

# The replace project

Making heating and cooling for European consumers efficient, economically resilient, clean and climate-friendly



[replace-project.eu](https://replace-project.eu)

---

*Disclaimer: The views expressed in this presentation are the sole responsibility of the author and do not necessarily reflect the views of the REPLACE consortium*



This project has received funding from the European Union's Horizon 2020 Research and innovation programme under grant agreement No 847087.



# Content

---

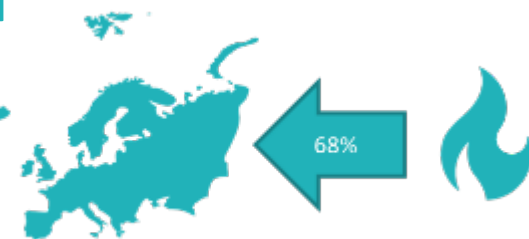
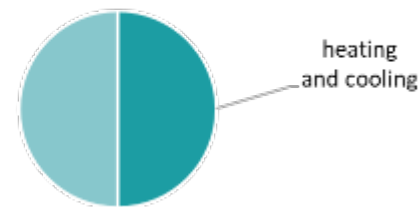
- **The **replace** project** (challenges, objectives etc.)
- **Our offer** (tools and information materials)
- **replace in action** (replacement campaigns in pilot regions)



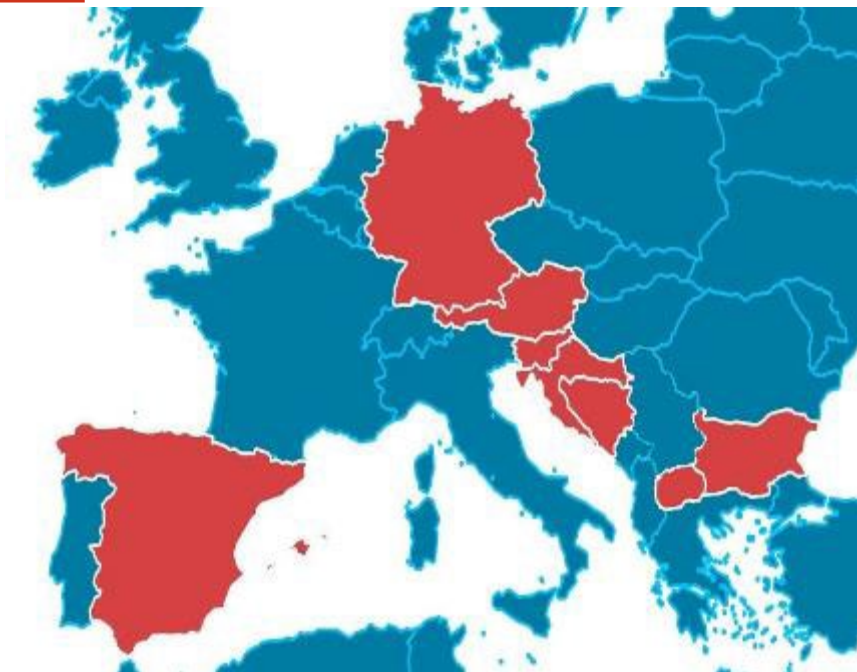
# Situation on the European space heating market

- Heating and cooling sector (HC)
  - causes 50% of the European final energy consumption,
  - is responsible for over 68% of all natural gas imports.
  - 80 million out of 120 million installed space heating systems in Europe only achieve C or D label class.
- **replace** aims to **boost the phase-out of inefficient and old heating systems** by targeting consumers, investors & owners as well as intermediaries and **helps them to make informed decisions.**

European final energy consumption



# The **replace** project - 11 partners in 8 countries, with different market development and socio-economic conditions



25.10.2022

**replace**

Page 4



## Our Objectives

---

- Space and tap water **heating** in **residential households** shall become **independent from energy imports**
- Green **heat shall come from close to home**, cleanly and efficiently from one's own roof, garden, soil or local forest



## The Challenge & Our Solution

---

- **Households** need **easy access** to product-neutral **know-how** to **take informed decisions** to quickly **end dependency** by local energy sources
- **replace supports informed decision making** by providing information about **sustainable solutions**, **tools** to find the most suited one, and **best practice examples** to learn from



...and what do we offer?

How does **replace** address the current energy crises, concretely?



25.10.2022

**replace**

Page 7

# Tools and info materials support all replacement actors to make informed decisions

---

- **Heating matrices** (which heating system fits to my house)
  - [replace-project.eu/replace-heating-matrix](https://replace-project.eu/replace-heating-matrix)
- Replace Your Heating System **Calculator** (an easy do it yourself energy advice)
  - [energieinstitut.at/tools/Replace](https://energieinstitut.at/tools/Replace)
- Heating replacement **Handbook** for **end consumers** & **Handbook** for **professionals**
  - [replace-project.eu/technology-guides](https://replace-project.eu/technology-guides)
- **Best Practice Examples** of heating system replacements
  - [replace-project.eu/best-practice/](https://replace-project.eu/best-practice/)





**replace** tools and product-neutral information is available  
 in **national languages for 8 countries** (inhabiting > 8 million people)



COUNTRY	TARGET REGION	INHABITANTS
AT	Federal State of Salzburg	550,000
DE	Bavarian Oberland	446,000
ES	Castilla y León	2,440,000
HR	Primorsko goranska County	300,000
	City of Zagreb incl. three bordering counties	1,400,000
BA	Canton of Sarajevo	400,000
BG	Rhodope Mountain Region	400,000
SI	Slovenia	2,070,000
MK	Skopje Region	200,000
<b>TOTAL</b>		<b>8,206,000</b>



# Enabling an independent **replace**ment advice

## Get your independent **advice**

---

- **Services often not available in ones region**
  - Therefore →
- **Alternative / add-on **replace** offer**
- **Do it yourself**
  - Heating matrices
  - Heat Cost Calculator





A **renewable energy based heating system** – be it an oven, an in-house boiler or a connection to district heat – not only brings a **clean, liveable environment** but **cost savings, comfort and cosiness**.

