

Support to key activities of the European Technology Platform on Renewable Heating and Cooling

Executive summary

PP-2041/2014

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(as a subcontractor)

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EXECUTIVE SUMMARY

Each year, almost 50% of the final energy consumed in Europe is used for heating or cooling for residential, tertiary or industrial purposes. The vast majority (around 80%) of this energy demand is met by the combustion of fossil fuels such as oil, gas and coal. Not only does this have a substantial impact on the environment, including in terms of greenhouse gas emissions, it also raises concerns about security of supply. Today, the social, environmental and economic costs of climate change highlight the urgency of moving towards a new and more sustainable energy scenario. In light of the Paris Agreement targets, the Montreal Protocol, the Kigali Amendment and the European Union's own climate and energy targets, the heating and cooling sector clearly has a central role to play in successfully addressing the challenge posed by climate change.

The European Technology and Innovation Platform on Renewable Heating and Cooling (RHC-ETIP) was officially launched in 2010 and currently brings together more than 700 stakeholders. Its members come from industry, research and public-sector backgrounds and it represents stakeholders from the biomass, geothermal, solar thermal, heat pump, district heating and cooling, thermal storage and hybrid system sectors throughout Europe. As such, it is a unique ETIP covering all existing renewable heating and cooling technologies.

The RHC-ETIP has been instrumental in raising the profile of the renewable heating and cooling sector. It has achieved this by publishing a set of common documents that lay out the sector's strategic research priorities, as well as by devising a number of project ideas geared towards increasing the share of renewable energy in the heating and cooling sector:

- [Common Vision for the Renewable Heating and Cooling Sector in Europe: 2020 – 2030 – 2050](#)
- [Strategic Research and Innovation Agenda](#)
- [Common Implementation Roadmap](#)

In 2015, a tender financed by the European Commission was awarded to the associations making up the secretariat of the RHC-ETIP (EUREC, Bioenergy Europe for the biomass sector, EGEN for the geothermal sector, EHPA for the heat pump sector, and SolarHeatEurope for the solar thermal sector¹), along with EURAC (which led the analysis of the heating and cooling industry) and VITO and Fraunhofer-ISE (which led the analysis of heating and cooling consumers).

The tender ran from November 2015 until March 2019. Over this period, the partners focused their activities on three main pillars:

- **Technology:** *analysis of the status of the RHC technology roadmaps in terms of reviewing progress on the targets set by the identified Key Performance Indicators (KPIs).*
- **Industry:** *analysis of the renewable heating and cooling industry and the fossil fuel industry.*
- **Consumers:** *analysis of the barriers and opportunities associated with the adoption of RHC technologies by consumers.*

¹ EuroHeat and Power has officially been part of the RHC-ETIP secretariat since December 2018. However, it was not a partner of tender PP2041/2014, although it did support VITO with the section on district heating and cooling.

Analysis of the KPIs revealed the following:

- *EU companies are spearheading technology innovation in the renewable heating and cooling sector. However, there is strong competition from the United States (biomass, heat pumps, geothermal) and India (considerable potential for commercial and industrial applications) and competition from China is increasing, especially given the significant opportunities for coal substitution.*
- *There is a general need to revise the KPIs to make them more suited to comparing the status of technology improvements over the years and gaining an insight into international competition. In general:*
 - *The KPIs used in different sectors must be more consistent (e.g. some common KPIs).*
 - *Given the complexity of the RHC sector and its technologies, clear parameters must be set for transparent evaluation of potential technology improvements to be possible.*
 - *The selected KPIs must allow evaluation within a short timeframe (four to five years).*

The aim of the industry analysis was threefold:

- *To provide qualitative information on the structure of the heating and cooling industry in terms of the technologies marketed, the energy sources used, and the types of companies involved.*
- *To deliver quantitative data on installations and sales of systems using the different technologies available on the market, and on turnover and employment in that market.*
- *To analyse the factors triggering or hindering each technology's market growth and gauge the intensity of competition experienced by companies on the international market.*

A SWOT analysis was also conducted for the RHC sector, highlighting the following:

- **Overall strengths:** *The market readiness level of RHC technologies is generally high; RHC technologies have a high level of scalability; the RHC industry is mainly based in the EU; the RHC industry is cross-cutting, covering multiple technologies; the RHC sector is composed of technologies with considerable potential for emissions reduction.*
- **Overall weaknesses:** *The initial investment cost of RHC technologies is still higher than that of fossil-fuel solutions; RHC technologies are still viewed as a relatively high investment risk; there is a lack of clear procedures for installers; legislation in the area differs from one country to another.*
- **Overall opportunities:** *The new legislative framework is set to be implemented fully at European level.*
- **Overall threats:** *RHC technologies and their potential are not widely known; fossil-fuel technologies still exist; there is stiff competition from electricity-based renewable energy solutions.*

The analysis of heating and cooling consumers (with a focus on residential consumers) set out to:

- *Develop a qualitative understanding of the barriers and opportunities associated with consumers' adoption of RHC technologies.*

- *Derive policy recommendations.*

The main barriers to the adoption of RHC technologies are as follows:

- *Consumers have little time to take an investment decision following the breakdown of their existing heating and cooling systems.*
- *RHC technologies are still not able to compete with the incumbent heating and cooling solutions due to high upfront investment costs, despite financial support.*
- *Installers are important gatekeepers and are able to influence investors' decisions, but they are not RHC ambassadors yet.*

The EAST (Easy, Attractive, Social, Timely) model has been applied to the analysis of RHC consumers with a view to identifying actions that are Easy to apply, Attractive, Socially-accepted, and Timely. Twenty-seven concrete recommendations have been drafted on the basis of the analysis: there is no silver bullet to foster the uptake of RHC solutions.

Finally, the following recommendations should be implemented to support the further development of the RHC industry at EU and international level:

- *Fossil fuel subsidies must be phased out urgently.*
- *Solutions must be found to the challenge of financing the consumer's upfront investment (for instance, measures to boost energy efficiency and implement renewable energy technologies should be taken simultaneously, especially in the building sector).*
- *Existing legislation must be implemented and a new regulatory framework developed to ensure the integration of RHC technologies in buildings, industry and smart thermal grids (strengthening existing measures beyond 2020 to encourage the renovation of the existing building stock).*
- *2030 governance: in the absence of binding national energy targets, a strong governance system for renewables and energy efficiency is needed. This must ensure consistency and comparability of Member States' policies and must also include indicators for tracking building renovation rates and the introduction of heating and cooling technologies.*
- *Fostering research, development and innovation: more attention should be paid to the energy system as a whole, to the development of smart thermal grids and to new industrial processes capable of decarbonising the sectors not covered by the Emissions Trading System. It is important to highlight that investments in research and innovation for renewable heating and cooling should be considered separately from investments focused on electricity. While sector coupling may act as an enabler to connect these two areas (plus transport), they should be addressed separately and in a more targeted manner. New funding programmes, such as Horizon Europe, should take a more balanced approach covering both research (lower TRLs) and practical demonstrations (higher TRLs) and should promote solutions incorporating multiple RHC technologies.*

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