

# 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



European  
Solar  
Thermal  
Industry  
Federation

ESTIF – Solar térmica



AEBIOM – Biomasa



EGEC – Geotermia



EHPA – Bomba de calor



## Agencias de la Energía



NL Agency  
Ministry of Economic Affairs

NL Agency



ADENE  
AGÊNCIA PARA A ENERGIA

ADENE



energy saving trust®

EST



IDAE

Instituto para la Diversificación  
y Ahorro de la Energía

IDAЕ



KAPE



## Expertos tecnológicos



CREARA

Análisis de mercado y  
de costes



QUERCUS

Consumidores y  
comunicación



AUSTRIAN INSTITUTE  
OF TECHNOLOGY

AIT

Análisis tecnológico y de  
costes



# ANTECEDENTES

## ¿QUÉ NECESIDADES TIENE EL SECTOR?

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

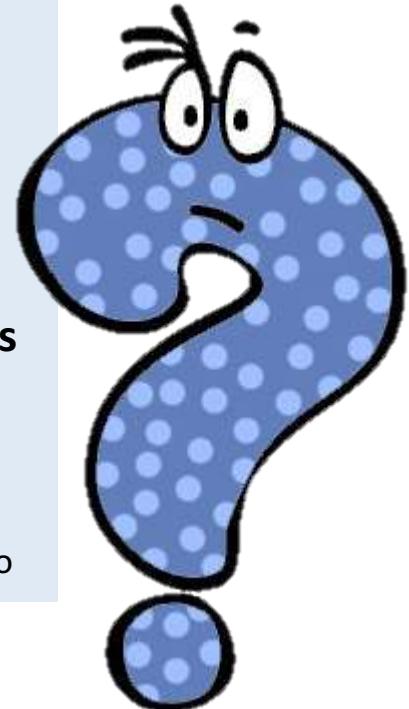
- Costes
- Potencial
- Mercado

Necesidad de **comprender al consumidor**

- Necesidades y expectativas
- Factores clave de decisión

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

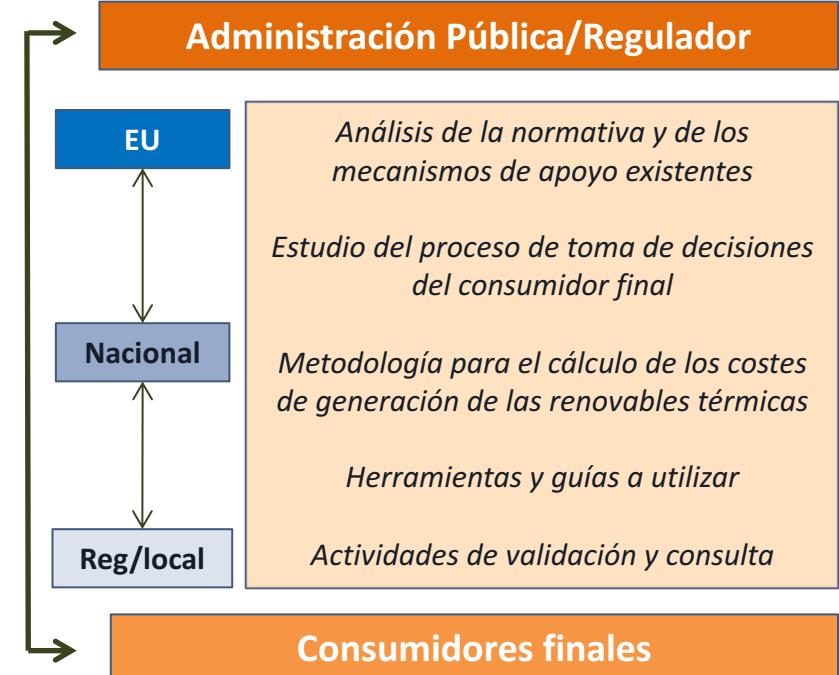
- Evaluación de los mecanismos existentes
- Identificación de factores de éxito
- Diseñar una estrategia integrada dirigida al sector renovable térmico



# 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



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FRONt RHC &gt; About FRONt

## 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?



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### Subscribe to the FRONt mailing list

 First name Last name Email[SUBSCRIBE](#)

### 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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FROnT RHC > FROnT Publications

## FROnT Publications

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This page contains all of the available and forthcoming FROnT Publications

Scroll down or use the links to the right find the publications you need.

