replace

Keeping the heat on in times of crisis

Rising to the occasion:
A Summary of REPLACE Results

Deliverable 1.2

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

April 2023

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Manuscript completed in April 2023
This document is available on: www.replace-project.eu

Document title	Keeping the heat on in times of crisis – REPLACE Results Report
Work	Package WP1
Document Type	Deliverable
Date	30 April 2023
Document Status	Final version

Acknowledgments & Disclaimer

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Introduction

Motivation

The motivation for the initiation of the REPLACE project in 2019 was the heating and cooling sector's high final energy consumption and its high dependence on fossil fuels within the European Union. At that time, heating and cooling accounted for around 50 % of European final energy consumption, which is still the case in relative terms. Moreover, in the residential sector, heating and cooling (H&C) and hot water together accounted for about 80 % of total energy use. Two thirds of this energy comes from fossil fuels. Furthermore, in 2019, 58 % of all boilers installed in the EU-27 were inefficient non-condensing oil and gas boilers, amounting to 61 million units.

It was clear that changes in this sector were essential to meet climate targets and make Europe independent of oil, coal and gas. Russia's war of aggression against Ukraine, which started in February 2022, and the energy crises that Russia has already triggered in mid-2022 (by significantly reducing gas deliveries to Europe), show the urgency of the clean heat transition. The transition to renewables energy is essential not only to mitigate climate change, but also to secure the supply of our vital energy needs and the welfare and well-being of our societies.

Project objective

The overarching goal of the European Horizon 2020 project REPLACE was to make heating and cooling for European consumers efficient, economically resilient, clean and climate-friendly. REPLACE therefore aimed to boost the phase-out of old fossil fueled and inefficient (e.g. log wood and direct electricity) heating systems by targeting consumers, investors and owners as well as intermediaries and helped them to make informed decisions

Activities in nine pilot regions

Over the course of three years, the REPLACE project worked towards motivating and assisting more than 8 million citizens in nine pilot regions across eight European countries to transition from fossil fuel-based or inefficient heating systems to modern, comfortable, and clean alternatives.

To implement this ambitious plan, the REPLACE project used a unique approach to bring together installers, chimney sweepers, policy makers and other key players at the local level in each target region. The role of these Local Working Groups was to design and implement effective, tailor-made measures to support the clean heat transition in the pilot region. Efforts to improve the local enabling environment and to introduce simple behavioural or low-cost energy saving or renovation measures that reduce overall energy consumption were also part of the action.

Boiler and oven replacement campaigns were implemented in each of the nine target regions to promote the phase-out of fossil fuels in the heating market. In addition, the project developed several tools to help households make informed decisions about which renewable heating system is best for their home. These include a heating matrix, a heating calculator and manuals for both consumers and professionals. This form of support was not previously available in the Eastern European partner countries and was made possible for the first time through REPLACE.

Scope of this report

This report focuses on the REPLACE project's efforts to transition from fossil fuel-based heating and cooling systems to clean alternatives. It covers topics such as the boiler and oven replacement campaigns, including supporting end consumers locally, and an overview of implemented campaign activities and project impact achieved. The report also includes information on the REPLACE toolbox, which enables informed decisions in practice. Success stories in times of multiple crises are shared, and strategies for accelerating the clean heat transition are discussed.

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1 | Boiler and oven replacement campaigns

1.1 | Supporting end consumers jointly and locally – through Local Working Groups

REPLACE facilitated a regionally focused, hands-on approach in order to support the clean heat transition. The diffusion of RES-H technologies depends to a great extent on local availability of information, local development of projects based on a detailed knowledge of local circumstances, communication flows, influential persons etc.

In practice, this was done by strengthening supra-regional and supra-national programme management and networking. The aim of REPLACE was to learn from each other and particularly from pioneers, so that less developed regions could avoid making the same mistakes and instead focus their efforts on activities that have proved effective elsewhere. Through REPLACE, one of the outcomes is the identification of successful activities and the reasons for their success in specific regions. Consequently, REPLACE can impart the lessons learned beyond the project's lifespan to facilitate the adoption of measures that promote the transition to clean heating in your region.

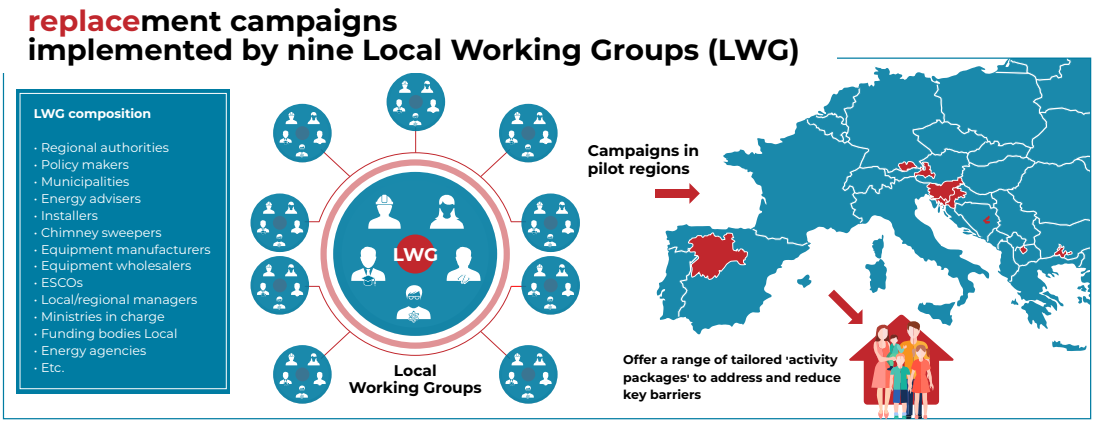
Prior to the fieldwork, comprehensive analyses were made of the status quo in the participating regions from a legal, administrative, political and socio-economic perspective, including experiences, stakeholder attitudes and best practices.

