Energy Labelling for existing heating appliances

Lessons from the HARP Project

19 JULY 2022 | 11:00 - 12:00 CEST

HARP

BUILD UP

The European Portal For
Energy Efficiency In Buildings

Agenda

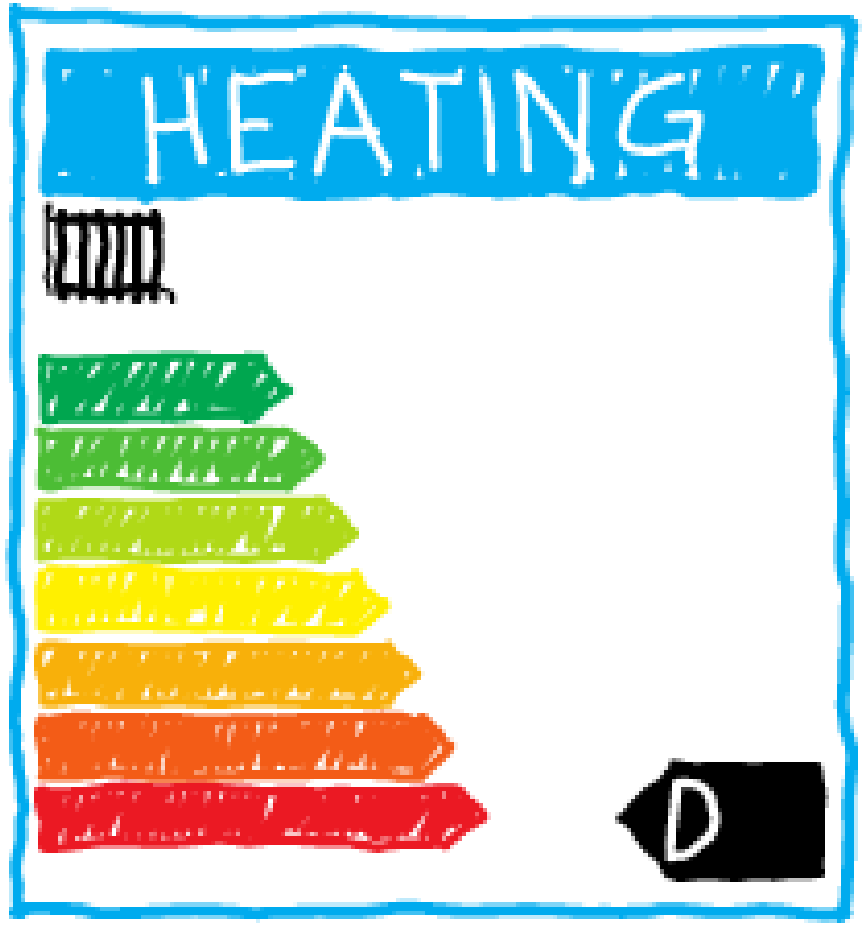
11:05 **The HARP project** (Rui Fragoso, ADENE)

11:15 **Energy labelling methodologies for existing heating appliances** (Diego Menegon, EURAC)

11:25 **National campaigns and reaching out to the consumer** (Eztizen Gregorio, OCU)

11:35 **Policy scenarios of the adoption of the energy labelling scheme for existing heating appliances at MS level** (Marco Calderoni, R2M)

11:45 **Dialogue + Q&A** (moderated by Marco Grippa, ECOS)



HARP Project – Heating Appliances Retrofit Planning

Build Up Webinar

Rui Fragoso, ADENE – Portuguese National Energy Agency

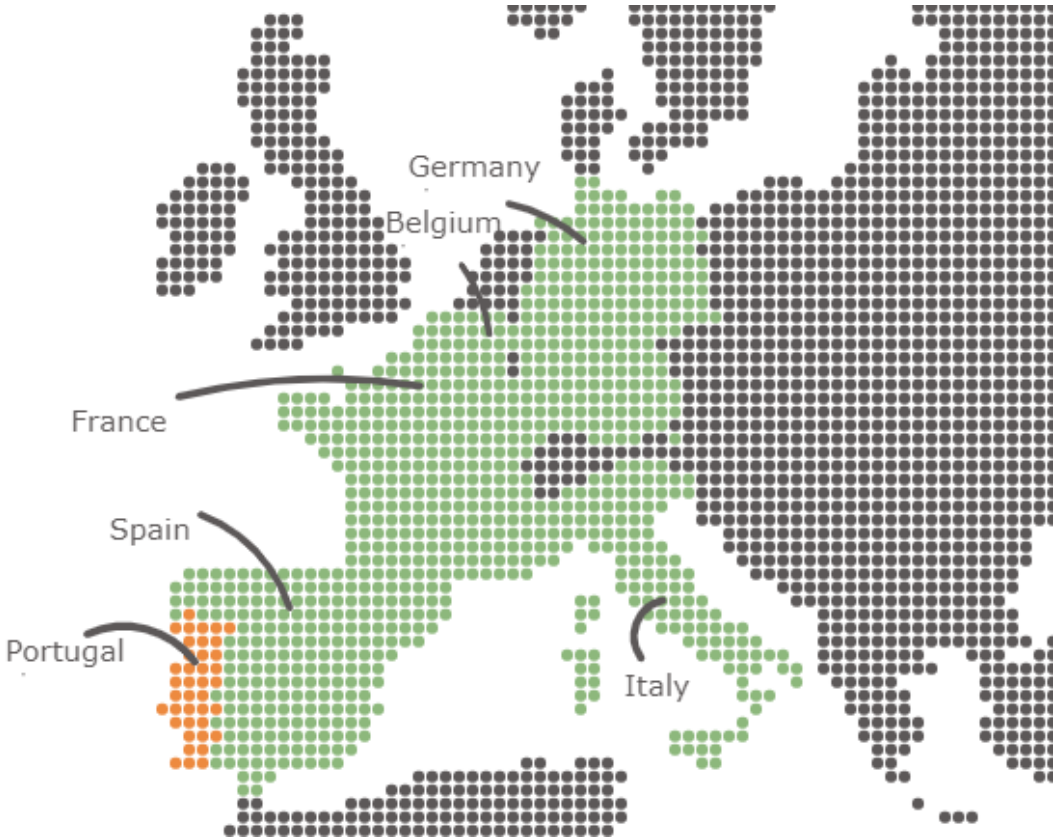
19th of July 2022, online

HARP
Heating Appliances Retrofit Planning

HARP CONSORTIUM

18	3	1,5	10,000
partners	years	million consumers	consumers
		expected to be reached	could be motivated to replace their heating

EUROPE	France	Germany	Italy	Portugal	Spain
ecos	énergies et avenir	dena German Energy Agency	Assotermica	adene Agência para a Energia	creara
ehi	ENERGIES 2050		ENEA	DECO	ocu
Solar Heat Europe ESTIF	Uniclima		eurac research	NOVA IMS	R2M SOLUTION
trenkner consulting				Universidade do Minho	



HEATING'S ROLE IN THE PATH FOR ENERGY EFICIENT BUILDINGS

Energy performance of buildings directive

Revised in 2018, new revision expected in 2022, the directive will help reach the building and renovation goals set out in the European Green Deal.

Renovation wave

Renovating the EU building stock will improve energy efficiency while driving the clean energy transition.

Long-term renovation strategies

EU countries have defined strategies that foster investments in the renovation of residential and commercial buildings.

Nearly zero-energy buildings

The EU has set a target for all new buildings to be nearly zero-energy by 2020.

