

# IX CONGRESO ENERGÍA SOLAR TÉRMICA ASIT

## PRESENTACIÓN DEL PROYECTO FRONt

Madrid, 1 de marzo de 2017



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Co-funded by the Intelligent Energy Europe Programme of the European Union

IEE/13/848/SI2.675532 FRONt

# CONSORCIO

## Asociaciones Sectoriales



**ESTIF** – Solar térmica  
European Solar Thermal Industry Federation

**AEBIOM**  
EUROPEAN BIOMASS ASSOCIATION  
AEBIOM – Biomasa

**EGEC**  
GEOTHERMAL  
EGEC – Geotermia

**ehpa**  
european heat pump association  
EHPA – Bomba de calor



## Agencias de la Energía



**NL Agency**  
NL Agency  
Ministry of Economic Affairs

**ADENE**  
AGÊNCIA PARA A ENERGIA

**energy saving trust**  
EST

**IDAE**  
Instituto para la Diversificación y Ahorro de la Energía

**KAPE**



## Expertos tecnológicos



**CREARA**  
ENERGY EXPERTS  
Análisis de mercado y de costes

**QUERCUS**  
Consumidores y comunicación

**AIT**  
AUSTRIAN INSTITUTE OF TECHNOLOGY  
Análisis tecnológico y de costes



# ANTECEDENTES

## ¿QUÉ NECESIDADES TIENE EL SECTOR?

Necesidad de **conocer el sector renovable térmico** a fondo

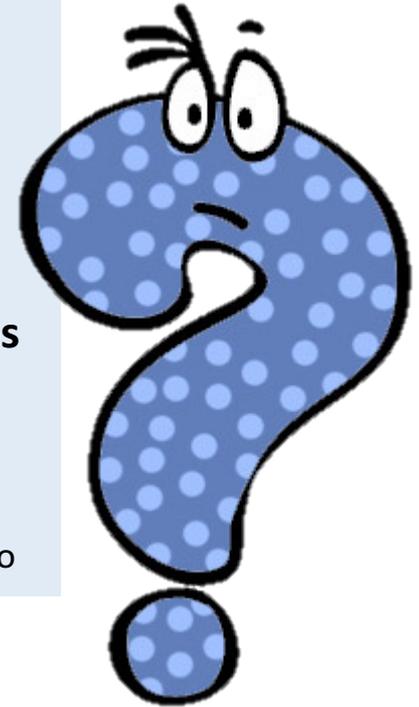
- Costes
- Potencial
- Mercado

Necesidad de **comprender al consumidor**

- Necesidades y expectativas
- Factores clave de decisión

Necesidad de identificar **buenas prácticas en los mecanismos de apoyo** existentes

- Evaluación de los mecanismos existentes
- Identificación de factores de éxito
- Diseñar una estrategia integrada dirigida al sector renovable térmico

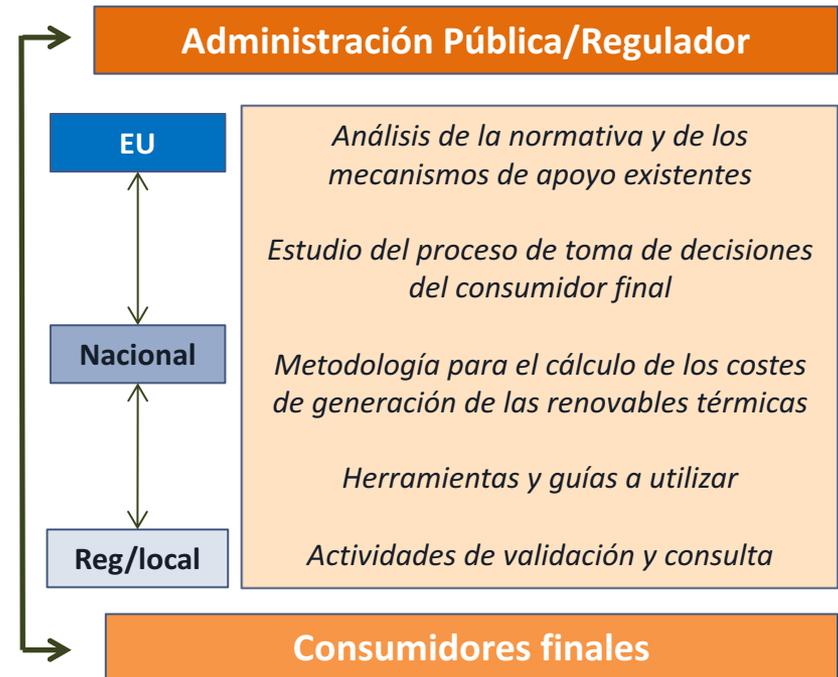


# OBJETIVOS

- **Promover** el papel de las **energías renovables** en el sector térmico en Europa

- Promover la **implementación a nivel nacional y europeo de estrategias** que contribuyan eficazmente a la implementación de los Planes Nacionales de Energías Renovables
- Facilitar la puesta en marcha de **nuevos mecanismos de apoyo** a las renovables térmicas

- **Mejorar la percepción de los usuarios** sobre los costes de las renovables térmicas, promoviendo la transparencia y claridad en la comunicación
- Conocer el proceso de **toma de decisiones de los consumidores** para diseñar estrategias y medidas que faciliten el desarrollo de las renovables térmicas



*FRONt facilita un **marco práctico** para implementar las actividades necesarias para conseguir estos objetivos*



## About FRONt



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### Why RHC?

About half of the energy used in Europe is used to heat and cool our homes, offices and businesses. Around 72% of the gas used in Europe, much of which is imported, is for heating buildings and industrial processes. Gas prices are unstable and concerns are growing about both security, and escalating costs for citizens and businesses.

Despite this, heating and cooling, in particular renewable heating and cooling, has remained overlooked in public policy and public life.

Nevertheless, renewable heating technologies have progressed and are now able to play a large role in Europe's energy mix, with significant economic and social benefits. In fact, covering 25% of the heat demand with renewables in 2020, could save the EU €21.8 bn annually on fuel imports compared to 2012.

To make this happen, there needs to be a greater understanding of the real costs of heating and cooling, more information and support for national and local authorities which are establishing administrative frameworks, and more information about the decision making factors of energy consumers.

