The **replace** project

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

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.

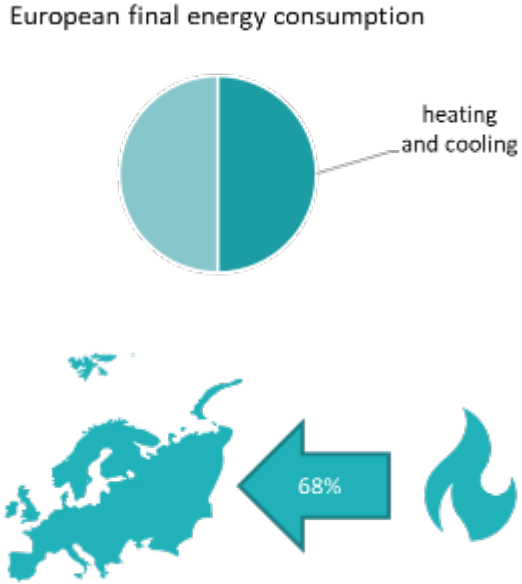
Content

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

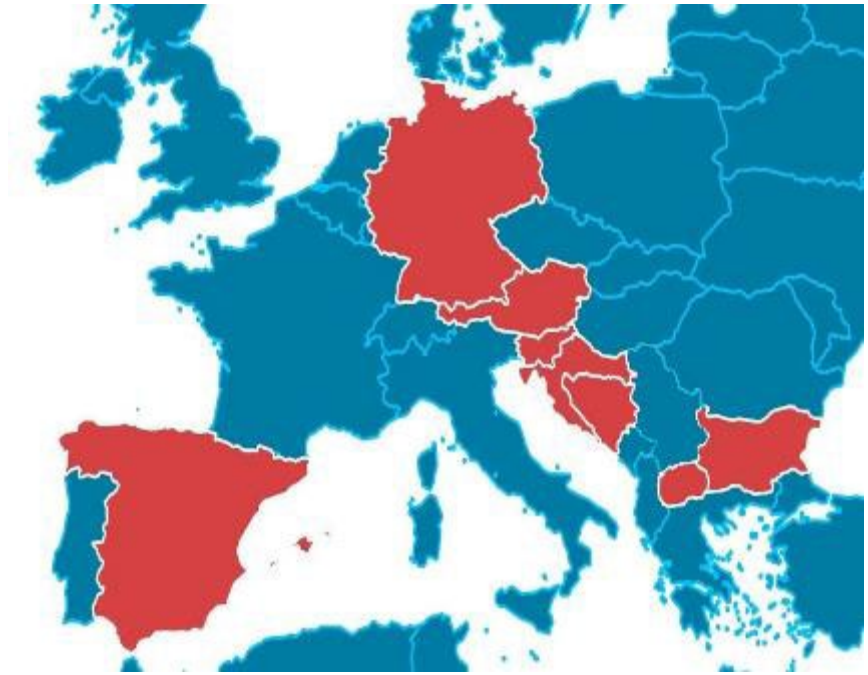
AUSTRIAN ENERGY AGENCY

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.**



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



AUSTRIAN ENERGY AGENCY

EIHP

BSERC black sea energy research centre

EREN

Junta de Castilla y León

escan s.l. the energy consulting

ENERGIE WENDE OBERLAND

SDEWESSHOPJE

REGEA

WIP RENEWABLE ENERGIES

Jožef Stefan Institute, Ljubljana, Slovenia

ENOVA CONSULTANTS AND ENGINEERS

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**

AUSTRIAN ENERGY AGENCY

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?

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
- Replace Your Heating System **Calculator** (an easy do it yourself energy advice)
  - energieinstitut.at/tools/Replace
- Heating replacement **Handbook** for **end consumers** & **Handbook** for **professionals**
  - replace-project.eu/technology-guides
- **Best Practice Examples** of heating system replacements
  - replace-project.eu/best-practice/