The REPLACE project has developed a number of successful activities that can become important elements in supporting policy programmes to replace fossil fuel and old heating systems with a comprehensive approach (see project report "Overview of boiler & oven replacement activities and campaigns in nine pilot regions"). The following figure provides an overview of the theoretical structure of how REPLACE has supported local policy programmes based on a comprehensive approach.

The core activity of REPLACE in the field was to develop, embed (by adapting/strengthening existing policy programs/measures) and implement nine (R)HC equipment replacement campaigns adjusted for local conditions and structures by a strong involvement of the Local Working Group (LWG) and further local key stakeholders in their design and implementation as depicted in the figure below.

Rather than focusing on policy makers and consumers only, the REPLACE concept uniquely encouraged new types of collaboration of the key actors and intermediaries in terms of the replacement campaigns and marketing activities.

More concretely establishing Local Working Groups meant bringing together all relevant actors for the clean heat transition (e.g. local and regional authorities, local organisations, installers, manufacturers, etc.), both for planning and implementation at local level, and for providing feedback to optimise the regional and national framework conditions towards an enabling environment.



1.2 | Overview of implemented campaign activities

The project was acting in the nine pilot regions Salzburg – Austria, Rhodope municipalities – Bulgaria, Canton of Sarajevo – Bosnia and Herzegovina, North-West Croatia and Primorsko goranska County – Croatia, Bavarian Oberland – Germany, Skopje region – North Macedonia, Slovenia and Castilla y Leon – Spain.
In collaboration with the Local Working Groups REPLACE developed tailor-made boiler and oven replacement campaigns that have been rolled-out starting in the heating season 2021 to March 2023. Due to different local conditions, REPLACE together with the LWG provided a communication framework and a toolbox of a wide set of online and offline actions targeted to their needs, pursuing policy and business-related improvements.
The replacement campaigns involved a range of activities that were successfully carried out, resulting in increased awareness of sustainable energy options and a higher adoption rate of renewable heating systems. The most important activities from our local campaigns are briefly described below.

- The activities included labelling of old and inefficient boilers by professional installers and chimney sweepers, accompanied by a folder containing important information on renewable heating. The aim was to make residents aware of the disadvantages of their inefficient heating system and at the same time raise awareness of the switch to renewables and the associated benefits. This activity was implemented in Croatia, North Macedonia and Spain and a total of over 250 boilers were labelled.

- As part of the REPLACE initiative, end consumers were offered free techno-economic pre-feasibility studies. Experts from the consortium visited homes and conducted face-to-face assessments, followed by phone consultations. The REPLACE Calculator was used to carry out these studies, which helped consumers make informed decisions about upgrading to energy-efficient and renewable heating systems by making them aware of the economic benefits and the costs and other aspects associated with the system switch. This activity has proved particularly successful in the Eastern and Southern European target regions, as such an offer did not exist there before and was very positively received. In some regions, such as Sarajevo, the study will also be offered beyond the project period. In total, over 50 households received extensive advice in the form of a pre-feasibility study in REPLACE.

- REPLACE information hubs were established throughout the pilot regions, providing public access to a range of useful resources. Visitors to these hubs could access flyers, technology briefs, handbooks, and information on REPLACE offers and activities. These hubs were located in energy advice offices and municipal offices throughout the pilot regions. At several of the hub sites, local office staff were also trained to provide visitors with advice on renewable heating and the various REPLACE tools available. Several project partners also held some presence days at their local information hubs to provide direct advice to visitors. A total of 32 information hubs were established in all pilot regions and were used by about 10,000 visitors over the entire project period.

- At large consumer fairs and festivals, the public was informed about renewable heating systems and REPLACE offers and activities. This increased awareness of sustainable energy options and encouraged consumers to make the switch to efficient and green heating technologies. The project took part in a total of seven such large events and was able to reach about 4,500 consumers there. The project also organised five events of its own, which were attended by over 350 people.

- Additionally, a labelling campaign was launched to recognise homeowners who had switched to 100 % renewable heating or cooling systems. By displaying a special label on the façade of their homes, these consumers helped motivate others to make the switch to sustainable energy options. The project alone awarded about 670 labels for houses with renewable heating systems so that owners can create more awareness for them and act as role models. Furthermore, over 1,000 labels were provided to stakeholders of the LWGs so that they can continue the labelling after the project.

- Open day/house events were organised in the target regions, giving interested consumers the chance to visit households that had already switched to renewable heating systems, as well as renewable energy companies and other local actors. These events provided a unique opportunity to see renewable heating systems in action and to ask questions to experts, which encouraged wider adoption of sustainable energy

options. Despite Covid-19 related restrictions, within REPLACE, a total of 25 open house events were organised and about 100 people took part to learn more about renewable heating systems.

- Regional field trips were organised to showcase best practice renewable heating systems for consumers, intermediaries, and investors. These trips provided a unique opportunity to see renewable heating systems in action and encouraged wider adoption of sustainable energy options. Eight such field trips with 140 participants were implemented in the project.