To keep informed about updates and new publications, sign up to the FROnT mailing list.

### 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



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## 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.

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### 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

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# 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](#)

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## 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

[Download PDF](#)

ES

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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



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# 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):

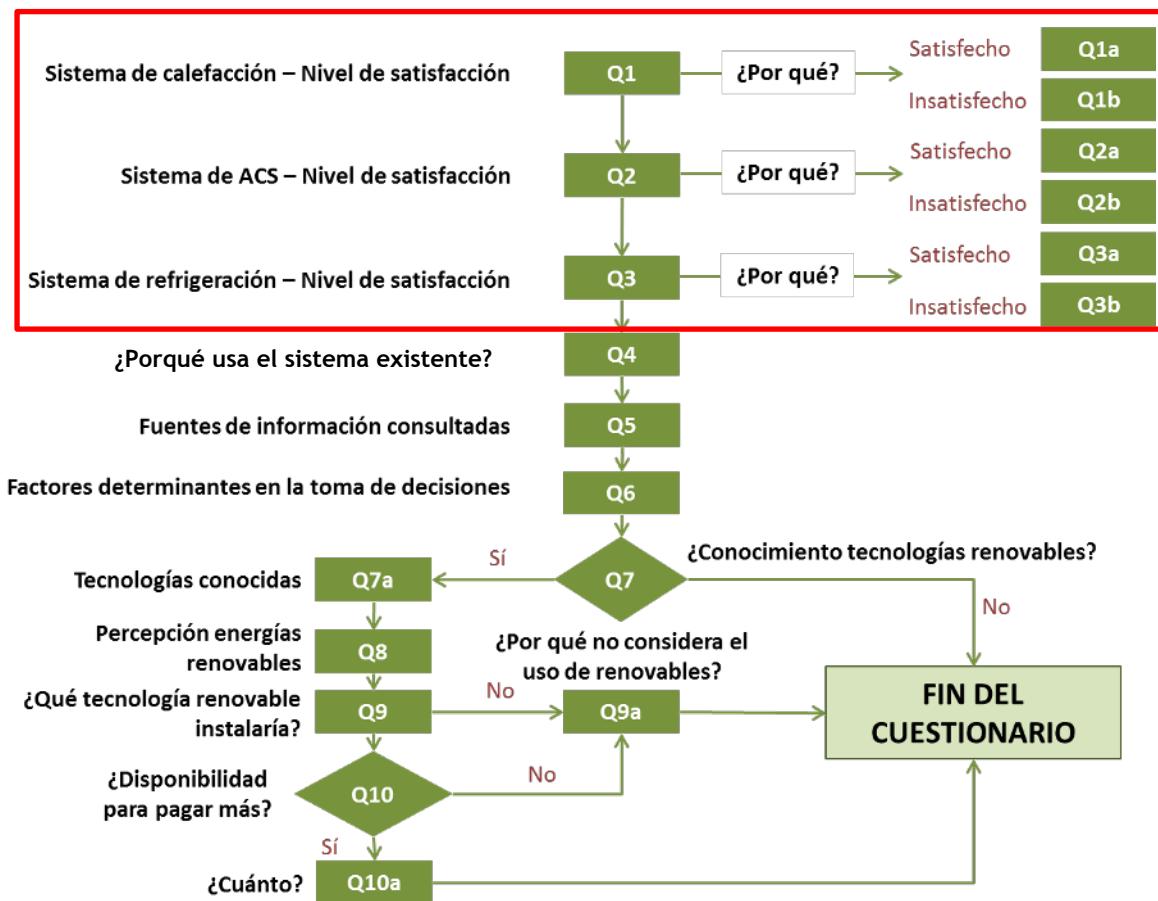
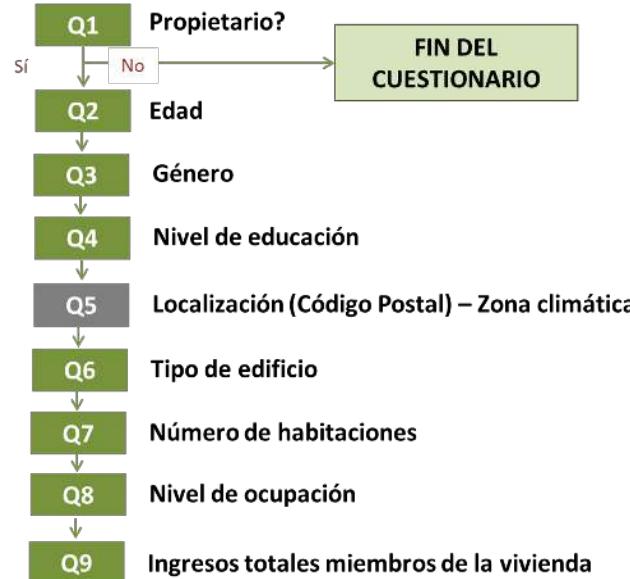