**On top** it delivers **independence and supply security**.

All that is made **possible with energy from your region**: whether being it **solar** energy, **biomass** or **ambient heat** (made available with renewable electricity) via a **heat pump** or a **connection to** (soon) **renewable district heat** network



## replace Tools -

### Interactive online Heating matrices (II)

In the Heating Matrices the **climate-friendly heating systems** are classified in a **traffic light system**. Gradation is based on a criteria, like energy efficiency, heating comfort, investment and CO<sub>2</sub> emissions.

Clean heating systems with **dark green fields** support **high energy efficiency**, **very low CO<sub>2</sub> emissions**, **low investment** and **high heating comfort**. Heating systems **with yellow fields** are only **conditionally recommended**, and those with **red fields** are **not recommended** – due to inefficiency or criteria non-compliance.

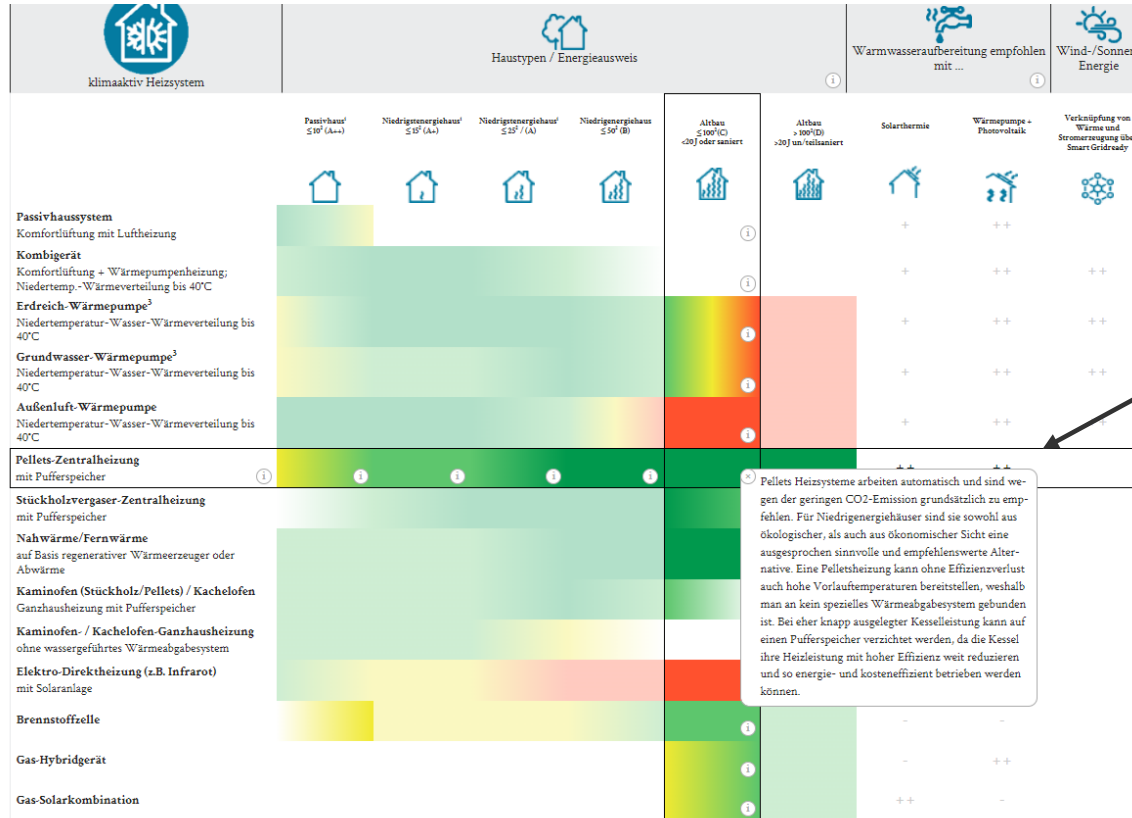


# replace Tools - Interactive online Heating matrices (III)

klimaaktiv Heizsystem	Haustypen / Energieausweis				Warmwasseraufbereitung empfohlen mit ...		Wind-/Sonnenergie		
	Passivhaus <sup>1</sup> ≤19 (A++)	Niedrigstenergiehaus <sup>1</sup> ≤15 (A+)	Niedrigstenergiehaus <sup>1</sup> ≤15 (A)	Niedrigstenergiehaus <sup>1</sup> ≤10 (B)	Altbau (≤100°C) >10J oder saniert	Altbau (>100°C) >10J un/saniert	Solarthermie	Wärmepumpe + Photovoltaik	Verknüpfung von Wärme und Stromerzeugung über Smart-Gridready
<b>Passivhaussystem</b> Komfortlüftung mit Lüftheizung <b>Kombigerät</b> Komfortlüftung + Wärmepumpenheizung; Niedertemp.-Wärmeverteilung bis 40°C									
<b>Erdreich-Wärmepumpe<sup>3</sup></b> Niedertemperatur-Wasser-Wärmeverteilung bis 40°C							+	++	++
<b>Grundwasser-Wärmepumpe<sup>3</sup></b> Niedertemperatur-Wasser-Wärmeverteilung bis 40°C							+	++	++
<b>Außenluft-Wärmepumpe</b> Niedertemperatur-Wasser-Wärmeverteilung bis 40°C							+	++	++
<b>Pellets-Zentralheizung</b> mit Pufferspeicher							++	++	
<b>Stückholzvergaser-Zentralheizung</b> mit Pufferspeicher							++	+	
<b>Nahwärme/Fernwärme</b> auf Basis regenerativer Wärmeerzeuger oder Abwärme							+	++	
<b>Kaminofen (Stückholz/Pellets) / Kachelofen</b> Ganzhausheizung mit Pufferspeicher							++	+	
<b>Kaminofen- / Kachelofen-Ganzhausheizung</b> ohne wassergeführtes Wärmeabgabesystem							+	++	
<b>Elektro-Direktheizung (z.B. Infrarot)</b> mit Solaranlage							++	++	
<b>Brennstoffzelle</b>							-	-	
<b>Gas-Hybridgerät</b>							-	++	
<b>Gas-Solarkombination</b>							++	-	

Sehr Empfehlenswert 
 Empfehlenswert 
 Weniger Empfehlenswert 
 Nicht Empfohlen 
 Technisch Nicht Sinnvoll

# replace Tools - Interactive online Heating matrices (IV)



Mouse-over info explains what users should look out for when choosing a certain heating system or why exactly a system is recommended or not recommended.