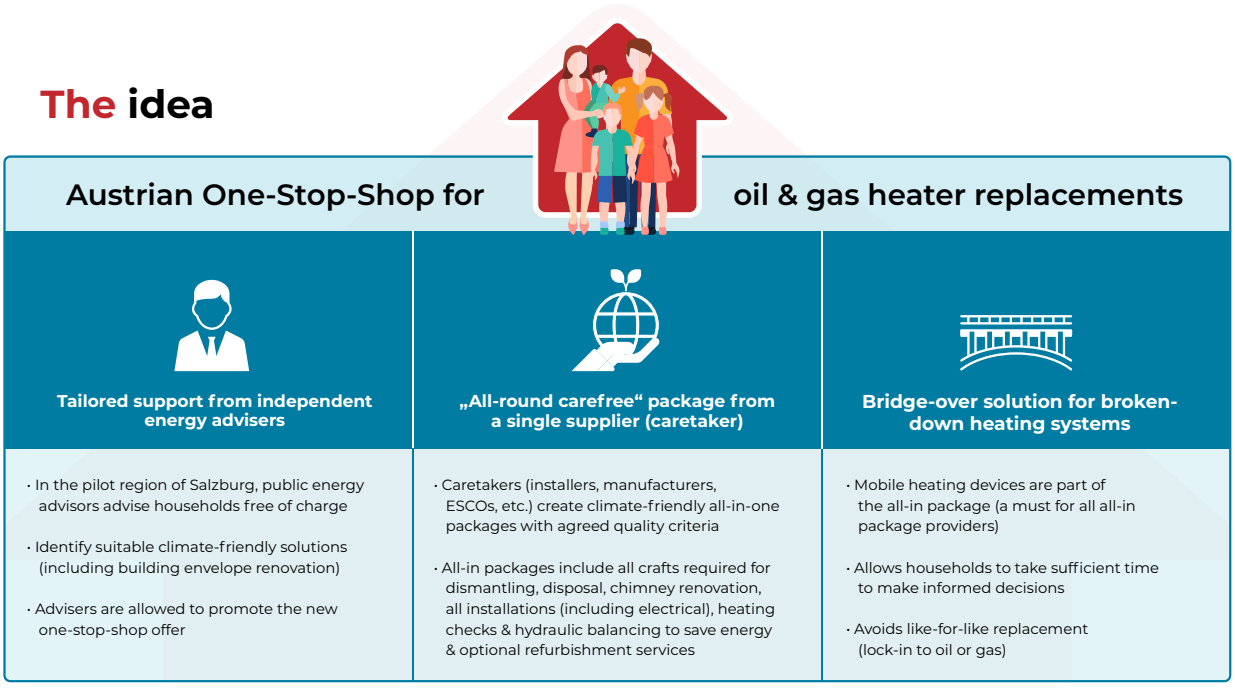
- Webinars were conducted to educate consumers and professionals on how to use the consumer-friendly "REPLACE your Heating System Calculator". This tool helps consumers make informed decisions about upgrading to energy-efficient heating systems. Performing webinars on the usage of the "REPLACE your Heating System Calculator" was essential to reach out to consumers and professionals who could not attend events or visit the information hubs. The interest in this offer was high and over 300 people participated in the 10 webinars held in the target regions.

- Innovative measures to promote the phase-out from fossil fuels were also pursued. These include the implementation of a one-stop shop for heating system replacement in Austria, which enables consumers to obtain all the necessary services from a single source and therefore motivate them more easily to install renewable heating systems due to the lower effort involved.

- Mobile heating devices were introduced to provide supportive renewable heating replacement services. These mobile devices were used to bridge sudden breakdowns, avoiding the lock-in effect towards fossil fuels. A showcase project was realised to demonstrate their effectiveness. They became also an obligatory service of the Austrian one-stop-shop all-in-one offers.

- Installers and energy utilities/service companies were encouraged to become plant (+ energy efficiency) contractors. The aim was to improve the quality of renewable heating system installations and reduce the barrier of high up-front investment costs.

- Collective actions were facilitated, such as the common purchase of pellets or heating equipment for consumers. This approach helped reduce costs for consumers and promoted wider adoption of sustainable energy options.



1.3 | The main results of REPLACE

Through its extensive campaigns, REPLACE has managed to reach a wide range of stakeholders and consumers, both in the pilot regions and beyond. The project's goals were ambitious and despite various challenges such as the pandemic and the energy crisis, the project has managed to exceed many of them. This is mainly due to the focus of the work on the local level of the pilot regions. Through close cooperation with the Local Working Groups and the implementation of various campaign activities, taking into account the national and regional framework conditions, it was possible to make a relevant contribution to advancing the phase-out of fossil fuels in the European heating sector.

The following overview presents some of the key performance indicators achieved by the project.

3,500,000
consumers reached through campaigns

17,650 t
CO2 emissions reduced yearly

17,200,000 €
investments in sustainable energy triggered

244 GWh/a
renewable final energy production triggered

15,000
users of the Heating Matrices

9,500
users of the REPLACE Calculator

51
households directly advised by techno-economic study

32
info hubs established with over 10,000 visitors

155
Jobs created

340,000
website sessions

2 | The REPLACE toolbox to enable informed decisions in practice

The REPLACE heating matrix allows users to quickly identify which heating systems are well suited and recommended for their home.

The REPLACE manuals provide detailed instructions and comprehensive information on how to install and use modern renewable heating systems.

