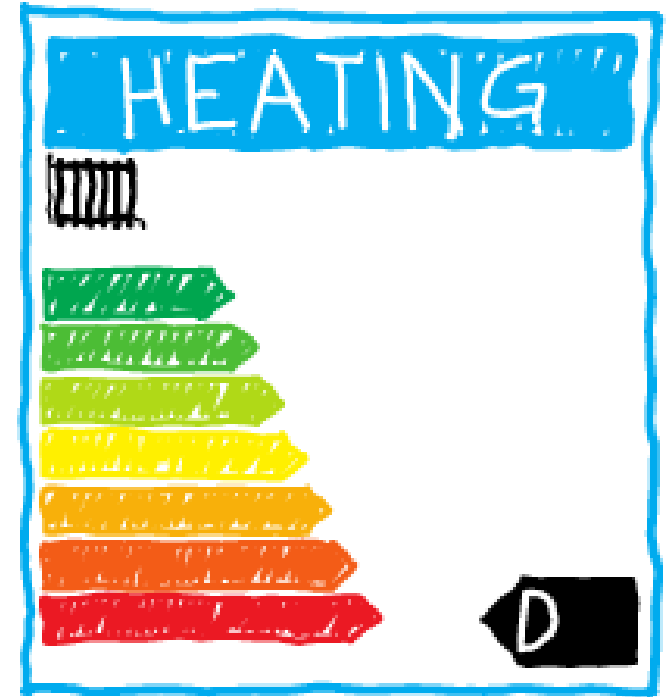


HARP Project – Heating Appliances Retrofit Planning



**AN EU ENERGY LABELLING METHODOLOGY FOR EXISTING
HEATING APPLIANCES AND HARP_a TOOL**

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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).

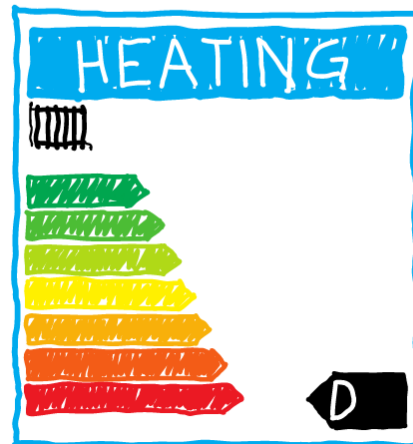
Give the possibility to final user and to professionals to **compare** the old appliance label with the one of a new product.

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

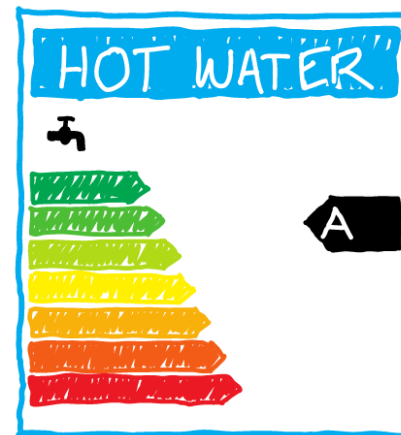
Introduction

The methodology has been implemented as first step of the HARP 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)