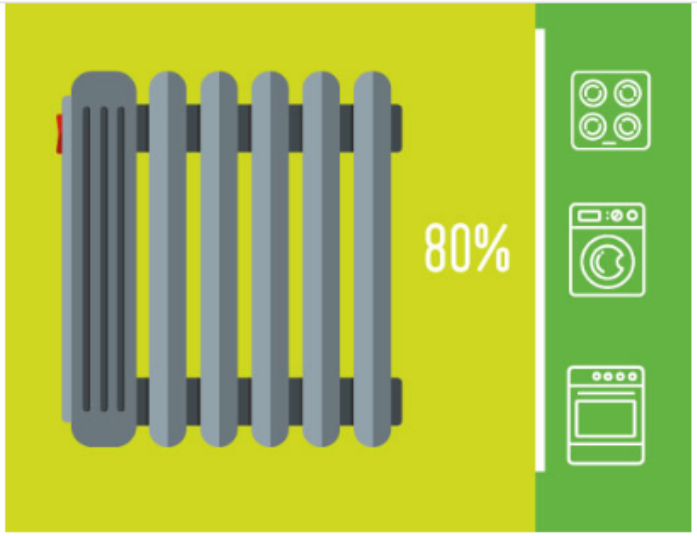
"Nearly 34 million Europeans unable to afford to heat their homes properly."

REPowerEU: Joint European action for more affordable, secure and sustainable energy

"…reducing faster the use of fossil fuels in our homes, buildings, industry, and power system, by boosting energy efficiency, increasing renewables and electrification…"

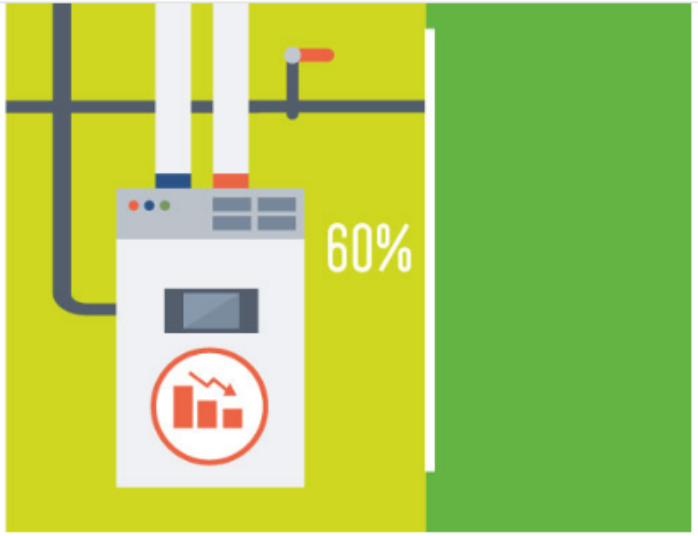
adene
Agência para a Energia

HEATING'S ROLE IN THE PATH FOR ENERGY EFICIENT BUILDINGS



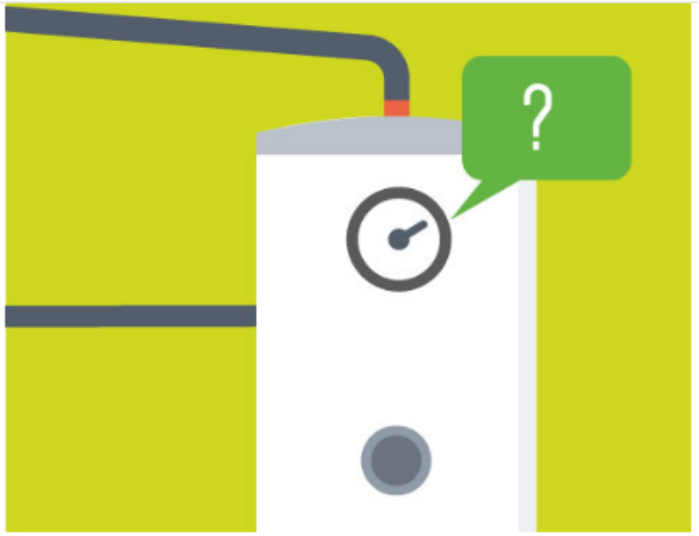
Heating and hot water represents 80% of the energy demand of EU households.

and 84% of it is generated from fossil fuels. A sharp decrease in the energy consumption and use of fossil fuels is needed for the EU to fulfil its climate and decarbonisation goals.



60% of the heating stock consists of inefficient boilers (class C or lower).

The Ecodesign and Energy Labelling regulations for boilers, in place since 2015, remove the worst performing products from the market, while driving consumers towards the most efficient choices. But installed boilers can last for over 15 years, and their replacement rate is very low (4% per year). As a result, a large number of inefficient boilers is still in use today.



Except in Germany, consumers are not informed about the efficiency of their installed heating systems.

This information is crucial to trigger a replacement of the least-efficient heating appliances. HARP will build on the experience of the mandatory labelling of installed boilers in Germany. Recommendations will be issued for the implementation of the labelling methodologies for installed heating systems at the EU-level, and specifically in countries not participating in HARP.

CONSUMER'S RELATION TOWARDS HEATING

It works ☺, all is well!

It does not work, urgente decisions are necessary:

The **consumer knows and considers the energy label** of new heating appliances:

- When acquiring a new heating equipment, **>70% of the consumers acquires the same technology it had installed before**
- **43% of the consumers** believes their house, the architectural and infrastructure characteristics, **do not allow for the installation** of a different heating solution
- **28%** doesn't know **other heating technologies**
- **25%** did not have the **time or availability** to look for more information

Source: EHI/Centerdata, October 2021)

CONSUMER'S RELATION TOWARDS HEATING

HARP's main goal is to **motivate individuals to plan the replacement of their often outdated and fossil-fuel operated heating appliances**, with more efficient and renewable alternatives.

To promote consumers conscious regarding energy efficient heating solutions the HARP consortium **invited consumers to know more about their current heating systems and plan the potential replacement of their heating system with more efficient and renewable solutions**, relying on the **energy label as the main instrument** to communicate energy efficiency.

HARP'S APPROACH

Allow the consumer to **compare, within the same basis, the label energy efficiency scale, old and new heating appliances**, promoting its planned replacement.

- ✓ **Awareness:** raising consumers' interest in the heating topic
  Consumer Theory of Change Model, key issues and communication channels

- ✓ **Quantification:** labelling the existing heating system
  Methodology to calculate the efficiency and class of space, water and combi existing heaters

- ✓ **Overview of solutions:** presenting the most efficient heating technologies on the market
  Assessment of heating solutions with the heating industry

- ✓ **Analysis of benefits:** providing information on potential energy, money and CO_2 savings
  Estimate potential savings, new energy class and added co-benefits upon the replacement

- ✓ **Motivate the replacement:** extending the information to professionals and incentives
  List of professionals that can support the consumer and available incentives

HARP'S ACTIVITIES

- ❑ Definition of the **consumer behaviour change model** regarding the adoption of heating systems
- ❑ Analysis of the heating stock in European households and current **market offer of heating solutions**
- ❑ Evaluation of the **co-benefits** associated with energy efficient heating solutions
- ❑ **Labelling methodologies** for the classification of existing heating appliances: space, water and combi heaters
- ❑ HARPa, **online application** (consumers and professionals)
- ❑ **Materials toolbox** about energy efficient heating solutions for consumers and professionals
- ❑ Two heating season communication campaigns **Feb/May 21 and Oct21/April 22**
- ❑ **Policy Integration scenarios** for the energy labelling of existing heating appliances in the EU and MS context

HARP'S RESULTS

8,9 m consumers reached
(KPI = 1,5 m)

34.367 Energy labels issued for existing heating systems

17.681 simulations for more energy eficient solutions

18.979 consumers motivated to change
(KPI=10.000)

134.355 professionals reached

1.037 professionals trained
(KPI = 1.000)

6 PROPOSALS FOR POLICY INTEGRATION SCENARIOS

Harmonize the existing systems for the energy labelling of existing heating appliances (voluntary and compulsory)

Take the opportunity to make these systems compatible with the EU regulations and considering both space and water heating

Reinforce the link to EPREL – European product database

Allowing for the comparison between the efficiency of old and new heating appliances

Maintenance procedures of heating appliances

providing more information on the energy performance and class of the existing appliance

Reinforce the link to EPBD

harmonizing the heating appliances performance evaluation with labelling regulations

One-stop-shops/renovation passports

support the consumer in the adoption of energy efficiency measures in their house, namely addressing the heating system

Prioritize energy efficiency incentives and support the energy transition

boosting the replacement of the oldest and most inefficient heating appliances, targeting those more in need and achieving the highest revenues in terms of energy savings

Thank you for your attention!

