change of the heating system is always an investment and should not turn into a cost trap in the end [1]. Below are some guidelines to help you make better actions.

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# 01

## THERMAL INSULATION FOR OLD BUILDINGS



Replacing of a heating system should be combined with a new insulation of a building. Therefore, the principle is always:

**First the buildings' envelope,  
then the buildings' inner scope!**

With subsequent insulation there is a risk that the new heating system already installed will be oversized and will work inefficiently!

Therefore, a comprehensive refurbishment (e.g., roof refurbishment, insulation of top floor and cellar ceiling, external wall insulation, exchange of windows) can reduce the heating costs by 50 - 80%. Due to the reduced heat demand, a usually more economical boiler, heat pump or even a solar thermal plant with a smaller output can be purchased. [1]



## 02

### REPLACEMENT OF OLD HEATING BOILERS

biomass as well as fossil burners

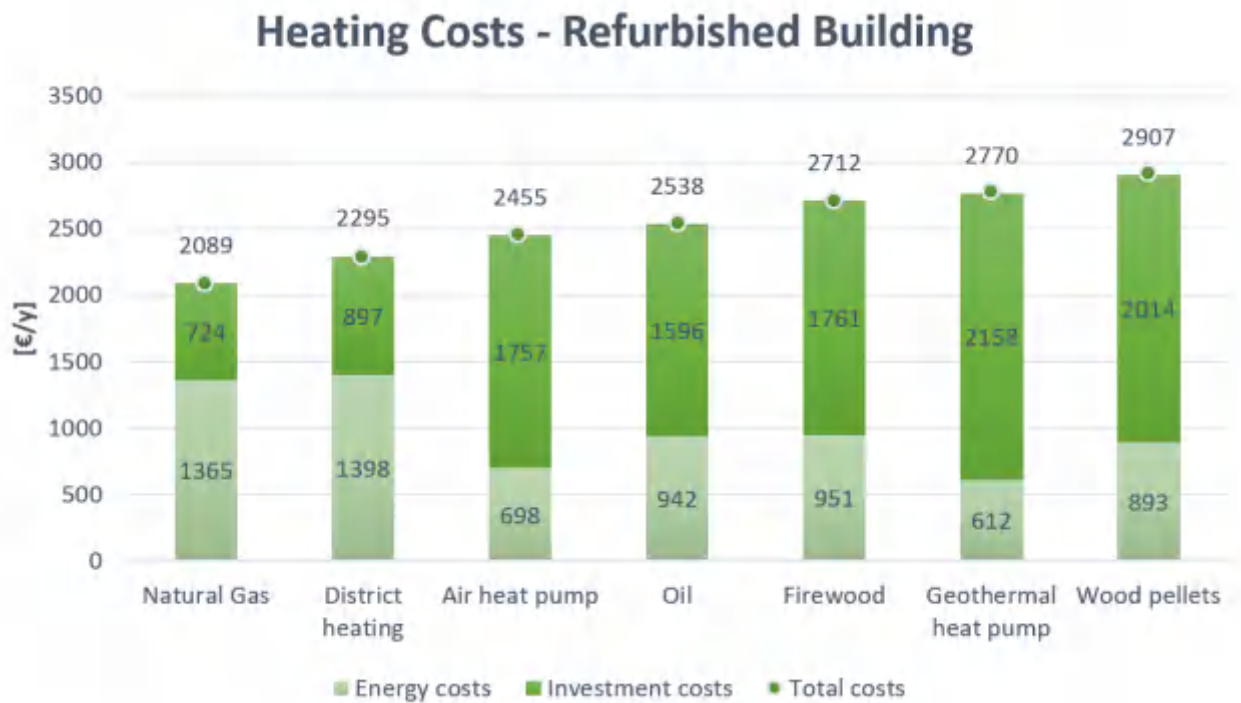


After the refurbishment of the building, the replacement of old boilers is the next step. If the boiler is older than 15 years, the replacement pays off. The technical development within 15 years is enormous! Old boilers have often a very high energy demand, especially if they are oversized, run independently of actual demand, and have poorly insulated distribution pipes in unheated rooms. At least 10 - 20% savings can be achieved with a new boiler alone. If the existing boiler is very old, even 30 - 40% savings are possible. [1]

**Refurbishment of building and exchange of heating system:  
50-80% energy cost savings!**



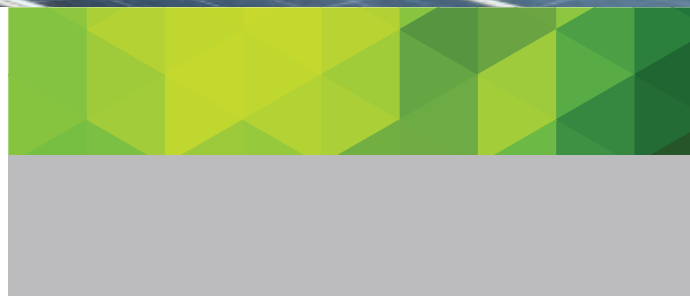
In a period of 20 years the following heating costs per year according to a refurbished single-family house (heating demand: 50 [kWh/m<sup>2</sup>\*y]) occur. It is obvious that the heating costs differ from the cheaper gas and district heating to the more expensive biomass types.