AUSTRIAN ENERGY AGENCY

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
TOTAL		**8,206,000**

AUSTRIAN ENERGY AGENCY

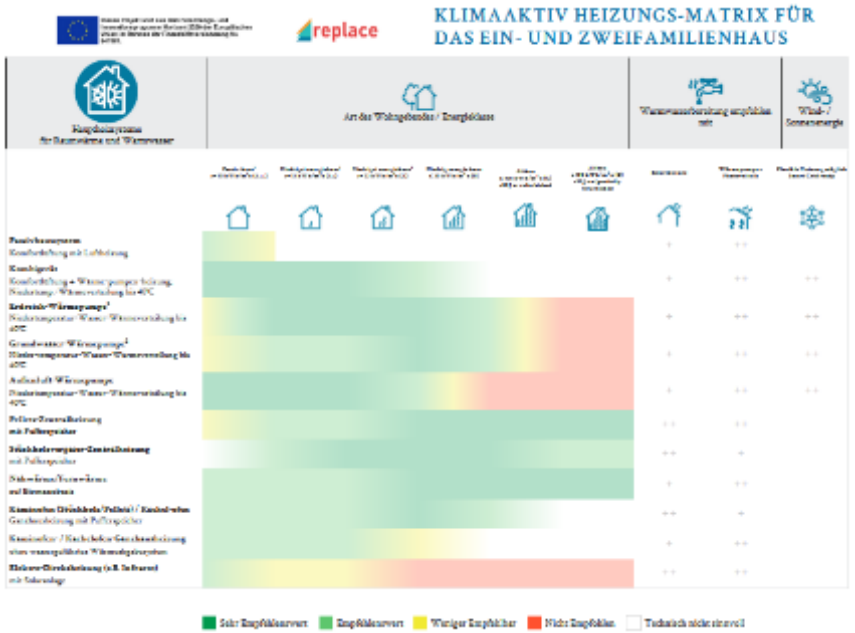
Enabling an independent replacement advice

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

replace approach to support informed decision making

- **Interactive online Heating matrices**
- Answers which climate-friendly heating system(s) fit(s) best to your house
- replace-project.eu/replace-heating-matrix



AUSTRIAN ENERGY AGENCY

replace Tools - Interactive online Heating matrices (I)

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**.

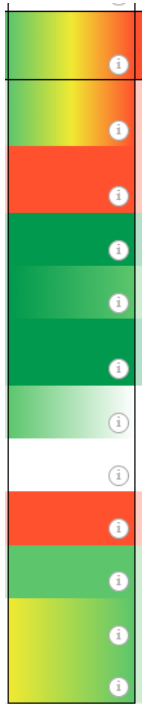
All that is made **possible with energy from your region**: whether being it **solar** energy, **biomass** or **ambient heat** (made available with renewable electricity) via a **heat pump** or a **connection to** (soon) **renewable district heat** network

AUSTRIAN ENERGY AGENCY

replace Tools - Interactive online Heating matrices (II)

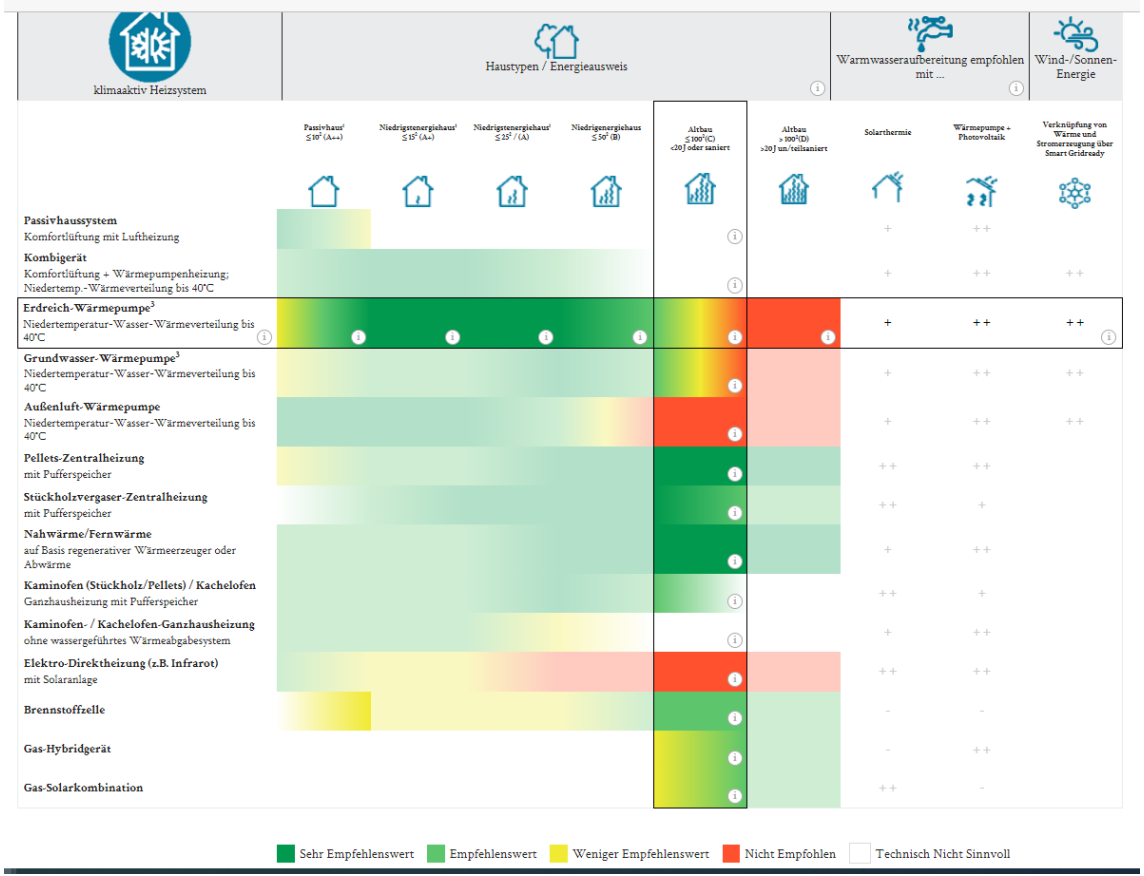
In the Heating Matrices the **climate-friendly heating systems** are classified in a **traffic light system**. Gradation is based on a criteria, like energy efficiency, heating comfort, investment and CO_2 emissions.