Rui Fragoso

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Heating Appliances Retrofit Planning

HARP Project – Heating Appliances Retrofit Planning

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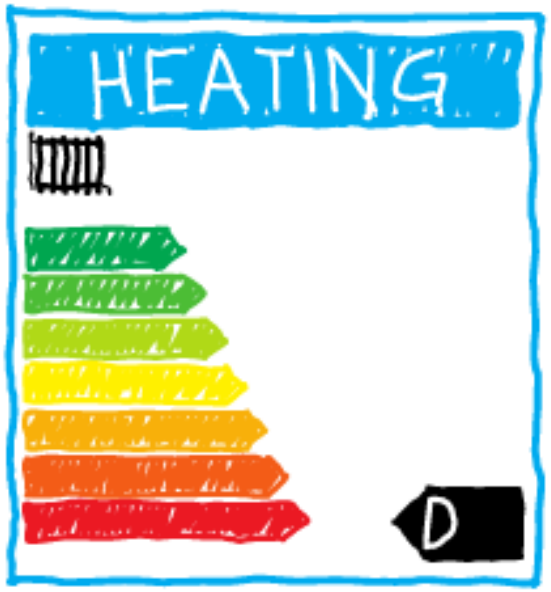
The European Portal For Energy Efficiency In Buildings



ENERGY LABELLING METHODOLOGY FOR EXISTING HEATING APPLIANCES

Diego Menegon

Institute for Renewable Energy, Eurac Research

19 July of 2022, BUILD UP webinar, online

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Heating Appliances Retrofit Planning

Introduction

Definition of an **energy label** for space heating and water heaters **old appliances**. For the appliances that were in the market before the introduction of energy label directive (regulations 811/2013 and 812/2013).

Give the possibility to final user and to professionals to **compare** the old appliance label with the one of a new product.

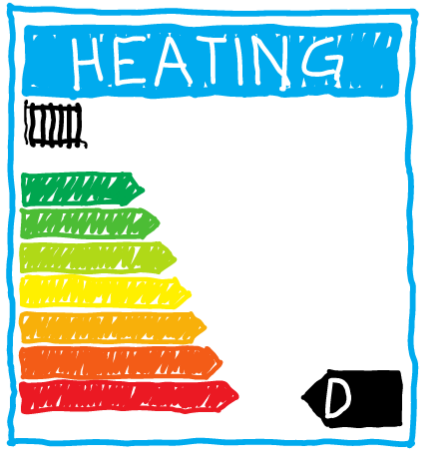
- **Simplified** version for a **common user**
- **Detailed** version for a **professional user**

Introduction

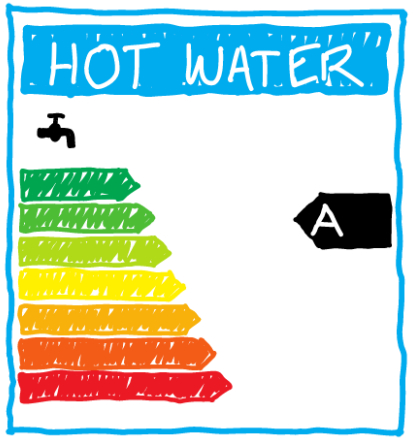
The methodology has been implemented as first step of the HARPa tool.

The labelling proposed in HARP is **voluntary** and its aim is to **inform** the final user about the (in)efficiency of old appliances. Therefore the graphics recalls the official label.

Your existing boiler has an estimated efficiency of 70%, reaching an energylabel class of D.



Your existing gas instantaneous water heater has an estimated efficiency of 83%, reaching an energylabel class of A.



Workflow of the developing of labelling methodologies

1) **Analysis** of the **existing** compulsory and voluntary heating **labelling schemes** in EU countries
2) Development of **harmonized** methodologies with the **EU energy labelling regulations** Reg. 811/2013 (space heating) and Reg. 812/2013 (water heating)
3) Introduction of a **degradation factor** according to the appliance's age defined in cooperation with the heating industry and considering the existence of regular maintenance procedures
4) **Validation** of the methodologies considering the technical data of more than **5.000 appliances** and **laboratory testing** of 5 appliances (space heating and water heaters)

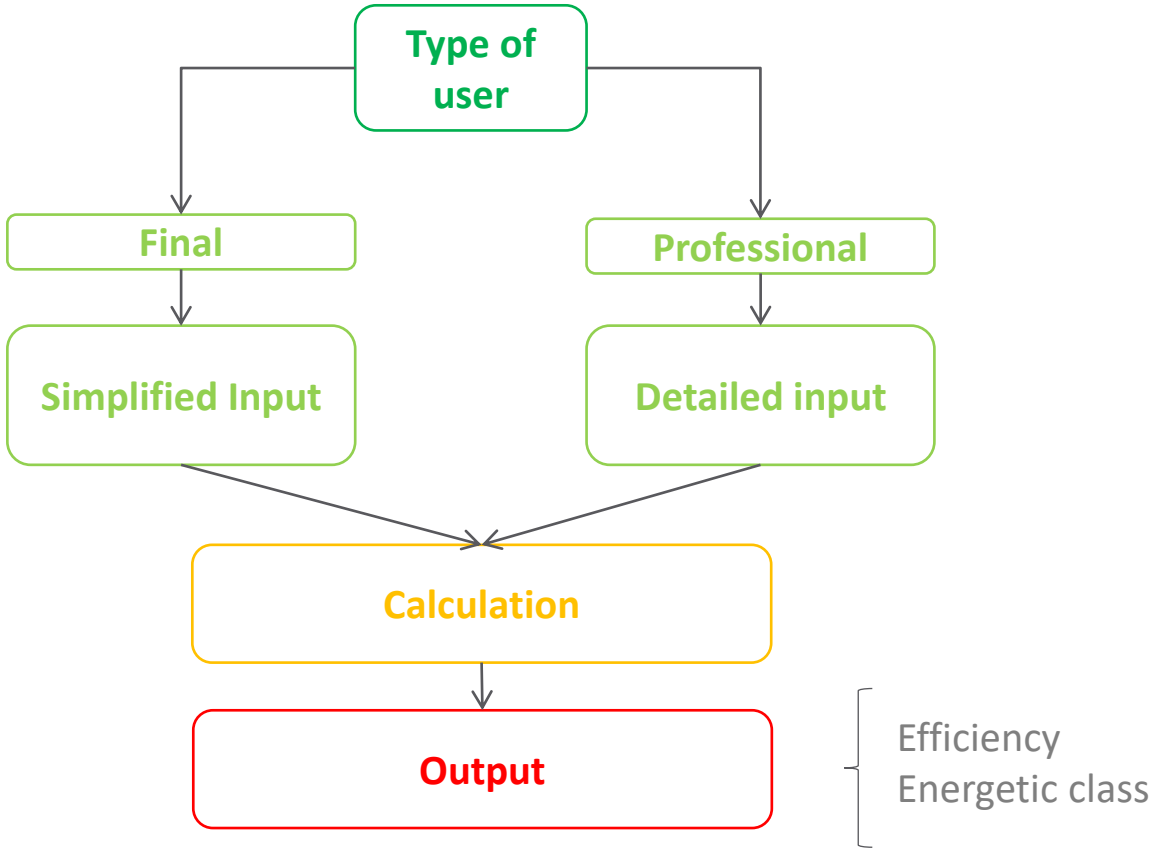
Labelling methodologies for existing heating appliances

- The final user is not aware of the meaning of the calculation inputs
- For old appliances some values cannot be retrieved from datasheets or appliances books.