Pellets Heizsysteme arbeiten automatisch und sind wegen der geringen CO<sub>2</sub>-Emission grundsätzlich zu empfehlen. Für Niedrigenergiehäuser sind sie sowohl aus ökologischer, als auch aus ökonomischer Sicht eine ausgesprochen sinnvolle und empfehlenswerte Alternative. Eine Pelletsheizung kann ohne Effizienzverlust auch hohe Vorlauftemperaturen bereitstellen, weshalb man an kein spezielles Wärmeabgabesystem gebunden ist. Bei eher knapp ausgelegter Kesselleistung kann auf einen Pufferspeicher verzichtet werden, da die Kessel ihre Heizleistung mit hoher Effizienz weit reduzieren und so energie- und kosteneffizient betrieben werden können.

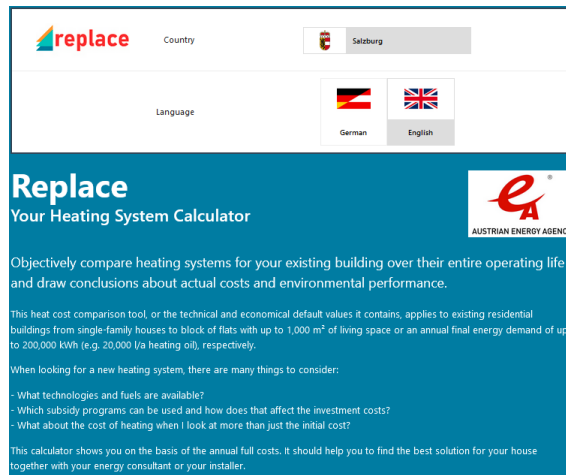


# Quick & Expert modus Check economic **replace**ment viability

(including any financial support)

# replace approach to support informed decision making

- **Replace** Your Heating System **Calculator**
- Supports an **easy do-it-yourself energy advice** (free of charge)
- [energieinstitut.at/tools/Replace](https://energieinstitut.at/tools/Replace)



replace Country Salzburg

Language German English

## Replace Your Heating System Calculator

**eA** AUSTRIAN ENERGY AGENCY

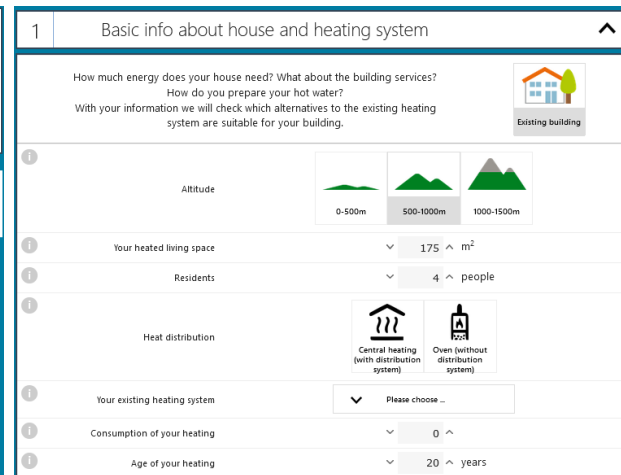
Objectively compare heating systems for your existing building over their entire operating life and draw conclusions about actual costs and environmental performance.

This heat cost comparison tool, or the technical and economical default values it contains, applies to existing residential buildings from single-family houses to block of flats with up to 1,000 m<sup>2</sup> of living space or an annual final energy demand of up to 200,000 kWh (e.g. 20,000 l/a heating oil), respectively.

When looking for a new heating system, there are many things to consider:

- What technologies and fuels are available?
- Which subsidy programs can be used and how does that affect the investment costs?
- What about the cost of heating when I look at more than just the initial cost?

This calculator shows you on the basis of the annual full costs. It should help you to find the best solution for your house together with your energy consultant or your installer.



### 1 Basic info about house and heating system

How much energy does your house need? What about the building services?  
How do you prepare your hot water?  
With your information we will check which alternatives to the existing heating system are suitable for your building.

Existing building

Altitude: 0-500m, 500-1000m, 1000-1500m

Your heated living space: 175 m<sup>2</sup>

Residents: 4 people

Heat distribution: Central heating (with distribution system), Oven (without distribution system)

Your existing heating system: Please choose ...

Consumption of your heating: 0

Age of your heating: 20 years

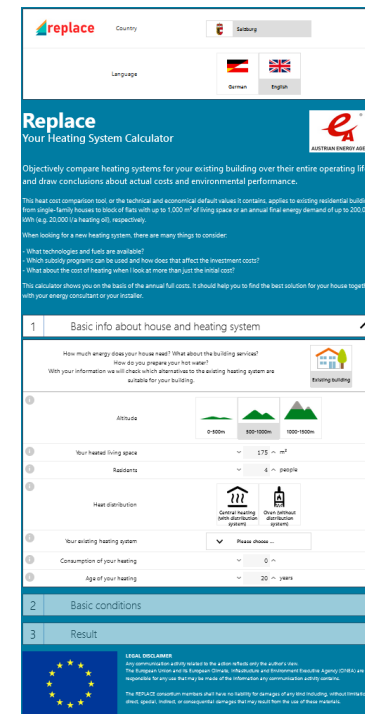


# The Replace Your Heating System Calculator



## Scope

- Giving **orientation and enable informed decisions** in the **residential heating sector** (consumers, investors, owners etc.)
  - **Replacement of an existing, old**
    - fuel oil, natural gas,
    - electric, coal or log-wood
    - **heating system** (boiler or ovens; depending on region)
- by **new, clean and climate-friendly** solutions.



# The Replace Your Heating System Calculator

## Features

---



- Based on the Austrian klimaaktiv [Hexit calculator](#) (of the Ministry for Climate Action).
- The **calculator is tailored** to the situation
  - in **8 European pilot regions** (AT, BiH, DE, BG, ES, HR, MK, SL) and
- **works in 8 languages** (incl. EN for every region)
- features **technical and economical default values**
  - applying to heating system renovations in residential buildings,
  - ranging from single-family houses to
  - block of flats with up to 20,000 l/a heating oil equivalent (i.e. 20 MWh/a).