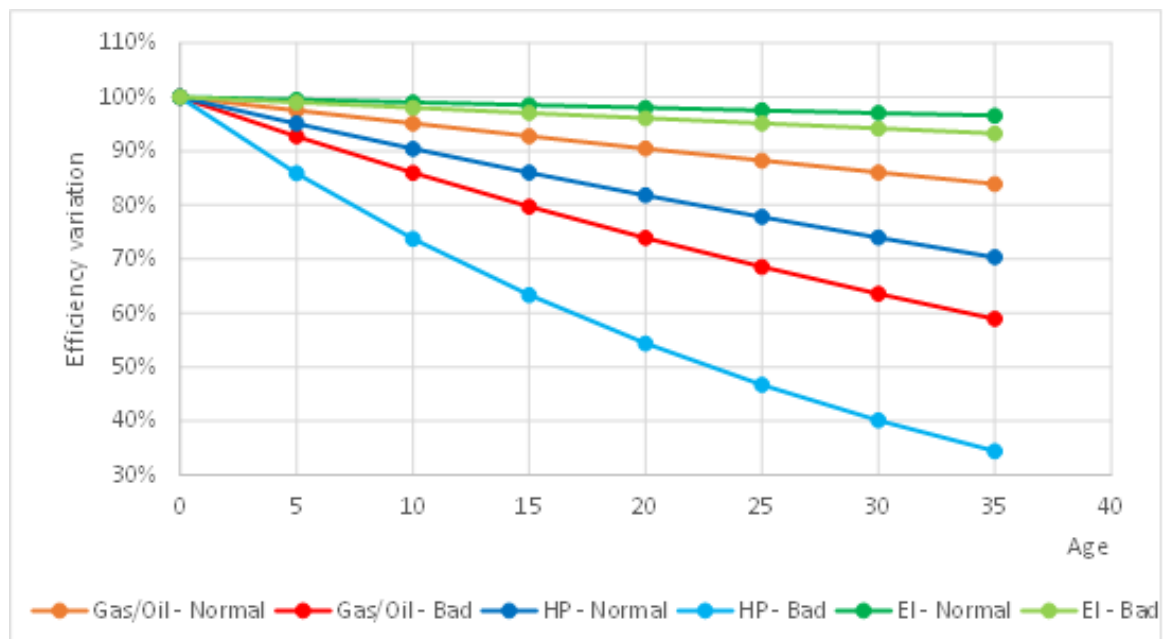
Labelling methodologies for existing heating appliances

EXISTING SPACE HEATERS

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

EXISTING WATER HEATERS

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



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

Labelling methodologies for existing heating appliances

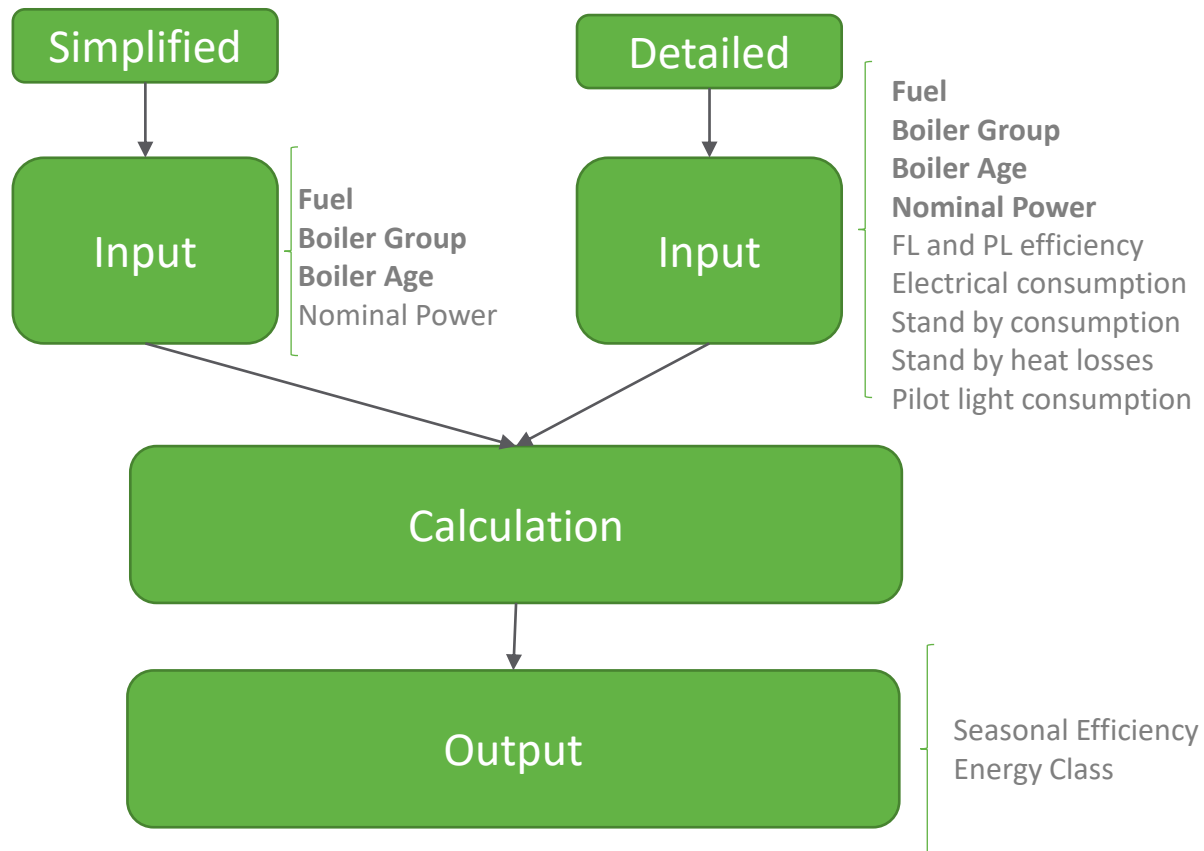
- The final user is not aware of the meaning of the calculation inputs
- For old appliances some values cannot be retrieved from datasheets or appliances books.