The validation of the methodologies considered those limits:

1. For the final user, the inputs are needed to define default values.
2. The selection of default values has been simplified.
3. The default values were selected from EN 15316 and from a market analysis.

Labelling methodologies for existing heating appliances



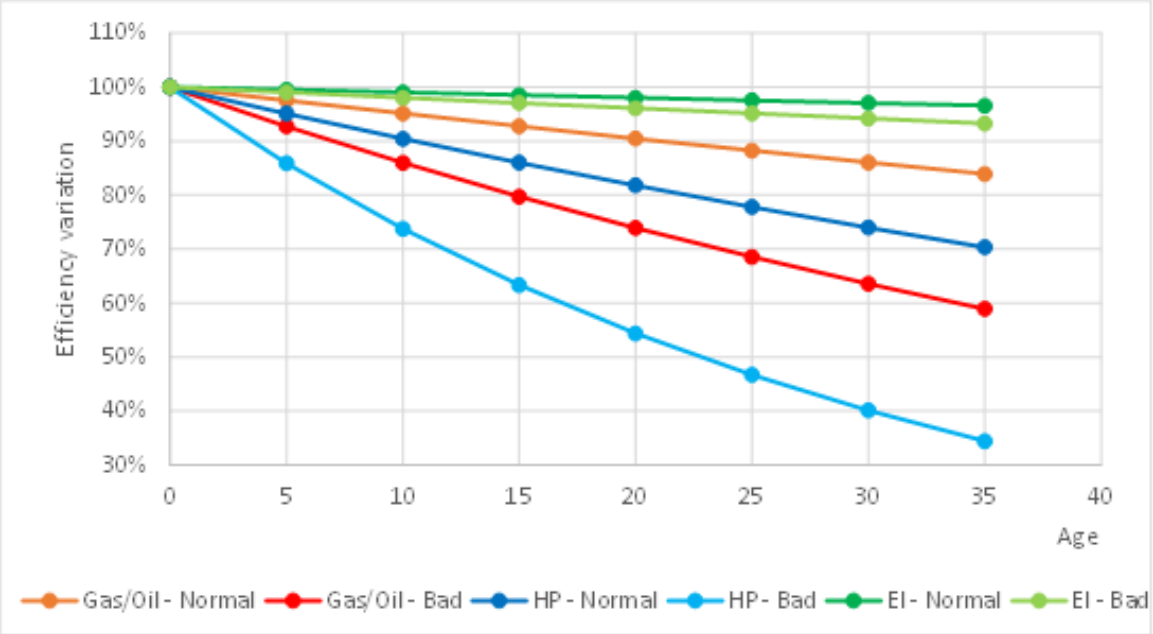
Labelling methodologies for existing heating appliances

EXISTING SPACE HEATERS

$$\eta_s = \eta_{son} \cdot \boldsymbol{C_{age}} - \sum F_{(i)}$$

EXISTING WATER HEATERS

$$\eta_{WH} = \frac{Q_{ref}}{\left(Q_{fuel} + CC \cdot Q_{el}\right) + Q_{cor}} \cdot \boldsymbol{C_{age}}$$



We considered different degradation coefficients for “normal” or “bad” maintenances depending on the appliances typology.

Labelling methodologies for existing heating appliances

SPACE HEATING

The representation is done according to the boilers groups:

- Standard
- Low temperature
- Condensing

The validation regarded:

- about 4600 models
- with construction year from 1972 to 2019
- gas and oil boilers

Labelling methodologies for existing heating appliances

SPACE HEATING

The representation is done according to the boilers groups:

- Standard
- Low temperature
- Condensing

The validation regarded:

- about 4600 models
- with construction year from 1972 to 2019
- gas and oil boilers

WATER HEATING

The appliances considered were:

- Gas storage
- Gas instantaneous
- Electric storage
- Electric instantaneous

The validation regarded:

- 400 appliances models
- Appliances older than 10 years old
- Electric and gas heaters

Average deviation of 3% between the simplified and the detailed calculations

Conclusion

Labelling methodologies for **existing space heating appliances** and **water heaters** has been developed.

The methodologies are **compliant to EU regulations** 811/2013 and 812/2013.

The methodologies considered **two versions**: a simplified for the **final user** and a detailed for the **professional user**.

The **validation** considered about **5000 appliances, laboratory test on 5 old appliances.**

The average deviation between the simplified and the detailed versions is about 3%.

Thank you for your attention!

Dr. Diego Menegon

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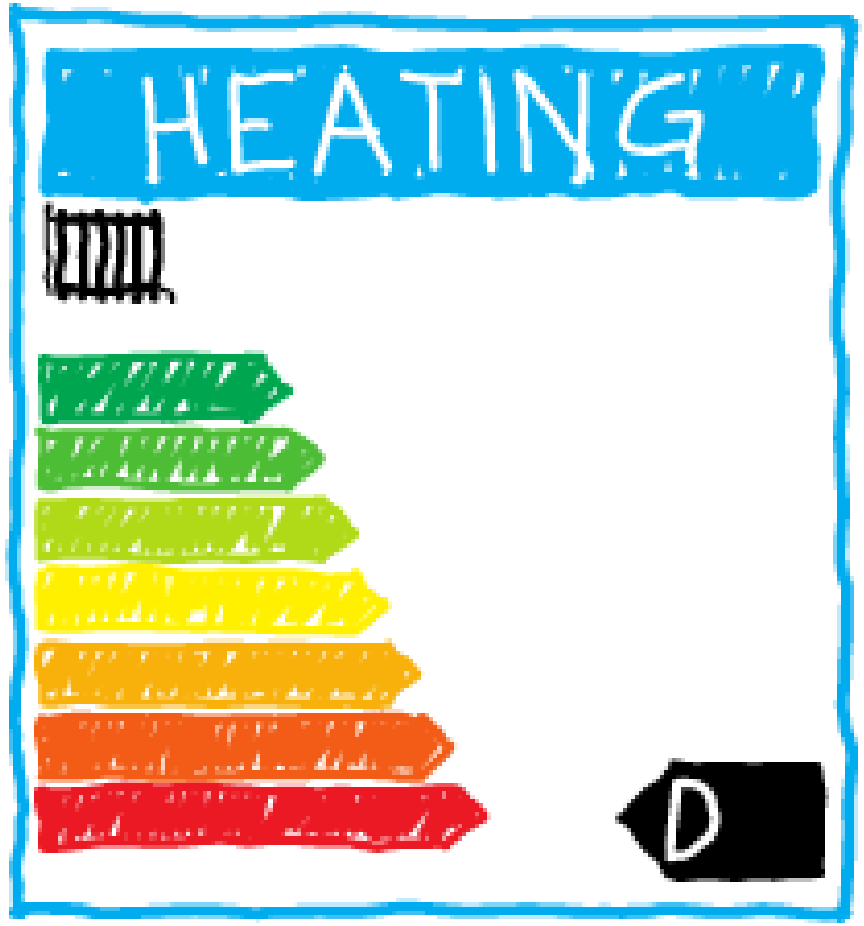


HARP Project – National campaigns and reaching out to the consumer

Build Up webinar

19th of July 2022

HARP
Heating Appliances Retrofit Planning

MAIN GOAL REGARDING CONSUMERS

HARP's main goal is to **motivate individuals to plan the replacement of their often outdated and fossil-fuel operated heating appliances**, with more efficient and renewable alternatives.

The objective isallow the consumer to **compare, within the same basis, the label energy efficiency scale, old and new heating appliances**, promoting its planned replacement.