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# Encuestas: Sector residencial

## 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"/>

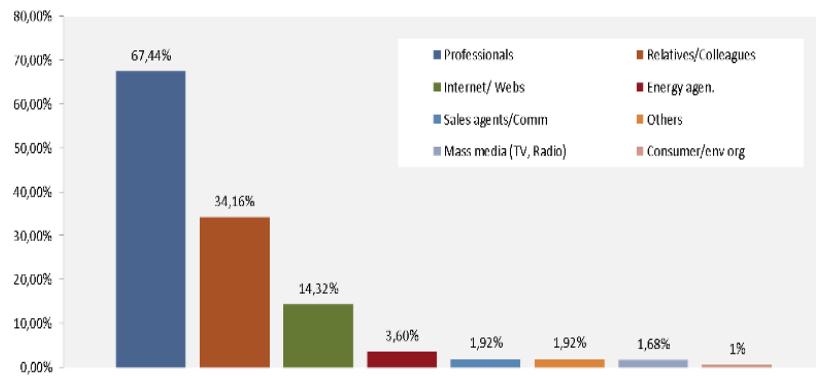
**Q9b.** ¿Por qué cree que no podría incorporar tecnologías renovables en su vivienda?

- 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

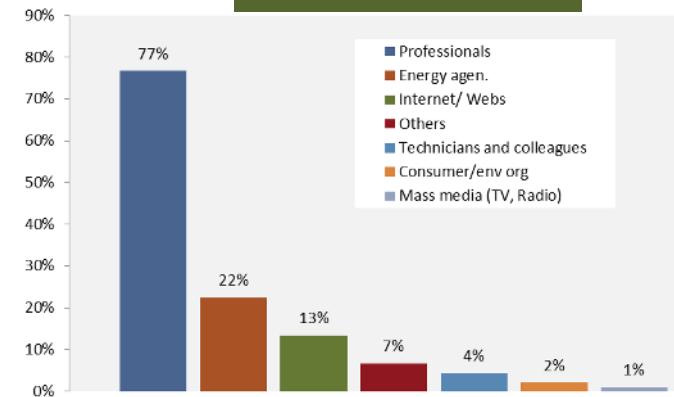


# FUENTES DE INFORMACIÓN

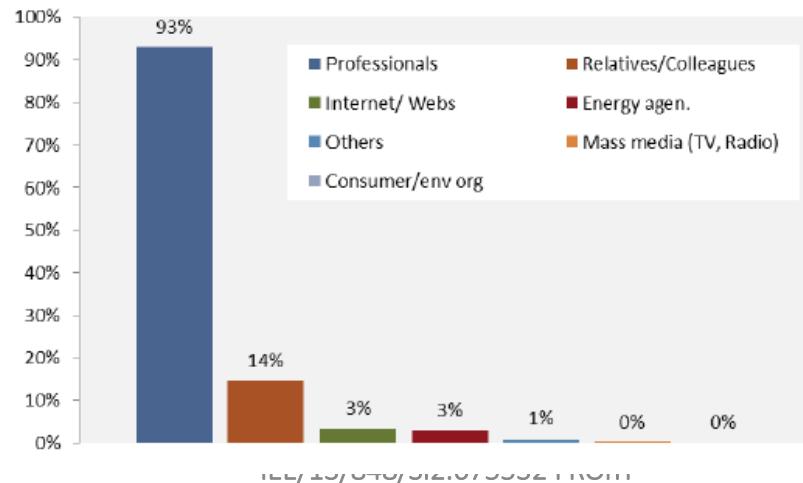
## Residencial



## No-residencial



## Industrial



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# Concienciación sobre Renovables

