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0.1	25/10/2021	Initial ToC	
0.2	30/01/2022	Theoretical business model definition	
0.3	10/02/2022	Initial inclusion of IPR section	
0.4	21/04/2022	Initial long term sustainability business model per country	
0.5	15/06/2022	Specific analysis of handover per country	
0.6	12/07/2022	Italian handover	
1.0	27/07/2022	Final version	

ABBREVIATIONS AND DEFINITIONS

ABBREVIATION	DESCRIPTION
AGENEX	Regional energy agency of Extremadura
BAFA	Federal Office for Economic Affairs and Export Control
BEG	Federal Promotion for Efficient Buildings
BMWI	Federal Ministry for Economic Affairs and Energy
CNA	Confederazione Nazionale dell'Artigianato
CNI	Consiglio Nazionale Ingegneri
DGEC	Directorate General of Energy and Climate
DHW	Domestic Hot Water
ELPRE	National Long Term Renovation Strategy
EPBD	Energy Performance Building Directive
EPC	Energy Performance Certificate
EPREL	European Product Registry for Energy Labelling
GSE	Gestore Servizi Energetici
iSFP	Individual refurbishment roadmap
NAPE	National Action Plan on Energy Efficiency
NECP	National Energy and Climate Plan
NEF	National Expert Forum



HARP

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1. PROJECT SUMMARY

The HARP project, Heating Appliances Retrofit Planning, has provided, to different kinds of actors (e.g. consumers, installers, heating system manufacturers, etc.), a European Union regulation compliant methodology and related online application to evaluate the efficiency and energy class of installed heating appliances. These have served to raise consumers awareness to the opportunities that underlay the planned replacement of their old and inefficient heating appliance, since the second part of the methodology presents the potential alternatives for replacing and the relative energy, financial and environmental savings. The mission to be accomplished is to accelerate the European replacement rate for heating systems, actively contributing to the reduction of energy demand in buildings, in line with the energy efficiency targets set by the EU.

Knowing the efficiency of installed space, water and combi systems is key to study the status of the installed heating stock, raise consumers' awareness about the opportunities of a planned replacement and allow for a faster ratio of retrofits in residential buildings. HARP methodology and the developed application (HARPa) represent a valuable decision tool to communicate and motivate the consumer to replace its heating system with modern high-efficiency and renewable solutions. In fact, HARP accompanies the consumer decision process, providing an impartial message, based on the energy label and presenting the market solutions that respond to the consumer's heating needs, providing a quantified approach for economic and non-economic benefits and bridging the gap with the market providers and available national incentives. HARP is promoted by key knowledgeable partners in the fields of consumer behaviour, energy efficiency, heating solutions and the heating industry, working directly with the consumer, or indirectly via professionals who are critical multiplying agents. The validation of the methodology by EU wide heating associations, developed by wide known research centres and supported by governmental authorities and energy agencies, is a great push for the wide reach of the use of HARPa and therefore for a faster uptake of energy efficient and renewable heating technologies in the residential sector.

1.1. T6.3 and its relationship with other tasks

T6.3 - "Business and financing models for HARP exploitation and sustainability management", has focused on investigating existing and innovative business and financing models for making the labelling methodology for existing heating appliances and HARPa self-sustainable in the medium-long term. Together with the national partners, a strategy for the sustainable handover of HARPa, from the project consortium joint ownership to a free-of-charge and available for everybody application has been developed for each country responsible who expressed the intention to keep the HARP methodology and particularly the online app operative and up-to-date after project completion.

Therefore, based on the results from previous project activitiesT6.1 (technical and non-technical factors of each country), T6.2 (policy suggestions) and the heating campaigns inputs, T6.3 analysis aims at making HARPa self-sustainable from the financial point of view and understand the potential export to other countries. The output is a set of guidelines for managing the energy label for installed heating appliances system at national and EU levels, including financial requirements, business models and mainstreaming opportunities.

The financial models are organised in a way that quantitative results are reported and a business model canvas is prepared for each country's handover. They also address the role of the main actors involved in the sectors (see D6.1) and how to work to keep the methodology operative after the end



of the project. Both public and private endorsements are presented, and a generalized self-financing business model to be applied to the replication countries is presented in detail, with all the different opportunities for cost and revenue streams.

T6.3 has served as "exploitation task" of the HARP methodology and of HARPa, since it made great progress to find a way on how to keep HARP operative even after the end of the project. The self-sustainable business model and the practical financial models that each of the interested countries responsible developed will help the National partners providing evidences of the financial self-sustainability of the tool, to facilitate the integration of the methodology into public instruments and policy measures (e.g. incentives schemes, subsidies programmes and mandatory maintenance procedures).

It is worth it to emphasize that the main result of the HARP project to be exploited is the energy efficiency calculation methodology for existing residential heating appliances. This will be continued to be used in 3 countries (France, Italy, Portugal) after the end of the project. In any case, HARPa was key to make the methodology endorsed at National level, because the stakeholders in the sector and the decision-makers could see and test, through HARPa, how the methodology works.

1.2. Matrix of technical and non-technical factors representing the system boundaries in the HARP countries (D6.1)

As explained in Section 1.1, to understand more in detail how the the self-sustainable models for the handover and future operation of HARPa after the end of the project were developed, it's important to know the regulatory and market framework of the HARP countries. Therefore, it is reported below the outcome of D6.1, a table representing and summarising existing methodologies already in place in the country before HARP, how these methodologies were promoted and their technical development, and a brief resume of the policy and market frameworks regarding the residential heating appliances, divided by country.

Coun try	Technical methodology	Procedures in place	Policy framework	Market framework
DE	The Energy Consumption Labelling Act (EnVKG) regulates which persons may issue the label. Methodology based on a national database for each type of heating appliance, which is created with basic parameters.	Mandatory - Class calculator by BWMI. BAFA (Federal Office of Economics and Export Control) applies it.	Federal government's energy efficiency strategy – long term renovation. Related policy is the renovation roadmap, implemented as part of an individual refurbishment roadmap (iSFP)	There is an evaluation tool for the measure. The data is not available.
	Thought for professionals only. 8€ per label generated. It does not motivate	Subsidies are more effective than labels for	Regional agencies can promote local measures to incentivise end users.	Users prefer cheaper installations (e.g. condensing boilers)



	stakeholders. No DHW.	retrofitting actions.		when applying retrofit.
FR	Just liquid and fuel boilers. Approved European Algorithm method (UE N°811/2013). Promoted by the heating industry.	Voluntary - Mon Étiquette Chaudière - by Coénove (Association for energetic mix and gas) and E&A	No policy instrument for pushing retrofitting – Main subsidies: Maprimerénov, Prime CEE - FAIRE	<i>Lettres CEE</i> by the Ministry for the ecologic transition – for market monitoring. More labels by HARP.
	Methodology works well, programme runs smoothly. Thought for both users and professionals. No DHW.	Impact of the methodology on the innovation ratio is low.	The first one for renovation in the building; the second one for retrofitting heating appliance.	Certain subsidies work better than labelling (e.g. promotion for efficient buildings)
IT	Single methodology in line with the EU calculation method (it is not possible that each manufacturer creates its own)	Voluntary - Etichetta Energetica by Assotermica.	Potential link to the national regulation D.P.R. 74/2013 that has completed the implementation of the EPBD	Market monitoring by Assotermica. Almost all the appliances labelled are below class C
	Developed by the industry for the industry. To be used by the installers. No DHW was considered because it could have created confusion in the end users.	The methodology was taught and developed together with the industry for the industry.	Manycurrentsubsidies support theretrofittingofexistingheatingappliances(e.g.ContoTermico,EcoBonus)	Over 37% of the interviewees considers the application of the label to installed appliances an improvement of the current legislation
ES	Simplified methodology, based on the type and the year of manufacturing of the heating system. The label is aimed at boilers, whether they are heating only or	Voluntary – FEGECA, association of manufacturers is the only promoter of the initiative.	Regulation of Thermal Installations of Buildings updated with more restricted measures for inefficient appliances	No market monitoring because of the complexity of getting data (many stakeholders involved)



	mixed (heating + domestic hot water).			
	Thought for when a professional go for inspection and can provide the label.	High interest but lack of following actions. Lack of public engagement.	Subsidies are related to retrofitting of buildings -> improve the energy class.	It could be interesting to apply the methodology to commercial and industrial spaces. Installers do not need a competitive advantage.
ΡΤ	Portugal would like to continue to use the HARP methodology at a national level, through the one-stop- shop.	No existing procedure. ADENE is in charge of promoting HARP in Portugal.	One-stop-shops are one of the measures listed in the EPBD to reinforce buildings energy retrofit.	ADENE supports the definition of the incentive's programs, but is not responsible for managing the funds themselves.
	HARP methodologies can also be used in the buildings energy performance system to calculate the efficiency of existing heating appliances.	N/A	Link to the National Buildings Certification Scheme.	Maintenance procedures for space and DHW appliances, either voluntary or compulsory, should be endorsed.