# The Replace Your Heating System Calculator

## Scope

---

- Regarding a new heating system, **many things to consider**:
  - What **technologies and fuels are available**?
  - Which **subsidy programs** can be considered, how does that affect costs?
  - What about the **cost of heating** when I look at **more than just the initial costs**?
- **replace** calculator gives **answers based on annual “full” heating costs**:
  - **Not just fuel cost comparison**, investment and subsidies are considered too
- Enables you to **find the best solution for your house**
  - Ideally, together with your energy consultant or your installer.



# “Quick mode” - You need no previous knowledge

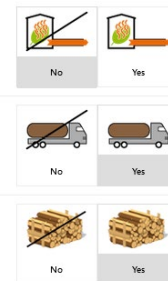
## In just 3 steps - by easily defining

### Step 1: Basic Info

- the **actual energy consumption** of the heated building
- the **type** of existing **heat distribution/emitter** and of hot water preparation system

### Step 2: “Fuel” options

- possible **connection** to a local or **district heating** network
- **accessibility** with a **wood pellets** lorry
- availability of a solid **biomass fuel storage** room



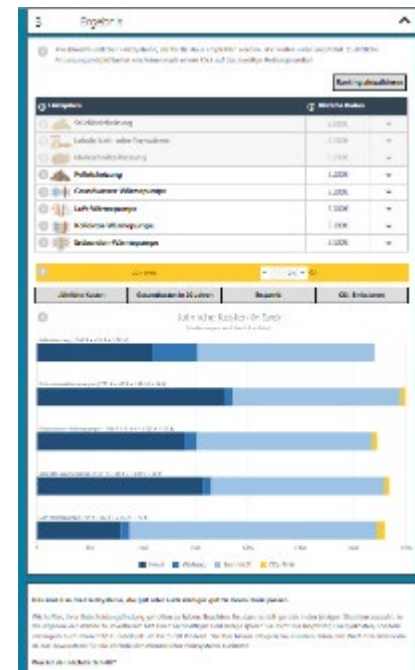
### Step 3: **Results**, i.e. techno-economical comparison of **viable green alternatives**



# The Replace Your Heating System Calculator

## Results

- Comparison of **annual heating costs**, i.e. yearly costs for
  - **Investment** (reduced for any subsidies & averaged)
  - **Fuel**, CO<sub>2</sub> price
  - **Service & Maintenance**
- Compared to existing heating system, **annual**
  - **cost savings**
  - **t CO<sub>2</sub> avoided**



“Expert mode” or

If you want to compare economics of installers’ offers, etc.

Further adjustments possible

Heating system Yearly costs

1	Log wood boiler	1.900€	▼
2	District or local heating grid	2.800€	▼
3	Pellets boiler	2.900€	▲

**Investment costs** (Subsid. included) ▲ 9700 Euro

**Annual CO<sub>2</sub> reduction** ▲ 7,3 tons

**Annual cost savings** ▲ 1400 Euro

**Comfort improvement** ▲

**Necessary storage space:**  
Necessary space for pellets (when stored in a pellets bunker) = 5,8 m<sup>3</sup>, gross  
Necessary filling volume for pellets (when stored in a fabric tank system) = 3,5 tons.

**Further adjustments**

- Technologie-Datenblatt.pdf
- Verfügbare Anreize für meine Region.pdf
- Nützliche Kontakte.pdf
- Best-Practice-Beispiel Ölkesselesatz durch Pelletskessel.pdf
- Best-Practice-Beispiel Kombiniertes Pellets- und Stückholzkessel in Einfamilienhaus.pdf
- Best-Practice-Beispiel Biomasse-Mikronetz in ländlicher Siedlung.pdf
- Best-Practice-Beispiel Nutzung von mobilen Heizgeräten mit Anwendungsfall (Hotel in Anif, Salzburg).pdf
- Best-Practice-Beispiele für Pelletskessel.pdf
- Planungshilfe.pdf
- Ist Biomasse nachhaltig.pdf

**Fact-Box Pellets boiler**

The pellet heating system combines the advantages of wood heating with the convenience of an automatic system, with the comfort of an automatic system. Space for a pellet store is available instead of the oil tanks. Pellets are a standardised fuel that can ideally be stored as a year's supply.

Advantages: low fuel costs; renewable energy source; fits any building;  
Disadvantages: higher investment costs; higher maintenance costs;





# “Expert mode” or

# If you want to compare economics of installers’ offers, etc.



Manually updates  
of investment,  
subsidies, fuel  
prices, other costs  
possible

The screenshot displays the 'replace' software interface for configuring a heating system. It shows a list of heating options with their respective costs: Log wood boiler (1,900€), District or local heating grid (2,800€), and Pellets boiler (2,900€). Below this, a detailed view for the 'Pellets boiler' is shown, including investment costs (9700 Euro), annual CO<sub>2</sub> reduction (7.3 tons), and annual cost savings (5400 Euro). A 'Further adjustments' section allows users to modify investment costs, energy prices, and service costs. The interface also includes a 'Fact Box Pellets boiler' with descriptive text and a list of links to additional resources.

Heating system	Yearly costs
Log wood boiler	1,900€
District or local heating grid	2,800€
Pellets boiler	2,900€

**Investment costs** (subsidies included): 9700 Euro  
**Annual CO<sub>2</sub> reduction**: 7.3 tons  
**Annual cost savings**: 5400 Euro  
**Comfort improvement**

**Further adjustments**

Investment costs (€)	Promotions (€)
20200	10500

Energy price OLD (cent/kWh)	Energy price NEW (€/(kWh))
132.9	306

Energy price increase: 2%, 4%, 6%

Service costs per year OLD (€)	Service costs per year NEW (€)
330	537

Links:  
- Technologie-Datenblatt.pdf  
- Verfügbare Anreize für meine Region.pdf  
- Nützliche Kontakte.pdf  
- Best-Practice-Beispiel: Ölkesselersatz durch Pelletskessel.pdf  
- Best-Practice-Beispiel: Kombienergie Pellets- und Stückholzkessel in Einfamilienhaus.pdf  
- Best-Practice-Beispiel: Biomasse-Mikronetz in ländlicher Siedlung.pdf  
- Best-Practice-Beispiel: Nutzung von mobilen Heizgeräten mit Anwendungsfall Hotel in Anif, Salzburg.pdf  
- Best-Practice-Beispiele für Pelletskessel.pdf  
- Planungshilfe.pdf  
- Ist Biomasse nachhaltig.pdf



# White-label option

## for professionals & public energy advise



- **White-label option**

- Businesses, installers, energy advisers, municipal energy offices etc. can **integrate** the **Calculator** **via a frame** into their own website **or place a link** to the Calculators landing page on their **own website**.
- Please **contact** the national REPLACE project partner
- The calculator will be **hosted until 30.11.2025**.
- **Replace your Heating System Calculator**
  - **free of charge** “energy advise” tool
  - **[energieinstitut.at/tools/Replace](https://energieinstitut.at/tools/Replace)**



...more information needed?

