Renewable Heating & Cooling

European Technology and Innovation Platform

Update of RHC-ETIP expert information material

Deliverable 2.3

WP2 – T2.2

Grant agreement: 825998

From December 2018 to November 2021

Prepared by: Andrej Mišech (EUREC)

Date: 30/11/2020

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 825998.

DISCLAIMER OF WARRANTIES

"This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 825998".

This document has been prepared by RHC ETIP project partners as an account of work carried out within the framework of the EC-GA contract no 825998.

Neither Project Coordinator, nor any signatory party of RHC ETIP Project Consortium Agreement, nor any person acting on behalf of any of them:

(a) makes any warranty or representation whatsoever, expressed or implied,

(i). with respect to the use of any information, apparatus, method, process, or similar item disclosed in this document, including merchantability and fitness for a particular purpose, or

(ii). that such use does not infringe on or interfere with privately owned rights, including any party's intellectual property, or

(iii). that this document is suitable to any particular user's circumstance; or

(b) assumes responsibility for any damages or other liability whatsoever (including any consequential damages, even if the Project Coordinator or any representative of a signatory party of the RHC ETIP Project Consortium Agreement has been informed of the possibility of such damages) resulting from your selection or use of this document or any information, apparatus, method, process, or similar item disclosed in this document.

ABBREVIATIONS

RHC ETIP: European Technology and Innovation Platform on Renewable Heating and Cooling

RHC: Renewable heating and cooling

SRIA: Strategic Research and Innovation Agenda

HWGs: Horizontal Working Groups

TPs: Technology Panels

PARTNERS

EUREC: the Association of European Renewable Energy Research Centres

BE: Bioenergy Europe (formerly known as AEBIOM)

EGEC: the European Geothermal Energy Council

EHP: Euroheat &Power

SHE: Solar Heat Europe (formerly known as ESTIF)

EHPA: European Heat Pump Association

TABLE OF CONTENTS

1. Introduction

Deliverable 2.3 “Update of RHC-ETIP expert information material” presents the RHC-ETIP publication “Strategic Research and Innovation Agenda for Climate-neutral Heating and Cooling in Europe” (generally known as the RHC-ETIP Strategic Research and Innovation Agenda (SRIA)), and explains the methodology and the process followed to draft and finalise the document. The SRIA was developed between November 2019 and October 2020 with contributions from RHC-ETIP Horizontal Working Groups´ and Technology Panels´ experts and the RHC-ETIP secretariat. Other national and European stakeholders, who are not members have been involved to review the content and the main messages of the SRIA. Chapter 2 provides details on the key actors involved, the methodology adopted, the main steps of the process. Chapter 3 gives an overview of the structure of the document and the link to the publication.

2. Process and methodology

2.1 Actors

The key actors involved in the process were:

- **Horizontal Working Groups (HWGs)**: as presented in Deliverable 2.1 "Report on the kick-off meetings of the Horizontal Working Groups", in January 2019 four new working groups were created by the RHC-ETIP Board next to the Technology Panels (TPs). Their mission has been to address and identified challenges, opportunities and development potential of RHC technologies in 4 different areas of interest, respectively individual buildings (not connected to the gas grid or H&C networks), industries, districts and cities. These technology-related HWGs played a central role in the development of the SRIA by preparing key R&I priorities for each Horizontal sector, together with transversal priorities, which, combined, provided the basis for drafting of the final document. The key R&I priorities included the state-of-the-art of the technologies in the respective sector, their potential for further development, including role in the energy system and the issues to tackle to achieve fully decarbonise heating and cooling (H&C), desired end-result and their potential for cooperation with third countries.
- **SRIA Working Group**: a temporary working group, called SRIA Working Group, has naturally evolved from the Vision Working Group and was set-up by the RHC-ETIP Board in November 2019 to review the contribution from the HWGs, overview and coordinate the drafting of the SRIA and ensure consistency throughout the document. This WG, composed of the chairs of all HWGs and the Chairs of Technology Panels and coordinated by EUREC, worked in parallel with the technical HWGs and played a strategic role to fine-tuning the final SRIA.
- **RHC-ETIP Secretariat**: the secretariat provided support to the HWGs and the SRIA WG to organise and manage meetings and conference call, as well as to draft and edit the draft and final R&I priorities. Each partner organisation of the secretariat has continued with its previously assigned role:
    - EUREC: support to the SRIA WG and editing of the SRIA;
    - Bioenergy Europe: support to Buildings HWG;
    - EHP: support to Districts HWG;
    - EGEC: support to Cities HWG;
    - SHE: support to Industries HWG;
    - EHPA: providing further support to the SRIA WG
- **Technology Panels (TPs)**: Technology Panels contributed to the SRIA by reviewing and updating the R&I priorities and their potential for development of all RHC technologies. The RHC-ETIP Board has decided to not include TPs´ technology-specific contributions, which would cause the document to be overly long and was possible due to tight dealine. It was agreed that TPs will update their individual technology-specific SRIAs and these will be later added and referenced in the SRIA.