Residential

63%

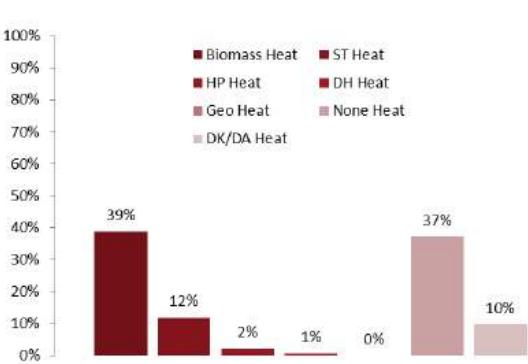
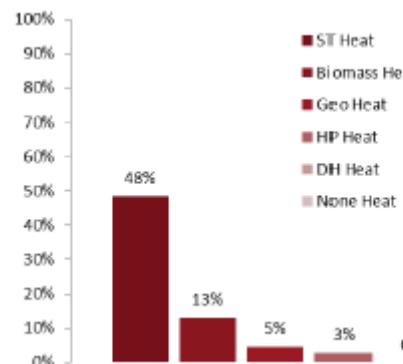
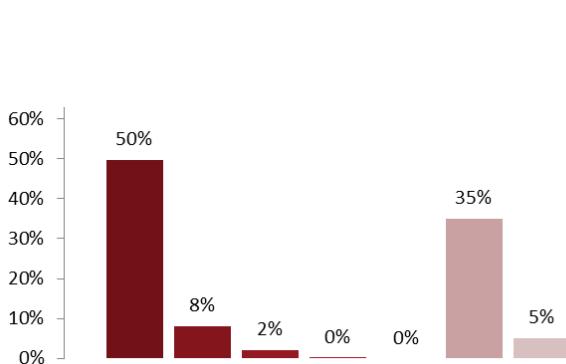
No-residencial

81%

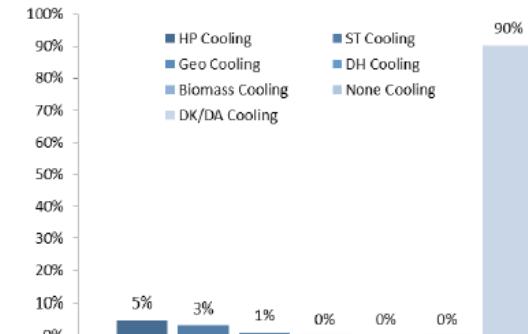
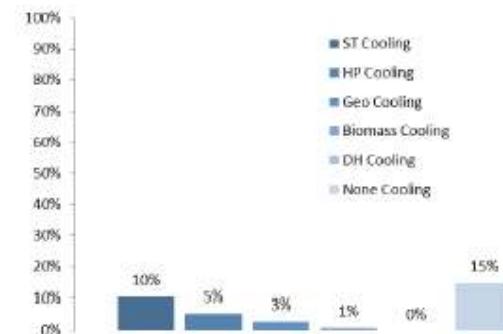
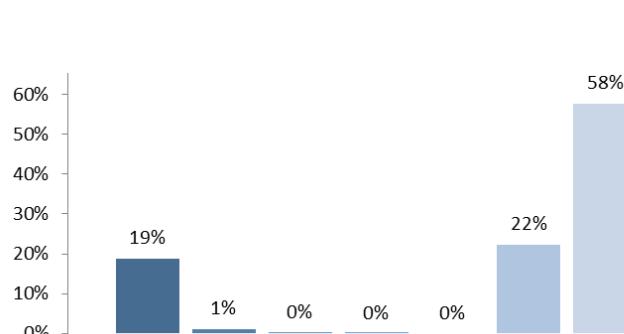
Industrial

74%

## Calefacción y ACS



## Cooling



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# Percepción sobre las renovables