1.3. Private and public endorsements and future policy suggestions (D6.2)

Similarly, to what is explained in Section 1.2, also the results of D6.2 were fundamental to developing the business model for the HARP methodology and HARPa. All the experience gotten from the national heating campaigns and the interactions with local and national stakeholders served to evaluate the interest of these kinds of actors to operate and pay to use the HARP online application. Therefore, also, in this case, the table representing the outcomes of D6.2 is reported here, to facilitate the comprehension of the readers. In both cases, more detailed and extensive information can be found in D6.1 and D6.2.

Countr	Feedback on HARP	Main policies related to the
У	methodology uses and how to improve its wide reach	heatingsystemsandpotentialHARPendorsement
DE	HARP's methodology is more complete than the current German one and could be offered to replace existing labelling	The heating label is part of the Energy and Climate Fund and the National Action Plan on Energy Efficiency (NAPE). Federal



	procedure. Existing labelling process works well, but this does not translate in a reason to change the heating system for the user. Need to increase users' awareness	Promotion for Efficient Buildings (BEG), the federal government's energy-related building promotion in the main subsidy programme for replacing heating appliances. HARP methodology can be included in the
	through communication actions. Create a monitoring surveillance strategy to understand if the labelling has been correctly assessed by the chimney sweeper. Need to harmonize the German methodology with the HARP/EU one (calculation and algorithms) and include water and combi heaters.	individual Renovation Passport strategy (direct report to user on how to improve their house energy efficiency). Since there is no building logbook in place in Germany at the moment, the Renovation Passport can create the link with the EPC, including in the report the efficiency of heating system.
FR	The existence of two different labelling tools (<i>Mon Étiquette Chaudière</i> and HARPa) created confusion between the professionals. HARP tool is assumed as more complete when compared to <i>Mon</i> <i>Étiquette Chaudière</i> by the French stakeholders involved in the project.	Various modifications are ongoing in the national policy framework (the existing policy instruments are being continuously changed) therefore there were difficulties in endorsing HARP at public level. Decree N°2009-649 of the 2009 June 9 th on mandatory maintenance.
	HARPa will be used to update <i>Mon</i> <i>Étiquette Chaudière</i> in France. The new application will be called <i>Mon Étiquette</i> <i>Chaudière Chauffage</i> and is supported by the French heating industry.	New subsidies programmes, replacing <i>Maprimerénov</i> and FAIRE can reference HARP putting professionals in contact with users and provide a simple tool for labelling. Contacts with DGEC are ongoing.
IT	HARP methodology is considered more complete than the one in place in Italy. It was validated by Eurac at the EU level by overcoming <i>Etichetta Energetica's</i> functionality. Combi-heaters addition during the second campaign is a strong point in the use of the application. Main difficulty is to reach the end users.	The main governmental efforts to improve the efficiency of residential buildings are based on incentives called <i>Ecobonus</i> , <i>Superbonus (Super-ecobonus)</i> and <i>Conto</i> <i>Termico</i> . The decree named D.P.R. 74/2013 specifies the periodicity and deadlines for residential and non- residential appliances energy efficient controls.
	In Italy, Assotermica's methodology has been updated by the HARP's one. HARP methodology and layout will be included in <i>Etichetta Energetica</i> as the handover of the project. The IT department of ENEA will make the required	Potential link to the national Decree named D.P.R. 74/2013 that has completed the implementation of the EPBD. Inclusion of HARP training in the existing professional courses (e.g. <i>crediti</i> <i>formativi</i>).

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	modifications and promote the new tool.	
ES	The non-consideration of air-air heat pumps in HARP's tool is a weakness. The tool usability for both users and professionals, is a plus. IDAE only wants to promote renewable energy alternatives.	In Spain, the main national strategy from which incentives and detailed policies are developed is the plan on energy and climate <i>"Plan Nacional Integrado de</i> <i>Energía y Clima 2021-2030"</i> .
	Professionals are already very busy and they don't need any competitive advantage. Focus should be on industrial/commercial buildings or coursed for unemployed people.	Focus on regional agencies and existing subsidies programmes (e.g. Madrid Plan Renove). Including HARP in the information provided to the users when they are applying for regional-based subsidies. AGENEX, the regional energy agency of Extremadura, officially endorsed HARP.
ΡΤ	The importance of co-benefits should be more straightforward. The app also misses information on installation and the maybe the solutions presented should focus solely on renewables.	National Long Term Renovation Strategy (EPREL) references the HARP as a supporting tool to incentive replacement of existing heating systems.
	The HARP methodology could be used to evaluate the requests for incentives and rank the best interventions requests (in €/kWh saved), introducing the "real"	Potentially adopted within the National Buildings Certification Scheme to estimate the energy efficiency of existing heating appliances.
	expected efficiency	If voluntary or compulsory maintenance procedures for space and DHW appliances were to be adopted the label for existing appliances could be considered.
		One-stop-shops, one of the measures listed in the EPBD to reinforce buildings energy retrofit, can also integrate the HARPa and promote the replacement of inefficient heating systems.

1.4. Methodology for the development of D6.3

Considering the outcomes of D6.1 and D6.2, D6.3 developed a consequent analysis on how to ensure the long-term sustainability of the HARP methodology and tool, facilitating the lobbying of the responsible partners for its integration in public policy instruments.

To this aim, and to give the possibility to replicating countries to have basic information to develop their own self-sustainability model when promoting the application at National level, in Section 3 a



generalised business model is presented, containing the main aspects to take into account for each tailored national situation. In here, different potential cost and revenues schemes are proposed, according to the definition in the Grant Agreement:

- <u>Policy initiative</u>: HARP methodology linked to energy efficiency measures in which the entity responsible for the implementation can pay for HARP integration into the mechanism and make it free of charge for the users/professionals.
- <u>Voluntary labelling scheme</u>: In this case, the professional pays a fee to have access to the labelling system. This business model did not receive positive feedback from the National partners and therefore has been omitted from the analysis.
- <u>Industry initiative</u>: the labelling mechanism is financially supported by manufacturers to have their products considered in the tool to potentially increase their sales.
- <u>Suppliers and installers partnership</u>: associations in the heating sector cover the cost of operation and maintenance of the application and provide free access to the labelling scheme and online tool to their network of installers.
- <u>Retailers tailored solution</u>: through the customization of the tool for a specific manufacturer/retailer, HARP could work to promote the portfolio of heating solutions they have on the market, incentivising the users to retrofit their old and inefficient installed heating appliances.
- <u>Professional individual access</u>: energy experts (energy advisors, installers, energy experts within the EPDB, etc.) pay a fee to have unlimited access to the online app, using it in their daily energy consultancy work.

The final business model canvas presented at the end of the section includes all the relevant aspects (e.g. key stakeholders, key activities, channels for promotion, added value, etc.) to make the financial model valuable and pertinent for its use for replicating actors. This section also includes an analysis of functional business models working for web applications in the energy sector and a detailed analysis of the Intellectual Property Rights of the developed HARP tool and the exploitation paths (e.g. consortium's joint ownership).

Section 4 focuses on understanding the quantitative costs related to the operation, maintenance and update of the app and the related methodology, offering an in-depth analysis of how the handovers to the national partners and the long-term financial sustainability plans will be enhanced.

Section 5 creates a bridge with the developed work of T7.4, in which the non-participating countries who want to replicate the HARP efforts on their national territories (Greece and Poland), can understand the best practices and lessons learnt from the HARP partners regarding the operation of the HARP methodology, tool and the related financial models.

2. HARP GENERALIZED BUSINESS MODEL

In section 2, different options for achieving the long-term self-sustainability of the HARP methodology and its tool are envisioned. A generalised but detailed business model is presented at the end of the section and its realization was possible thanks to the lesson learnt by D6.2 and considering the legislative and market framework methodology in the HARP countries and the experience got from the heating campaigns.





The first uniformed feedback coming from all the partners responsible for the National campaigns, independently from the system boundaries, is that the potential of the energy labelling of existing heating appliances would be immensely extended if the label becomes part of public policies. Rather than focusing on the use of the application as a stand-alone product, D6.2 focused on how the HARP methodology could be part of National-wide objectives in each country, for an adoption at governmental level. It is clear to the project partners that it is way more significant to include the use of the HARP methodology into national policies than making it attractive for different potential stakeholders, like the chimney sweepers in Germany, who are getting only 8€ per label emitted.