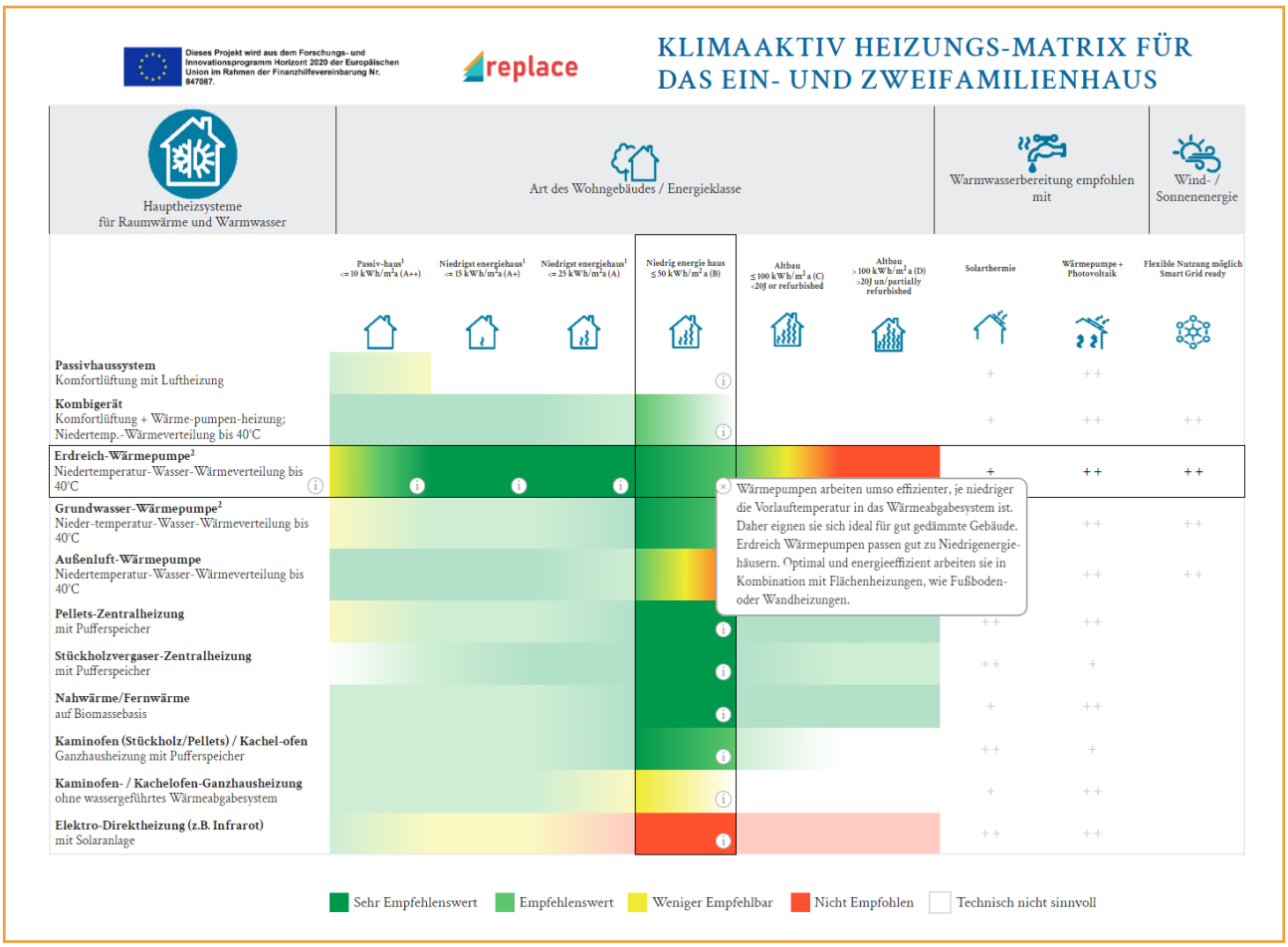
The REPLACE Calculator allows users to calculate in three simple steps how much a new renewable heating system would cost them, compare different solutions and also directly see their savings (both financial and energy).

Enabling informed choices is key to giving the end user confidence in the choices they make in relation to the refurbishment of their home, both in terms of the heating and/or cooling system and the thermal refurbishment of the building envelope. Ideally, the overall energy efficiency of the house is the first priority.

The aim of providing a general REPLACE toolbox for decision-makers was to design and develop tools that assist consumers, installers and investors in selecting the most appropriate heating systems when replacement is needed. Great attention has been given to ensure that the tools and materials described in more detail below are comprehensive, of high quality, targeted and well adapted to the different regions, including availability in local language.

Such tools and information materials did not yet exist in the South-Eastern European partner countries, and for many of them the project partners were able to make them available to the population in the local language for the first time.

2.1 | Replace Heating Matrices



The **"REPLACE Heating Matrices"** provide an initial overview of which heating system is most suitable for a home, adapted for each of the nine pilot regions. It provides a manufacturer-independent initial assessment of technology options for a heating system replacement.

Based on an existing Austrian matrix, developed within the Austrian klimaaktiv programme[1], each of the nine pilot regions has adapted such a matrix for both single- and two-family houses as well as large volume residential buildings, which are available on the project website[2].
The matrix (see figure below) shows which heating systems (see rows) are best suited to different building types and qualities in terms of comfort, investment and CO2 emissions, based on the heat demand from the building's Energy Performance Certificate (see columns).