### What is FRONt?

## Subscribe to the FRONt mailing list


## Latest News

13  
OCT

**How to develop support schemes for Renewable Heating and Cooling**

Published in Media

27  
SEP

**Learn how RHC technologies work**

Published in Media

8  
AUG

**Conference: COP21 – no Decarbonisation without Local Engagement on Heating and Cooling!**

Published in Media



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### Final Report

### Executive summary

EN

ES

DE

NL

PL

PT

### Categories

- Policy Priorities
- Key Success Factors for Renewable Heating and Cooling Support Schemes
- Costs of Heating and Cooling
- The Heating and Cooling market: Decision making for consumers
- Capacity Building
- Events
- Infographics and interviews



## Key Success Factors for RHC support Schemes

### A good practice guide for setting up integrated support schemes

This FROnT Manual of good practices provides recommendations for the design and implementation of successful financial support schemes for RES-HC technologies. It covers technical, economical, financial, legal and marketing aspects.

[Download PDF](#)

### The Key success factors for RHC support schemes

Following an in depth review of policies in eight EU member states, a number of key success factors have been identified by the FROnT project.

[Take Part](#)

### Results of consultation events

The FROnT project has published the key conclusions from a series of consultation events, known as National Consultation Platforms (NCP), undertaken by each of the Energy Agencies involved in the project.

[Download PDF](#)

### Integrated Support Schemes for RHC- Assessment Report

This document presents a summary of Key Success Factors identified by FROnT partners during the assessment of RES-H&C schemes implemented in several European countries

[Download PDF](#)





# Costs of Heating and Cooling

## Methodology for estimating costs

Technical Report on the Elaboration of a Cost Estimation Methodology.

[Download PDF](#)

### Online cost estimation tool

The overall objective of the tool is to assess the competitiveness of renewable energy technologies (biomass, solar thermal, air-source heat pump and ground-source heat pump) against traditional fossil fuels.

*DISCLAIMER: The FROnT tool has been simplified to make it easy for end-users.*

*The calculations and results provided by the tool should be supplemented by real quotes from experts on the ground. An investment decision should not only be based on the results provided by the tool.*

[Renewable Heating and Cooling Cost Estimation Tool \(multilingual\)](#)

## How to use the FROnT cost methodology

[Guidelines: Using the RHC costs' estimation methodology](#)

[ES](#)

[NL](#)

[PT](#)

[PL](#)

[DE](#)

## Information Sources for understanding the cost of heat

The FROnT project is working on how the costs of energy (heat and cold) are defined. As part of this work, a 'technical report on the elaboration of a cost estimation methodology' is being prepared.

This bibliography will serve as a useful reading list for anyone investigating costs of heat.

[Download PDF](#)





## The Heating and Cooling market

### End user decision making factors for H&C system choices

The behaviours and attitudes of European consumers towards the heating, cooling, and hot water systems they use have been analysed in a study of more than 5500 participants representing private households, tertiary buildings, and industry.

The study examined why current systems are used, where users get information about thermal energy, why they choose some systems rather than others, how they perceive different sources of energy, and their sensitivity to price changes.

#### → European Report

This report brings together the results from all countries to show general trends

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#### → National Reports

[The Netherlands \(English\)](#)

[The Netherlands \(Dutch\)](#)

[Portugal \(English\)](#)

[Portugal \(Portuguese\)](#)

[Spain \(English\)](#)

[Spain \(Spanish\)](#)

[Poland \(English\)](#)

[Poland \(Polish\)](#)

[United Kingdom\(English\)](#)

#### → Database of the National Surveys

[Click here to download](#)

*The data is made available for experts (academic, industry, consultants, public authorities) provided that any use references to the FROnT project and the support of the European Commission.*

### Promoting transparency of H&C costs

[Recommendations for promoting transparency of energy costs](#)

[ES](#)

[NL](#)

[PT](#)





# ESPAÑA: INFORME NACIONAL SOBRE FACTORES DE DECISIÓN

Informe nacional sobre los factores de decisión que afectan a los usuarios finales en la elección de sistemas de calor y frío

Entregable número: (D.4.1)  
Autor(es): Departamento Solar  
Filiación del autor(es): IDAE



# INFORME EUROPEO: FACTORES CLAVE DE DECISIÓN

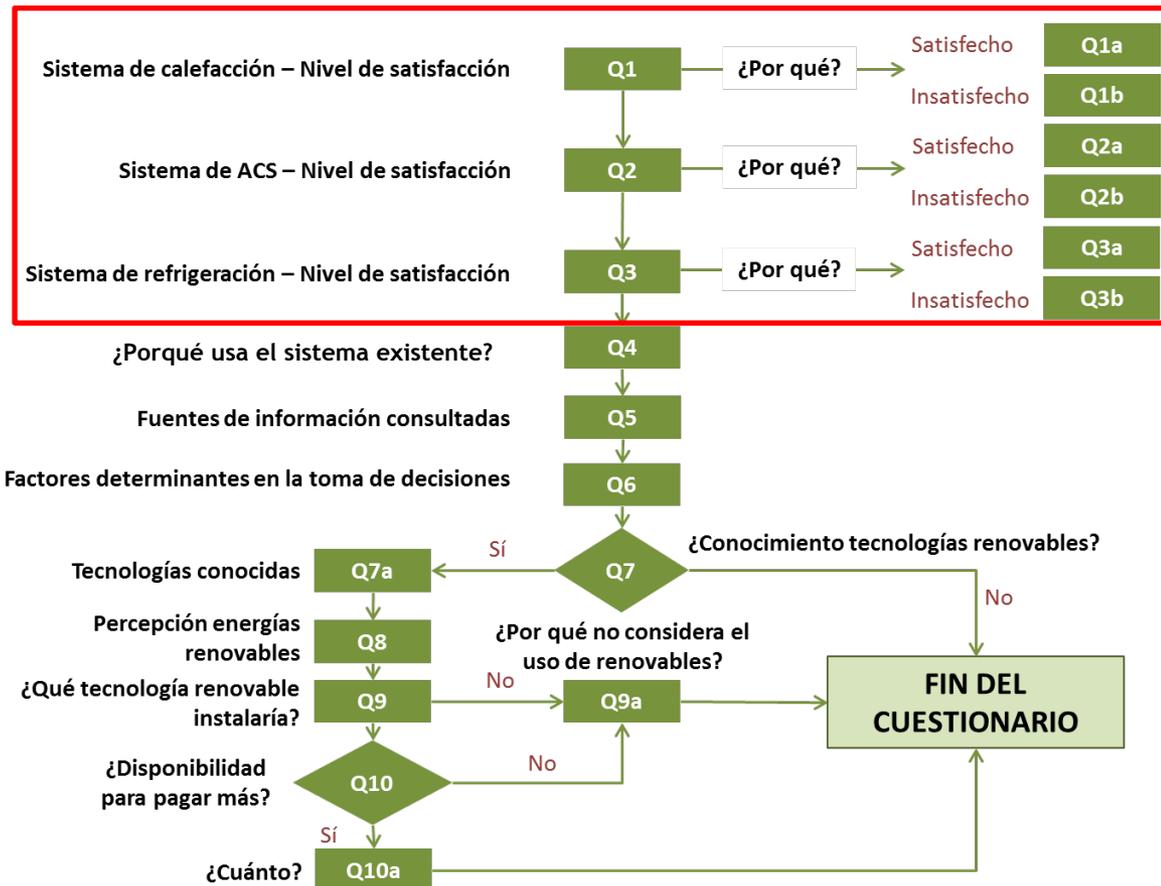
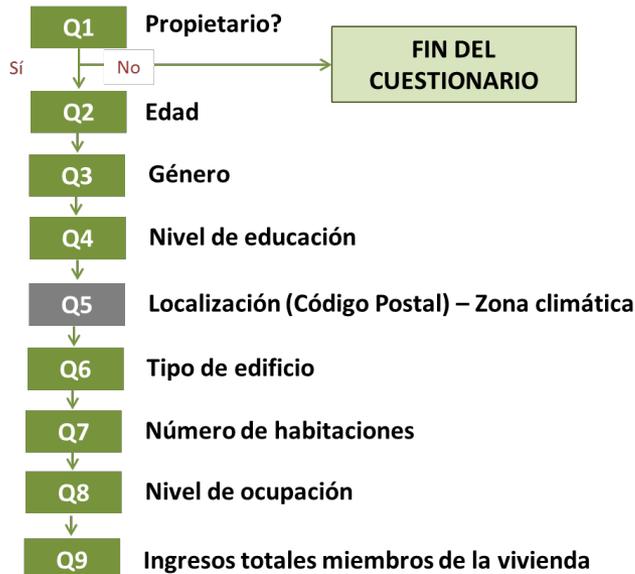
Informe europeo sobre los factores de decisión clave de los usuarios finales en sistemas de calefacción y refrigeración