Through this section, the generalized business model will answer to questions like: which is the value proposition to promote (the HARP methodology or HARPa)? Who is going to pay for the operation and maintenance of the labelling scheme? Which are the preferred stakeholders who can share the potential of the offered product/service?

Therefore, the aim of the generalised business model is to provide a basic tool for potential replication from public entities and private organisations who could use the methodology and the HARP tool to facilitate the renovation of installed inefficient residential boilers (see also Section 3.3 on T7.4).

2.1. Successful applications in the energy sector and their business models

As depicted at the beginning of Section 2, the HARP methodology for labelling existing heating appliances is the main result that the HARP partners want to share and disseminate to other Member States in the EU and potentially to private organisations that aim to offer an innovative service to their customers. In both cases, the utilization of a web application like the HARPa one is suggested to the replication actors since it has been widely recognized as a valuable tool for the heating sector professionals and the end-users. Therefore, web research has been conducted to identify the more successful web or mobile applications in the energy sector and understand their business models. This information is used for a better definition of the generalised business model. Below, three examples of successful mobile applications and a summary of their business model is provided.

<u>Smappee</u> is certainly one of the most downloaded **Smappee**

applications in the World related to increase the energy efficiency in residential buildings. Smappee can help the users to check their energy data and control the utilisation of electricity and thermal energy at home, through a simple and user-friendly configuration. Through an interconnected ecosystem, the users can schedule the use of their home appliances, including planning the charging/discharging of energy storage and connected electric vehicles. It requires setting a certain amount of energy data (solar, gas, electricity and water inputs) and connecting them to sensors, gateways and smart sensors directly produced by Smappee in collaboration with technology providers. Therefore, their business model is based on offering a free-of-charge mobile application to be used together with technological products directly sold by the company. A potential opportunity for operating this sustainability **model to the use of HARPa would be the customization of the tool for a specific heating equipment manufacturer, which can offer the HARPa free-of-use for all users buying a product and wanting to evaluate the energy efficiency of their boiler over the time**.



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PV Forecast: Solar Power Generation Forecasts: PV forecast, developed by the NRG labs, has a totally different related topic from HARPa, but, since it is considered one of the most successful mobile apps in the energy sector (more than 100k downloads and evaluation of 4.7 stars on Google Play), it is interesting to evaluate their business model. PV forecast allows the users who installed solar panels on their roofs to predict their own electricity generation, hour-by-hour for the next 48 hours, and daily for the next 7 days. It is easy to connect via Bluetooth or Wi-Fi to the solar panels to correct the live production data. Therefore, it allows the end-users to schedule home appliances usage or electric vehicle charging based on solar generation, but also to know in advance the current possible power of a new solar power installation. Since it is customizable to each end-user and can be used by all kinds of actors (e.g. private citizens, private industries, public actors) to evaluate their potential PV production it is an example of a versatile application that can be tailored to every user's need. NRG labs obtains its revenues thanks to ads popping up on the application, specifically with solar and energy-related products, and therefore represents a completely private elfsustainability option that replicated for HARPa. can be







Energy Label: A curious and very similar to HARPa mobile application is the Energy Label one. • Differently from HARPa, it focuses on all types of home appliances except for the heating ones. It was developed by the Bundesanstalt für Materialforschung und -prüfung (BAM), a senior scientific and technical Federal institute with responsibility to the Federal Ministry for Economic Affairs and Energy. It is in line and it complies with the new EU energy label for appliances such as washing machines, TVs, lamps, etc. It helps consumers to understand how the label works and how they can benefit from it, it gives a checklist to consumers to choose their new appliances and hints for everyday life for energy efficiency. It includes a QR scan option which allows the consumer to obtain additional information about the labelled product, like its efficiency class, resource consumption and other details. Energy Label also includes a feature of gamification, with quizzes on energy efficiency at home (like the serious games developed by HARP). Manufacturers can promote their products on the app, to help customers find out more about the products they sell, including efficiency details without the need for manufacturer-specific sites, catalogues or flyers. Energy Label is offered free-ofcharge to the end-users. HARPa could be self-sustainable such as the Energy Label app, offering heating system manufacturers to promote their products in the second part of the application, in which HARPa suggests the user about the potential retrofitting system they can choose to replace their old and inefficient heaters.



2.2. HARP methodology and application (HARPa) Intellectual Property Rights (IPR)

Since the development of the HARP methodology and the related application (HARPa) were possible because of a joint effort of the project partners, and since the aim of the consortium is that the methodology will be used in the following years by the highest number of countries in the EU, a simplified agreement on the developed intellectual property must be created. In any case, HARP's consortium intention is to allow third parties (e.g. National Energy Agencies, Industrial associations, etc.) to freely exploit HARPa. Modifications of HARPa (algorithms, underlying data, layout, etc.) should be allowed and financially covered autonomously by consortium or third parties.



As depicted on the project Grant Agreement, HARP consortium adopted during the project development, precise provisions regarding the ownership, transfer, protection, use and dissemination of foreground, access rights for implementation, use and background covered and any other principles relevant to intellectual property rights. Specifically, regarding the foreground, the Grant Agreement precises that:

- Foreground shall be the property of the beneficiary carrying out the work generating that foreground.
- Fair and Reasonable compensation must be provided to the other joint owner(s).

Therefore, since the work carried out during the project generated innovative foreground, a precise share cannot be ascertained; therefore, the consortium should have joint ownership of such foreground. To do so, the consortium, through the coordinator ADENE, is currently drafting an agreement that establishes how the created foreground can be exploited by each project partner and used by external actors. In this agreement, "each of the joint owners shall be entitled to use their jointly owned foreground on a royalty-free basis, and without requiring the prior consent of the other joint owner(s)".

Furthermore, since both the methodology and especially HARP could potentially be applied as a commercial product, there is the need to adequately protect the foreground, having due regard to the legitimate interests of the other beneficiaries. In particular, commercialization could allow private/public organizations to sponsor HARPa (e.g. including their logo in the application) and help in the dissemination of the methodology.

The agreement drafted by ADENE (under revision by the consortium) will be established as an official document to protect the intellectual property generated by the project. Once again, it is worth it to mention that the proposed agreement to be celebrated between all HARP partners will assure that HARPa is free of use by partners and external third parties (such as in the cases of Poland and Greece, described in Section 3.4), providing that its source is always acknowledged and that the HARP consortium will not be responsible for future update or malfunctions in the application.

2.3. HARP business model canvas

In section 2.3, the business model canvas is used as a graphical tool to summarize the main aspects related to the self-sustainability plan of HARP after the end of the project. All the different canvas subsections are analysed in detail in the following paragraphs.

Value proposition (key activities and key resources)

The most valuable aspect of the project is the creation of a detailed methodology to label the efficiency of old heating systems. The HARP methodology is in line with the approved European Algorithm method (UE N°811/2013) and therefore has the potential to become an EU-wide tool usable by all the Member States. The methodology was endorsed by EU partners such as the European Heating Industry (EHI) and Solar Heat Europe (SHE) and validated by technical research centres such as EURAC and national energy agencies (ADENE, ENEA, DENA). Therefore, its promotion and dissemination have surely a strong basis of important entities supporting it, which can make it easier for potential adoption and/or endorsement at the public/private level.





In any case, the development of a web application for using this methodology (HARPa) and therefore allowing end-users and professionals to easily get the required information about the installed heating system is part of the strong value proposition of HARP. Furthermore, HARPa allows the application's users to find out which are the different alternatives available on the market for the replacement of their inefficient heaters and evaluate the financial and environmental savings related to this potential change, facilitating the decision-making of the end-users. HARPa is also user-friendly, it does not require the user to insert much data and provides simple but significant results that can serve as the first information to get the awareness of the efficiency of the heating systems. To make HARPa's impact, even more, spread, the HARP partners suggested extending the potential of the tool and creating a related mobile app which can provide an alternative to the web application. It is expected that through the mobile app, and a stricter relationship with public incentives for renovation and energy savings, HARPa can reach even a wider public that can use it directly on their smartphones. The mobile app can be used for showing subsidies and energy savings.

The main resources that HARP can offer to the market are the labelling methodology, the online application HARPa and the acquired know-how of the technical partners related to the development of the methodology. This last point is of fundamental importance in case of certain updates, potentially related to upcoming EU laws and regulations, required to maintain the methodology up to date. The methodology is available to whoever wants to make use of it (see Section 2.2) and therefore each interested actor can modify and update it as preferred, together with the support of IT experts. However, the know-how of the HARP partners regarding the methodology and the web development is considered as a competitive advantage over external companies and research centres, since CREARA, EURAC and SHE are the developers of the methodology. Therefore, these organisations could provide consultancy and maintenance services to the interested parties (see revenue streams section).