Clean heating systems with **dark green fields** support **high energy efficiency**, **very low CO_2 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.

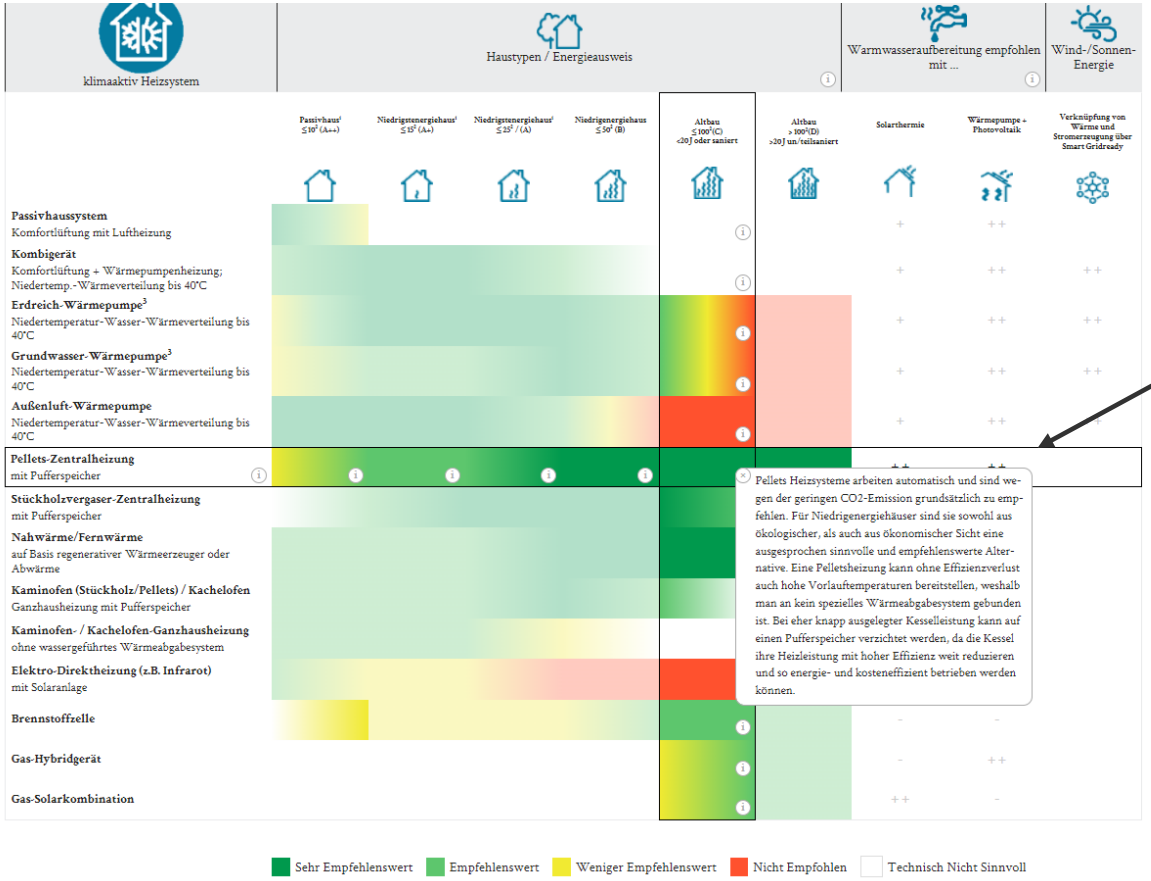


AUSTRIAN ENERGY AGENCY

replace Tools -
Interactive online Heating matrices (III)



replace Tools -
Interactive online Heating matrices (IV)



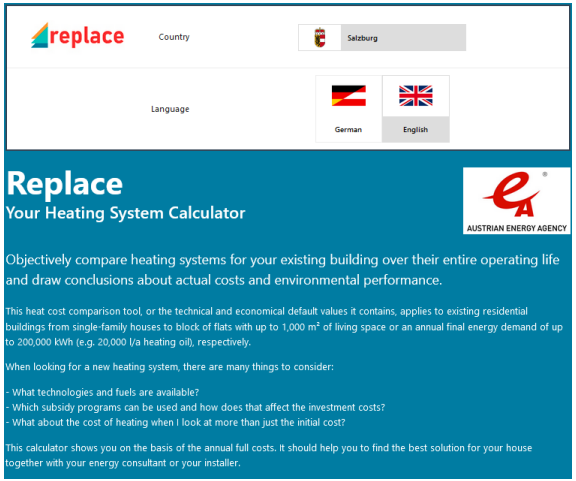
Mouse-over info explains what users should look out for when choosing a certain heating system or why exactly a system is recommended or not recommended.