Número de entregable: (D.4.1)  
Autor(es): Ortega Izquierdo M.  
Organización del/(de los) autor(es):



# Encuestas: Sector residencial

## Encuestas dirigidas a PROPIETARIOS DE VIVIENDAS



**Q6.** ¿Cuáles son los factores determinantes a la hora de adquirir un equipo nuevo de calefacción/refrigeración/ACS? *El entrevistador debe marcar una opción para cada cuestión.*

	<i>Muy importante</i>	<i>Poco importante</i>	<i>NS/NC</i>
Coste de instalación (incluyendo incentivos)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ahorros a lo largo de la vida del equipo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Necesidad baja de mantenimiento y/o bajo coste del servicio	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Garantía de confort (temperatura adecuada, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Razones medioambientales y demostración del compromiso ambiental del usuario	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conocimiento de la tecnología	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recomendación o experiencias previas de familiares y/o amigos	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tecnología fiable y/o segura	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Existencia de etiquetado energético de los equipos	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disponibilidad de los equipos en el mercado	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accesibilidad al combustible y/o recurso energético y seguridad de suministro (uso de fuentes energéticas locales...)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Integración arquitectónica/facilidad de instalación y disponibilidad de espacio en la vivienda	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Que el equipo pertenezca a una marca conocida (confianza, disponibilidad de mantenimiento, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Otros: Añadir	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

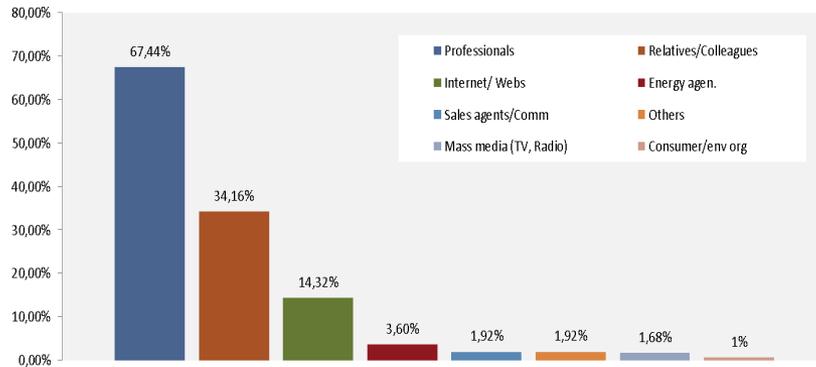
**Q9b.** ¿Por qué cree que no podría incorporar tecnologías renovables en su vivienda?

- Son muy caras
- Requieren cambios estructurales en la vivienda (almacenamiento, cubierta...)
- Requiere permiso y/o aprobación del resto de vecinos del inmueble
- Las condiciones climáticas de mi población no son adecuadas
- No considero que los equipos sean fiables
- Es difícil encontrar instaladores cualificados
- Los costes de mantenimiento son elevados
- Es complicado el uso de este tipo de equipos