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.

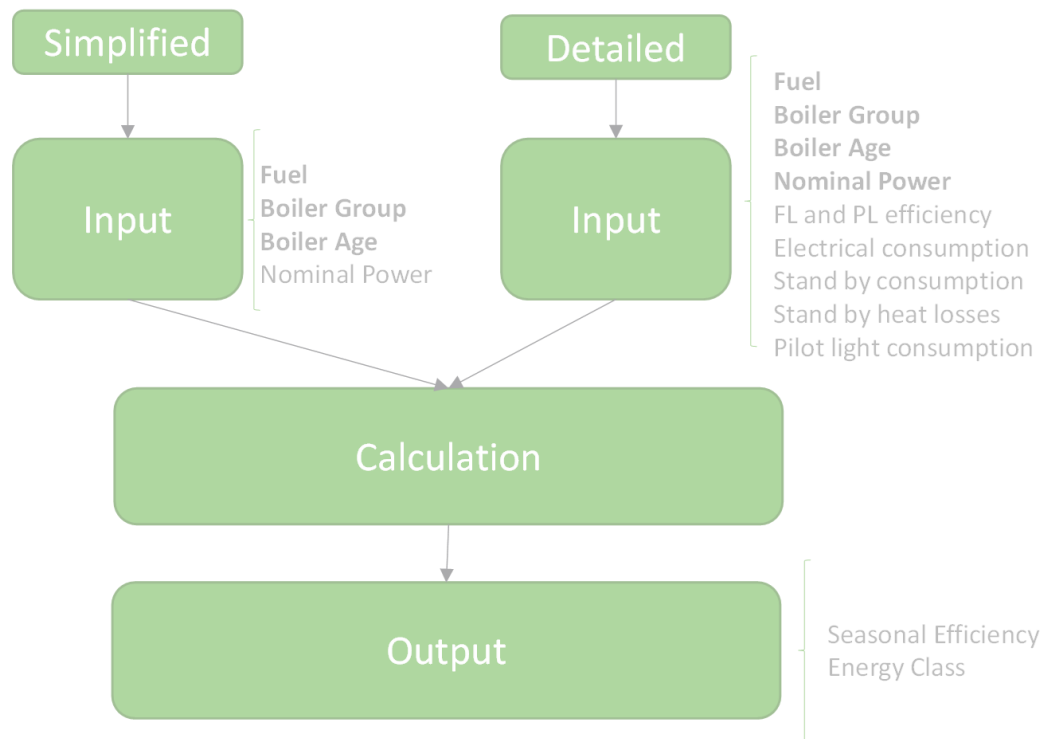
Labelling methodologies for existing heating appliances