Consumers don't tend to plan the replacement. They replace the heating appliances once they are not working and often in a hurry without time or availability to look for information.

Although they consider the energy label wen acquiring a new appliance, **3 out of 4 consumers choose the same technology they had installed**.

HARP'S ACTIVITIES FOR CONSUMERS

Two heating season communication campaigns **Feb/May 21 and Oct21/April 22**

Omnichannel campaigns through

- ✓ Newsletters
- ✓ Consumer organizations websites
- ✓ Social media
- ✓ Articles in consumer magazines,
- ✓ Webinars
- ✓ Branded content

Adapted to the different behaviour of consumers in each country.

HARP'S COMMUNICATION JOURNEY

Rising awareness: raising consumers' interest in the heating topic though social media newsletter, etc.

Offer information on what they have: labelling the existing heating system is a starting point.

Overview of solutions: presenting the most efficient heating technologies on the market adapted to consumer necessities. Through the app and factsheets.

Information on benefits and cobenefits: providing information on potential energy, money and CO_2 savings and also cobenefits. Through the app and infographics.

Motivate the replacement: extending the information to professionals and incentives. Explaining though webinars.

HARP ONLINE APPLICATION. HELPING CONSUMER IN THE DECISION MAKING PROCESS

HARPa, an online application supports consumers (and professionals) in the **identification of their current heater's energy class and finding an energy efficient replacement solution.**

It also provides the contact with professionals and identifies incentives available at national level.

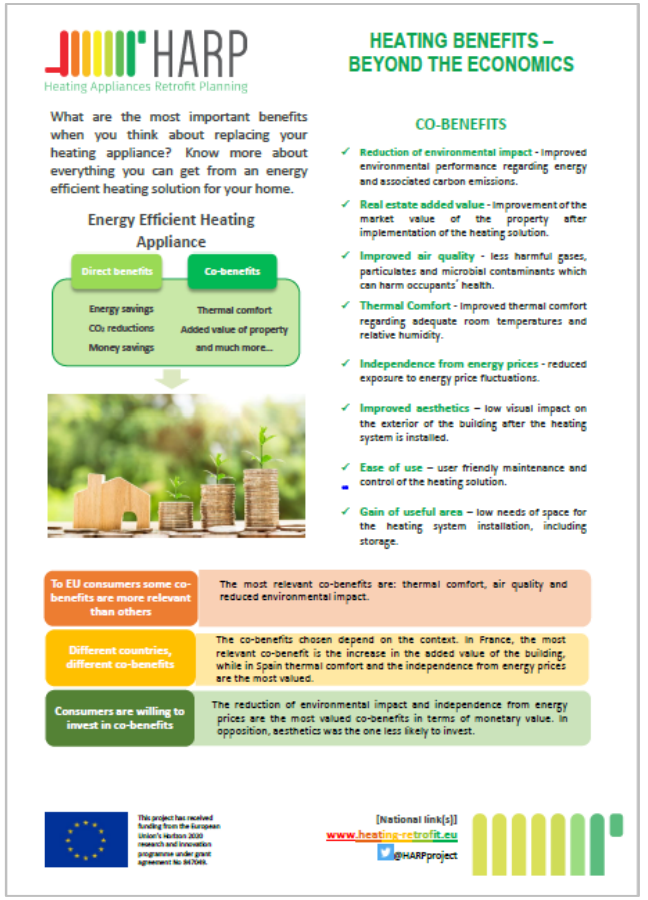
COMMUNICATION CAMPAIGN AND RESOURCES

Two heating seasons campaigns in 5 countries: 2020/2021 and 2021/2022

- Social media campaign.
- Public media.
- Communication and lobby activities engaging national authorities, consumers and industry.
- Using HARP toolbox for consumer on the different channels.

HARP'S TOOLBOXS, FOR CONSUMERS

BROCHURES



HARP'S TOOLBOXS, FOR CONSUMERS

HEATING TECHNOLOGIES FACTSHEETS

HARP FACTSHEET

Heat Pump

Heat my home and water with the heat pump

If your heating system is older than 15 years, it might be inefficient and highly energy consuming. Replacing your heating system with a more efficient solution will help you reduce your energy bill and additionally keep your home more comfortable, improve air quality, increase your home's market value and contribute to reducing global CO_2 emissions.

60% of the heating appliances installed in the EU are old and inefficient (energy class C or lower) — 60%

A heat pump can cover the complete needs for heating and hot water, as well as for cooling — 100%

In 2019, the European geothermal heat pump market reached a milestone of 2 million heat pumps installed — 2 millions

Aero and geothermal heat pumps can reach efficiencies on primary energy between 110/130 and 140/190, respectively, meaning they produce more useful energy than they consume. — 110-190%

✓CHECKLIST

Heat pump fits my home because

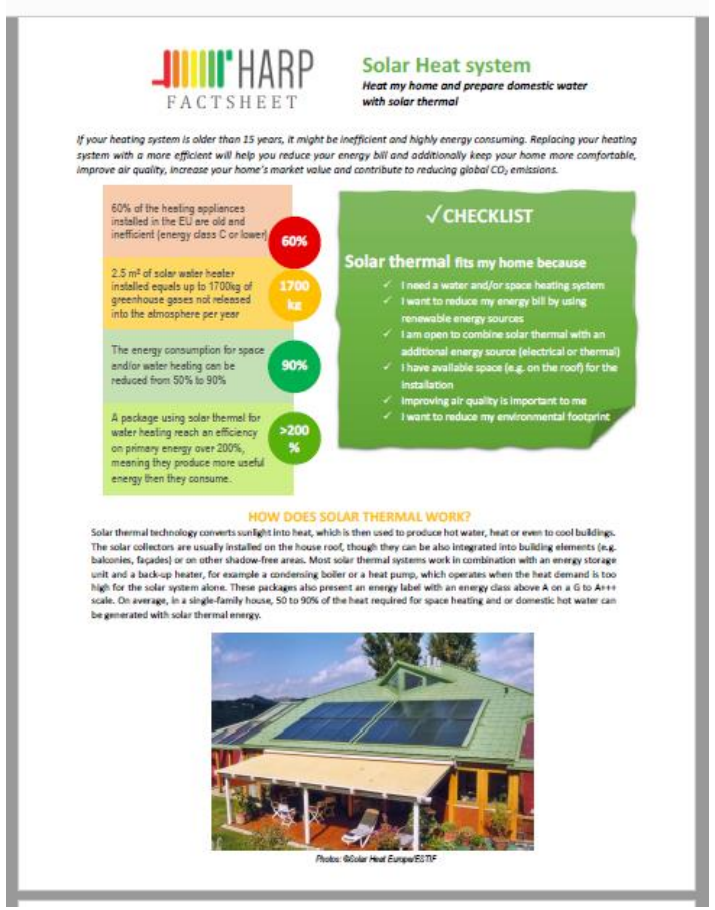
- ✓ I need a water and/or space heating system
- ✓ I want to reduce my energy bill by using energy that can be extracted from the ambient air, water or ground
- ✓ I want to install the most efficient technology
- ✓ I have access to a stable electricity network
- ✓ I have space for the installation
- ✓ Improving air quality is important to me
- ✓ A system with the cooling function would be a great option for my house
- ✓ I want to reduce my environmental footprint
- ✓ I want to increase my house value

HOW DOES THE HEAT PUMP WORK?

A heat pump is a well-known technology that can provide heating, cooling and hot water. Using a heat exchanger, it can extract energy from air (aerothermal), ground (geothermal) or water (hydrothermal) and use it to provide heat for space heating and hot water. This conversion is done via a compressor, which needs electricity to run but the global balance is fair and positive for environment and climate. The efficiency is above 100% and it is the most efficient technology that exists. There are diverse models and types of heat pumps that can be easily adapted to the needs and spaces of every house. Combined storage tanks are often installed to stock heat for hot water and space heating

DID YOU KNOW?