Regarding the utilization of the methodology and/or the application at public/private level, each interested organisation should contact the HARP consortium (through the coordinator, ADENE) to ask for permission for the legitimate use of the app. Then, key activities should be performed such as for example the customization of the web application to the country-specific requirements. These surely include the translation into the required national language, the modification of electricity and gas prices, the definition of the different climate zones, the required maintenance procedures, etc.

Involved stakeholders (related relationships and channels)

In D6.1 the main stakeholders involved in the heating sector for each of the HARP countries (including the NEF participants) are listed, as well as the meetings held by the HARP partners with the most relevant ones. The promising relationships established are going to last after the end of the project and will certainly be exploited to ensure further public/private endorsement of the HARP methodology. The national and local actors identified relate to heating appliances replacement subsidies, private manufacturers and policy-makers in the sustainable building sector with the power of creating/modify existing regulations. Outside the HARP countries, these actors could be more or less relevant for the future utilisation of the HARP labelling methodologies, nevertheless, this subsection serves as an initial set of information for replication strategies.

In Germany, the existing label is hosted by the Federal Ministry for Economic Affairs and Energy (BMWI) and promoted by national heating associations such as BWP (German Heat Pump Association), DEPV (German Energy Wood and Pellet Association) and BDH (Federal Association of the German Heating Industry). This relationship between public entities like BMWI and the heating associations



has been successful for the inclusion of the National database of heating appliances in maintenance procedures but it had a minor effect on facilitating the renovation of residential boilers. The existing relationship channel existing between the chimney sweepers and energy consultants with the endusers (due to the regular mandatory maintenance procedures) is key for ensuring customers awareness regarding the efficiency of their current heating system and therefore promoting its renovation. The potential role of regional energy agencies in promoting the use of the methodology to classify and prioritize the replacement of old heaters and access a subsidy for replacement must be further analysed.

In France, *Mon Etiquette Chaudière* was an initiative hosted by Coénove (Association for energetic mix and gas) and Energies et Avenir (HARP partner) and promoted by French professional associations (such as UMGCCP, the heating appliance installers association). Other National Expert Forum (NEF) members, such as CAPEB (the SMEs and craft companies' association), AFG (Gas installers and suppliers) and the FNAS (distributors/retailers association) validated the HARP methodology and will support its wider impact (through promotion and dissemination) on the new labelling initiative - *Mon Etiquette Chaudiére-Chauffage*. Professional associations are willing to support the HARP initiative also after the end of the project since they can benefit from the implementation of the new labelling. The established relationship with the French Directorate General of Energy and Climate (DGEC) is of fundamental importance to potentially endorse HARP methodology in one of the new Recovery Fund related incentives programmes. The participation of Energies 2050 in the development of consumer materials allowed the HARP project to reach a considerable number of end users (higher compared to the ones reached by Mon Etiquette Chaudière).

In Italy, Assotermica, together with its members developed and promoted *Etichetta Energetica*, and from the creation of this initiative, they looked for the support of policymakers such as the Commission of the Italian Chamber of Deputies on the National Action Plan of Energy and Climate and local/regional entities (ANCI, the National Association of the Italian municipalities and the representatives of Regions like Piemonte, Lombardia, Marche, etc.). Private support from Confartigianato (Italian organization of craftsmanship and micro and small business), AiCARR (Air Conditioning, Heating and Cooling Italian association) and ANGAISA (National Association of Traders in Sanitary Ware, Air Conditioning, Flooring, Coatings and Bathroom Furnishings) is needed for presenting to the Italian government a valuable scenario of the industry sector needs. Consumers associations, such as Altroconsumo, are also working to suggest the installation of affordable and sustainable technologies to end-users and therefore are a key partner for HARP in Italy.

In Spain, the association of thermal equipment manufacturers, FEGECA, was the only organization developing an energy label for existing heating appliances. The role of the National Energy Agency (IDAE) would be to endorse HARP methodology in policy documents (*Real Decretos*) to make it accepted by both the industry and the consumers. The local energy offices of the Spanish autonomous communities (*Oficinas Energeticas de las Comunidades Autonomas*) are the policymakers who establish the energy-related subsidies and therefore have an influential power in the decision-making of the end-users when it comes to foster building renovation (including heating systems). OCU, the Spanish consumer association worked in the HARP project during its entire duration and will keep the information regarding the methodology and the tool on their website after the end of the project.

In Portugal, a variety of stakeholders were involved in the project development. Apart from the NEF members, ADENE had contacts with the technical team for the harmonization of the EPBD at the





National Level, the National General Energy Directorate and the National Long-Term Renovation Strategies responsible team. All these policymakers have a great impact on the decisions made for the creation of new subsidy programmes, energy efficiency plans and to regulate periodic maintenance procedures for residential heaters. Since the communication towards the end-users is one of the main activities to perform for an efficient adoption of the HARP methodology at National level, the Portuguese Consumer association (DECO) should be part of the key partners for future implementation strategies.

Cost and revenues

Costs streams

To assess the potential self-sustainability of the HARP methodology (e.g. in subsidy programmes through governmental endorsement) and of HARPa (e.g. through private investments of heating system manufacturers), the business model must include a list of costs and revenues items.

Regarding costs, the methodology is approved by EU industry partners, research centres and National Energy Agencies, therefore no major changes are envisioned in this sense. Simplifications in the calculations were made (see D6.2) to ensure coherence and consistency at the EU level and therefore some more detailed changes in the methodology could be applied by interested parties. The use of HARPa by private and public organisations can include some small costs related to the national customization of the application, for example. The translation of the text, the visualization of the climate areas, the update of electricity and fossil fuels costs are all changes that must be implemented for replicating countries. Modifications in terms of user interface can occur as well. ICT departments of public or private organizations wanting to exploit the application would need to be involved in the improvement of the application. The operation and maintenance of HARPa, the update of the energy prices and of the incentive programmes should be taken into account as a small cost per year when defining a medium-long term sustainability plan.

To validate the quality of the provided labels, a quality check initiative should be established. This is particularly true for those cases in which the HARP methodology would be integrated into incentive programmes (e.g. the idea is to give subsidies to people who have a heating system below class C, therefore people could cheat to obtain the subsidy). There should be a monitoring service that makes the process transparent. This monitoring check should be provided by public authorities, such as the Ministries of Economics and/or the Energy Transition (as suggested in D6.2) and this also represents a cost for the operation of the methodology. In any case, this monitoring process could be very useful for the public authorities developing it, since it will allow creating a database of existing heating systems at national level and can therefore be used for implementing targeted policies for facilitating and increasing the replacement of old and inefficient boilers.

Another fundamental cost to take into consideration in the sustainability business plan is related to the promotion for the use of the methodology and of HARPa. The need for promoting co-benefits and raise the awareness of the end-users has been confirmed by all the National partners, since different barriers were found to engage the consumers during the two heating campaigns.

Promoting HARPa as an informative tool for the consumers to understand the importance of having an efficient heating system is of fundamental importance and this is what the Greek and Polish representative will do as well (see T7.4). A dedicated marketing strategy, potentially involving young



people, must be developed to achieve a widespread impact in the awareness regarding HARPa and its potential for pushing the energy transition in the heating sector.

Revenue streams

The costs for operation and maintenance of the methodology and HARPa must be clearly covered by the own funds of the organizations promoting it or through revenues coming from the utilization and/or paid advertisements. As it is explained in Section 3 through quantitative data, in France, Italy and Portugal, the utilisation of the methodology and the maintenance of the application will be covered by the own resources of the responsible organizations (E&A, Assotermica and ADENE). In the case of Energies et Avenir and Assotermica, associations in the heating sector, the funds available are part of the annual membership fee requested to their members to be part of the association. In Portugal, ADENE, as the National Energy Agency, uses funds coming from public initiatives, governmental sponsorship for reaching energy efficiency objectives by 2050, and remunerations from private projects as the resources for operating and maintaining the application on their servers. Based on the DENA's feedback regarding the inefficiency of the existing National Efficiency Label for Old Heating Systems model (government support for each label issued pays the chimney sweepers 8€), this is not included in the suggested revenue streams for the handover of HARPa.

In general terms, there are different ways to make the HARP methodology self-sustainable in the long term, especially if this is directly linked with the use of an application like HARPa (See Section 2.1). One example is the revenue stream through advertisement, directly or indirectly connected to the heating system sector. In the first case an ad server (like Google Ads), allows the application owner to track and even sell page impressions and or click-throughs. This determines a new cost to be covered but at the same time allows to obtain valuable revenues related to the number of uses and to collect data related to the use of the application. In the case that heating appliances manufacturers aim to sponsor their products on HARPa, they can pay a yearly fee to advertise their systems in the suggestions for the consumers. This option would potentially decrease the trust of the users since they might think that there is no transparency in the methodology development. Therefore, even if this second option is the most cost-effective (e.g. the Spanish partners evaluated this option to keep using the application), it should be carefully evaluated.