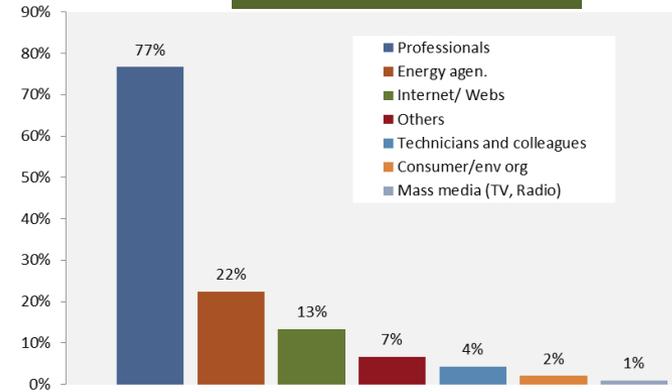


# FUENTES DE INFORMACIÓN

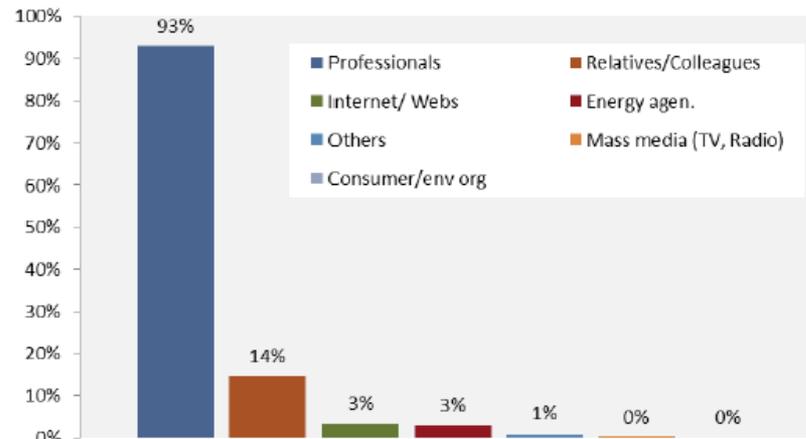
## Residencial



## No-residencial



## Industrial



Co-funded by the Intelligent Energy Programme of the European Union

# Concienciación sobre Renovables

Residencial

63%

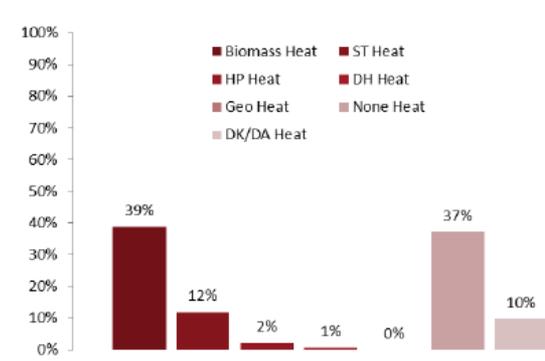
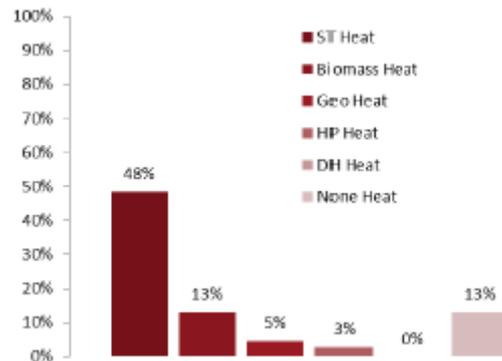
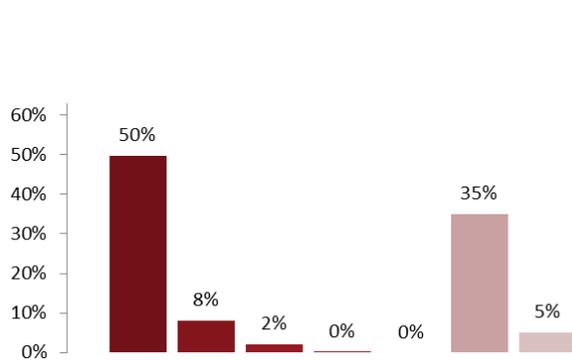
No-residencial

81%

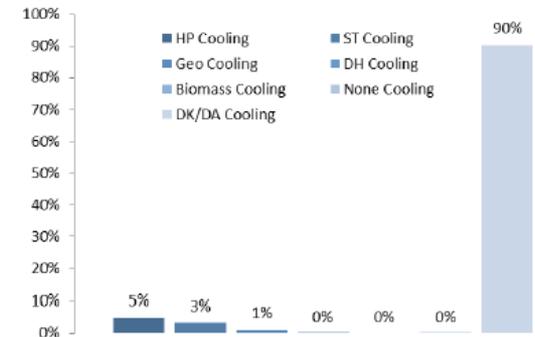
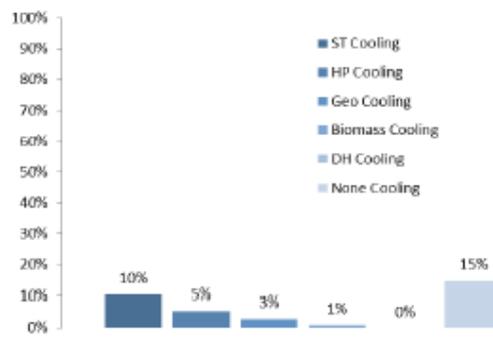
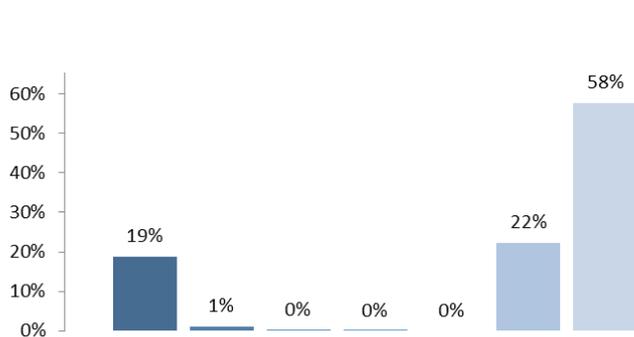
Industrial