# Handbooks for heating system **replacements**



25.10.2022

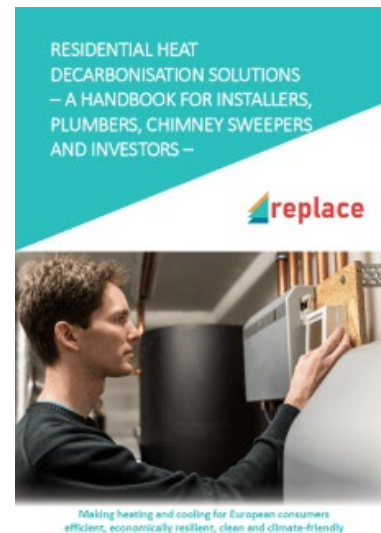
**replace**

Page 27

## Product-neutral information to enable informed decisions

### Handbooks for Heating System Replacements

- for end consumers
- for professionals & investors
- [replace-project.eu/technology-guides](https://replace-project.eu/technology-guides)



...more information needed?

# Handbook for heating system **replacements**

## For end consumers



25.10.2022

**replace**

Page 29

- **Objective:** to provide a **practical guide** to end-users who are considering **replacing their heating system** or **setting an energy efficiency measure** in their home.
- [replace-project.eu/technology-guides](https://replace-project.eu/technology-guides)



# replace Handbook for end consumers

## What's in it?

- **Useful information on the economic, environmental and social benefits** of replacing an old and inefficient heating system with an innovative low-carbon and renewable one
- **Advises on the steps that every informed consumer should take** before and during the replacement process
- **Answers the most common questions** that end-users ask in the replacement process
- **A comprehensive list of the renewable heating and cooling technologies currently available** on the European market through concise and illustrated **technology factsheets**.

RENEWABLE HEATING & COOLING  
REPLACEMENT TECHNOLOGY BRIEFS  
FOR END CONSUMERS



Making heating and cooling for European consumers  
efficient, economically resilient, clean and climate-friendly



# replace Handbook for end consumers

## RH&C technologies covered

- Biomass boilers for **wood pellets** and for **logwood**
- Biomass heating systems with **woodchips**
- Modern wood **stoves** and pellet stoves
- Electric **heat pumps**
- **Solar thermal**
- **Photovoltaic** power for heating
- Renewable mechanical (active) **cooling**
- Multifunctional **façade systems**
- **Other** heating options (i.e. collective actions, shading and insulation, infra-red heating systems, etc.)

**SOLAR THERMAL**

**Did you know?**  
While PV currently harnesses up to 20% of sun light, solar thermal plants harness about 40% per square meter. Although both mechanisms rely on the energy of the sun, solar thermal collectors and solar panels (photovoltaics) are used for different purposes. While PV are (traditionally) used to generate electricity from solar energy, solar water heating converts sunlight into heat. Consequently, we start use solar thermal for lighting, but we can use it to heat water or for space heating.

**How it works**  
A solar thermal system works by harnessing the sun's energy and converting it into heat which is then transferred into your heating system for hot water or space heating. Everyone knows what happens to the water inside a garden hose lying in the sun: after a while, the water gets hot. Solar collectors make use of this effect. Absorbers made of copper or aluminium capture the heat's rays and transfer the heat to the water that flows through them. The absorbers are covered with glass, insulated on the back and tightly sealed with a jacket so that as little as possible of the valuable solar heat can escape back to the outside. From around 1,000 kWh of solar radiation per square metre and year, solar collectors get 200 kWh of hot water. This is collected in a solar storage tank and fed into the sanitary and heating installations in the house.

**What you can do**

1	2
3	4
5	6
7	8
9	10
11	12
13	14
15	16
17	18
19	20
21	22
23	24
25	26
27	28
29	30
31	32
33	34
35	36
37	38
39	40
41	42
43	44
45	46
47	48
49	50





...more information needed?

# Handbook for heating system **replacements**

## For professionals



25.10.2022

**replace**

Page 33

- **Objective:** to encourage the commitment of intermediaries and investors towards the transition of the residential H&C sector.
- [replace-project.eu/technology-guides](https://replace-project.eu/technology-guides)



# replace Handbook for intermediaries & investors – What's in it?

- Provision to **professional intermediaries** (such as installers, chimney sweepers, building developers, energy advisors, etc.) of **in-depth knowledge of the RH&C systems options available** on the market today.
- Tips for intermediaries on how to become **well-trained facilitators of replacements** and on how to **enable them to measure and communicate expected energy and financial savings and wider societal benefits** of H&C replacements.
- **Information for investors** (either financing institutions, public authorities, energy suppliers, or homeowners) about **economic issues, best practices and innovative business models, and model contracts** for RH&C solutions.



# replace Handbook for intermediaries & investors – Tips to intermediaries

---

## Replacement project phases

1. Conception and consultation
2. Planning
3. Design
4. Decommissioning and disposal of old system
5. Realisation: installation and commissioning
6. Operation: use and maintenance



# replace handbook for intermediaries & investors – Tips to intermediaries

---

## Failures to avoid and common mistakes

1. The wrong size
2. Disregarding the quality of the heat distribution water and the importance of the hydraulic balancing
3. Poor ductwork installation
4. Insufficient drainage
5. Inadequate inspection and missed opportunities in home performance
6. Insufficient refrigerant charge



# replace handbook for intermediaries & investors – Tips to intermediaries

## replace technology factsheets

1. Building type
2. Planning guidelines and recommendations for installers
3. Matching technologies for each system
4. Installers' selling points for customers

**BIOMASS BOILERS FOR LOGWOOD**

**WOOD REPLACEMENT OPTIONS ARE AVAILABLE ON THE MARKET**

**WOOD REPLACEMENT OPTIONS ARE AVAILABLE ON THE MARKET**

massive fire resistant cladding etc.) For long term storage of wood all kind of assessments shall not have more than 30% of water content. With more than 35% severe problems can occur already.