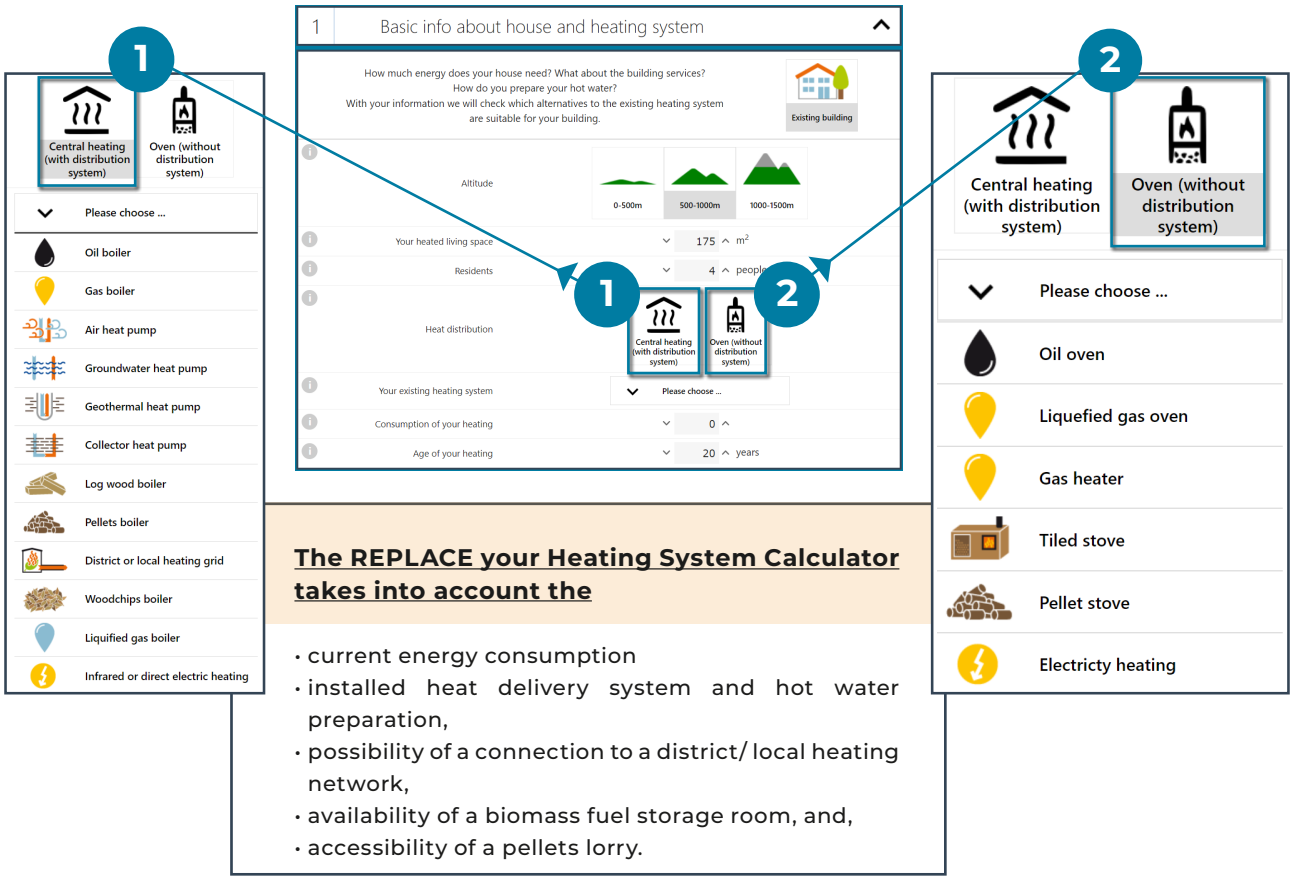
In more detail, the rows show the different climate-friendly heating systems available in the pilot regions for single and two-family houses. The columns further to the left show energy efficient building qualities (in terms of energy consumption per m²), and those further to the right show buildings with higher energy consumption. The climate-friendly heating systems are categorised according to their suitability for the energy intensity of the house - like a traffic light system from dark green (highly recommended) to red (not recommended).

[1] klimaaktiv is the Austrian climate protection initiative and integral part of the Austrian climate strategy. It´s primary objective is to launch and promote climate-friendly technologies and services.

[2] replace-project.eu/replace-heating-matrix

2.2 | Replace Your Heating System Calculator

The “REPLACE your Heating System Calculator” is one of the main outputs of the project. The tool is based on the Austrian klimaaktiv Hexit Calculator (from the Federal Ministry for Climate Action). This calculator allows you to objectively compare and evaluate new clean heating systems for your existing building, whether a stove or a boiler, over their lifetime and draw conclusions about actual costs and environmental performance.
These are the existing and new clean heating systems (and energy carriers) that the tool can handle, whether they are central heating systems (with a distribution system) or ovens (without a distribution system).