74%

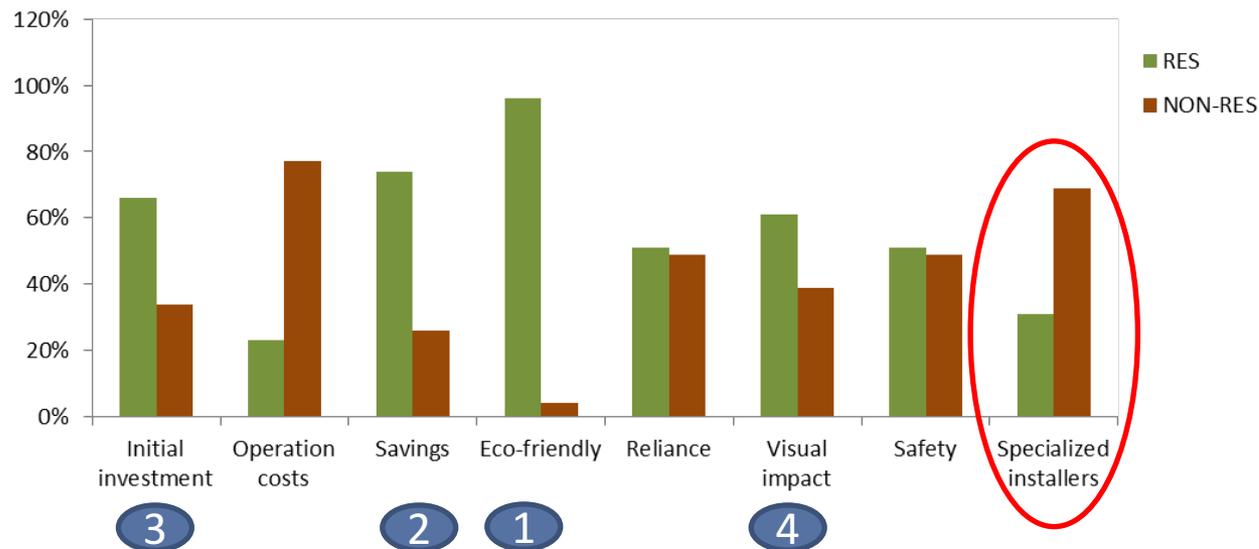
## Calefacción y ACS



## Cooling



# Percepción sobre las renovables

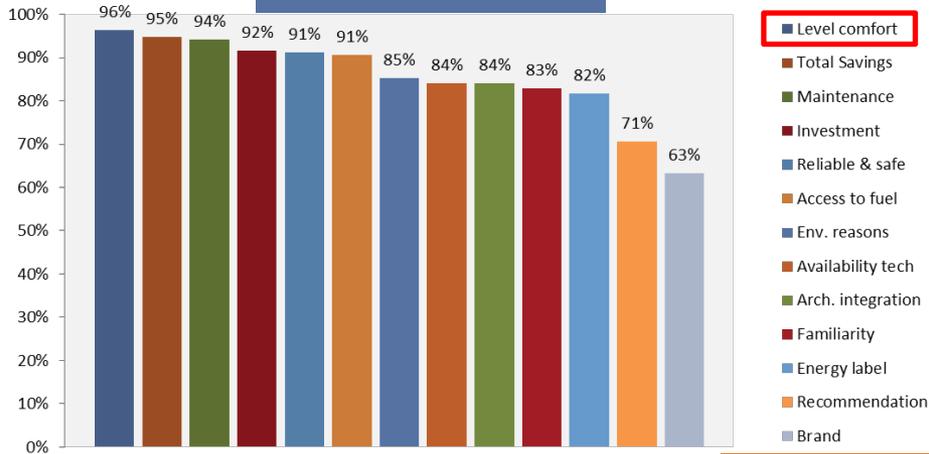


- No se aprecia una clara influencia de las características de la muestra (género, edad, etc) en la percepción de las tecnologías renovables.
- El coste de operación lo consideran mayor para las renovables que la media los mayores de 60 años y aquellos que viven en zonas rurales.

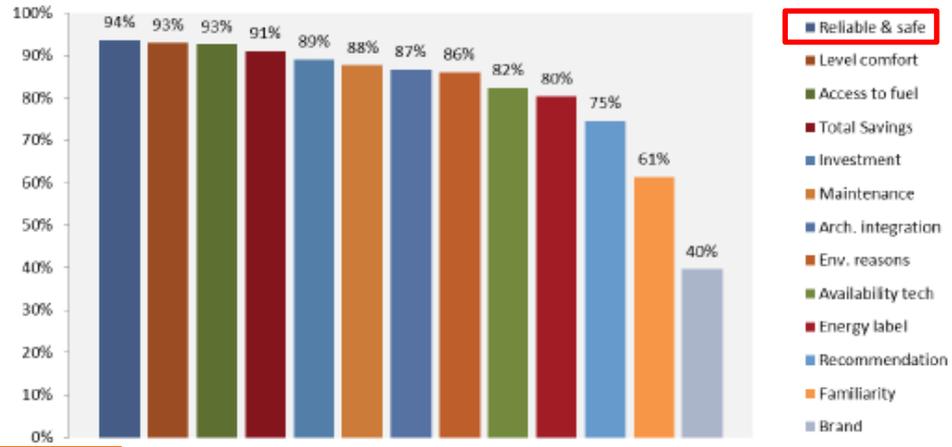


# FACTORES CLAVE DE DECISIÓN

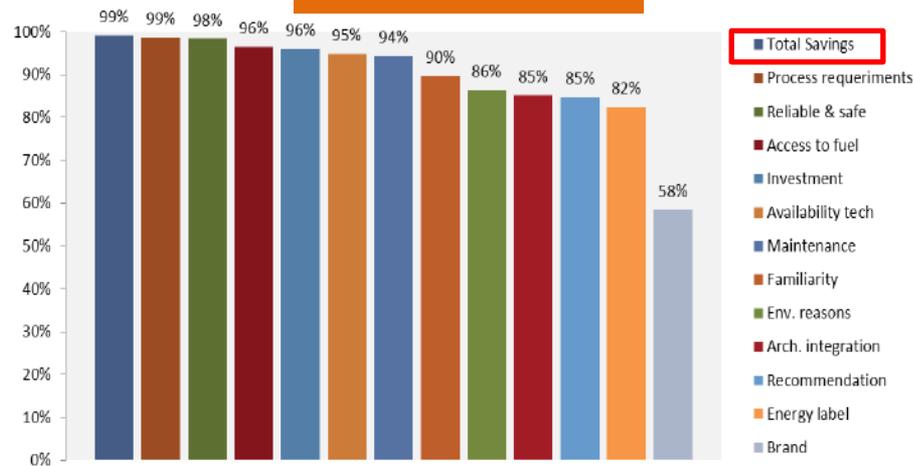
## Residencial



## No-residencial



## Industrial



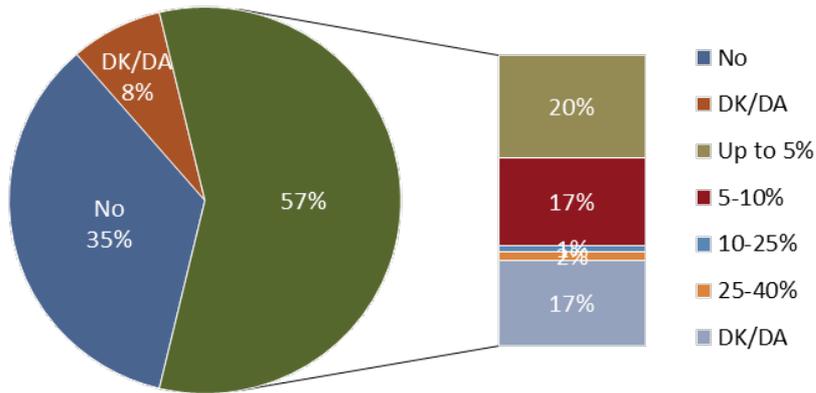
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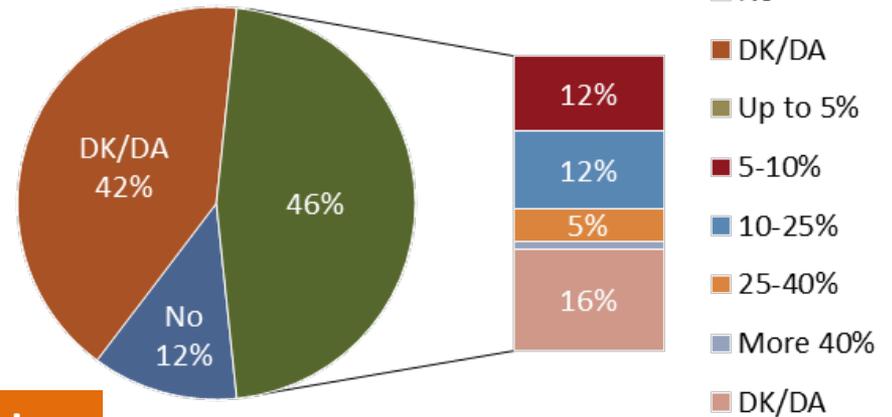
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# DISPONIBILIDAD A PAGAR MÁS