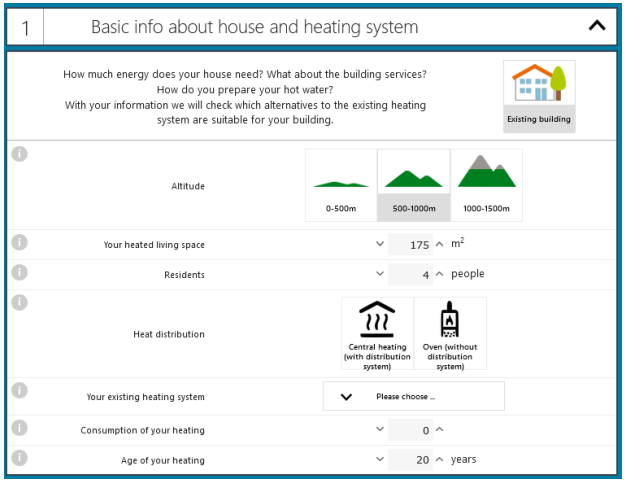
Quick & Expert modus Check economic replacement viability

(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



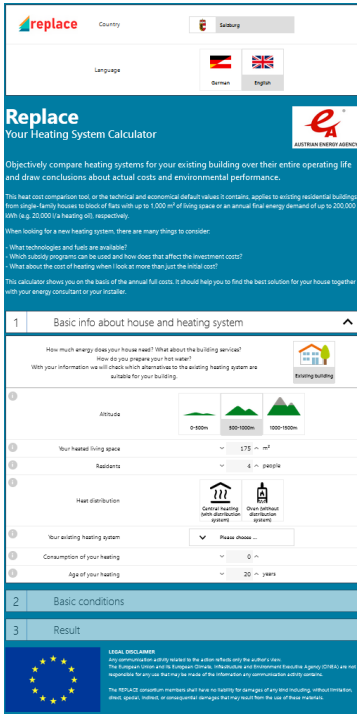


The Replace Your Heating System Calculator

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 klima**aktiv** 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.

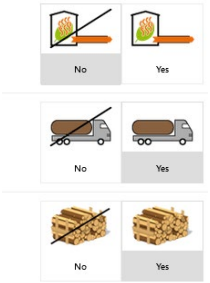
“Quick mode” - You need no previous knowledge
In just 3 steps - by easily defining

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

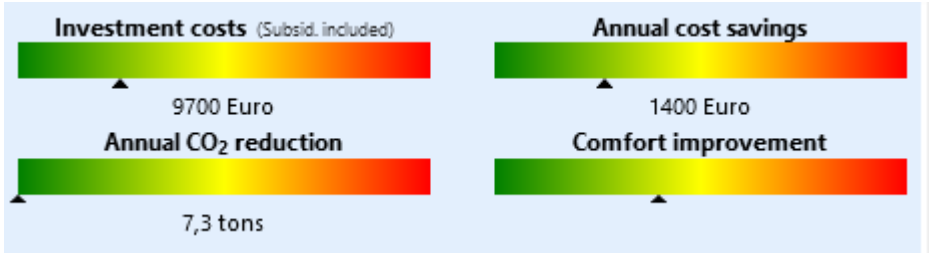


Step 3: Results, i.e. techno-economical comparison of **viable green alternatives**

The Replace Your Heating System Calculator

Results

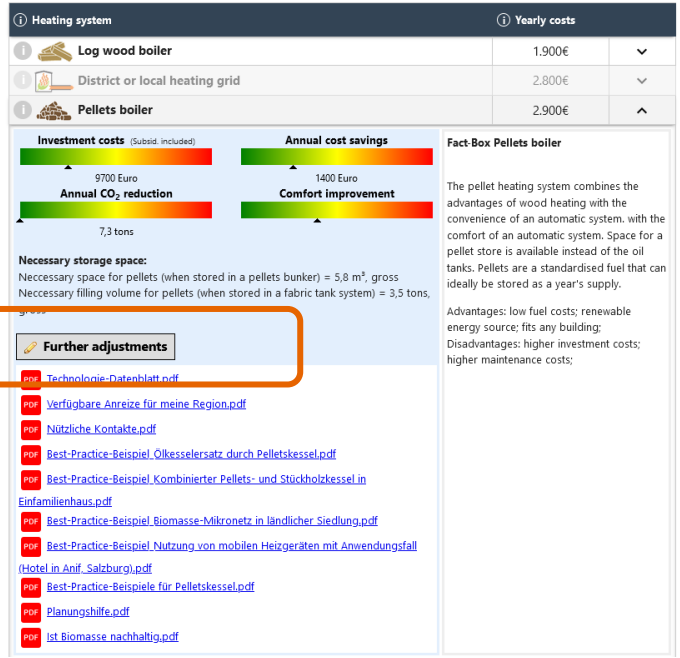
- Comparison of **annual heating costs**, i.e. yearly costs for
  - **Investment** (reduced for any subsidies & averaged)
  - **Fuel**, CO_2 price
  - **Service & Maintenance**
- Compared to existing heating system, **annual**
  - **cost savings**
  - **t CO_2 avoided**