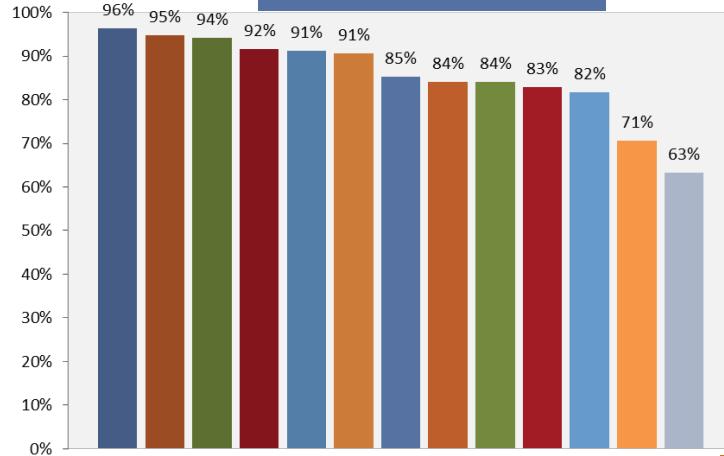


- No se aprecia una clara influencia de las características de la muestra (género, edad, etc) en la percepción de las tecnologías renovables.
- El coste de operación lo consideran mayor para las renovables que la media los mayores de 60 años y aquellos que viven en zonas rurales.

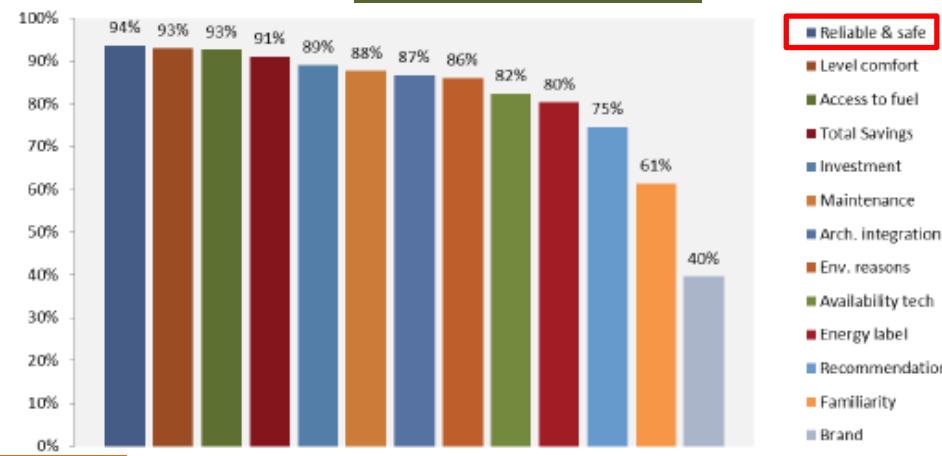


# FACTORES CLAVE DE DECISIÓN

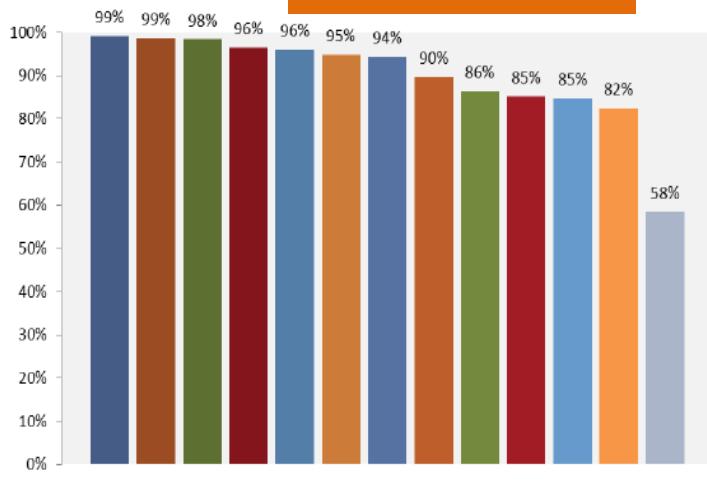
**Residential**



**No-residencial**



**Industrial**



**Total Savings**

- Process requirements
- Reliable & safe
- Access to fuel
- Investment
- Availability tech
- Maintenance
- Familiarity
- Env. reasons
- Arch. integration
- Recommendation
- Energy label
- Brand