Heating costs per year of a refurbished building in Austria. [2]



## 03 SUBSIDIES



For renewable heating systems such as biomass (wood pellets, firewood), heat pumps or solar thermal plants subsidies are available which reduces the investment costs to a certain degree. In some countries subsidies for the exchange of the heating system and the replacement of old oil boilers (e.g. “Raus aus Öl” in Austria) can be combined with refurbishment subsidies.

Find out the requirements to get subsidies!



# 04

## REPLACEMENT OF HEATING SYSTEM RESPONSIBLE FOR GREENHOUSE GAS EMISSIONS OR ABBREVIATION (GHG)

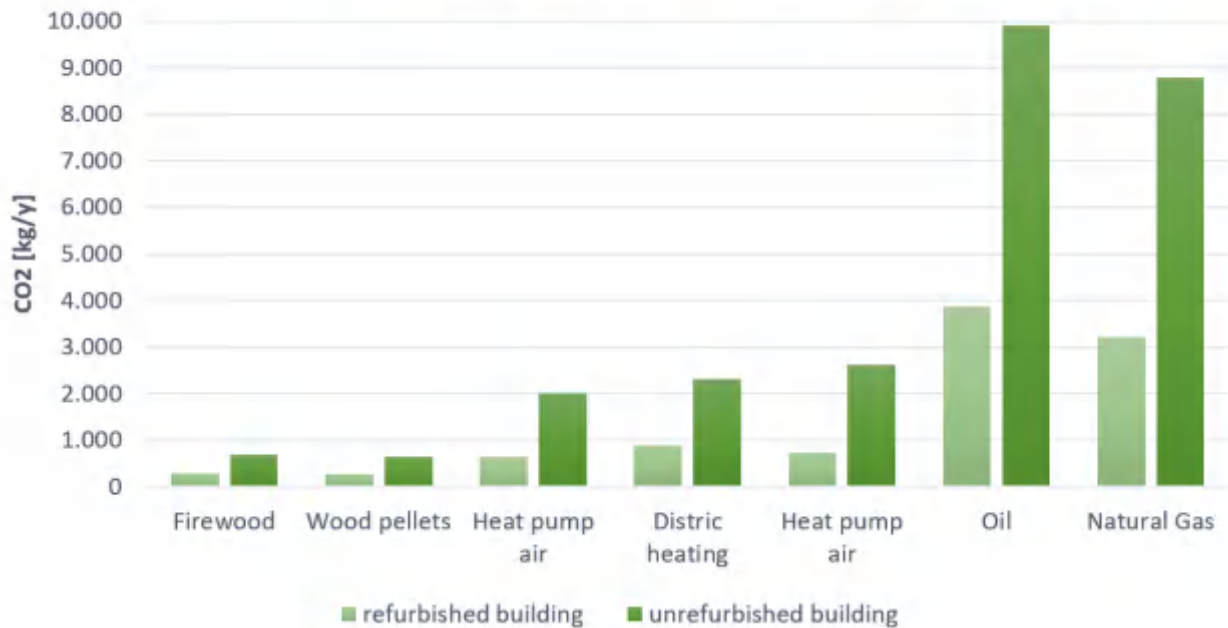


Another aspect beside heating costs and the suitability of the heating system (high/low temperature system) to the heating demand of the house is the effect of the new heating system on the climate change. This can be indicated by the greenhouse gas emissions that are released throughout a year. A lower heating demand in a refurbished building leads to a lower emission of greenhouse gases but it is obvious that greenhouse gases emissions due to oil and gas boilers are 10 times greater than those ones due to biomass appliances.





## Greenhouse Gas Emissions - Heating systems



Greenhouse gas emissions of different heating systems. [3]

Especially the change from an oil heating system to a similarly comfortable low emission (heat pump, firewood, wood pellets) heating system amortize with present energy prices fast. Due to the high energy density of pellets, often no additional storage room is necessary. [1]

**Ask for advice from an energy consultant!**  
**Investment in heating system is always an investment in the future!**

# LITERATURE



For more information visit BB-Clean website:

<https://www.alpine-space.eu/projects/bb-clean/en/home>

1. Energieagentur Steiermark, „Ratgeber H2 – Heizungstausch.“  
[http://www.net-eb.at/download/Ratgeber/H2\\_Heizungstausch.pdf](http://www.net-eb.at/download/Ratgeber/H2_Heizungstausch.pdf)
2. Austrian Energy Agency, „Heizkostenvergleich - Thermisch saniertes Gebäude.“  
<https://www.energyagency.at/fakten-service/heizkosten/thermisch-saniertes-gebaeude.html>
3. Austrian Energy Agency, „Heizkostenvergleich: THG-Emissionen.“  
<https://www.energyagency.at/fakten-service/heizkosten/thg-emissionen.html>

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