AUSTRIAN ENERGY AGENCY

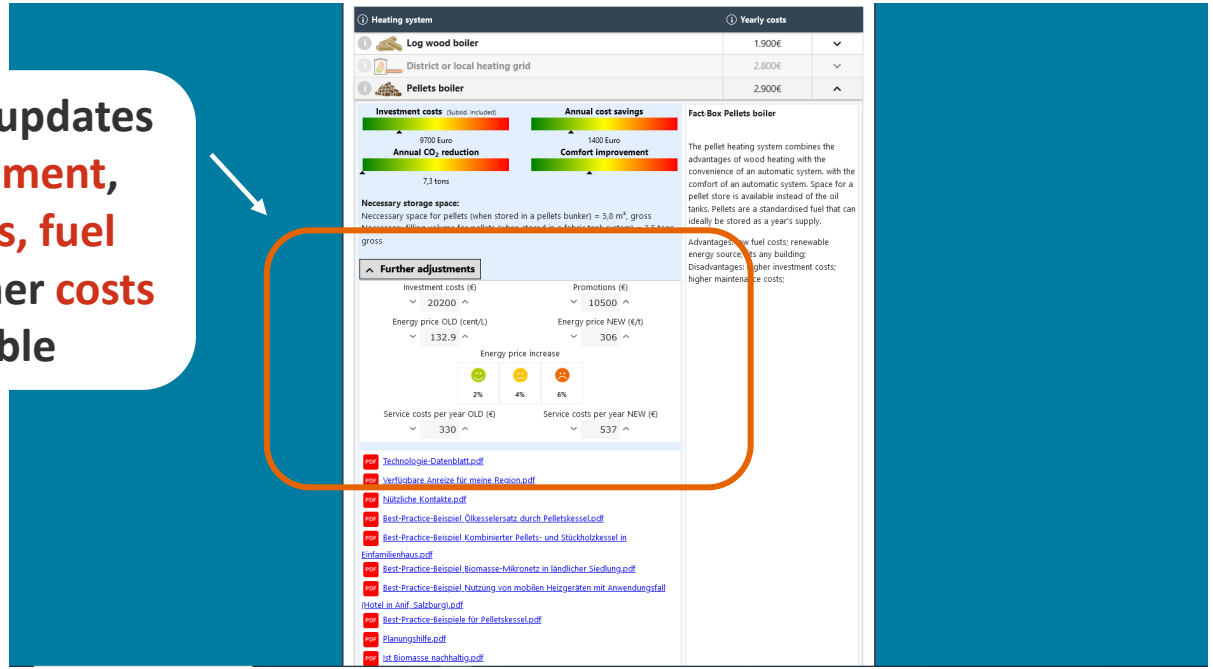
“Expert mode” or
If you want to compare economics of installers’ offers, etc.

Further adjustments possible



“Expert mode” or
If you want to compare economics of installers’ offers, etc.

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



AUSTRIAN ENERGY AGENCY

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

…more information needed?

Handbooks for heating system replacements

Product-neutral information to enable informed decisions

Handbooks for Heating System Replacements

- for end consumers
- for professionals & investors
- replace-project.eu/technology-guides

…more information needed?

Handbook for heating system replacements

For end consumers

AUSTRIAN ENERGY AGENCY

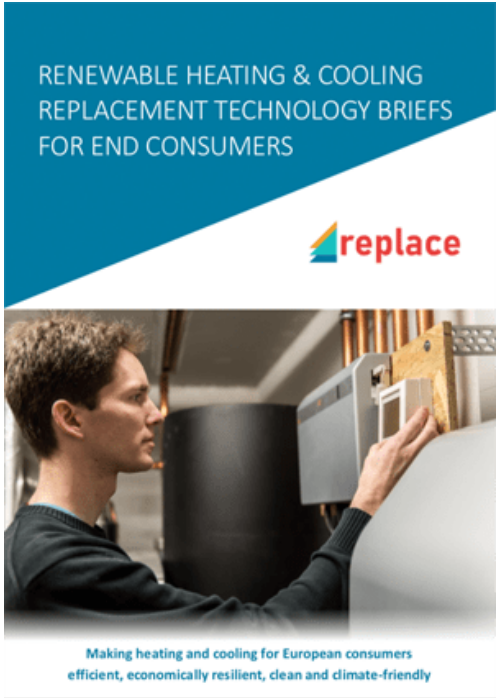
Handbook for end consumers

- 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

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**.