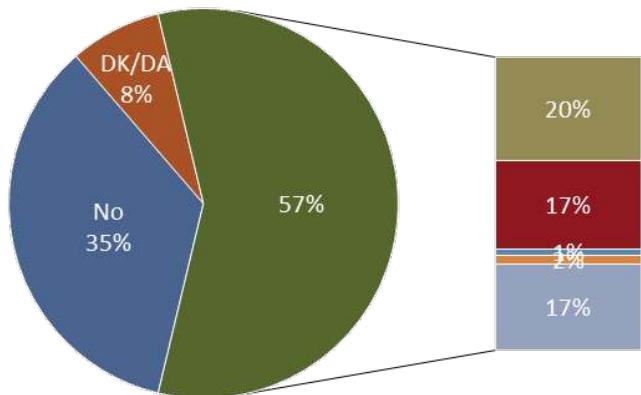


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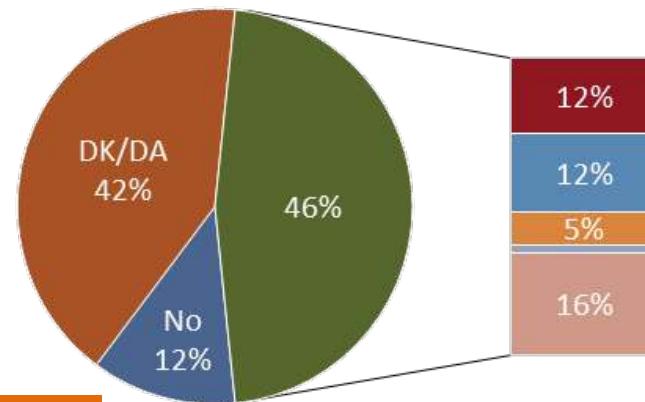
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# DISPONIBILIDAD A PAGAR MÁS

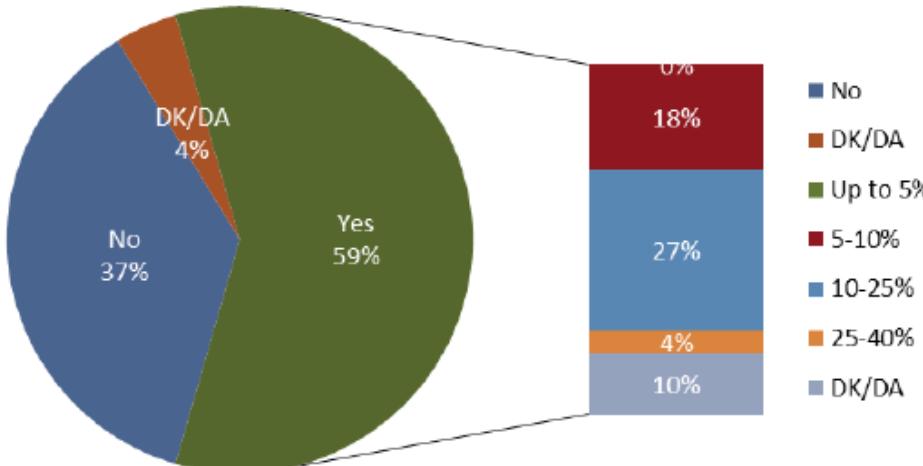
Residencial



No-residencial



Industrial



- No
- DK/DA
- Up to 5%
- 5-10%
- 10-25%
- 25-40%
- More 40%
- DK/DA



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# HERRAMIENTA ONLINE DATOS ENCUESTAS

The screenshot shows the FROnT website's navigation bar with 'RESULTS' highlighted. A dropdown menu from 'RESULTS' includes 'Policy Priorities', 'Key Success Factors for RHC Support Schemes', 'Costs of Heating and Cooling', and 'The Heating and Cooling market: Decision making for consumers'. The last item is highlighted with a red box. Below the menu, there are sections for 'Capacity Building', 'Events', and 'Infographics and interviews'. To the right, there's a sidebar for subscribing to the mailing list with fields for first name, last name, and email, and a 'SUBSCRIBE' button. At the bottom, there's a 'Latest News' section with three items: 'Event. Promoting transparency on energy costs: heating & cooling solutions' (13 JAN), 'FROnT Results Oriented Final Report' (22 DEC), and 'Choosing renewable heating and cooling systems: new online tools for consumers' (15 DEC).