When operating a wood chipper, sharp blades and a metal screen (where branches are further shredded) in the ejector are crucial. It guarantees the sorting into the suitable particle size for the boiler. Oversized long particles like branches can lead to woodchip bridge formation, i.e. the automatic feeding does not work anymore despite the storage is full with woodchips. This means that the plant is in standby if this bridge is not destroyed manually, which can become costly too, in case the whole woodchip delivery contains such branches. Furthermore, stones (damage to screen and conveyor) or sand should not be in the woodchips also fine material like dust or green needles (visual check when woodchips are delivered, before unloading) can increase the ash amount and particulate emissions.

**Ash manipulation and disposal**

The ash accumulation is strongly dependent on the biomass fuel used. For sawdust and wood chips without bark, the ash content is around 0.5% of the dry fuel substance. The emptying intervals for ash containers depend on the system. The ash discharge works automatically with screw. For the ash collection when containers are used that can be transported directly by trucks. Depending on national and regional legislations, ash may be either be spread in the forest, used as fertilizer in agriculture, or dumped on landfills, especially the fine fly ash, which is separated in electrostatic precipitators, is usually dumped on landfills, as it usually contains higher concentrations of heavy metals.

**Woodchip heating systems match with...**

Woodchip boilers can completely replace existing fossil fuel (gas, oil, LPG) boilers and provide all your space, underfloor and water heating requirements but can also be integrated with other systems.

**Aspen's Emission Levels (calc. 2016-2017)**

Wood chip boiler	Fossil boiler
CO 88	CO 10
CO <sub>2</sub> 15	CO <sub>2</sub> 14
CH <sub>4</sub> 1.4	CH <sub>4</sub> 1
NO <sub>x</sub> 16	NO <sub>x</sub> 10
SO <sub>2</sub> 15	SO <sub>2</sub> 14
SO <sub>x</sub> 1.9	SO <sub>x</sub> 1
NO <sub>2</sub> -	NO <sub>2</sub> -

**Figure 17 Emission of main of the air wood boilers**

**RESIDENTIAL HEAT DECARBONIZATION SOLUTIONS**

...A HANDBOOK FOR INCLUDING FULFILLING CHANGING EXPECTATIONS AND INVESTORS...

are easily integrated in existing central heating systems with **buffer storage tanks**. An additional heat exchanger can even partially cover space heat demand in transitional seasons (before and after seasonal differences).

Heat exchangers are ideally combined with a **water collector system**, which provides domestic hot water and can even partially cover space heat demand in transitional seasons (before and after seasonal differences).

**How to tell your customers?**

The prices of woodchips are usually lower and less volatile compared to the prices and conditions of wood fuels. Today's industry offers a wide range of a high energy efficiency and low dust emissions.

**High efficiency heating:** Modern woodchip heating systems are clean and, because of their management, secure long-term wood supply as well as sustainable operation, stabilizing millions of forests and increasing their yield over time.

**Market stabilization:** In recent years woodchips produced to be a good raw material, combined such as storm, snow, ice breaker and bark chippings, thus creating forces and the functions of woodchips as the only cost-effective way of utilizing wood assessment's waste.

Wood is normally available within the region and its price is not volatile. Given the increasing emissions caused by fossil fuels for the residential sector is unarguably.

For while heating woody fuel equals the amount of CO<sub>2</sub> that the plant for both heating and hot water.



# replace Handbook for intermediaries & investors – Why should investors go for RH&C?

1. Clean energy investments yield an **economic return 3 to 8 times higher than the initial investment** during the whole project lifetime
2. The **instability of fossil fuel prices** presents a global opportunity to accelerate the shift to clean energy
3. Ambitious investment in RES and energy efficiency could lead to **63 mln new jobs by 2050**
4. **Stable regulatory framework** at EU and national level (i.e. favourable EU legislation and numerous financial incentive schemes)
5. **Positive externalities for the society** (i.e. reduction of GHG emissions)
6. **Security of energy supply**
7. **Creation of economies of scale**
8. **Technological leadership** of the European renewable heating industry
9. **Increased business value of the property**



...more information needed?

# Best practice examples of heating system replacements



25.10.2022

replace

Page 40



## Best practice examples of RH&C replacements

- Objective:
  - To provide a **catalogue of best practices** and innovative approaches for H&C replacement from **Western, to Central to South-Eastern Europe**.
  - To show how **replacements** can be implemented under **real local conditions**, being technically and economically **feasible** at the same time.
- [replace-project.eu/best-practice/](https://replace-project.eu/best-practice/)



# replace Best practice examples of RH&C replacements

## What's in it?

### Best practice examples:

- Residential building **refurbishment**
- Heating and cooling **replacement**
- Demand-response and **collective actions**
- **Innovative** approaches like utilising **mobile heating units** or innovative building renovations



# replace Best practice from Bosnia & Herzegovina



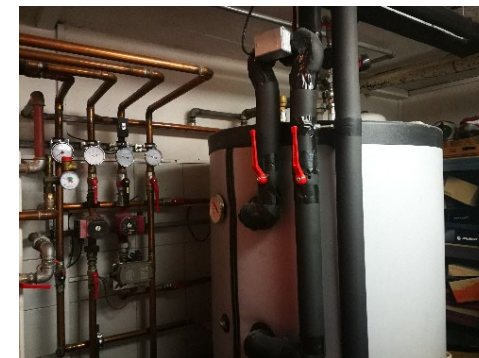
<b>New heating system in use</b>	Pellet boiler with radiator installation
<b>Previous replaced heating system</b>	Coal boiler with radiator installation
<b>Building type</b>	Detached family house
<b>Installed capacity (kW<sub>th</sub>) – Before and after</b>	35 kW → 40 kW
<b>Primary energy - Before and after</b>	51,282.40 kWh → 40,650 kWh
<b>Annual energy savings (compared to the previous system)</b>	1.2%; 0.4 MWh
<b>Initial investment (purchase and installation)</b>	3,300 EUR
<b>Yearly CO<sub>2</sub> emission reductions</b>	9.93 t CO <sub>2</sub>