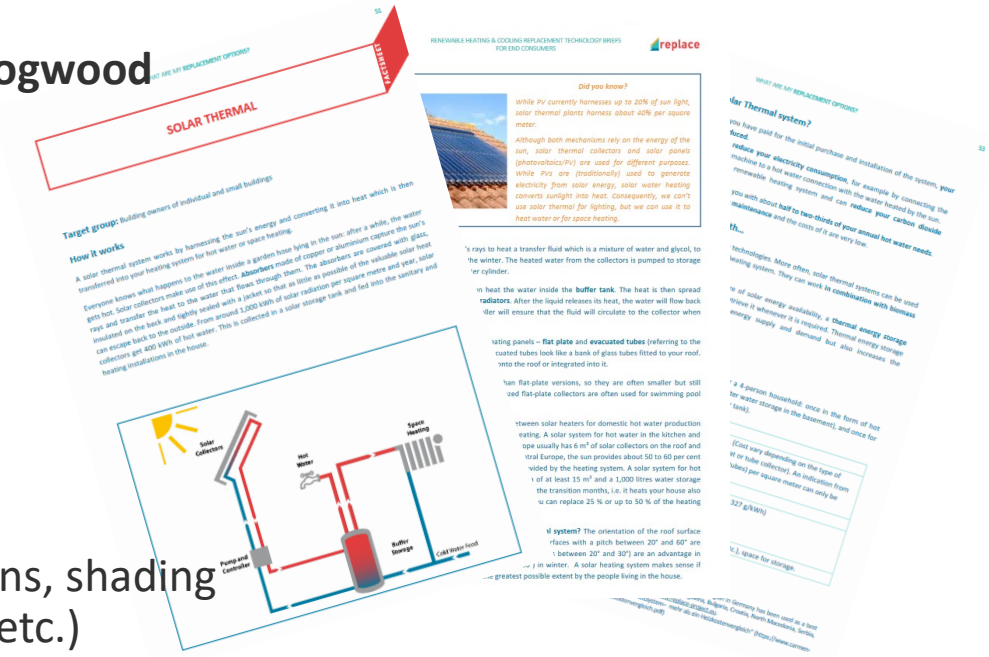


AUSTRIAN ENERGY AGENCY

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.)



AUSTRIAN ENERGY AGENCY

...more information needed?

Handbook for heating system replacements

For professionals

AUSTRIAN ENERGY AGENCY

Handbook for intermediaries & investors

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

AUSTRIAN ENERGY AGENCY

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.

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

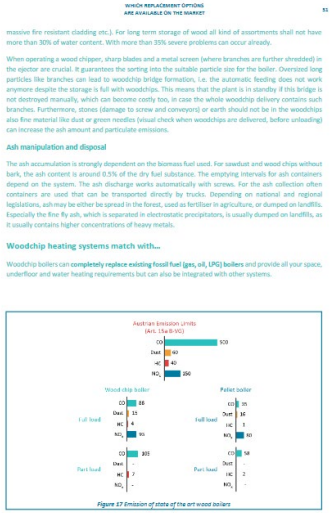
Failures to avoid and common mistakes

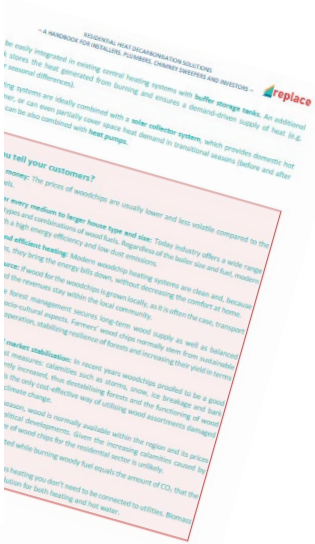
1. The wrong size
2. Disregarding the quality of the heat distribution water and the importance of the hydraulic balancing
3. Poor ductwork installation
4. Insufficient drainage
5. Inadequate inspection and missed opportunities in home performance
6. Insufficient refrigerant charge

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





AUSTRIAN ENERGY AGENCY

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**

AUSTRIAN ENERGY AGENCY

...more information needed?

Best practice examples of heating system replacements

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/

replace Best practice examples of RH&C replacements

What's in it?