**FROnT** FAIR RHC OPTIONS AND TRADE

LOG IN REGISTER

RESULTS

TOOLS FOR CONSUMERS

MEDIA

EVENTS

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The Heating and Cooling market: Decision making for consumers

Capacity Building

Events

Infographics and interviews

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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](http://www.front-rhc.eu/library/#market)

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

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Last name

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Latest News

13 JAN Event. Promoting transparency on energy costs: heating & cooling solutions  
Published in Media

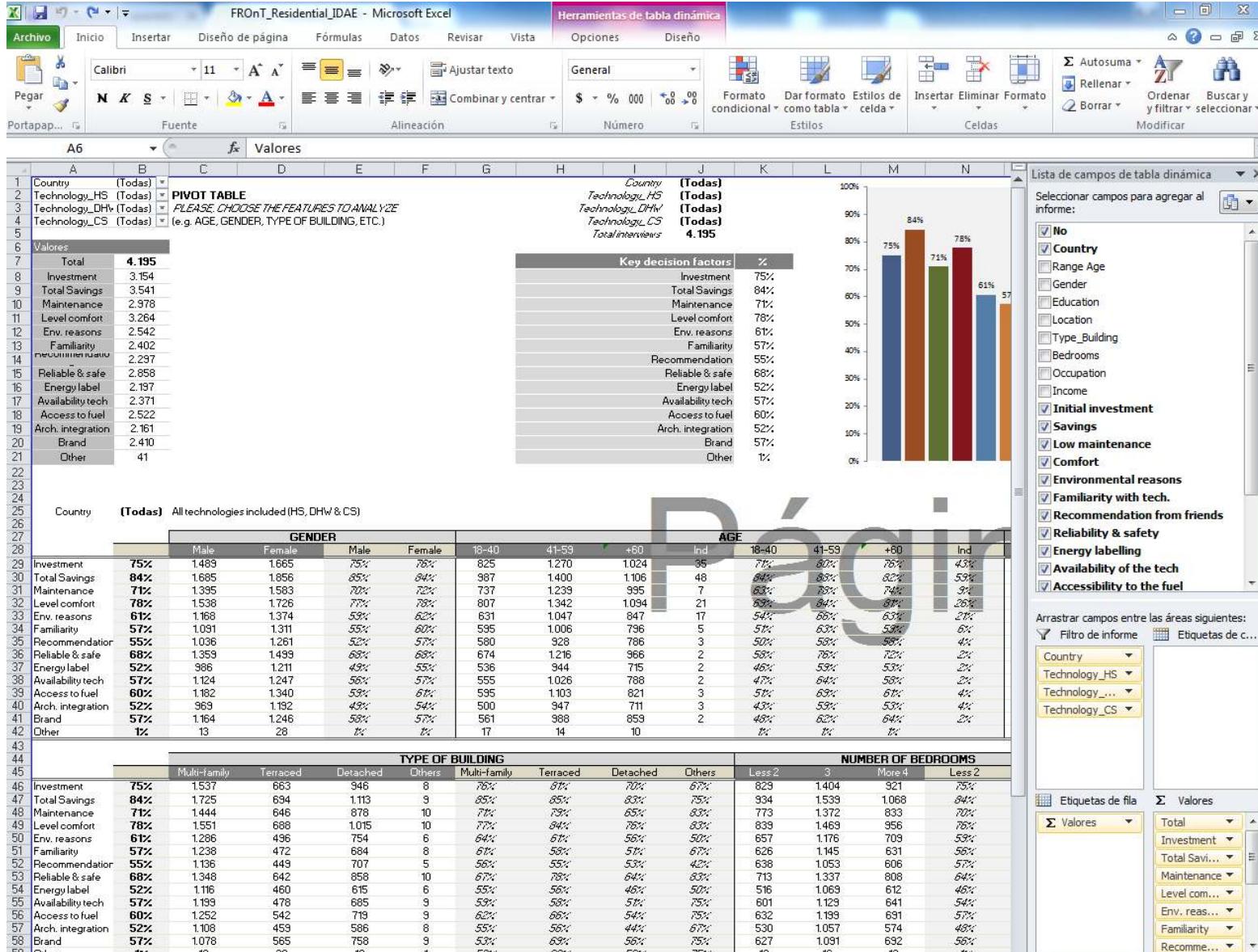
22 DEC FROnT Results Oriented Final Report  
Published in Media

15 DEC Choosing renewable heating and cooling systems: new online tools for consumers  
Published in Media



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## 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](#)