# replace Best practice from Slovenia



<b>New heating system in use</b>	Heat pump (air to water)
<b>Previous replaced heating system</b>	Oil boiler
<b>Building type</b>	Single family house
<b>Heated floor area</b>	140 m <sup>2</sup>
<b>Installed capacity (kW<sub>th</sub>) – Before and after</b>	Before: 30 kW After: 9 kW
<b>Energy carrier – before and after</b>	Before: Fuel oil After: Electricity
<b>Energy use for heating – before and after</b>	Before: 2.5 m <sup>3</sup> After: 6,500 kWh
<b>Initial investment (purchase and installation)</b>	12,000 EUR
<b>Yearly savings on the energy bill (compared to previous system)</b>	38 % in EUR
<b>Yearly energy savings (compared to previous system)</b>	37 % in MWh
<b>Yearly CO<sub>2</sub> emission reductions (only heating system replacement)</b>	45 %



## Heating container in Penzberg:

- Ongoing modernisation of the swimming pool of the city of Penzberg (lasting several years)
- Switching from a gas CHP + peak load boiler to a woodchips heating system
- Interim heating solution: **mobile container unit** running on wood chips



- About the container:
  - Delivered, switched on and connected within one day
  - It can store up to 55 cubic meters of wood chips
  - Wood chips delivery two/three times a week in winter on the basis of short-term supply contracts
  - The container was purchased by the municipality of Penzberg and will be sold at the end of the project



**replace** campaigns are carried out in nine different pilot regions

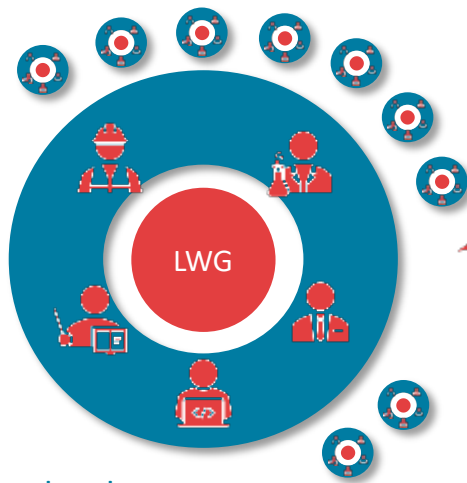


# replacement campaigns

## implemented by nine local working groups (LWG)

### LWG composition

- Regional authorities
- Policy makers
- Municipalities
- Energy advisers
- Installers
- Chimney sweepers
- Equipment manufacturers
- Equipment wholesalers
- ESCOs
- Local/regional managers
- Ministries in charge
- Funding bodies
- Energy agencies
- Etc.



local  
working  
groups



campaigns in  
pilot regions



Offer of different tailor-made „activity packages“  
addressing and reducing main barriers





# Boiler/Oven Replacement Campaign activities

1/2

Activity/target region	AT	BG	BiH	HR1	HR2	DE	NM	SL	ES
1 Labelling of boilers					X	X	X	X	X
2 Six techno-economic <b>pre-feasibility studies</b>		X	X	X	X	X	X	X	X
3 <b>Municipal information hubs</b>		X	X	X	X		X	X	X
4 Heating systems replacements info at <b>consumer fairs and festivals</b>		X	X	X	X			X	X
5 Cooling system replacements info at consumer fairs and festivals		X							
6 100 % renewable heated <b>houses labelling</b> campaign			X			X	X	X	X
7 <b>Open cellar</b> events			X		X	X	X	X	X
8 Regional <b>field trips</b> to best practice RHC systems		X	X	X	X	X			
9 Two to three <b>webinars</b> showing the “REPLACE your Heating System Calculator”		X		X			X	X	
10 Facilitating <b>mobile emergency heating devices</b> (avoiding like-for-like change-overs / lock-ins)	X					X			X

HR1: City of Zagreb incl. three bordering counties; HR2: Croatia, Primorsko goranska County



Activity/target region	AT	BG	BiH	HR1	HR2	DE	NM	SL	ES
11 Facilitating <b>installers to become contractors</b>					X		X		
12 Facilitating <b>collaboration of installers and contractors</b>		X				X		X	
13 Realisation of <b>collective actions</b>	X	X	X	X	X	X	X	X	X
14 Phase-out oil and gas <b>marketing campaign</b>	X								
15 <b>All-round carefree packages</b> for boiler replacement	X								
16 Tackling <b>financing and affordability</b> issues	X								
17 <b>Information evenings on municipal level</b>	X			X					
18 Innovative <b>other boiler or oven replacement activities</b>		XX	X	X				X	

HR1: City of Zagreb incl. three bordering counties; HR2: Croatia, Primorsko goranska County



## Activity 3 - Municipal information hubs



## Activity 4 & 5 – H/C replacements info at consumer fairs and festivals



25.10.2022

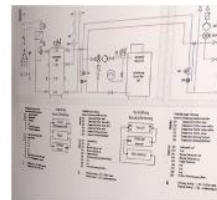
replace

Page 51

## Activity 6 - 100 % renewable heated houses labelling campaign



## Activity 7 - Open cellar events



25.10.2022

replace

Page 52



AUSTRIAN ENERGY AGENCY

## Activity 8 - Regional field trips to best practice RHC systems



## Activity 10 - Facilitating mobile emergency heating devices



## Activity 12 & 13 - Facilitating collaboration of installers and contractors & Realisation of collective actions

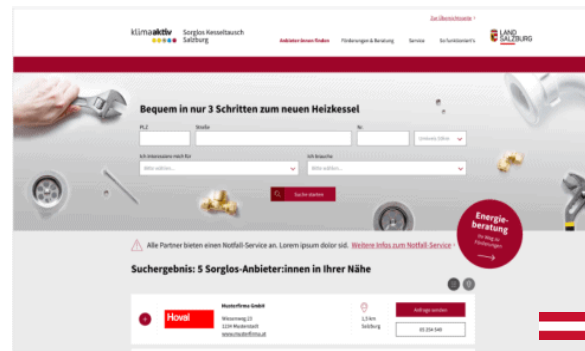


25.10.2022

## Activity 15 - All-round carefree packages for boiler replacement



- internet platform of the pilot initiative, to select a provider in the homes' vicinity
- provider **carries out heating checks** to save energy, **installs** climate-friendly heating system and **provides a mobile heating device** in the event of a heating system breakdown