Best practice examples:

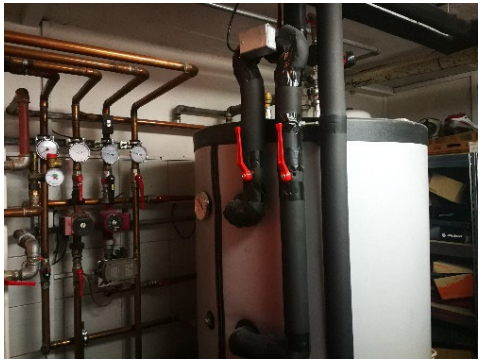
- Residential building **refurbishment**
- Heating and cooling **replacement**
- Demand-response and **collective actions**
- **Innovative** approaches like utilising **mobile heating units** or innovative building renovations

replace Best practice from Bosnia & Herzegovina

New heating system in use	Pellet boiler with radiator installation
Previous replaced heating system	Coal boiler with radiator installation
Building type	Detached family house
Installed capacity (kW_{th}) – Before and after	35 kW → 40 kW
Primary energy - Before and after	51,282.40 kWh → 40,650 kWh
Annual energy savings (compared to the previous system)	1.2%; 0.4 MWh
Initial investment (purchase and installation)	3,300 EUR
Yearly CO_2 emission reductions	9.93 t CO_2

replace Best practice from Slovenia

New heating system in use	Heat pump (air to water)
Previous replaced heating system	Oil boiler
Building type	Single family house
Heated floor area	140 m^2
Installed capacity (kW_{th}) – Before and after	Before: 30 kW After: 9 kW
Energy carrier – before and after	Before: Fuel oil After: Electricity
Energy use for heating – before and after	Before: 2.5 m^3 After: 6,500 kWh
Initial investment (purchase and installation)	12,000 EUR
Yearly savings on the energy bill (compared to previous system)	38 % in EUR
Yearly energy savings (compared to previous system)	37 % in MWh
Yearly CO_2 emission reductions (only heating system replacement)	45 %



replace Innovative best practice from Germany (I)

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

AUSTRIAN ENERGY AGENCY

replace Innovative best practice from Germany (II)

- 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

AUSTRIAN ENERGY AGENCY

replace in action

replace campaigns are carried out in nine different pilot regions

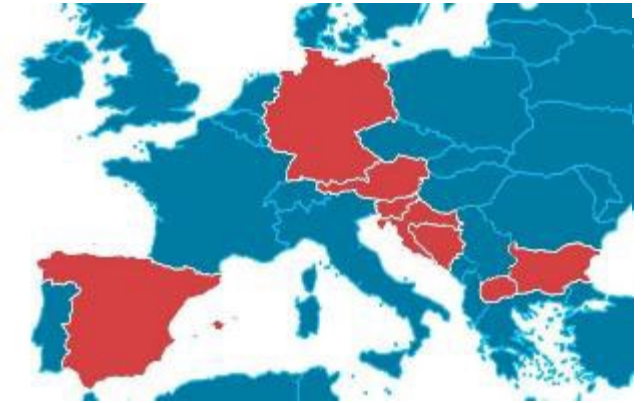
AUSTRIAN ENERGY AGENCY

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**

AUSTRIAN ENERGY AGENCY

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 **pre-feasibility studies**		X	X	X	X	X	X	X	X
3	**Municipal information hubs**		X	X	X	X		X	X	X
4	Heating systems replacements info at **consumer fairs and festivals**		X	X	X	X			X	X
5	Cooling system replacements info at consumer fairs and festivals		X							
6	100 % renewable heated **houses labelling** campaign			X			X	X	X	X
7	**Open cellar** events			X		X	X	X	X	X
8	Regional **field trips** to best practice RHC systems		X	X	X	X	X			
9	Two to three **webinars** showing the “REPLACE your Heating System Calculator”		X		X			X	X	
10	Facilitating **mobile emergency heating devices** (avoiding like-for-like change-overs / lock-ins)	X					X			X

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

AUSTRIAN ENERGY AGENCY

Boiler/Oven Replacement Campaign activities 2/2

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

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

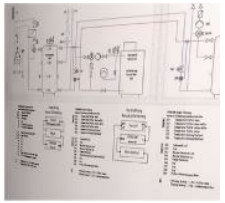
AUSTRIAN ENERGY AGENCY

Activity 3 - Municipal information hubs

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

Activity 6 - 100 % renewable heated houses labelling campaign

Activity 7 - Open cellar events



Activity 8 - Regional field trips to best practice RHC systems

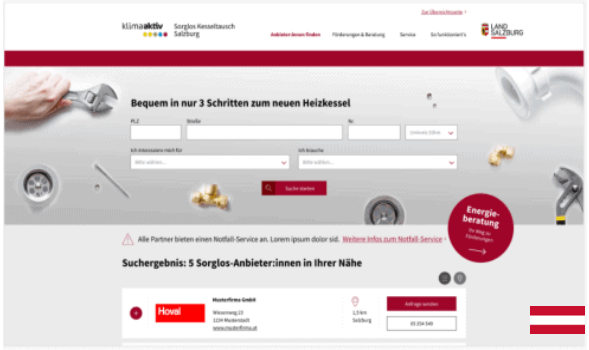
Activity 10 - Facilitating mobile emergency heating devices

AUSTRIAN ENERGY AGENCY

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

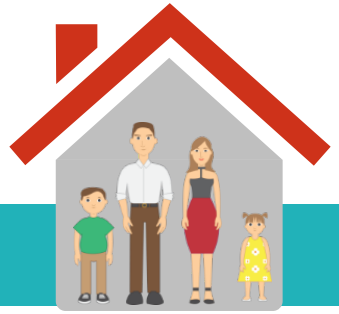
Activity 15 - All-round carefree packages for boiler replacement

- **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



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.