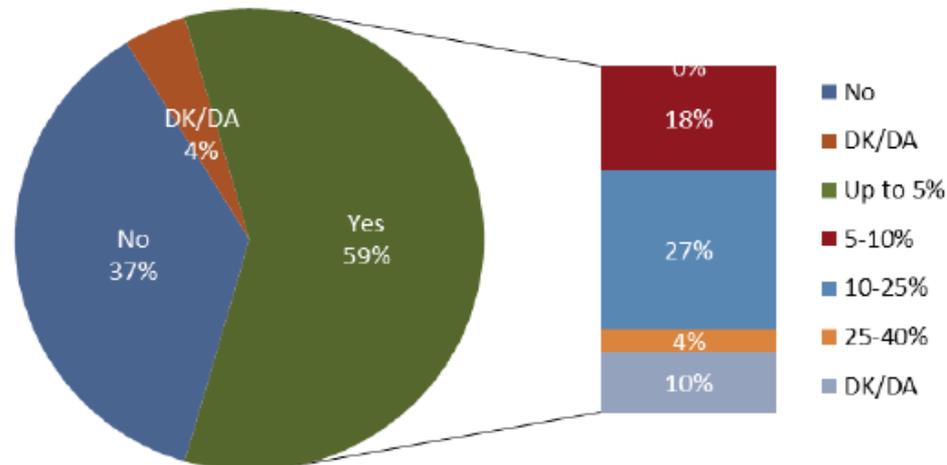
## Residencial



## No-residencial



## Industrial



# HERRAMIENTA ONLINE DATOS ENCUESTAS

FROnT  
FAIR RHC OPTIONS AND TRADE

LOG IN REGISTER

ABOUT RESULTS TOOLS FOR CONSUMERS MEDIA EVENTS

FROnT RHC > FROnT Publications

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Categories

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- Costs of Heating and Cooling
- The Heating and Cooling market: Decision making for consumers
- Capacity Building
- Events
- Infographics and interviews

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- 13 JAN Event. Promoting transparency on energy costs: heating & cooling solutions
- 22 DEC FROnT Results Oriented Final Report
- 15 DEC Choosing renewable heating and cooling systems: new online tools for consumers

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## Final Report

Executive summary

EN ES DE NL PL PT

Results oriented final report

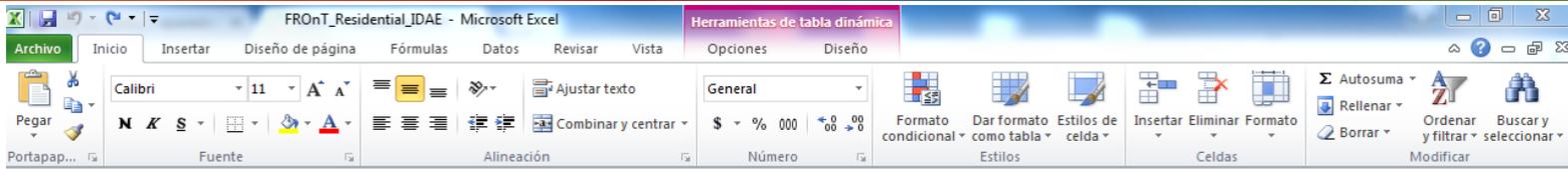
EN (only in English)

Extended executive summary

EN (only in English)

www.front-rhc.eu/library/#market





**PIVOT TABLE**  
 PLEASE CHOOSE THE FEATURES TO ANALYZE  
 (e.g. AGE, GENDER, TYPE OF BUILDING, ETC.)

**Country (Todas)**  
 Technology\_HS (Todas)  
 Technology\_DHW (Todas)  
 Technology\_CS (Todas)

**Valores**  
 Total: 4.195

**Country (Todas)**  
 Technology\_HS (Todas)  
 Technology\_DHW (Todas)  
 Technology\_CS (Todas)  
 Total interviews: 4.195

**Key decision factors**

Factor	%
Investment	75%
Total Savings	84%
Maintenance	71%
Level comfort	78%
Env. reasons	61%
Familiarity	57%
Recommendation	55%
Reliable & safe	68%
Energy label	52%
Availability tech	57%
Access to fuel	60%
Arch. integration	52%
Brand	57%
Other	1%

**Country (Todas)** All technologies included (HS, DHW & CS)

**GENDER**

	Male	Female	Male	Female	18-40	41-59	+60	Ind	18-40	41-59	+60	Ind	
Investment	75%	1.489	1.665	75%	78%	825	1.270	1.024	95	77%	80%	75%	43%
Total Savings	84%	1.685	1.856	85%	84%	987	1.400	1.106	48	84%	83%	82%	53%
Maintenance	71%	1.395	1.583	70%	72%	737	1.239	995	7	63%	73%	74%	3%
Level comfort	78%	1.538	1.726	77%	78%	807	1.342	1.094	21	83%	84%	81%	26%
Env. reasons	61%	1.168	1.374	59%	62%	631	1.047	847	17	54%	66%	63%	21%
Familiarity	57%	1.091	1.311	55%	60%	595	1.006	796	5	51%	63%	53%	6%
Recommendation	55%	1.036	1.261	52%	57%	580	928	786	3	50%	58%	58%	4%
Reliable & safe	68%	1.359	1.499	68%	68%	674	1.216	966	2	58%	76%	72%	2%
Energy label	52%	986	1.211	49%	55%	536	944	715	2	46%	59%	53%	2%
Availability tech	57%	1.124	1.247	56%	57%	555	1.026	788	2	47%	64%	58%	2%
Access to fuel	60%	1.182	1.340	59%	61%	595	1.103	821	3	51%	69%	61%	4%
Arch. integration	52%	969	1.192	49%	54%	500	947	711	3	43%	59%	53%	4%
Brand	57%	1.164	1.246	58%	57%	561	988	859	2	48%	62%	64%	2%
Other	1%	13	28	1%	1%	17	14	10		1%	1%	1%	

**AGE**

**TYPE OF BUILDING**

	Multi-family	Terraced	Detached	Others	Multi-family	Terraced	Detached	Others
Investment	75%	1.537	663	946	8%	76%	81%	70%
Total Savings	84%	1.725	694	1.113	9	85%	85%	83%
Maintenance	71%	1.444	646	878	10	71%	79%	83%
Level comfort	78%	1.551	688	1.015	10	77%	84%	76%
Env. reasons	61%	1.286	496	754	6	64%	61%	58%
Familiarity	57%	1.238	472	684	8	61%	58%	51%
Recommendation	55%	1.136	449	707	5	55%	55%	53%
Reliable & safe	68%	1.348	642	858	10	67%	78%	64%
Energy label	52%	1.116	460	615	6	55%	56%	48%
Availability tech	57%	1.199	478	685	9	59%	58%	51%
Access to fuel	60%	1.252	542	719	9	62%	66%	54%
Arch. integration	52%	1.108	459	586	8	55%	56%	44%
Brand	57%	1.078	565	758	9	53%	63%	56%
Other	1%	10	20	10	1	53%	63%	56%