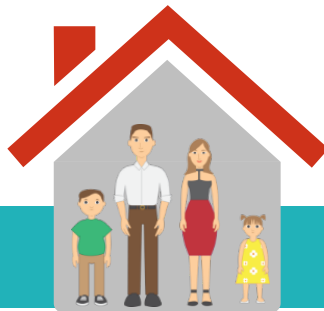
replace

Page 54



AUSTRIAN ENERGY AGENCY

# Activity 15



Austrian One-stop-shop

for oil & gas heater replacements



## Tailored support from independent energy consultants

- The pilot region Salzburg's public energy consultants advise households free of charge
- Identify suitable, climate-friendly solutions (incl. building shell refurbishments)
- Give reference to accredited providers of **replace** all-in replacement service packages



## „All-round carefree“ package via one single supplier (care-taker)

- Care-takers (installers, manufacturers, ESCOs etc.) created climate-friendly all-in packages in consultation with **replace**
- Offer all-in packages incl. all crafts needed for dismantling, disposal, chimney renovation, all installations (incl. electrics), hydraulic balancing & many other (partly optional) refurbishment services



## Bridge-over solution for broken-down heating systems

- Mobile heating devices are part of the all-in package (must have for all all-in package suppliers)
- Allows households to take adequate time to make informed decisions
- Avoids like-for-like replacements (lock-in to oil or gas)



## replace – Highlights

### Increased volume of subsidies in Bulgaria

Project partner BSERC was directly involved in increasing the subsidy for renewable heating systems at the national level to 70 mio Euro.

BSERC is also organizing a joint purchase of pellets in two municipalities in the summer of 2022, which will also have a positive effect on the price.





## replace – Highlights



### A new subsidy scheme in Spain

The project partners made more knowledge about biomass directly available to end customers: 200 houses and 200 boilers are getting an information label.

10 info hubs have been established.

A new subsidy scheme developed by EREN is helping to switch a total of 10 MW of residential boiler capacity from fossil fuels to biomass within some months.



## replace – Highlights

### Fuel oil boilers decrease in Slovenia

Everyone who wants to apply for a subsidy for climate-friendly heating is automatically recommended to use the **replace Calculator**.

Campaign “**Replace fuel oil for the sake of the environment**” resulted in **replacement of over 130 fuel** oil boilers with heat pumps.



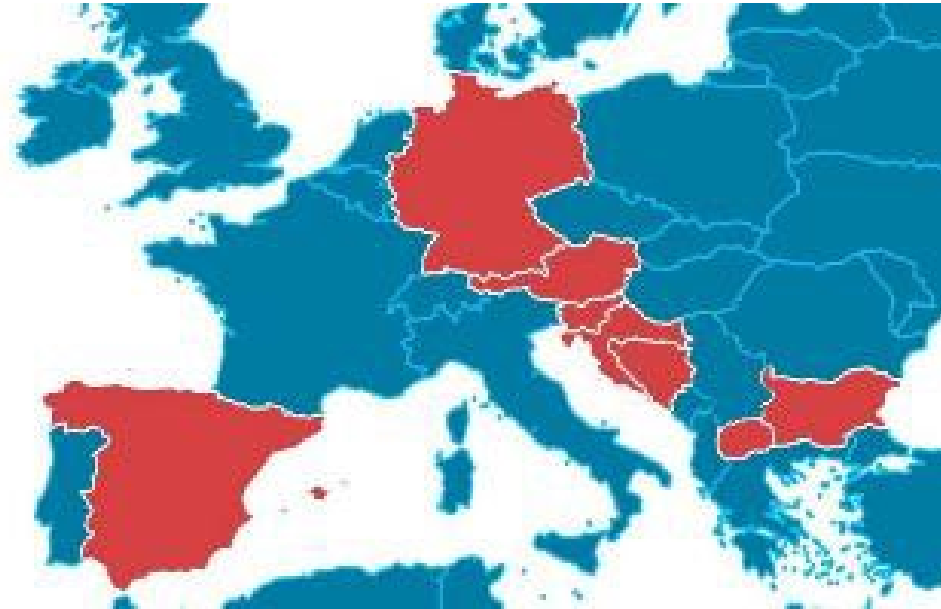
**ZAMENJAJ OLJE  
ZA OKOLJE**



## Main challenges in country xxx

---

- E.g.
- Energy poverty
- No/insufficient individual subsidies
- No/insufficient long term subsidies
- Insufficient nr of skilled labour
- Lack of high-quality products
- Lack of political commitment
- Insufficient fuel supply



## Opportunities in country xxx

- REpowerEU
- Recovery and Resilience Facility
- National programs
- (Inter)national funds
- New products/services
- Any **replace** offers
  - 1.
  - 2.



# Kick-off meeting in November 2019 in Vienna



25.10.2022

replace

Page 61



## The **replace** project

---

- **Call 2017:** Building a low-carbon, climate resilient future: secure, clean and efficient energy (H2020-LC-SC3-2018-2019-2020)
- **Target sector:** residential buildings
- **Budget:** 2 Mio. EUR
- **Coordinator:** Austrian Energy Agency
- **Consortium:** 11 partners, 8 countries, 7 (ntl.) languages
- **Project life:** Nov 2019 – **Apr 2023**



# Contact

---



**Herbert Tretter**

**Austrian Energy Agency**

[Herbert.tretter@energyagency.at](mailto:Herbert.tretter@energyagency.at)

T. +43 (0)1 586 15 24 - 0

Mariahilfer Straße 136 | 1150 Vienna | Austria

[www.energyagency.at](http://www.energyagency.at)



**Further info:**

[www.replace-project.eu](http://www.replace-project.eu)



[linkedin.com/company/H2020Replace](https://linkedin.com/company/H2020Replace)



[twitter.com/H2020Replace](https://twitter.com/H2020Replace)



[facebook.com/H2020Replace](https://facebook.com/H2020Replace)



This project receives funding from the European Union's Horizon2020 research and innovation programme under grant agreement No. 847087.

Any communication activity related to the action reflects only the author's view. The European Union and its Climate, Infrastructure and Environment Executive Agency (CINEA) are not responsible for any use that may be made of the information any communication activity contains.



AUSTRIAN ENERGY AGENCY