- **RHC-ETIP Members**: all RHC-ETIP members were offered the possibility to contribute to the SRIA by reviewing the final draft in the framework of an open consultation. The feedback received was consolidated in the final document.
- **External stakeholders**: these external stakeholders include national and European organisations who have an interest in H&C but are not directly represented in the RHC ETIP. External stakeholder included in the database of relevant stakeholders (see Deliverable 3.2) provided feedback on the final document through a dedicated webinar organised by the Secretariat in September 2020.

2.2 Process

In October 2019, all HWGs, supported by the Secretariat, kicked off their preparation of the SRIA based on the agreed guidelines, scope and provisional outline for the preparation R&I priorities. Between November 2019 and mid-March 2020, each HWG conducted internal brainstorming to draft R&I priorities. Each HWG held several physical or online meetings (2-4). The Secretariat, via its partners supporting HWGs, played a strategic role providing logistic support, clarifying the scope of the activity, giving direction, reviewing the draft R&I priorities and liaising with the Board and the SRIA WG. The Secretariat had organised two internal coordination meetings In January and February 2020 to discuss and prepare the overall outline of the document. Two different options for the overall structure of the SRIA have been discussed: 1. One focused on priorities; and 2. One focused on HWGs (selected option). The overall structure of the SRIA document has been approved by the Board on 3 March. It was decided that the document will be structured according to the HWGs, with separate chapter on transversal topics.

From mid-March onwards, the coordination calls have been organised involving the SRIA HWG on a monthly basis to review progress and discuss any issues. Between mid-March and May 2020, all HWGs delivered their draft contributions for the R&I priorities. In parallel, EUREC, in its position of scientific coordinator, supported by EHPA, analysed all submitted inputs and drafted the first version of the SRIA, which was periodically reviewed by the Secretariat and by the SRIA HWG. The 1st draft was shared with the Project Officer in May 2020, who provided feedback and comments. These were discussed within the SRIA HWG and it was decided that a dedicated small working group will work on preparing a chapter identifying the position of RHC within the broader context of European clean energy transition framework. This chapter aimed to provide a simpler message showing the linkage between our RHC SRIA and the EU clean energy transition strategy.

Input from TPs was foreseen to be collected starting from mid-March, when first draft is available until end of April. However, during the Board meeting in June 2020, it was decided to postpone the inclusion of TP´s technology-specific inputs due to time constraints.

A second draft was prepared by the end of July and published on the RHC-ETIP website for consultation in August 2020. The members of the RHC-ETIP were informed of the opening of the consultation

through several emails, posts and advertisements on social networks and other platforms. The consultation was open until 7 September 2020. The draft version of the SRIA was presented by the Secretariat and HWG representatives to external stakeholder in a webinar organised on 15 September 2020. 61 participants (out of 90 registered) form national and European associations participated in the webinar and provided additional feedback (see in annex II the list of participants). Comments and suggestions collected during the consultation and stakeholder webinar were thoroughly analysed by EUREC, discussed within the SRIA-HWG and included in the third version of the document.

The final version of SRIA was approved by the RHC-ETIP Board on 1 October 2020. In the following weeks the final text was thoroughly proof-read to eliminate all typos and mistakes, while EUREC worked with the graphic designer to define the final layout of the publication. The SRIA was published on the RHC-ETIP website on 15 October 2020 to coincide with its official presentation at the RHC-ETIP annual conference – 100% RHC EVENT 2020 (online) on 15 October 2020.

2.3 Methodology

Drafting the SRIA was a long process characterised by multiple interactions. Several stakeholders were involved in the process at different stages, in order to ensure the development of a broadly acceptable R&I priorities for all the sector. A prominent role was assigned to the technology experts organised in the HWGs. Their input was used to set the content of the SRIA and to develop the key messages. Know-how, expertise and ideas from the platform members and external organisation was beneficial to verify, confirm and sharpen the conclusions of the HWGs.