**NUMBER OF BEDROOMS**

	Less 2	3	More 4	Less 2
Investment	829	1.404	921	75%
Total Savings	934	1.539	1.068	84%
Maintenance	773	1.372	833	70%
Level comfort	839	1.469	956	76%
Env. reasons	657	1.176	709	53%
Familiarity	626	1.145	631	56%
Recommendation	638	1.053	606	57%
Reliable & safe	713	1.337	808	64%
Energy label	516	1.069	612	46%
Availability tech	601	1.129	641	54%
Access to fuel	632	1.199	691	57%
Arch. integration	530	1.057	574	46%
Brand	627	1.091	692	56%
Other	12	16	13	1%

**Lista de campos de tabla dinámica**

Seleccionar campos para agregar al informe:

- No
- Country
- Range Age
- Gender
- Education
- Location
- Type\_Building
- Bedrooms
- Occupation
- Income
- Initial investment
- Savings
- Low maintenance
- Comfort
- Environmental reasons
- Familiarity with tech.
- Recommendation from friends
- Reliability & safety
- Energy labelling
- Availability of the tech
- Accessibility to the fuel

Arrastrar campos entre las áreas siguientes:

Filtro de informe:  Etiquetas de c...

Etiquetas de fila: Country, Technology\_HS, Technology\_..., Technology\_CS

Etiquetas de columna:  Valores

Valores: Total, Investment, Total Savi..., Maintenance, Level com..., Env. reas..., Familiarity, Recomme...





## Tools

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### RHC cost estimation tool

The FROnT project is currently working on a model to define the Levelised cost of heating and cooling, taking into consideration the specificities of different technologies, as well as environmental and end use variables.

This work will lead to the development of an online tool which will allow users to estimate costs, payback period, ROI, and the environmental benefits of different Heating and Cooling options.

Sign up to our mailing list to be informed when the tool is available.



### Decision making tools

Making decisions about installing and replacing parts of heating and cooling systems can be difficult, so the FROnT project is working on a number of tools to support end users when making these choices.

These tools will be based on studies of what are the most important factors for consumers, and will present information in a clear and simple way.

Discover the tools

<http://www.front-rhc.eu/front-rhc-quiz/>  
<http://www.front-rhc.eu/tools/>



# HERRAMIENTA ONLINE: ESTRUCTURA (1/4)

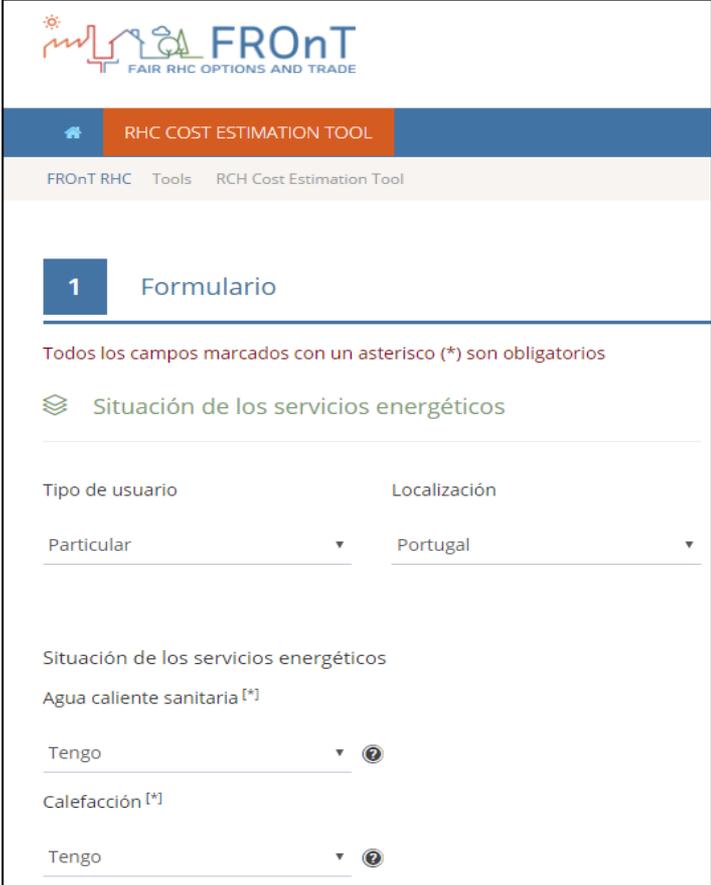
## Paso 1 de la herramienta

La herramienta online está dividida en tres secciones:

### 1. Información general

El usuario selecciona la localización a analizar, el tipo de usuario (persona o empresa) y las aplicaciones energéticas que han de ser consideradas en el estudio

Tres aplicaciones energéticas están disponibles: agua caliente sanitaria, calefacción y refrigeración (como aplicación deseada)



The screenshot displays the 'RHC COST ESTIMATION TOOL' interface. At the top, the logo for FROnT (FAIR RHC OPTIONS AND TRADE) is visible. Below the logo, a navigation bar includes 'FRONt RHC', 'Tools', and 'RCH Cost Estimation Tool'. The main content area is titled '1 Formulario' and contains a warning: 'Todos los campos marcados con un asterisco (\*) son obligatorios'. The form is divided into sections: 'Situación de los servicios energéticos', 'Tipo de usuario' (set to 'Particular'), 'Localización' (set to 'Portugal'), and 'Situación de los servicios energéticos'. Under this section, 'Agua caliente sanitaria [\*]' is set to 'Tengo' and 'Calefacción [\*]' is also set to 'Tengo'. Each dropdown menu includes a question mark icon for help.