Potentially, the HARPa banner could be also sold with a fixed revenue per month and it is the preferred solution in terms of software and implementation. Partnerships with industrial brands are needed in the case. The actor in charge of the handover of the application at the national level should sell the market banner space to potential advertisers. There are two potential approaches for this: a) sell advertisement per national site (banners would have to be localized, so that one company only advertises in Portugal and another only in Italy); b) the banners can be bought only by some longer-term "sponsors" of the page(s) (e.g. "This service is brought to you by Super Heating Ltd" together with their logo). In this case, the selling, and implementation of the advertisement, could happen maybe once a year).

The methodology could be interesting to use by private installers and manufacturers organizations (as for the French and the Italian case) which could cover the operation and maintenance cost of the use of the methodology and related applications. These interested parties could customize the app to their needs and create a service centre to be used by the end users for understanding the performance of their system and evaluate the best potential alternative for the replacement. The application could also be customized to be used exclusively by professionals (with a higher level of detail) and could be



used internally for updating the installers on the most efficient appliances currently available on the market. A potential business model for the HARPa owner (in this case it's not the association itself, but, for example, a consultancy company) could be to let the professional associations pay a fee related to the number of uses of the application, releasing a certificate of utilization for each of the labels emitted (the label PDF).

Furthermore, consumer associations could also be the potential owners of the application, offering the use of the application as a service to their associated consumers (e.g. in OCU, consumers have to pay a yearly fee to benefit from some services). In the case end consumers are the main target, the customization of the app could include extra services to be offered, such as gamification features, through quizzes and virtual serious games (like the one developed during the HARP project).

Below, a summarised business model canvas with the main sections related to Section 2.3.



3. Long-term sustainability business model for HARP methodology and/or tool in the HARP countries

3.1. Quantitative costs of needed updates and modifications in HARPa

Section 2 presented the successful experiences of application in the sector, the availability for each interested actors to customize, update and use the methodology and app developed by HARP and a general business model for its commercial exploitation. Section 3 goes into details regarding this last point, providing quantitative data for the needed actions to be implemented for the long-term self-sustainability of the app. The reported costs were discussed together with the HARP partner trenkner consulting, responsible for the HARPa development. The general outcome is that the more services and pieces of software are added (e.g. for logging the labels) the more maintenance costs would incur



and therefore a cost-benefit analysis should be performed to evaluate what is needed for each organization responsible for the handover of HARPa.

Estimated yearly operation and maintenance costs: For the usual server maintenance, the own estimation by the HARP partner is 600 €/year (50€/month). These costs are related to keeping the operating system and third-party software up-to-date and managing backups (this reference is made out of Uwe's internal costs. When other organizations aim to take these costs over themselves, costs may differ (e.g. because of different personnel costs)).

If an external organization aims to transfer HARPa to a shared hosting service, where the operating system and (most of) the software is kept up-to-date by the hosting company, the costs could be lower. A potential costs estimation to run HARPa on a webspace suitable for an app (e.g. Wordpress) would be of 5€/month.

Sporadically operation and maintenance costs: At least once in the first five years of of HARPa's commercial life, some bigger adaptions must be made due to current versions of PHP becoming obsolete (e.g the PDF library (TCPDF) has to be upgraded to a new version, needing major changes to how the PDF files are generated). This is because the developer of TCPDF has announced a new library, rewritten from scratch, for several years and will not support older versions, once this new library is completed. These major changes will depend on the requested changes by the HARPa owners, and it is expected that they will have an extra cost of 500€ every five years.

Web statistics software: To keep track of the use of the application, a web statistic software may be used. This can be used as a monitoring market service for the HARPa owner to monitor the status of the heating system stock at National level. Two different alternatives are available: "self-hosting" and "cloud service".

If the organization in charge of the use of HARPa at a National level aims to host the application internally, they would have full control of the data related to the use of HARPa and lower privacy concerns (since everything is stored internally). At the same time, the organization would incur higher costs for maintenance (because of the need to update the software continuously), and potentially higher costs of web hosting, compared to a cloud service host (since a database system is needed).

The other option is to use a cloud service for hosting the tool. The costs related to such an alternative could vary from a free alternative with problematics related to privacy issues and GDPR (e.g. Google Analytics) to prices in the range of 20-50€/month for cloud-hosted, depending on the number of hits (e.g. <u>Matomo</u> or similar).

Labels logging: In the case the leading organization hand overing HARPa does not use self-hosted statistics software and does not log the labels emitted and the related savings, then there is no need for a database system.

If the choice of self-hosting the tool is taken, to log labels generated and achievable savings through the upgrade of the heating system, which is related to the second part of the use of the application, the database of data must be kept and an additional regular cost should be taken into account. Depending on the software used for self-hosting, a database system could be already available and therefore the additional cost is null.





If web hosting is outsourced (e.g. shared web hosting), then a database is usually already included. It is possible to find a host offering a lower price if no database system is needed, but that would reduce the cost from 5€/month to 3€month and therefore it is negligible on the long-term.

Requests for changes: This clearly depends on the type of change requested. Changing a link or a sentence is quick and easy (I might calculate $500 \notin$ /change). Including a new feature, changing the algorithm or logic of the methodology, should be discussed internally. This was the case for the French changes' implementation (See Section 3.1). New functionalities, parameters and customization features can be included too. Changes of this type could require high budget, in the range of 5.000 to 10.000 \notin /change. The required changes by the national partners are presented in Section 2 of D6.2.

Translations: regarding the translation of the application into other languages apart from the five + EN of the HARP countries, this could be a relatively easy task. This is the case for the replication countries (Greece and Poland – T7.4). The inclusion of non-Latin characters could make the work harder, since other fonts, change the font depending on the language, etc.

3.2. The handover of the HARP methodology and HARPa in France, Italy and Portugal after the end of the project

As defined in the conclusions of D6.2, the three endorsements expected for HARP at the end of the project were achieved thanks to the official handover of the application (HARPa) to three National partners who are going to take care of the operation and maintenance of the application after the end of the project. This is the case of ADENE in Portugal, Uniclima and Energies et Avenir in France and Assotermica and ENEA in Italy. For the first one, the endorsement is completely supported by a public entity (the Portuguese National Energy Agency), while in the case of the French and Italian partners, the endorsement is coming directly from industrial associations in the heating sector, with the support of the National Energy Agency in the Italian case. In Spain and Germany, as widely reported in D6.2 and summarized in Section 3.3, DENA and CREARA will keep the source code of HARPa on their internal servers, for future potential exploitation activities. Therefore, the HARP project can represent a variety of outcomes that can be used as a guideline for the future interested actors who want to implement it at the regional/national level (see HARP replication countries, Greece and Poland, for example). As explained in Section 2.2, the HARPa application will be open source, so that everybody can modify, optimise and tailor the methodology and application, according to specific needs and objectives. Therefore, the HARP partners will be responsible for covering the operation and maintenance costs for the use of HARPa in its national version. It is expected that minor changes and updates will be required in the next future, such as the potential revision of the labelling scale, according to the updated version of the EU regulations for new heating systems.

Below, the specific national handovers are described in terms of long-term sustainability strategy.

As described in detail in D6.2, HARP French partners Uniclima and Energies et Avenir initially had difficulties in finding the support of the heating industry they represent since during the project development, HARPa was competing with the existing Mon Etiquette Chaudière. Uniclima and Energy et Avenir are both private associations dedicated to the professionals in the heating sector. More specifically, they have two complementary and essential roles in the heating and cooling sector by representing their members in the policy sector helping them to have a joint unified position in the H&C and energy market. Following, the revenue streams of the two associations are presented:



Uniclima represents the most important and relevant association for the industry and manufacturers stakeholders in the Heating cooling and Aerolic sector in the French ecosystem. Uniclima has now 86 organization members who represent a total turnover of 6,6 billion \in in total (with an export turnover outside of France (from international sales/ exported sales) of 1,8 billion \in). The members contribute to Uniclima's self-sustainability by giving a financial contribution every year, with a coefficient depending on their own turnover. The memberships and the Interclima fair (co-organized by Uniclima) are the main revenue streams. Uniclima has other revenue streams such as state financial aid and subsidies on special projects or other commercial negotiations.

Energies et Avenir is a private association gathering professionals from the heating, sustainable building and energy providers sectors. The professional associations' members of Energies et Avenir are mostly installers, maintenance companies, retailers and energy providers that represent the French's most important stakeholders in the sector, such as UMGCCP, FFB, FEDENE, SYNASAV, CAPEB, FGAZ, Synasav, etc. (check D6.2 for more information). Energies et Avenir's main revenue streams are the members annual financial contributions (as in the case of Uniclima) and they also benefit from public fundings and other commercial partnerships.