Aerothermal heat pumps make good use of the heat drawn from the air but are more sensitive to variations in the outside temperature, differently from geothermal heat pumps that benefit from the ground's stable temperature all year round.



HARP FACTSHEET

Solar Heat system

Heat my home and prepare domestic water with solar thermal

If your heating system is older than 15 years, it might be inefficient and highly energy consuming. Replacing your heating system with a more efficient will help you reduce your energy bill and additionally keep your home more comfortable, improve air quality, increase your home's market value and contribute to reducing global CO_2 emissions.

60% of the heating appliances installed in the EU are old and inefficient (energy class C or lower) — 60%

2.5 m² of solar water heater installed equals up to 1700kg of greenhouse gases not released into the atmosphere per year — 1700 kg

The energy consumption for space and/or water heating can be reduced from 50% to 90% — 90%

A package using solar thermal for water heating reach an efficiency on primary energy over 200%, meaning they produce more useful energy then they consume. — >200 %

✓CHECKLIST

Solar thermal fits my home because

- ✓ I need a water and/or space heating system
- ✓ I want to reduce my energy bill by using renewable energy sources
- ✓ I am open to combine solar thermal with an additional energy source (electrical or thermal)
- ✓ I have available space (e.g. on the roof) for the installation
- ✓ Improving air quality is important to me
- ✓ I want to reduce my environmental footprint

HOW DOES SOLAR THERMAL WORK?

Solar thermal technology converts sunlight into heat, which is then used to produce hot water, heat or even to cool buildings. The solar collectors are usually installed on the house roof, though they can be also integrated into building elements (e.g. balconies, façades) or on other shadow-free areas. Most solar thermal systems work in combination with an energy storage unit and a back-up heater, for example a condensing boiler or a heat pump, which operates when the heat demand is too high for the solar system alone. These packages also present an energy label with an energy class above A on a G to A+++ scale. On average, in a single-family house, 50 to 90% of the heat required for space heating and or domestic hot water can be generated with solar thermal energy.