SPACE HEATING – data input

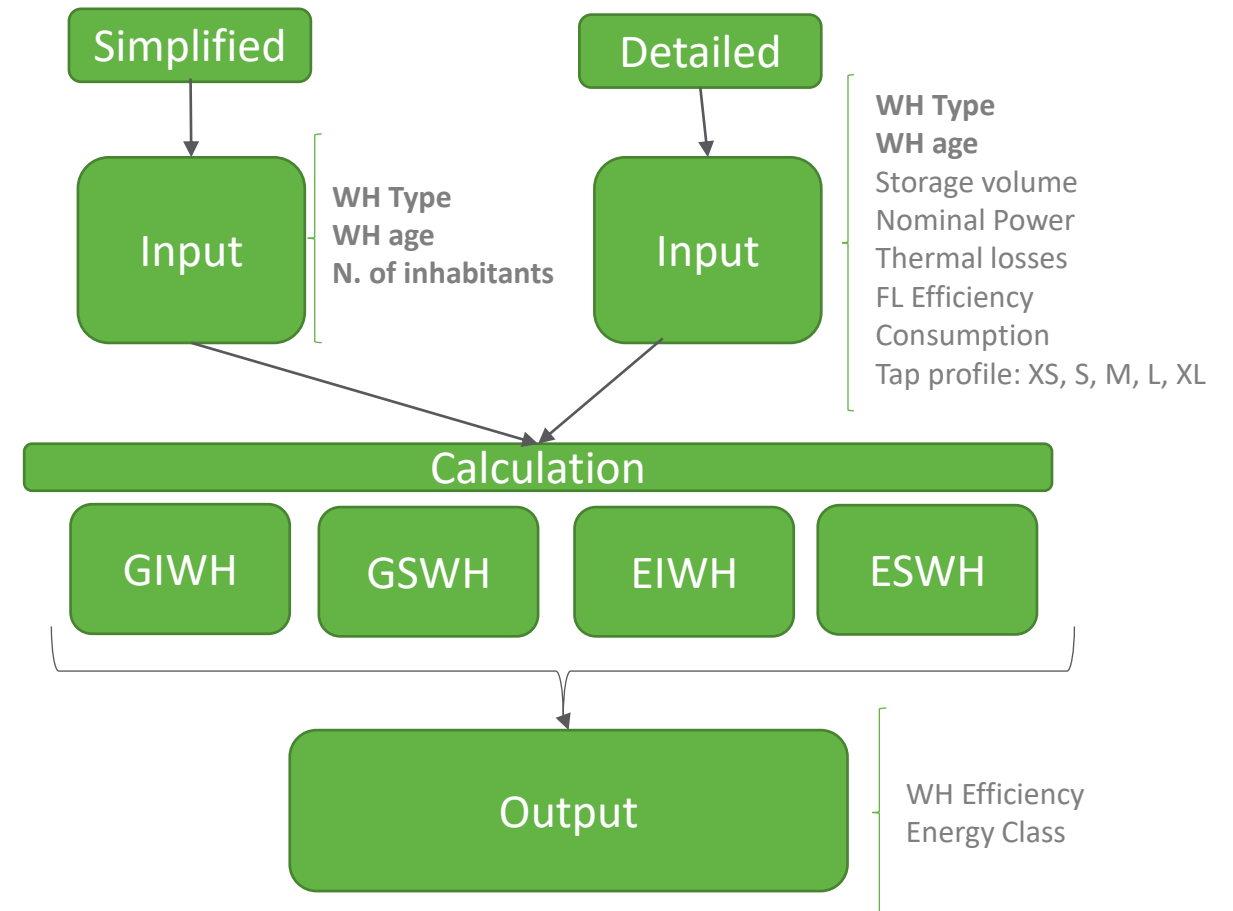


Labelling methodologies for existing heating appliances

SPACE HEATING – data input



WATER HEATING data input



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
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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

HARPa Tool

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.