The REPLACE your Heating System Calculator takes into account the

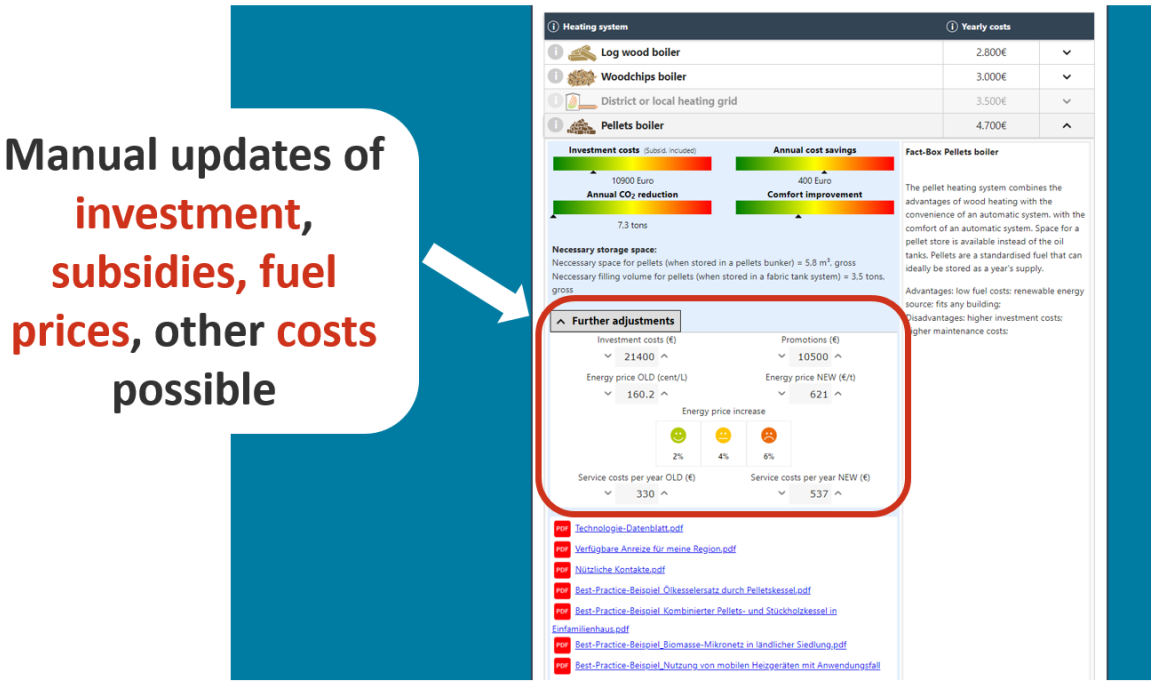
- current energy consumption
- installed heat delivery system and hot water preparation,
- possibility of a connection to a district/ local heating network,
- availability of a biomass fuel storage room, and,
- accessibility of a pellets lorry.

The result of the assessment is both a financial consideration of the investment and operating costs, as well as the annual cost savings and annual CO2 emission avoidance compared to the existing system.

In more detail,

- all currently possible subsidies of nine European target regions are included in the overall (full costs) consideration,
- the tool features technical and economical default values that apply to residential buildings from single-family houses to block of flats with up to 1,000 m² of living space, applicable for your target region
- it assists end consumers, intermediaries (like installers, energy advisers etc.) and investors in a quick mode (with just three steps for getting a result) and professional mode, in the latter mode actual project-specific values can be considered, and
- a lot of further information like technology factsheets, national best practice examples and useful contacts for boiler and oven replacements are provided.

By this means, it is possible to find the best future-proof, resilient and climate-friendly alternative to your old heating system in just a few steps, product-neutral and in a highly professional way.



2.3 | Replacement Handbooks for End Consumers & Professionals

The replacement handbook for end consumers, and the replacement handbook for intermediaries and investors, are oriented to allow better-informed decisions and available for each country. The handbooks provide easy-to-digest information on climate-friendly technologies that are available to move away from fossil fuels. It tells you where they are most appropriate and what combinations of technologies are feasible. The content is technology neutral and promotes the principle of energy efficiency first.

There is a handbook per country (and a general one in English) with useful information aimed at end users, including the benefits of replacing old inefficient heating systems, steps to take, FAQs, technology fact sheets (including passive measures) and contacts for further information at regional level. The handbook for professionals also includes guidance on planning, business models and financing[3].

Furthermore, the Replace Collection of best practice examples is a report on 38 existing best practice and examples on residential building refurbishment, heating and cooling systems replacement and collective actions in all participating countries. The report shows how replacements can be carried out under real local conditions, while being technically and economically feasible[4].

[3] replace-project.eu/technology-guides

[4] replace-project.eu/best-practice

3 | Success stories in times of multiple crises

During the boiler and stove replacement campaigns, the project partners and Local Working Group members had to adapt to changing conditions, starting with COVID-19, price increases from mid-2020, the Russian war of aggression against Ukraine and energy price crises. Mitigating heat market distortions and supply uncertainties have become serious issues that Replace has had to address. The following section presents success stories of how REPLACE initiatives have alleviated these multiple crises.

However, experience has shown that there is no one-fits-all solution or strategy for the replacement of fossil or inefficient heating systems that can be implemented in a variety of national settings. It is crucial to respond to the general conditions on site and the situation of the residents.

This is a summary of various REPLACE best practices that were implemented at the local level during the project's lifespan. Certain activities will persist even after the project's conclusion. More information on our campaign activities is available in the REPLACE report Deliverable 6.2 "Overview of boiler & oven replacement activities and campaigns in nine pilot regions".