# HERRAMIENTA ONLINE: ESTRUCTURA (1/4)

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)

### Paso 1 de la herramienta

The screenshot shows the 'FROnT FAIR RHC OPTIONS AND TRADE' logo at the top left. Below it is a navigation bar with a house icon, 'RHC COST ESTIMATION TOOL' (highlighted in orange), 'FROnT RHC', 'Tools', and 'RCH Cost Estimation Tool'. The main content area has a blue header '1 Formulario'. A note below says 'Todos los campos marcados con un asterisco (\*) son obligatorios'. A section titled 'Situación de los servicios energéticos' contains dropdown menus for 'Tipo de usuario' (set to 'Particular') and 'Localización' (set to 'Portugal'). Below this, another section for 'Situación de los servicios energéticos' includes 'Agua caliente sanitaria [\*]' (set to 'Tengo') and 'Calefacción [\*]' (set to 'Tengo').

# HERRAMIENTA ONLINE: ESTRUCTURA (2/4)

La herramienta online está dividida en tres secciones:

## 1. Definición del sistema actual

El usuario ha de llenar 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

### Paso 1 de la herramienta

The screenshot shows the second step of a three-step process. At the top right, there are language and currency selection buttons: 'Español' and 'EUR'. The main title is 'Definición del sistema renovable'. Below it, a sub-section title is 'Definición del sistema de referencia (sistema actual)'. There are two input fields: 'Fuente de energía' (set to 'Electricidad') and 'Potencia del sistema de referencia [\*]' (set to '5 kW'). Further down, there are two more input fields: 'Precio de la electricidad [\*]' (set to '0,2 EUR/kWh') and 'Eficiencia del sistema de referencia [\*]' (set to '80 %'). A small circular icon with a question mark is located next to the efficiency field.

# HERRAMIENTA ONLINE: ESTRUCTURA (3/4)

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

### Paso 2 de la herramienta

เทคโนología y parámetros de demanda

Seleccione la energía renovable que desea comparar con el sistema de referencia. Note que no todas las tecnologías renovables pueden proporcionar todos los servicios energéticos considerados.

Tecnología

Biomasa      Solar térmica      Bomba de calor aerotérmica      Bomba de calor geotérmica

# HERRAMIENTA ONLINE: ESTRUCTURA (4/4)

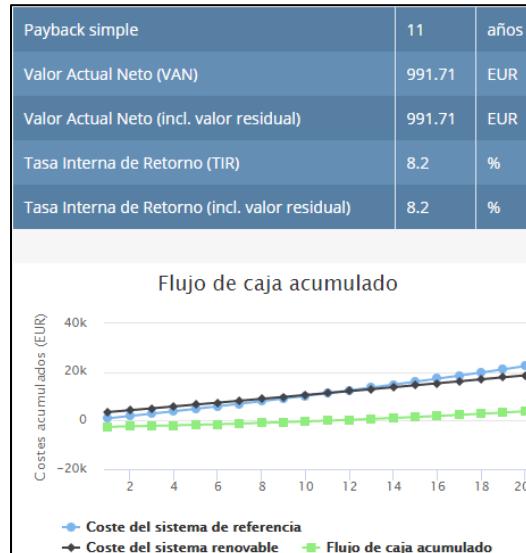
La herramienta proporciona 3 tipos de resultados:

LCoHC de la tecnología renovable	11.23	EUR -cent/kWh
LCoHC del sistema de referencia	12.11	EUR -cent/kWh
Rango del LCoHC		
Sistema renovable de calefacción y refrigeración (Sistema RHC)	11.23	11.50
Sistema de referencia	12.11	12.40



## 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

Reducción en la emisión de gases de efecto invernadero	43.42	Toneladas CO2
Diferencia en el consumo de electricidad	8	MWh
Diferencia en el consumo de gas natural	-225.05	MWh
Diferencia en el consumo del petróleo	0	MWh
Diferencia en el consumo de gas licuado de petróleo	0	MWh

Consumo de fuentes de energía

Fuente	Diferencia
Electricidad	+8.0
Gas natural	-225.1
Derivados del petróleo	0.0
GLP	0.0



## 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

# CONTACTO

Coordinador:



ESTIF – European Solar Thermal Industry Federation

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B 1050 Brussels

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