H2020 Work Programme

D6.7 - SO WHAT POSITIONING PAPER

Lead Contractor: **RINA-C**

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Deliverable leader	Giorgio Bonvicini (RINA-C)
Contributing Author(s)	Roberta Montesano, Arianna Amati (as representative of RINA-C project team)
Reviewer(s)	Nick Purshouse (IESRD)
	Stan Verdonck (Antwerp)
	Francisco Javier Morentin (CAR)
Final review and quality approval	Arianna Amati (30/11/2022)

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Executive Summary

Based on lessons learnt from the regulatory and policy aspects related to WH/C at EU and Member State level, the present deliverable was prepared, which constitutes the positioning paper of the SO WHAT project. The document presents the recommendations to policymakers for an increased exploitation of WH/C recovery as a tool for the achievement of decarbonization, energy transition and security of supply targets.

The actions recommended to policymakers for the exploitation of this low-carbon energy source are:

- define and standardize "waste heat/cold" to support energy planning and align it with renewable energy sources;
- integrate recovered heat/cold in building energy performance calculation;
- simplify procedures for permitting and connection to electricity and DHC networks;
- make waste heat/cold recovery attractive for investors;
- abate residual technological gaps to waste heat/cold recovery.

Abbreviations

CAPEX	Capital Expense
DHC	District Heating and Cooling
ESG	Environmental, Social and Governance
EU	European Union
GHG	GreenHouse Gas
LCOH	Levelized Cost of Heat
TRL	Technology Readiness Level
WH/C	Waste Heat and Cold

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1 Introduction

The main objective of SO WHAT WP6 is to conduct the impact analysis of the industrial WH/C recovery and RES integration solutions promoted by the SO WHAT tool and project, as well as to draw the derived conclusions into lessons learnt and recommendations, including analysis of relevant regulatory issues and certification/standardization procedures and requirements and proposition of policy instruments for industrial WH/C recovery promotion.

Specifically, the outcomes of assessment carried out in T6.2 are presented in SO WHAT D6.2, with reference to regulatory issues in the different EU countries, which could represent a barrier to the deployment of certain solutions proposed by SO WHAT. On the other hand, the results of the analysis done in T6.3 are presented in SO WHAT D6.3, focused on policy measures can be used to overcome market failures, improve the resource allocation and unlock investments in industrial waste heat/cold recovery and RES integration.

Leveraging on the analyses carried out in the two tasks mentioned above and more in general on lessons learnt from the whole project, the present deliverable constitutes the positioning paper of the SO WHAT project, presenting the recommendations to policymakers for maximizing the exploitation of WH/C recovery to achieve decarbonization, energy transition and security of supply targets at EU and national level.

2 Policy Recommendations

Based on the barriers to WH/C recovery identified in the SO WHAT project, the actions recommended to policymakers to increase the exploitation of this low-carbon energy source are:

- define and standardize "waste heat/cold" to support energy planning and align it with renewable energy sources;
- integrate recovered heat/cold in building energy performance calculation;
- simplify procedures for permitting and connection to electricity and DHC networks;
- abate residual technological gaps to waste heat/cold recovery;
- make waste heat/cold recovery attractive for investors.

More details regarding these recommendations are presented in the following paragraphs.

2.1 Define and Standardize "Waste Heat/Cold" to support energy planning and Align it with Renewable Energy Sources

While carrying out energy planning activities, local authorities and utility companies are generally considering different kinds of sustainable energy sources, with main reference to renewable sources and cogeneration of heat and power. Waste heat and cold recovery is generally not among the priorities even because it is not enough mentioned in the EU and national targets, which introduces the perception of a low sustainability of this source and in turn obstacles the exploitation of a really low-carbon source of heat with a significant high potential over the EU energy system.

To this aim it is recommended to assimilate waste heat with renewables, e.g. clearly mentioning it in the definitions of efficient DHC and in the targets related to renewable energy, as well as classifying it among sources aligned with the EU Taxonomy for Sustainable Finance. This would contribute to the reduction of risks associated to excess heat/cold recovery due to its potential environmental non-sustainability.

Moreover, a clear definition of waste heat and cold and of its technical, environmental and economic feasibility shall be given, giving quantitative thresholds in terms of e.g. distance between source and user, GHG emission factor, levelized cost of heat (LCOH), payback of the investment to identify actions that can become mandatory and not only recommended.

In addition, a standard approach to the quantification of waste heat and cold should be applied in order to make uniform evaluations across different projects and cities, and to evaluate the introduction of potential incentives for their recovery. To this aim, a detailed proposal has been developed and presented in SO WHAT D6.2.

2.2 Integrate Recovered Heat/Cold in Building Energy Systems

It is well known that there is enough waste heat in the EU to cover the needs of the entire building stock in its Member States[2], and that district heating and cooling constitutes a solution to connect the potential availability of excess heat/cold (similarly to heat/cold from renewable sources) with the demand, i.e. buildings and other end users.