Austrian pilot region Province of Salzburg:
all-round carefree package for boiler replacement

In Austria, a first-of-its-kind online one-stop-shop for replacing oil, gas, biomass and direct electric heating systems by clean systems has been developed for the pilot region, Province of Salzburg. On this independent, public, "match-making" online platform households can easily find suppliers (installers, manufacturers) nearby that offer all that is needed for a boiler exchange (i.e. all crafts) managed by one supplier/contact person (the installer), only. The platform was developed jointly with several regional and national stakeholders in response to the barrier of people often not having the time and knowledge to manage a complex construction site by themselves. The platform usage is free of charge for households and suppliers. The suppliers' all-round carefree packages include obligatory energy savings' up to emergency solutions, like mobile heating devices for bridging over heat supply. The platform was finalised in autumn 2022 shortly after fuel prices began to rise rapidly. It had to be put offline before the official launch, however, as households' replacement requests overheated the market by that time. The required suppliers' capacity for that new, high quality offer has not been available any more. Nevertheless, the platform shall be launched in 2024, when markets hopefully recover. The innovative offer is particularly suited to manage projects of elderly people or for low income / energy poor households, as the all-round care free package format guarantees high quality realization and a lot of support in the implementation of the heating system exchange. It is financed to run for four years and can be extended to up to three further Austrian provinces, if the Salzburg pilot turns out to be successful.

German pilot region Bavarian Oberland:
biomass micro-grids

One way to overcome the limited availability of installers is to consider a centralized biomass heating system, e.g. woodchip based, with a small heat distribution network, if this is possible. Such, so-called biomass micro-grids, are particularly suitable for rural areas or settlements outside of urban centers with forest rich regions nearby. Modern biomass micro grids consist of standardised plug-and-play central heating containers with pre-installed boilers, hot water tanks, hydraulics and control systems etc. A concrete foundation is required for the heating device container and probably for a further biomass

storage container. In addition, trenches laid to a couple of houses are connected to the central heating system. A modern, smaller biomass micro grid can be installed within a few weeks. Installers who are currently in high demand are only required for the heat transfer station on the consumer side. These installers are often employees of the heat supplier or micro-grid operator. Since biomass micro-grids involve comparatively less work, they can contribute to facilitating the energy transition through the resources saved. Within Replace, this proved to be a successful model, especially in the German pilot region, where even larger biomass district grids have been realised. The project partner Energiewende Oberland (EWO) supported stakeholders in the region to newly set up 10 district heating networks, and to re-densify 3 existing ones. By this approach, EWO enabled households to act quickly even in times of crisis and multi-level supply shortages.

Project pilot region State of Slovenia:
joint purchase action

Another way of overcoming supply disruption issues and attracting potential suppliers to engage is to launch collective actions. The project partner Jožef Stefan Institute (JSI) organised a joint heat pump purchase action, where 147 replacements of oil and gas boilers in households were accomplished. As the target of 50 heat pumps was overachieved successfully, a follow-up collective action is envisaged. Furthermore, the "Replace Your Heating System Calculator", developed by REPLACE, was rolled out as public energy advisory tool by the funding agency. The Slovenian independent energy advisors did not have such a decision-making advice tool before. Now households benefit from a better decision-making basis.

Spanish pilot region Castilla y León, Central-North Spain:
local subsidy program

The project partners EREN (Ente público Regional de la Energía de Castilla y León) and Escan (ESCAN sl) managed to establish a local subsidy program financed by public funds that allows residential sector buildings within the pilot region to switch from coal, oil and gas towards biomass boilers. Several MW of residential oil and coal boilers have been replaced by local biomass fueled, modern boilers. In addition, two local biomass logistics hubs are currently being developed as part of the REPLACE initiative, with more to follow. This collective action will continue as a public-private partnership for a further three years after the end of the project.

North Macedonian pilot region Skopje Region:
decision making tool for energy community heat pumps

The project partner SDEWES-Skopje (North Macedonian Section of the International Centre for Sustainable Development of Energy, Water and Environment Systems) developed a decision-making tool for inverter air-air heat pumps (operable in reverse mode for air conditioning), which is similar to the REPLACE Calculator, but aimed at large-volume houses that form energy communities based on PV plants to supply heat pumps after heating system renewals. Recently, a pre-feasibility study for an apartment building (with seven apartments) regarding a switch from a direct electric heating system towards a collective purchase of an air-air inverter heat pump, including a photovoltaics plant applicable for an energy community scheme was conducted.

Bosnia and Herzegovina's pilot region Sarajevo Canton:
pre-feasibility studies

The project partner Enova d.o.o. (Enova) prepared seven pre-feasibility studies for the replacement of heating systems in residential buildings free of charge by means of the REPLACE Calculator. Such information has not been available to local households so far. It is planned that this activity will be continued even after the project and to make it a possible standard in the long-term when replacing the heating system in households in Sarajevo Canton and beyond.

Pilot region Bulgarian Rhodope Mountains:
mitigation options for energy poverty

The project partner Black Sea Energy Research Centre (BSERC) has been giving advice to ten municipalities in the Rhodope Mountains on options to mitigate energy poverty issues. A joint pellet purchase was planned in some of the municipalities. Due to cultural and other challenges, this activity could not be implemented. Instead, a guide to joint pellet purchasing was developed based on the experience of REPLACE partners. Furthermore, a collective domestic hot water system in a multi-family building with 48 apartments, using an air-water heat pump, was realised. This is an excellent replacement solution for buildings using electrical boilers – the majority of multi-family buildings in Rhodope region and Bulgaria in general. Pre-feasibility studies have shown that for the predominant heating system of smaller houses, a fuel switch from old firewood/coal ovens to modern firewood ovens is beneficial under current conditions. Furthermore, to make the choice of private financing for heating replacement easier, information was collected about the conditions offered by the main private banks in Bulgaria. A comparative assessment of conditions was developed for a typical loan used for heating replacement, where the loan amount, loan period, and other factors are fixed for all options. The document enabled residents to easily compare the different bank offers, e.g. to compare the total loan expenditures, bank requirements, etc.