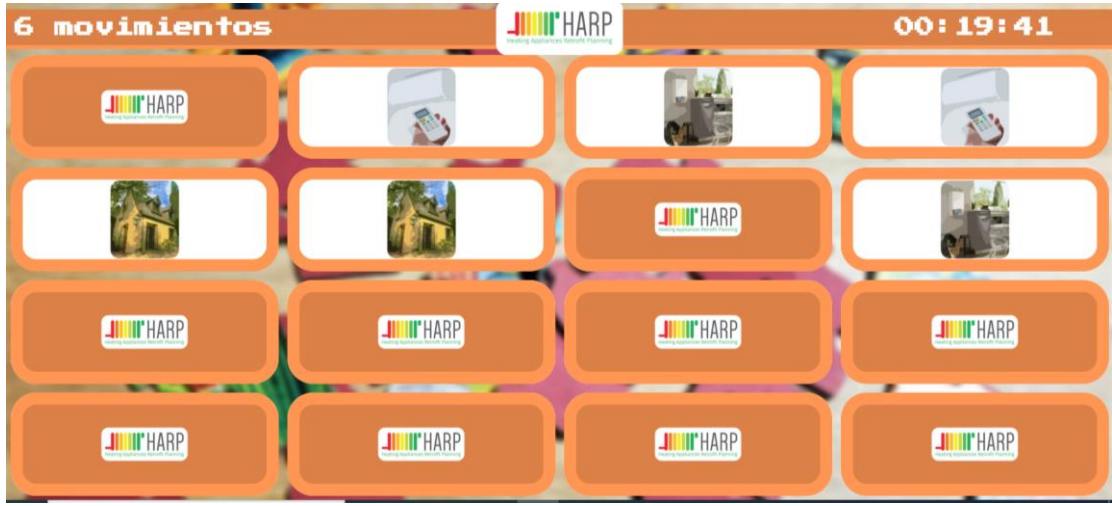
Photos: ©Solar Heat Europe/ESTIF

HARP'S TOOLBOXS, FOR CONSUMERS

VIDEOS

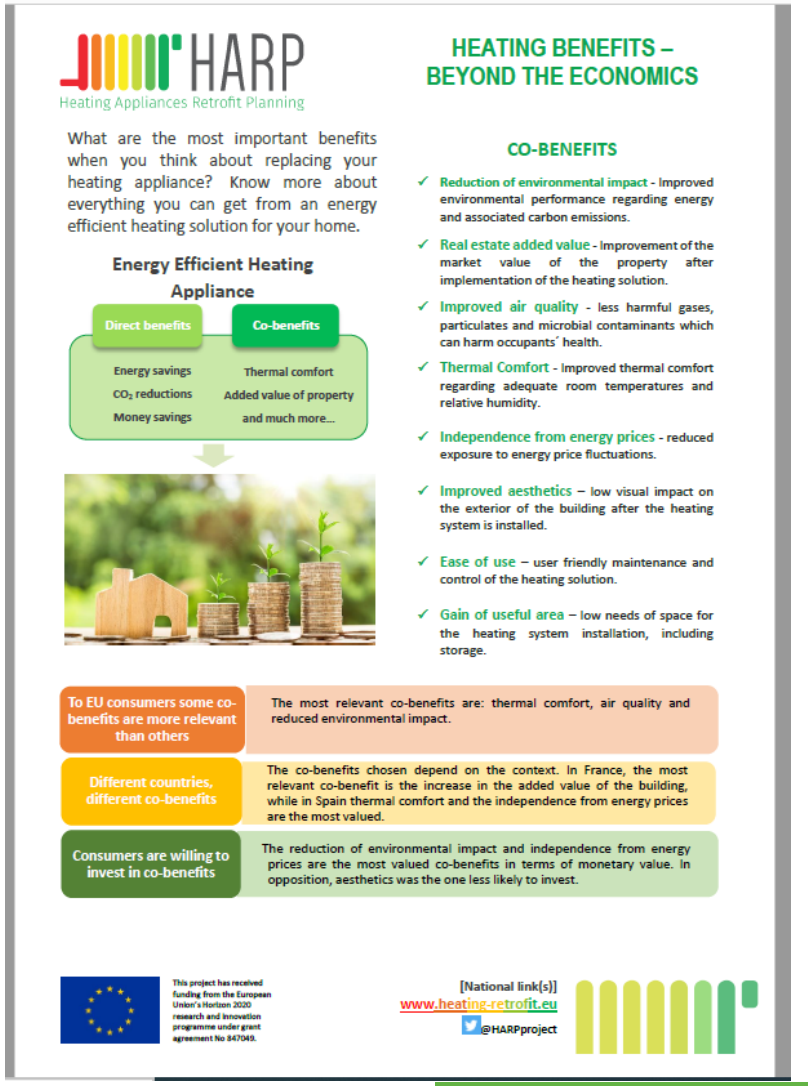
HARP'S TOOLBOXS, FOR CONSUMERS

SERIOUS GAMES



HARP'S TOOLBOXS, FOR CONSUMERS

INFOGRAPHICS

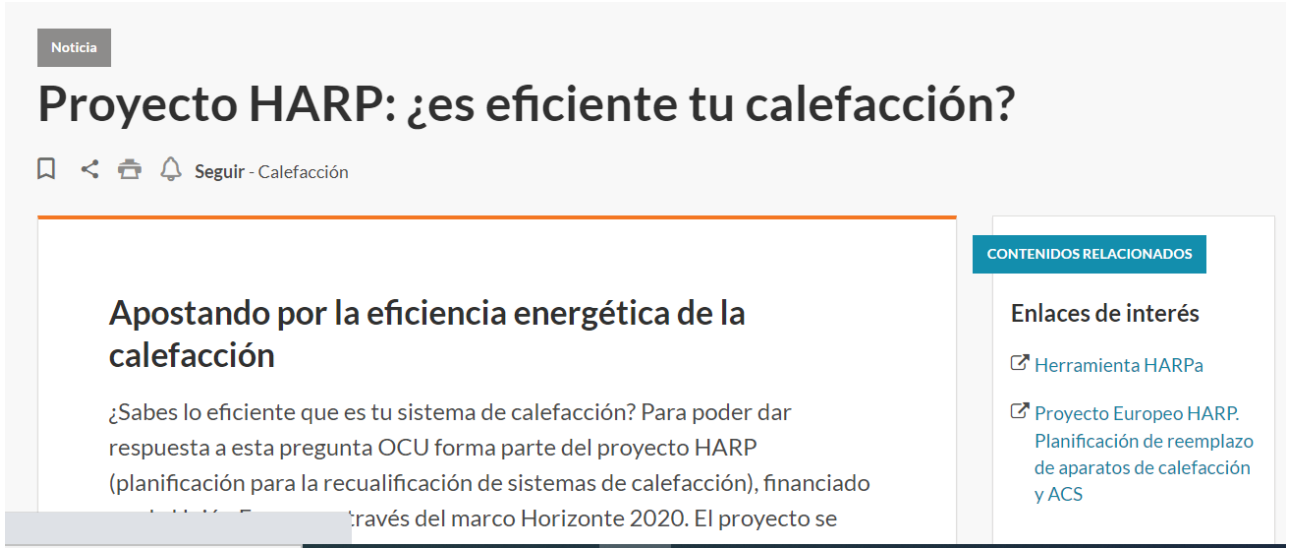


HARP'S TOOLBOXS, FOR CONSUMERS

HARP: as tecnologias de aquecimento domés...
pt.linkedin.com

HARP: Porque é tão importante os consumidores...
deco.pt

ARTICLES



Noticia

Proyecto HARP: ¿es eficiente tu calefacción?

Seguir - Calefacción

Apostando por la eficiencia energética de la calefacción

¿Sabes lo eficiente que es tu sistema de calefacción? Para poder dar respuesta a esta pregunta OCU forma parte del proyecto HARP (planificación para la recualificación de sistemas de calefacción), financiado través del marco Horizonte 2020. El proyecto se

CONTENIDOS RELACIONADOS

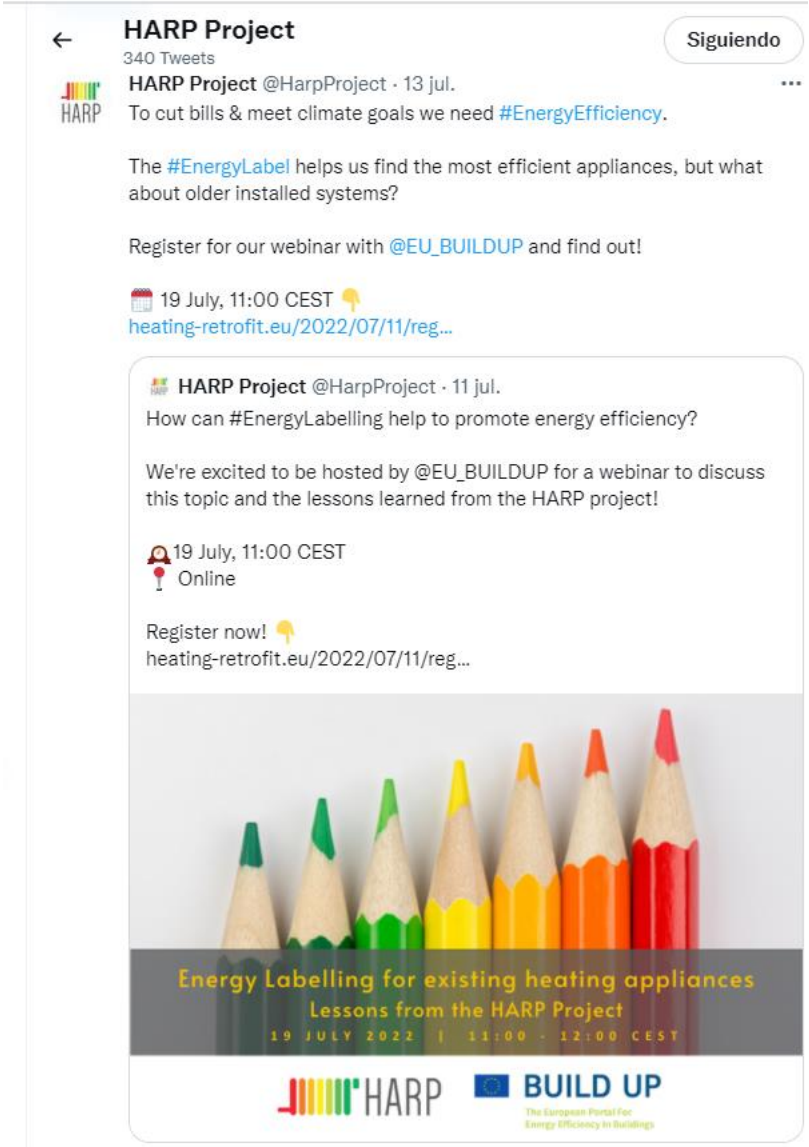
Enlaces de interés

Herramienta HARPa

Proyecto Europeo HARP. Planificación de reemplazo de aparatos de calefacción y ACS

HARP'S TOOLBOXS, FOR CONSUMERS

SOCIAL MEDIA CAMPAIGN



LESSONS LEARNED REGARDING CONSUMERS

- Development of adapted material for consumers (for each country).
- Engagement through organization of webinar with other topics more interesting for consumers (i.e., energy bill).
- Higher impact through paid campaigns for consumers and professionals.
- Information about incentives is not clear, is fragmented, is not at national level and does not reach properly to consumers.

HARP'S RESULTS REGARDING CONSUMERS

- 8,9 m consumers reached (KPI = 1,5 m)
- 34.367 Energy labels issued for existing heating systems
- 17.681 simulations for more energy eficient solutions
- 18.979 consumers motivated to change (KPI=10.000)

Thank you for your attention!

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A new labelling for installed heating appliances in Europe?

Policy integration scenarios for the new label

Marco Calderoni and Fabio Aprá

R2M SOLUTION
RESEARCH TO MARKET
Innovation
Energy Services & Sustainability
Engineering
ICT & Automation

HARP
Heating Appliances Retrofit Planning

Adoption of the HARP methodology: the consortium countries' experience

Labelling initiative	
Public (Energy Agencies)	Private (Industrial Associations)

Main Recipients		
End users	Authorities providing incentives	Professionals/installers

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FRANCE

Existing methodologies and tools

Voluntary – Methodology by E&A and COENOVE. Thought for **professionals** only. **No DHW** (just liquid fuel + gas)

The **industrial associations** promoted and financed the methodology and tool.

HARP in the future

HARPa will be used instead of Mon Étiquette Chaudière. The new application will be called Mon Étiquette Chaudière Chauffage

Contacts ongoing with the French **Directorate General of Energy and Climate** to possibly endorse HARP.

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PORTUGAL

Existing methodologies and tools

There is **no existing tool** in Portugal, neither voluntary – **ADENE aims at using HARP at national level.**

ADENE's idea is to **create a framework to offer to the government** to implement HARP methodology

HARP in the future

The HARP methodology could be **used to evaluate the requests for incentives** and rank the best interventions requests (in €/kWh saved)

There is a explicit request from the European Commission in developing **one-stop-shop activities for the EPBD.**

HARP
Heating Appliances Retrofit Planning

ITALY

Existing methodologies and tools

Voluntary – Methodology by Assotermica. Thought for **professionals** only. To apply during maintenance. No DHW.