# HERRAMIENTA ONLINE: ESTRUCTURA (2/4)

## Paso 1 de la herramienta

La herramienta online está dividida en tres secciones:

### 1. Definición del sistema actual

El usuario ha de rellenar una serie de datos relacionados con el sistema convencional, no renovable

La herramienta incluye guía y valores por defecto, cuando es relevante, para facilitar la tarea de relleno de los datos

2 Definición del sistema renovable

Definición del sistema de referencia (sistema actual)

Fuente de energía	Potencia del sistema de referencia [*]
Electricidad ▼	5 kW
Precio de la electricidad [*]	Eficiencia del sistema de referencia [?] ⓘ
0,2 EUR/kWh	80 %

# HERRAMIENTA ONLINE: ESTRUCTURA (3/4)

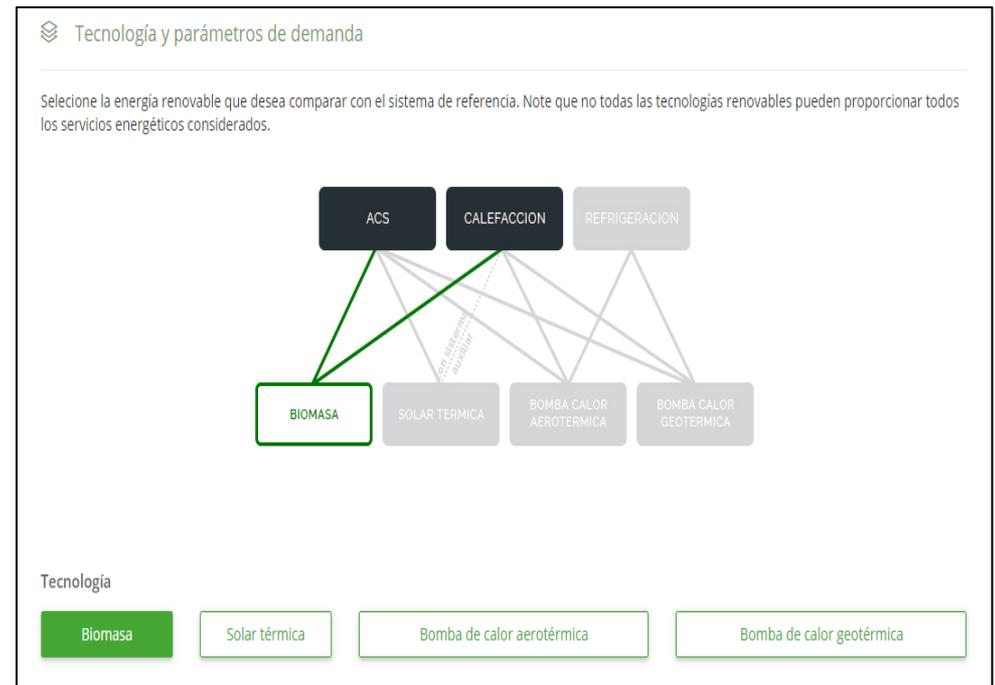
## Paso 2 de la herramienta

La herramienta online está dividida en tres secciones:

### 2. Definición del sistema renovable

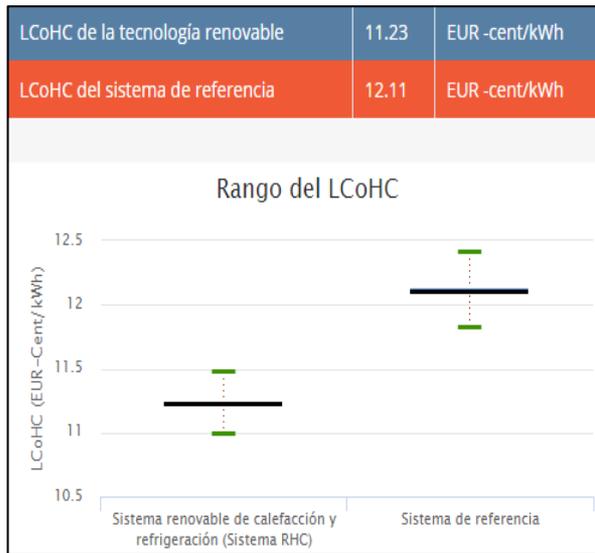
En primer lugar, el usuario elige la tecnología renovable a evaluar entre aquéllas disponibles tras la selección de las aplicaciones energéticas

A continuación, se solicita información relativa al sistema renovable a instalar. Se incluye una guía y valores por defecto cuando resulta de aplicación



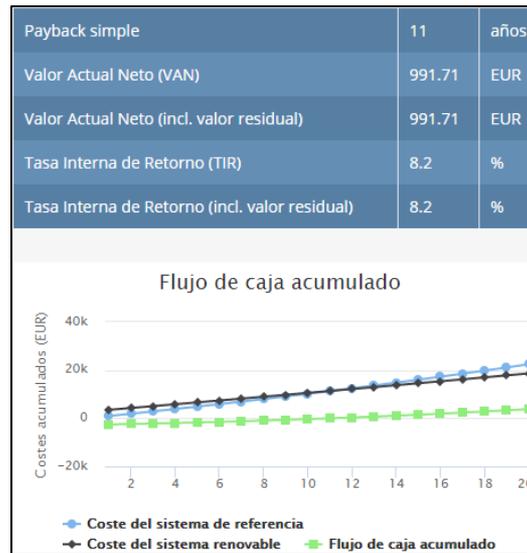
# HERRAMIENTA ONLINE: ESTRUCTURA (4/4)

La herramienta proporciona 3 tipos de resultados:



## LCoHC

- Se calculan dos LCoHC para el sistema renovable, considerando o no el valor residual
- El LCoHC del sistema renovable se calcula para establecer la comparación
- Los resultados se muestran en un gráfico que incluye un rango representando los resultados de un análisis de sensibilidad

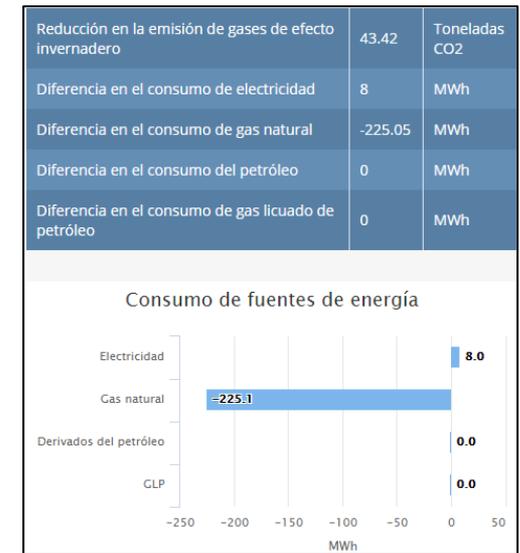


## Resultado financiero

Se calculan tres parámetros:

- Payback simple
- Valor Actual Neto (VAN)
- Tasa Interna de Retorno (TIR)

El flujo de caja acumulado, además, se muestra en el gráfico



## Resultado medioambiental

- Reducción en las emisiones de efecto invernadero
- Consumo de las fuentes de energía: un valor negativo significa una reducción en el consumo mientras que uno positivo refleja un aumento

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