After various discussions with the members of the heating associations, specifically related to certain required changes for making the application customised according to the French system boundaries and regulations (See D6.2), Uniclima and Energies et Avenir finally reached an agreement with their members which is reported in Annex I and officially endorsed HARP at the private level. The new application must perform at its best on the long term in France and be adapted to the regulations. Therefore, it will be updated to not become obsolete in the five upcoming years with an adaptation of the labelling and the calculating method every time there is a new regulation or a needed modification. The two French partners will be then in charge of operating and maintaining the application, promoting its use among the professionals in the sector and ensuring monitoring surveillance measures in the long term. In addition, the two partners will start again their interrupted conversations with the DGEC to promote the use of the developed HARP methodology at the public level and in policy instruments (such as the new incentives schemes which will replace Maprimerénov and the Prime CEE programmes).

As depicted, before getting to an agreement with the involved representatives of the French heating sector, the HARP French partners had to ask for certain modifications of the HARP application, to then receive their official endorsement. These are detailed in D6.2 and represent mainly some actions such as the modification of the name, the application's aspect and design, the adaptation of the texts and the technical terms and the creation of an updated Backoffice cockpit. Clearly, the revision and creation of the new application (Mon Etiquette Chaudiere-Chauffage) took time and manpower, so Uniclima and Energies et Avenir decided to shift some of the non-used extra budget of the project, to ensure the application and adaptation process before the end of the project. The continuity of the application's development and its adoption by the French professional sector will be ensured by Uniclima and Energies & Avenir during the post-project period.

The new Mon EtiquetteChaudiere-Chauffage has both an added value for the French industrial sector and the European Commission. The targeted added values for the French stakeholders are related to have:

- A better national adaptation: since HARPa is mostly based on a European-wide approach, some of the application criteria didn't fit the French regulations nor the French market such as building age, appliances range age, etc.



- A good compromise for the two existing labelling tools (HARPa and Mon Etiquette Chaudière): the adoption of the HARP methodology in a new national tool, fits the French market expectations, avoids having two labels supported by the same professional associations. Instead, Mon Etiquette Chaudière Chauffage, proposes an EU-based methodology but applied it to the French sector.
- A solution that would be maintained and updated: since Mon Etiquette Chaudière would fit perfectly the French professionals' and consumer's needs, it will be in their own interest to maintain its credibility and make operative a tool that is performing at its best for the professionals. Therefore, it will be a high-interest motivation for Uniclima and Energies et Avenir to maintain and keep adapting the tool in the long term.

The total amount estimated for the required modifications by the Uniclima IT department is of 24,963 €. Part of this amount would be transferred from unused other direct costs for travelling and events organization from the HARP project.

For the maintenance, operation and update of the application, for promotion and awareness activities and for the development of activities to endorse the methodology of labelling existing heating appliances (e.g. organisation of meetings with the DGEC), Uniclima and Energies et Avenir will use their own available budget. According to what is described in Section 3.1, and looking at the features of interest for Uniclima, the required budget for keeping the tool active would be of around 7,000 \in /year plus a punctual extra cost related to the potential rescaling of the application (e.g. due to changes in the French regulations).

Type of cost	Cost	Additional info
Extra maintenance and hosting cost per year	230, 40 €/year	Hosting + domain being 19,20€/month on O2 switch
Maintenance cost per year	6 808 , 20 €/year	6 whole days/year
Cost in case of a rescaling every 5- 6 years	11 347 €	2 weeks' time for tool adaptation

As a summary of this section, the business model canvas for the self-sustainability of Mon Etiquette Chaudiere- Chauffage is presented, considering the estimated costs and revenues for the tool, the main activities to be performed, the key resources and key partners and how the messages related to the importance of replacing old and inefficient heating systems are disseminated.



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In Italy, the handover of HARPa was initially planned to be Assotermica's responsibility. Assotermica evaluated the potential of replacing the currently in place *Etichetta Energetica* with the HARPa one, together with the modifications provided in the project report D6.2 and briefly reported in this section. The initial intentions of Assotermica were to finance the modifications with their own budget and, with the updated version of HARPa, looking for a public endorsement in the pool of already contacted stakeholders in the sector. The main challenges for the handover were related to the support of public and private entities at Italian level, which may delay and/or block the further use of the developed HARP methodology in Italy. The missing support of both public authorities (e.g. the Italian Energy Agency, ENEA) and the industry representatives, could have undermined the potential of wide-reach in the use of HARPa. These barriers were due to some simplifications which have been made in the process from the initial developed methodology to the current version of HARPa, making it excessively straightforward and not enough detailed for the professionals in the sector. Critical points regarding the second part of the application (the one in which suggestions are given to the user for the retrofitting activity) were also seen as a barrier for its handover in Italy and the support of public authorities. Furthermore, ENEA would have not agreed to promote a private owned tool (the updated Etichetta Energetica from Assotermica) on their channels, because as a National Energy Agency, they could disseminate and use only publicly funded projects.

Therefore, a jointly exploitation plan has been defined by the Italian partners (Assotermica, ENEA and EURAC) which confirmed that with the required changes, the Italian involved stakeholders will endorse the HARP methodology and HARPa. The new Italian version of the tool will be developed by the ENEA IT team, thanks to the technical support of EURAC and Assotermica. Therefore, this is certainly a great



success of the HARP project, which provided a public endorsement of HARP in Italy with private support of the heating industry and the academia.

As widely commented, the Italian partners intend to use only the first part of HARPa (labelling of existing appliances) and they do not intend to use/show the second part, which presents the options for a replacement. ENEA is going to realize a new version of HARPa for the Italian case, providing only the energy label for old and inefficient heating appliances. The app will be new, and not just a minimized version of the existing one, because differences between the HARPa operation and methodology developed by EURAC need to be removed.

The HARP Italian partners have decided to disseminate beyond HARP a new adapted version of the HARPa tool: it will give the opportunity to only generate the energy labels of space and water heaters, in accordance with the national market's needs and feedback collected during the Italian communications campaigns (more information available in D4.4). In fact, for the Italian professionals, the HARPa tool second part was unattractive because of many simplifications. Instead, the first part is technically strong for the methodology adopted and attractive because it shows the final label of the appliance. The Italian partners will promote only the first part of the HARPa tool by maintaining the dedicated cells useful for the energy label of the old appliances (e.g. the climate zone can be removed). To overcome the aforementioned simplifications implemented into the HARPa tool and consider the input listed below as the EU calculation methodology, the following are the needed changes required for the new version of the Italian HARPa:

- Addition of boiler type, installation year, and aging coefficient.
- Space heating appliances/Heating professional -> Stand by consumption (PSB) and Pilot light consumption (Pign). Currently, HARPa considers constant values: the Italian partners propose this simplification only in absence of specific appliance values.
- GSWH, GIWH -> FL electrical consumption (elmax), stand by consumption (PSB). Same as previous point.

Furthermore, some cells should be removed:

- Page 1 space and water heating, two different appliances
- Page 1 all the countries (except Italy)
- Page 2 System Type -> Heat Pump

The Italian partners also believe it can be useful to add the location of the obsolete boilers to be labelled (for collecting data) and giving to the consumers/professionals the opportunity to download the energy label generated in the tool and having a dedicated digital database of installed appliances on the Italian territory. To apply the required modifications, 3-5 days of work are estimated by the ENEA IT team.

The Italian partners will promote it amongst the market stakeholders already involved during the HARP seasonal heating campaigns, with the aim to disseminate the energy label of space and water heaters and accelerate the decarbonization process in the heating sector.

For the maintenance, operation and update of the application, for promotion and awareness activities and for the development of activities to endorse the methodology of labelling existing heating appliances (e.g. organisation of meetings with the policymakers), ENEA will cover the related expenses. The main costs are related to the use and maintenance of the server and for the monitoring







of the effectiveness and regularity of the labels emitted. Assotermica and ENEA will also take advantage of the handover, preparing training activities involving HARPa (Assotermica Academy).