AUSTRIAN ENERGY AGENCY

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

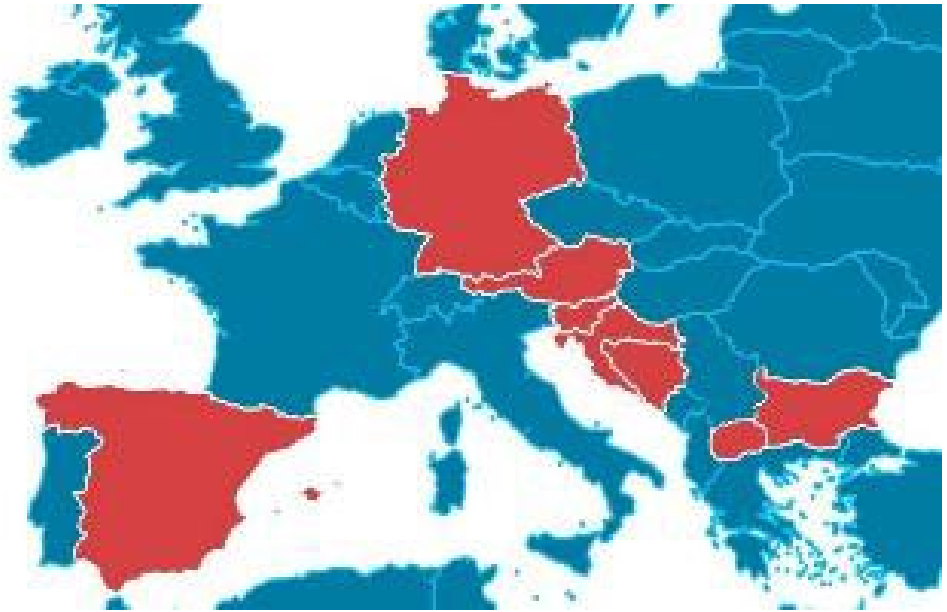
Everyone who wants to apply for a subsidy for climate-friendly heating is automatically recommended to use the **replace Calculator**.

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

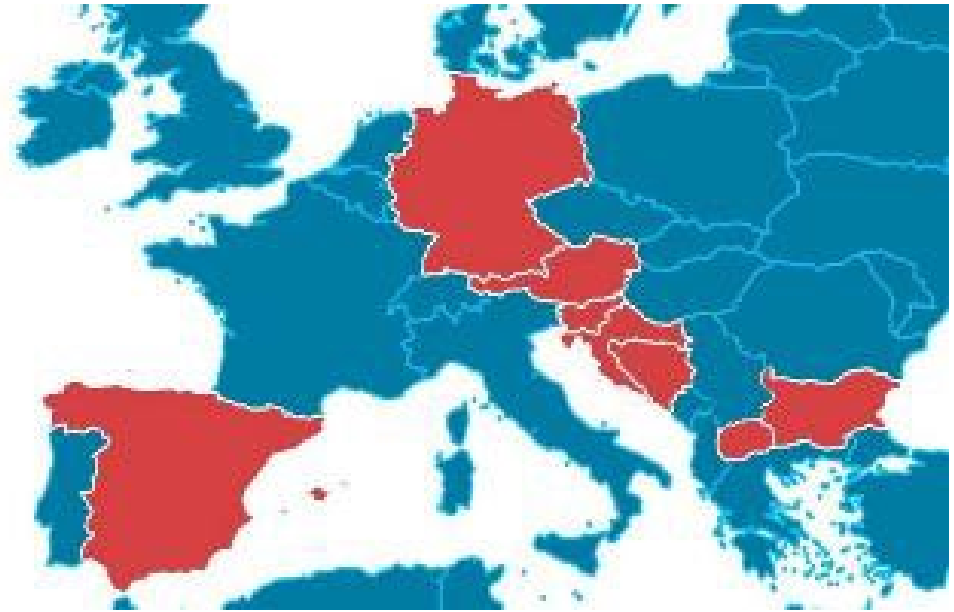
Main challenges in country xxx

- 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.



AUSTRIAN ENERGY AGENCY

Kick-off meeting in November 2019 in Vienna

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

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

Mariahilfer Straße 136 | 1150 Vienna | Austria

www.energyagency.at

@at_AEA

Further info:

www.replace-project.eu

linkedin.com/company/H2020Replace

twitter.com/H2020Replace

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