The Strategic Research and Innovation Agenda aimed to include a list of updated research and innovation priorities per HWG (buildings, districts, cities, industries) with a view to reaching 100% RHC by 2050. Generally speaking, the R&I priorities were not meant to be technology-specific, but rather look at challenges and opportunities with a systemic perspective. In other terms, R&I priorities were to be developed with a market pull approach (as opposed to a research push approach), bearing in mind that the ultimate goal is to foster the further uptake of RHC technologies in buildings, districts, cities and industries. This represented a significant change as compared to the work done by the technology panels in the past years.

To develop the specific R&I priorities contributions, each HWG adopted the approach that better fitted their internal governance (e.g. brainstorming session, mind mapping, issue groups) in line with the guidelines and the timeline provided by the secretariat. Each R&I priority was to include a description of the current situation and of the challenges to tackle, as well as a general presentation of the R&I activities needed and of the expected results.

For the fine-tuning of the document an expert review approach was adopted (similarly to the preparation of the previous strategic document), asking relevant stakeholders to provide their comments directly on the draft text. Overall, the secretariat tried as much as possible to include in the final version of the SRIA the feedback received. When contrasting positions emerged, the issues were addressed with the SRIA WG in order to find a balanced synthesis.

3. The Strategic Research and Innovation Agenda for Climate-neutral Heating and Cooling in Europe

3.1 Structure of the SRIA

The SRIA is organised in eight chapters, which partly reproduce the division in areas of interest created with the HWGs. It was previosuly agreed among the Secretariat and the Board that putting the focus on market segments and end users allows to better envision the contribution of RHC technologies in a renewables-based energy system. Moreover, focusing on market uptakes and the needs of end users foster the emergence of a multidisciplinary approach and unveils synergies between different technologies, which is hardly the case when looking at each technology in isolation.

The document develops and presents technology and innovation priorities for reaching 100% RHC in the EU by 2050. The first chapter broadly introduces the document, its objectives, difference with the previous RHC-SRIA[1], as well as reminding of the main political message from the RHC-ETIP Vision[2]. Chapter 2 positions the RHC sectors within the broader challenge of achieving carbon net-zero EU by 2050. Transversal priorities cutting across the horizontal division of H&C sectors are outlined in chapter 3. Next, chapters 4 to 7 present technology and innovation priorities of the horizontal working groups, each describing state-of-the-art of the deployment environment, scope of the priorities and the expected outcome/impact. Priorities from the previous SRIA are flagged to allow similarities and areas requiring continuous R&I effort to be spotted. Moreover, for some priorities, any cooperation needed with third countries is described as well. Chapter 8 offers concluding remarks and summary. Finally, Annex I shows R&I targets for the 4 horizontal working groups, while Annex II presents methodology and assumptions behind calculations for the graphs presented in Chapter 2.

3.2 Accessibility

The full text of the SRIA is publicly available on the RHC ETIP website at the following link: https://www.rhc-platform.org/content/uploads/2020/10/RHC-ETIP-SRIA-2020-WEB.pdf

[1] The European Technology and Innovation Platform on Renewable Heating and Cooling (RHC-ETIP), 2013. https://www.rhc-platform.org/content/uploads/2020/06/gp_eudor_WEB_LDNA26009ENC_002-1.pdf.en_-1.pdf

[2] The European Technology and Innovation Platform on Renewable Heating and Cooling (RHC-ETIP), 2019. https://www.rhc-platform.org/content/uploads/2019/10/RHC-VISION-2050-WEB.pdf

It was decided that paper copies of the SRIA will only be produced at later stage, as there are no physical meetings or events being organised in the foreseeable future. Once available, paper copies of the SRIA may be requested from the RHC-ETIP Secretariat by contacting info@rhc-platform.org

3.3 Visibility and dissemination

The RHC-ETIP Secretariat is strongly committed to disseminate the SRIA. The SRIA was officially presented at the RHC-ETIP annual conference – 100% RHC EVENT 2020 (online) on 15 October 2020. Moreover, the publication of the document was disseminated among platform members and external national and European stakeholders, as well as through social networks and press releases.