Croatian pilot region Zagreb incl. three bordering counties:
intermediary campaign

An intermediary campaign initiated in the region aimed to bridge the gap between citizens and available funding opportunities offered by county governments. Citizens were informed about existing funding opportunities and local authorities were supported in the development of suitable funding options. This helped increase awareness among consumers about the funding options and made it easier for them to access the support they needed to install renewable heating systems. The local partner REGEA (North-West Croatia Regional Energy and Climate Agency) provided technical assistance to local and regional authorities, resulting in successful policy measures and subsidies for over 100 end consumers. The region plans to share their experiences with other authorities to identify innovative financing solutions. The policy measures implemented by the REPLACE project serve as an excellent example of sustainable energy and heating system planning on a local level.

Croatian pilot region Primorsko-Goranska County:
visits to good practice examples

In Primorsko-Goranska County, the consumers involved particularly enjoyed the organised visits to examples of good practice. The project partner Energy Institute Hrvoje Požar (EIHP) organised an open house event on the island of Mali Losinj. The house owner presented the interested visitors a solar PV plant including a battery storage. This is an energy supply solution that is suited for high cooling needs during summer, e.g. for private house-owners that rent out flats in their house. As a result, the visitors were convinced by the technology and wanted to use similar systems. Another advantage of the visit was that the owner also invited his responsible installer to participate, so that the participants could ask him questions directly.

Another activity in this context was the organisation of a field trip. A visit to the Elementary school “Jelenje-Dražice” in Dražice, which is a village very close to the city of Rijeka, was organised for interested stakeholders and consumers. The existing pellet boiler with an installed capacity of 250 kW and the existing heat distribution system in the form of floor heating were presented to the participants as a modern and renewable heating solution. They had the opportunity to ask questions to the persons responsible for the technical planning. The feedback on the event was very positive, so similar visits will be organised in the future to promote the use of renewable heating solutions.

4 | How the clean heat transition can be accelerated

During the three years of fieldwork, the project team found that, in an ideal world, an enabling environment that effectively supports clean heat transition should be based on the following key features.

1. Establish a national level playing field that takes into account the external costs of using different energy sources through a bundle of appropriate financial measures (e.g. CO2 price, VAT, one-off investment subsidies to reduce the barrier of high up-front costs, tax breaks, etc.).

2. Set clear and binding national (and regional) long-term clean heat transition targets, coordinated with industry and trade, with clear and achievable milestones that provide investment certainty and strengthen long-term political commitment.

3. Support industrial development: Heating manufacturers should optimise their products and work more closely with installers to improve their services and create a more dynamic impact on the market.

4. Public authorities should support R&D activities that help to promote the clean heat transition in the direction described in the recommendations above.

5. Ensure a just transition by mitigating the socio-economic impacts of the clean heat transition.

6. Stable and Comprehensive Policy Programmes and Long Term Approach: Establish long-term heat transition policy programmes with a comprehensive approach and sufficient resources. Comprehensiveness is a prerequisite for successful policies and can best be achieved by involving all potentially relevant stakeholders in the definition and implementation of the policy. Appropriate programme management has a key role to play in this respect.

7. Train sufficient professionals and tradespeople to provide the workforce needed to support suppliers and end users in the clean heat transition. The lack of trained manufacturers, service technicians and installers is a key bottleneck for RES-H market development throughout Europe.

8. Establishing and ensuring a high quality of products and services is a fundamental issue that needs to be addressed to enable a successful clean heat transition, strengthening end-user confidence.

9. Ensure long-term price stability of locally available renewable energy sources for the clean heat transition, making them future-proof and price resilient for end-users.

10. Facilitate a regionally focused, hands-on approach in order to support the clean heat transition. The diffusion of RES-H technologies depends to a large extent on local availability of information, local development of projects based on detailed knowledge of local conditions, communication flows, influential people, etc.

11. Regulations can be an effective and inexpensive measure for public budgets to ensure the widespread introduction of clean heating systems.

12. Information and promotion Dissemination and marketing is a key activity in developing clean heat markets. Both information and promotion independent from direct commercial interests and commercial promotion are essential.

During the last heating season, the project team discovered that unforeseen market distortions such as the supply shortage of natural gas and fuel oil can lead to escalating energy prices and inflation, resulting in widespread insecurity and decreased affordability and financing capabilities for fuel switching. To mitigate the pressure faced by households, the project team recommended non-regret, low-cost, or easy-to-finance measures.

One of the most efficient short-term strategies to reduce price and supply risk is to rapidly reduce energy demand. REPLACE has therefore compiled a list of behavioural or minor investment measures that have the potential to immediately achieve the indicated percentage reductions in the total cost of space heating and hot water supply. The article with all the information can be found on the project website under the following link: https://replace-project.eu/alleviating-the-clean-heat-transition-distortions-and-supply-insecurities-in-the-short-term/

AUSTRIAN ENERGY AGENCY

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Junta de Castilla y León

REGEA

BSERC black sea energy research centre

ENERGIE WENDE OBERLAND Bürgerstiftung für Erneuerbare Energien und Energieeinsparung

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ENOVA CONSULTANTS AND ENGINEERS INSPIRED BY THE FUTURE

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

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