The **industrial associations** promoted and financed the methodology and tool.

HARP in the future

HARP methodology is **more easily accepted by public entities** (validated by EURAC, endorsed by ENEA)

Etichetta Energetica will be **replaced by HARP**.

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SPAIN

Existing methodologies and tools

Voluntary – Simplified methodology by FEGECA. To apply during maintenance by professionals.

Low utilisation of the tool up to know.

HARP in the future

IDEA (Spanish energy agency) **focuses on RES** only, therefore cannot endorse HARP. Lack of Air-air heat pumps is also a weakness.

AGENEX (regional energy agency of Extremadura) **endorsed HARP** and is using it.

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GERMANY

Existing methodologies and tools

Mandatory - Class calculator by BWMI.
Thought for **professionals** only.
No DHW.

Methodology based on a **national database** for each type of heating appliance, which is created with basic parameters.

Labelling process works well, but this **does not translate in a reason to change the heating** system for the user.

HARP in the future

Germany will continue with the **current methdology.**

HARP's methodology is more complete than the current German one (e.g. it covers also DHW).

Idea: HARP methodology can be included in the **individual renovation passport** (direct report to user on how to improve their house energy efficiency).

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POLAND

Promoter: Association of Heating Device Manufacturers and Importers

Motivation:

- To avoid the user choosing the new heating system based on the most advantageous incentive.
- Put incentive providers in a position to assess whether the end user's request makes sense.

Immediate actions:

- Translate the app into Polish
- Adapt fuel prices and climate conditions

Medium-term actions:

- Make the app suitable for use by incentive providers

GREECE

Promoter: Greek Solar Thermal Industry Association

Motivation:

- The HARP app allows end users to simply get information about the benefits of modern technologies

Immediate actions:

- Translate the app into Greek
- Adapt fuel prices and climate conditions

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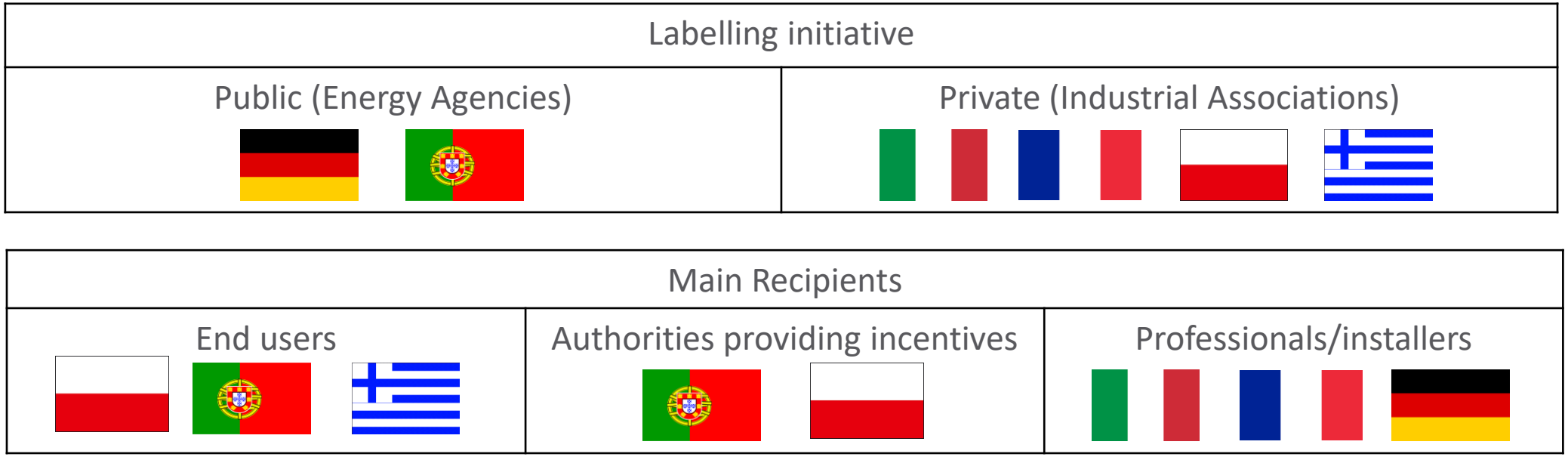
Adoption of the HARP methodology: the consortium countries' experience



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Conclusions

APPROACHES TO LABELING

- Labelling of existing heating appliances first was adopted in Germany.
- The German experience shows that making this mandatory for professionals is not necessarily a promising approach.
- Industry-driven approaches seem to have a good potential.
- Another likely effective approach is to link the energy label to incentive mechanisms.

FUTURE SCENARIOS

- Besides countries participating in the HARP project, other countries showed interest for this methodology.
- HARP will provide feedbacks to the European Commission, which may or not consider to introduce labelling of existing heating appliances in legislation.
- Possible ways of introducing labelling at EU and national level are:
  - Incentive mechanisms
  - Future recast of EBPD
  - (Digital) Building logbooks
  - One-stop-shop for building renovation
- Important messages to be communicated to end users are not only related to operational savings (economic and energy), but also to health improvement and increased economic value of the building.

Thank you for your attention!

Marco Calderoni, Fabio Aprà

R2M Solution

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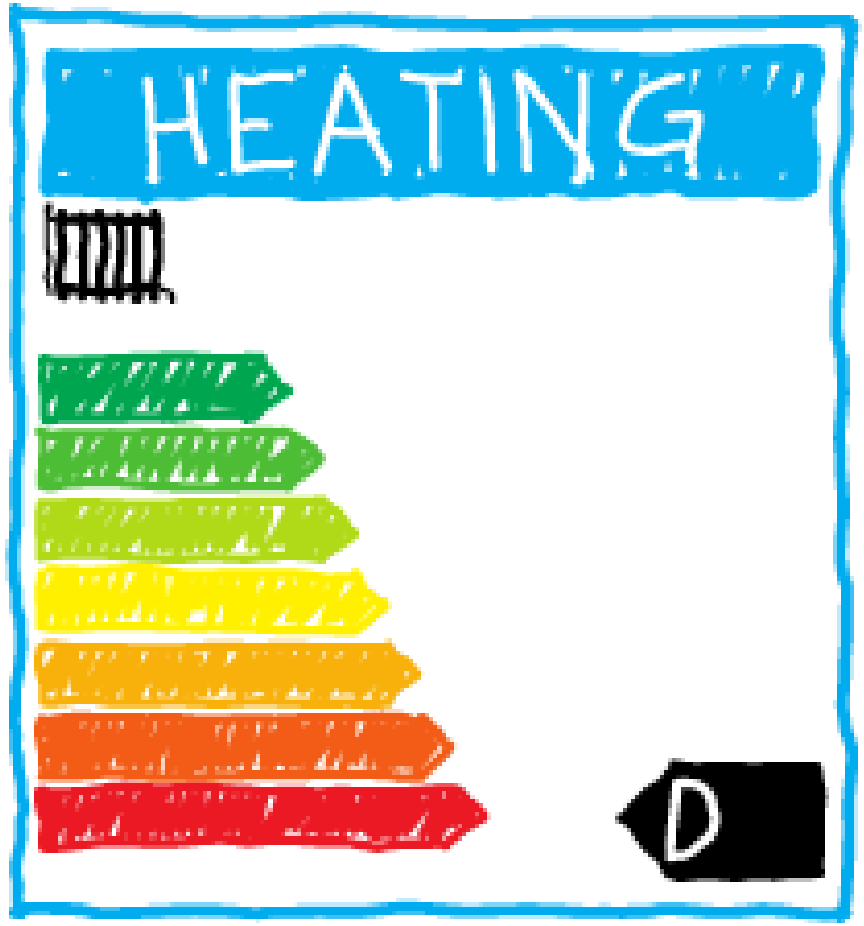

Roundtable and Q&A

Moderated by Marco Grippa, ECOS

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