Annex I – Template for the priorities provided by the HWGs

R&I topic

Repeat this table for all R&I topics

TITLE	*Summarise in one line the object of the R&I topic*
CHALLENGE TO BE TACKLED	*Describe the issue/s to be addressed by the research action*
SCOPE	*Describe what the R&I action should aim to*
RESULTS	*Describe the expected results in qualitative and/or quantitative terms*
COPERATION WITH THIRD COUNTRIES	*Specify if cooperation with third countries (non-EU) is relevant for the topic. If yes, specify which country/ies.*

Tips:

- *Since the ultimate goal is fostering market uptake of RHC technologies, define R&I topics based on a market-push approach (rather than research-pull). This implies defining R&I topics who contribute to enhance attractivity and acceptance of RHC solutions. Performance and cost-effectiveness should not be the only drivers: easiness of use, reliability, integration in the built environment etc., are just some examples of aspects to consider.*
- *Do not include too many topics; focus on the most relevant ones.*

- *Do not be too prescriptive. Leave the topic open to allow a set of alternatives solutions.*
- *It is important to ensure that all relevant experts are included in the HWGs, covering all technologies and areas of expertise. While defining R&I topics consider also issues from the system perspective, as well as technology-specific issues.*

Annex II – List of participants to the webinar with external stakeholders

Last Name	First Name	Organisation	Country
Abrecht	Stefan	Solar-Experience GmbH	Germany
Baeten	Rutger	VITO	Belgium
Barateau	Alex	SYTEC15	France
Barceló Ruescas	Francisco	Instituto de Ingeniería Energética - UPV	Spain
Bayraktar	Kemal	REHVA	Belgium
Blangé	Jan Jette	Canopus Drilling Solutions Geothermal BV	The Netherlands
Boutaghriout	Badreddine	Solar Heat for Industrial Processes	Algeria
Bozzini	Giorgia	CCSA	Belgium
Calderoni	Marco	R2M Solution	Italy
Carvalho	Maria João	Unidade de Recursos Minerais e Geofísica, Laboratório/ LNEG	Portugal
Cazorla-Marín	Antonio	Universitat Politècnica de València (UPV)	Spain
Coelho	Luis	Polytechnic Institute of Setubal	Portugal
Concari	Edoardo	Climate Action Network (CAN) Europe	Belgium
Corberan	Jose M	Universitat Politècnica de València (UPV)	Spain
Coss	Stefano	StartUS	Austria
Costa	Michela	CNR	Italy
Drosou	Vassiliki	CRES	Greece
Delord	Christine	National Institute of Solar Energy (INES)	France
Dierckens	Danny	CTC Benelux	Belgium
Dimitrisina	Reghina	EGEC	Belgium
Doll	Herbert	Carrier	USA
Dolzynska	Magdalena	Bialystok University of Technology	Poland
Driessen	Jan	CEE	Belgium
Duvivier	Grégory	Fluxys	Belgium
Eggestad	Karl	Inaventa Solar	Norway
Fadl	Mohamed	Mansoura University	Egypt
Fikiin	Kostadin	TU - Sofia	Bulgaria

Fransson	Liisa	RISE	Sweden
Gawsewitch	Christophe	NATURAXIS ENERGIA	France
Geerts	Rene	HoCoSto	The Netherlands
Graner	Peter	PG Solar Greenergy	Canada
Guglielmetti	Luca	UNIGE	Switzerland
Haugstad	Heidi Pegill	Statkraft	Norway
Jensen	Jakob	Heliac	Denmark
Kramer	Korbinian	Fraunhofer ISE	Germany
Kusters	Dirk	Aperam	Belgium
Lettenbichler	Sofia	EuroHeat & Power	Belgium
Madelenat	Jean-Marie	Le Pays de Fougères	France
Metge	Julien	newHeat	France
Maciaszek	Grzegorz	SolHotAir	Poland
Marchetti	Paolo	Eni	Italy
Misté	Gianluigi	Nabla Wave	Italy
Morini	Mirko	University of Parma	Italy
Morozyuk	Tetyana	TU-Berlin	Germany
Navarro	Emilio	Universitat Politècnica de València (UPV)	Spain
Neyens	Jo	ODE	Belgium
Piette	Ivan	Viessmann	Belgium
Pischow	Kaj	Savosolar	Finland
Poggi	Pascal	Orange	France
Ramaswamy	Sangeetha	OWI Science for Fuels GmbH	Germany
Skreiberg	Øyvind	SINTEF	Norway
Spiller	Nathalie	Swiss Solar	Switzerland
Stefanica	Dan	EHPA	Belgium
Sutu	Alexandra	SolarHeat Europe	Belgium
Travasaros	Costas	Prime Laser Tech	Greece
Vanderstraeten	Stefaan	Daikin Europe	Belgium
Weiss	Werner	AEE INTEC	Austria
Winterhalder	Katharina	Wissenschaftliche Mitarbeiterin Institut für neue Energie-Systeme (InES)	Germany
Yilmaz	Levent	Turkish-German University	Turkey
Olausson	anton	SWEP Linköping Institute of Technology	Sweden
Ülke	Kutay	BURAL SOLAR	Turkey