<https://www.heating-check.info/>



HARPa Tool

Efficient Heating System
Online-check

Start Existing combi heating system Your building Requirements Finished

In order to tailor this app to your situation, we need to start with a few general questions.

What would you like to calculate?
Please choose your heating system

In which country is the building located?
Please choose one country

Climate zone
Please choose

colder
 average
 warmer

What describes best your role? I am a ...
 End User Heating Professional

Let's start!

Existing Heating System
Calculate Energy Label

Start Existing space heating system Your building Requirements Finished

Previous

Please tell us a little about your existing heating system.

System type
Boiler

Energy source used by your installed heating appliance
Please choose

Age of heating system (installation year)
Please choose

Maintenance
Has the heating system been professionally maintained in the last 5 years?
Yes No

Optional field(s) below: Leave empty if you are not sure.
The values missing will be filled with default values

Nominal power (in kilowatt, kW)

Calculate Label

Characteristics of the existing solution

Existing Heating System
Calculate Energy Label

Start Existing space heating system Your building Requirements Finished

Previous

Your existing boiler has an estimated efficiency of 37%, reaching an energylabel class of D.

Calculate Your Options

Label for the existing solution

HARPa Tool

Space heating need defined from:

- typical buildings for single family houses, small multi-family houses, large multi-family houses
- different construction years
- different countries

Intended use

Estimate Your Energy Demand

Start — 2 Existing space heating system — 3 Your building — 4 Requirements — Finished

← Previous

Now, we need some information about the building.

Type of Buildings

Building Construction

Heating area (in m²)

Part-time usage?
Is the building used only for a part of the year?

Yes No, the building is used throughout the year.

Next questions

This heating check tool was developed within the [HARP project](#), which received [funding from the European Union](#). [Contact details](#)

Heating needs

HARPa Tool

Evaluation of installation requirements.

Intended use

Some technical requirements

Start Existing space heating system Your building Requirements Finished

Previous

In order to recommend certain heating options, we need to ask a few last questions.

Storage space available?
Is a minimum of 1.5 m³ available (1 m² x 1.5 m height)?

Yes No

Roof/Garden available?
Is at least 6 m² available?

Yes No

Large Garden/Land available?
Is at least 40 m² available?

Yes No

Gas network
Is the house connected to the gas grid?

Yes No

Electric capacity sufficient?

Yes No

Show Results

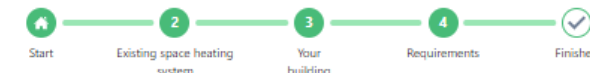
Characteristics of the house

HARPa Tool

Possible solutions (that satisfy the requirements of previous page).

Efficient Heating System

Possible Heating Solutions



[Previous](#)

Please find below the results for different technologies and your situation. These are indicative average values. For more details check the detailed information [Q](#).

Best Energy Bill Savings

Technology	Energy	Energy bill savings
Solar thermal + Heat pump, air/water Q	Solar, Electricity	2,460 €/year

Best Energy Savings

Technology	Energy	Energy savings
Solar thermal + Heat pump, air/water Q	Solar, Electricity	36,200 kWh/year

Best CO₂ Savings

Technology	Energy	CO ₂ savings
Biomass boiler Q	Biomass	10.9 t/year
Solar thermal + Biomass boiler Q	Solar, Biomass	10.9 t/year

Additional benefits

The replacement of old and inefficient heating appliances allows the consumer to benefit not only in terms of energy and money savings but also from additional benefits such as reduction of environmental footprint, reduction of fossil fuels dependence, real state valuation of the house, improved air quality, etc. To know more about these benefits and consider these in the replacement decision process check the information materials available on the HARP project's website.

[Full table](#)

Heating solutions

Thank you for your attention!



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