Other potential business models that could be of interest for the Italian partners are related to customising the application layout for one or more companies in the field which can then use the new version of HARPa for the Italian case during the maintenance procedures operated by their own professionals (see Section 2 for more detail on this potential revenue stream). The new Italian version of HARPa, embedded with the HARP methodology, could be also exploited for the creation of a help desk for the end-users, in which voluntary heating system manufacturers companies pay a fee for being integrated into the application and provide feedback, help and support to end users when they need to change their inefficient boilers



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In Portugal, ADENE, the National Energy Agency and HARP coordinator, is the stakeholder in charge of the handover of the methodology and use of the HARP application at the National level. ADENE has been very active at the public level during the entire duration of the project, through different meetings and discussions with governmental entities and policymakers (See D6.1 and D6.2 for more details). Especially, the conversations with the teams in charge of the transposition of the EPBD at the national level, with the National General Energy Directorate and with the team in charge of the long-term renovation strategy (ELPRE), validated the interest of the governmental bodies and technical teams for the HARP methodology. This last interaction brought the first public endorsement of the HARP methodology, since the ELPRE, which includes several measures that should be implement until 2030 to foster the renovation of buildings, references the HARP as a supporting tool to incentive the replacement of existing heating systems. Nevertheless, the goal of ADENE is to make the methodology available to each kind of interested actor (e.g. end-users, professionals in the sector, heating system



manufacturers, etc.) and since HARPa is open source and free-of-charge to use, this would be implemented in Portugal.

In particular, the HARP application is already included in the <u>Portal Casa Mais</u> and accessible to all the consumers and professionals registered in the portal. The goal of the Portal Casa Mais is to become a unique one-stop-shop for the consumers to identify and implement energy efficiency measures in their houses. HARPa will become one of the available applications for the users to evaluate the current energy efficiency of their appliances and provide suggestions for improving and retrofitting them. For the moment the HARPa will be integrated into the one-stop-shop and all the app operation costs will be considered as part of the one-stop-shop initiative and therefore covered by ADENE.

Future developments are still expected for the continued and improved use of the app, integrating HARPa in the simulators section of the portal. The transfer of the app into ADENE's server will have mainly internal costs from ADENE'S IT team ($4000 \notin$ /year). This concerns an IT resource for 40 hours ($50 \notin$ /hour) every 6 months to update the app and perform any kind of preventive maintenance.

As for the French and Italian cases, ADENE requires some modifications to the application to make it compliant with Portuguese legislation and the market, such as the update of the energy and CAPEX prices for the different technologies included in the application. Still, within the project the energy prices were updated. Upon the project's end it will be up to ADENE's IT team to perform this action, within their own budget, in the context of the one-stop-shop initiative.

For future applications of HARP methodology and labelling, for example as a mandatory requirement to request heating retrofitting incentives, further modification may be needed. In fact, the current existing subsidy schemes for changing home appliances, are given independently of the customer's financial conditions, the type of appliance they want to buy, etc. This is seen by ADENE as a missed opportunity to target energy poverty and prioritize the replacement of the most inefficient appliances. Therefore, such modification could include changes in the application such as the revision of the code to present solely renewable heating solutions and/or the sole utilisation of the 1st part of the app (until the emission of the energy label for the existing heating apppliance). If this would be the case, a totally new application should be developed (e.g. harmonizing the app with the one-stop-shop design and overall layout) and the cost estimations are around 10.000€. Regarding the potential features to add to HARPa, reported in Section 3.1, ADENE will require to use the statistic software in place to collect and store valuable information for the heating stock in Portugal (extra cost of 20-50/month). In the same way, they will need the labels to continue to be logged in a database (extra cost of 5/month).

ADENE does not expect any revenues for the HARPa and the costs will be supported within the one stop shop. If the labelling methodologies are adopted by the buildings certification system, published in the national regulations for this, the costs for keeping the app can also be considered within the buildings certification system budget. Another potential revenue for the future is related to the potential integration in the maintenance procedures. if this would happen, the knowledge and ability of using HARPa can be a mandatory requirement for the professionals certified to perform the maintenance procedures and therefore ADENE could invite the heating professionals or their associations, to participate in the operation and maintenance of the application.



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3.3. HARP methodology and the challenges for its public endorsement: the cases of Germany and Spain

The German case is obviously different from the other countries, mainly because labelling existing heating appliances is set as a mandatory requirement by the Government through the Energy Consumption Labelling Act. Switching to a new methodology and application would therefore have imply a complex process. The German application is furthermore linked to the national database for heating appliances provided by BDH (Federal Association of the heating industry).

For these reasons Germany will not adopt the HARP methodology and application in the short run.

A detailed comparison between the German and the HARP methodologies has been performed in another public report of the project (Deliverable 6.2 Guidelines for national policy integration, paragraph 3.1), which shows that HARP offers some improvements (and also has some drawbacks). These improvements will be considered will be taken into consideration by DENA for a future revision of the German methodology.





In Spain, since the existing labelling methodology for already installed heating appliances is way simpler than the one developed by the HARP project (see more details on the FEGECA labelling in D6.1), there is great potential for the endorsement of HARPa in the country.

Nevertheless, the public dissemination of HARP methodology encountered some barriers that allowed only partial endorsement in Spain. In fact, the National Energy Agency, IDAE, only promotes 100% renewable heating systems to replace the old and inefficient residential boilers, while HARP methodology also suggests natural gas appliances. Furthermore, the subsidies for the replacement of existing heating systems are regulated at the regional level, and such fragmentation created some challenges in reaching the responsible persons to present to them HARP and its benefits.

On the private side, CREARA maintained bilateral meeting with FENIE (Federación Nacional de Empresarios de Instalaciones de España), whose interest was positively perceived. Unfortunately, FENIE's main business focus is on heat pumps and since HARP supports also other types of heating systems, they were not interested in keeping using the tool (after the training effectively done for their installers during the project duration).

In any case, the Spanish partners, which, successfully reach their endorsement goal through the regional energy agency of Extremadura, AGENEX, which have been officially using the HARP tool in meetings with residents' associations, and officialised their commitment in continuing using the application and potentially include it in future subsidies scenarios through a signed letter of support (see D6.2).

3.4. Exporting HARP methodology and HARPa to replicating countries

The experiences of the HARP national partners for the endorsement and handover of the HARP tool could clearly serve as examples for EU countries aiming at promoting the use of the methodology for labelling existing heating appliances in their territories. Therefore, the HARP exploitation plan is not only restricted to the further utilisation of HARPa in the national frameworks but also to the potential endorsements outside the HARP borders.

This is specifically related to the efforts developed by WP6 in collaboration with T7.4, and detailed in D7.4, but that is valuable to summarize in this section to provide a complete overview of the after-the-project-end activities that will be performed by the HARP partners.

Two non-participating countries in the HARP project have been invited to get to know the developed HARP methodology and the usefulness of the HARP application. These two countries are Greece and Poland, represented respectively by the Greek Association of Solar Energy Industries (EHBE) and the Polish Association of Producers and Importers of Heating Appliances (SPIUG). In both cases, the initial interest of the responsible partners was very high and therefore, initial discussion on the potential use of the application started. R2M, together with EHI, first interviewed the two partners and obtained valuable information related to the legislative and market framework regarding the heating stock in residential buildings. Furthermore, a list of existing subsidy programmes regarding the installation of



new heating appliances was shared by EHBE and SPIUG, so that the HARP partners could have a comprehensive overview of the boundary conditions in the two replicating countries. This exchange of knowledge between the HARP partners and external actors helped to validate the developed HARP methodology and the usefulness of the application, and at the same time provided interesting policy suggestions (from lessons learnt and best practices in the HARP project) that could be applied in Greece and Poland.

In the end, both organizations agreed on promoting HARP methodology and HARPa as an informative application for users (in both countries) and professionals (mainly in Greece) to raise their awareness regarding the financial and environmental benefits of replacing old and inefficient heating systems. Clearly, to implement the application at National level, some minor modifications are required (e.g. translation, definition of climate areas, etc.) and the two organizations are the ones who will completely cover the related expenses thanks to internal funding. In Greece, HARPa will be a useful application for end-users to understand the energy improvement they can achieve, in a simple and fast way and to understand the benefits and differences of each heating technology. In Poland, HARPa will support the user in the identification and selection of the most adequate heating solutions, considering their real situation concerning location, heating needs and house characteristics.

Also, for the replicating countries, the further step after the handover of the application is to include the HARP methodology in national policy measures, existing or new subsidy programmes and maintenance procedures. In Greece, if HARP development's are successfully undertaken, it could be included in the National Program for renovation ""Εξοικονομώ Αυτονομώ" and become a mandatory application to use during maintenance procedures. In Poland, the promotion of the application will be done through the SPIUG website and dissemination activities (presented in fairs and events) and contacting the Ministries of Climates, Environment and Sustainable Development for public support. Further discussions are needed to understand the potential endorsement of HARPa in the Clean Air programme as an informative application and/or for its potential relationship with the incentives (since they already have the minimum class up to give the subsidies, HARPa can provide the list of heating systems that could be considered and are available for subsidies).

Apart from the joint work with EHBE and SPIUG, HARP partners aim to extend the exploitation of the project in other different ways. As commented in D6.2, in Germany and Spain, the local/regional energy agencies could be valuable policymakers able to endorse HARP at the public level (especially in Spain since the regional energy agencies are responsible for developing subsidy programmes). HARP partner CREARA has contacts with energy agencies and institutions in Lithuania and Croatia, which can be interested in promoting the application in their countries. ADENE is also a member of the European network of National Energy Agencies and is also active in the energy labelling working group and in the EPBD transposition working group, and as such can actively promote the methodology outside of the HARP borders as well.

4. CONCLUSIONS

This report presented long-term sustainable financial models for fostering the further use of the HARP methodology and the developed HARPa after the end of the project, to have a tangible impact on the heating sector even without the availability of public funding.



The official public and private endorsements obtained by HARP partners in France, Italy, Portugal and Spain show the interest of the policymakers and organizations in the heating sector to promote a methodology that showed its potential in increasing the renovation rate of old and inefficient heating systems in the pilot countries. HARP results include different types of handovers (public, private, public-private) and therefore different types of financial sustainability models had to be drafted. In Portugal, ADENE obtained a public endorsement from the long-term renovation strategy (ELPRE) and the National Directorate for Energy in official policy documents, and currently includes HARPa as one of the tools presented for the users in the one-stop-shop for residential building renovations. In Spain, the Extremadura Regional Energy Agency (AGENEX) committed to promote and use HARPa in the future to raise consumers' awareness. In Italy, the handover will be made by the Italian Energy Agency (ENEA), together with the support of the industry (Assotermica) and the HARP methodology developer (EURAC). In France, the heating industry, through Uniclima and Energies et Avenir, will continue to promote the use of HARPa on the French territory.

For the EU commission, the HARP experience in the pilot countries is of great importance since it could represent an example for other Member States wanting to adopt the HARP methodology to their countries' frameworks. The Italian and French cases show that, with the support of the industry and an EU-based methodology for the labelling of installed heating appliances, it is possible and valuable to implement HARP and the use of HARPa at the national level. In Italy, the initial industrial initiative from Assotermica, led to a public adoption by the National Energy Agency, ENEA. In Portugal, the public endorsement from the Long-Term Renovation Strategy and the inclusion of the HARP methodology in a more generalized framework for building renovation (one-stop-shop), can represent a successful example for the other Member States.

Furthermore, HARP is an independently developed methodology that does not require external aids to finance its maintenance, since the adopters of the HARP tool could easily cover the minimum costs for update and maintenance of the application. Through the drafted IP agreement (document signed by all project partners), HARP consortium intends to share all of the information generated with interested parties. This, together with the developed long-term financial sustainability models, would further facilitate the use of HARP methodology in the public sector. On the one hand, third parties are allowed to modify and update the methodology according to specific conditions in their own countries, knowing that there are successful examples of financial self-sustainability in the HARP countries. On the other hand, if the first phase of the implementation provides valuable results (e.g. high use of the application and increased building renovation rate), this may push decision and policy makers to use HARPa as part of wider existing measures, such as incentive schemes and mandatory maintenance procedures.





5. ANNEX I: Proposal document for the endorsement of HARP in the French case

_HARP



Adoption proposition of the HARP methodology inside the new French national labelling tool.

Energies et Avenir and Uniclima - partners of the Heating Appliances Retrofit Planning (HARP) project.

We as industrial French Partners of the HARP project, part of the Horizon 2020 program launched by the European commission, are willing to adopt and implement the HARP methodology in our new updated version of the French Labelling tool for old heating appliances (supported by the French heating associations professionals).

We want to instal and create a new labelling tool – this tool will be an online platform based on the same type of layout as the existing European and national French tool; it will integrate the HARP methodology as the main method used for the calculations of the labels, with some modifications brought from the actual French tool in place.

To be able to settle this new tool in the long run we have written this proposal to ensure the European commission our honest will of implementation and adoption of the HARP methodology at a national level with the help of the professional heating associations.

The revision and creation of the tool would take us some time and manpower, so we have decided to shift some of the non-used extra budget of the project, to use them wisely and insure the tool adaptation process before the end of the project. The continuity of the tool's development and its adoption by the French professional sector will be insured by Uniclima and Energies & Avenir during the post project period.

However, Uniclima and Energies & Avenir have some requirements that needs to be taken into account, so the offer can take place in the best conditions possible

The main modifications and requirements are:

New naming of the tool.

We would like to name the tool "Mon etiquette Chaudière-Chauffage"

The existent French tool on the French market named by Energies et Avenir and COENOVE is already recognised by the French installers associations and has already benefited from the sectors support. It is to be replaced by this new tool that would join both HARP and Mon etiquette Chaudière's methodology. We would like to keep a part of its original name "Mon etiquette Chaudière" (which means my boiler label) and add "-Chauffage" (heat) to the initial name, to demonstrate the multi-technology approach of the HARP methodology and open the promotion of this project to all the Professionals appliances and concerned by this tool. (Heat pump and renewable energy). Moreover, The Mon Etiquette Chaudière-Chauffage is understandable and evokes the use/ purpose of that tool to the professionals and consumers while reading its name.

The use and the mention of the HARP methodology in every step of the tool.

We want to make sure the users see this tool's creation is based on the HARP methodology and its project initiatives. This mention at the HARP implications and support will be shown directly in the home page of the tool and in the frame of every step of this following one. It is very important to us that the HARP implication is mentioned along the way of the new "Mon etiquette Chaudière- Chauffage" tool since it is core element that will help us create it.

Change the tool's aspect and design.





We want to make the tool more user friendly and simple to get for them; With simplified visuals and some modifications planned to be done on the general design of it (make it fully responsive) and erase some of the transition problems bugs between each questionnaire pages.

• The adaptation of the texts and the technical terms

Change the remaining English text on the new version of the tool, correct and adapt the technical terms that aren't accurate to the national spoken language.

• A creation of updated Backoffice cockpit:

This cockpit will be able to let the administrator, pilot and collect the statistics of the tool in real time such as:

Number of energy label produced

Percentage of resources used

And other data that are used on the tool

We will mainly focus on the technical part of the tool for the recreation of its new tool version.

Main Other criteria of modifications planned to be done:

- Change the age range of the technologies and the habitats (find the consumption elements of the habitats consumption)
- Adapt the C age factor to the classification of the technologies and the calculating methodology.
- define the climate zones by regions so it is more accurate on the weather estimation and to the RT2012 regulations
- modify the PEF and correct the CO₂ emissions data.
- Delete the question: "do you have reliable energy sources?" since it is supposed to be directly seen with the
 installer in charge of the renovation, and since the consumers wouldn't know how to respond to this question.
- Study the possibilities about existing supporting technology in the habitat.
- Add in the recommendation section the mention "estimated costs and savings, without the public financial aid"
- Cancel the recommendations with a combination of Heat pump and solar thermal due to the lack of relevance compared to the actual average expenses on the French market, and recommend fossil boilers with solar thermal appliances.

As mentioned before to be able to make those modifications and really implement the HARP methodology at a national level, we have worked with the workforces of Uniclima and Energies et Avenir (Engineers, project manager, developer - IT, and professional association representant) on this adoption and update of this new tool.

We, Uniclima have already proposed a shifting of hours for both partners that was previously sent and validated by our Project coordinator Joana Fernandez.

The budget to be shifted for both partners is detailed below.

Uniclima

We will use the 3000 € of extra direct cost that aren't used for WP7 and the other non-used direct cost for travels

We will use the remaining non-used travel costs for Uniclima: 2998.45€





This gives us a total of 5998.45 € of other direct cost shifted from Uniclima's initial given budget that we will use for the remodelling and adaptation of the tool in France.

Energies et Avenir

We will use the 2750€ of extra direct cost that aren't used for WP7 and the other non-used direct cost for travels

We will use the remaining non-used travel costs for energies et avenir: 8590 €

This gives us a total of 11 340 € of other direct cost shifted from Energies et avenir's initial given budget that we will use for the remodelling and adaptation of the tool in France.

This agreement will be doable in exchange of a good tracking of the man power, A real implication, some viable resources, perspective of adoption in the long term by the French industrial partners.

This co-signed proposition by Uniclima and Energies et Avenir's is to make sure those propositions of adoption are respected and maintained in the long-term bases.

By signing this document Uniclima and Energies et Avenir agree to respect the initiatives mentioned previously, to adopt the HARP methodology in this new national tool that will merge both existing tools, respect the adoption ethics of the HARP project on the French sector and will make sure to provide all the necessary documents (Business plan, Hourly rate budgets/cost estimations for the shifted budget used, access to the data generated by the labels) to the European commission and the HARP partners concerned by this methodology adoption.

Jean-Paul Ouin

Délégué Général - Uniclima On the 20th of may 2020

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