[2] https://celsiuscity.eu/an-un-tapped-resource/

The quantification of this huge potential, coming from industrial sites like in the SO WHAT project but also from unconventional excess heat sources, and the related feasibility study for its recovery, should be made mandatory for new buildings construction and in case of realization of new district heating networks or important retrofitting of existing systems.

To this aim, energy planning tools suitable for matching heating and cooling demand and supply and to evaluate the technical, environmental and economic feasibility of thermal energy recovery and distribution systems should be supported. Ideally, the availability of standardized tools for the execution of this kind of assessment in different contexts would be a plus, also in relation with the need, highlighted in the previous recommendation, of having clear thresholds defining the feasibility and potentially the mandatory nature of the implementation of a district heating/cooling system based on waste heat/cold recovery.

2.3 Simplify Procedures for Permitting and Connection to Electricity and DHC Networks

Projects for the exploitation of waste heat/cold require different types of authorization from public authorities depending on the specific features and location of the solution planned. Consequently, the barriers identified are different from project to project.

For instance, projects for WH/C recovery within an industrial site for reuse within the plant itself appears to be easier under the permitting perspective. However, all changes implemented at industrial plants under an environmental license, make necessary a request for amendment to the licenses in place, which can introduce a significant barrier to the implementation of the project. To overcome this barrier, the recommendation is to introduce different thresholds related to modification of industrial sites, allowing the execution of small and intrinsically environmental-friendly measures such as those related to the recovery of WH/C being implemented without an amendment to the overall environmental license of the plant but only with a communication or a simplified evaluation process.

Additional barriers, and consequently needs for simplification, concern projects for WH/C recovery for supply of thermal energy to DHC networks or for production of electricity to be supplied to the national grid. In this case, further to the simplification already mentioned above, what is required is a simplification of procedures to be completed at municipal level. The legal framework for the implementation of these projects should be standardised, to avoid that any project is analysed as a "first of its kind" with different administrative paths, documents to be prepared and authorities to be involved according to the competences of the specific authority or even of the specific person managing the local administration. A clear legal and permitting framework for a given energy source and technology should therefore be developed, with the definition of documents to be prepared, authorities to be involved, limits of time for answers and requests of integration to be provided, etc.

The availability of a clear legal and permitting framework for this kind of projects would also contribute to the abatement of the barrier related to the low attractivity of WH/C recovery for investors, since the potential delays in the authorization of projects is one of the risks perceived as most impacting on project implementation timeline.

2.4 Make Waste Heat/Cold Recovery Attractive for Investors

Making a category of projects attractive for investors is a matter not only of increasing their financial profitability, but also of reducing the risk associated, or perceived to be associated, to these projects. The need to increase financial profitability is also due to the fact that industrial companies accept investment out of their core processes only if the payback period is very short (i.e. below 3-4 years), whereas DHC operators work with significantly longer payback periods (i.e. over 10 years), and the needs of these two parties need to be matched in order to achieve projects feasibility.

To increase the level of profitability, the main recommendation to policymakers is to incentivize WH/C solutions, rewarding their potential effect for energy transition, the decarbonization of the energy system and the increase of security of supply, since these projects are able to produce thermal energy and/or electricity with no additional consumption of fuels and production of pollutant or GHG emissions. Incentives shall be aligned with those available for cogeneration, energy efficiency and energy production from renewables in terms of contribution to CAPEX coverage (e.g. in form of grants, tax credits, etc.) and of increase of annual revenues (e.g. in form of feed-in tariff for the energy produced or of generation of carbon credits for GHG emissions avoided). Moreover, public incentives could also be provided in form of public guarantees to commercial banks for loans related to the realization of WH/C recovery projects, or by adding a clear mention to WH/C recovery projects in the EU Taxonomy for Sustainable Finance, in order to increase willingness of investors to insert these projects in their ESG-linked portfolios.

On the other hand, the de-risking of WH/C recovery projects can be carried out by implementing the other recommendations presented in the present deliverable (i.e. by simplifying permitting, abating technological barriers, etc.) but also by increasing knowledge on the topic among different categories of investors and the other stakeholders, such as project promoters and their consultants involved, in addition to feasibility study and design activities, also in the execution of due diligence process. This knowledge creation can be achieved by policymakers by continuing the provision of support to demonstration projects in the field of WH/C recovery also including a strong component of communication and dissemination of results, training and capacity building. Moreover, the creation of platform for the matchmaking among WH/C owners, DHC operators, thermal energy and electricity end-users and potential investors shall be supported in order to increase additional business opportunities in this field.

2.5 Abate Residual Technological Gaps to Waste Heat/Cold Recovery

The previous recommendations have shown that technological barriers are not the main obstacles to the deployment of waste heat/cold recovery projects. Indeed, these solutions rely on technologies and devices with a very high technology readiness level (TRL) including for instance heat exchangers, heat pumps, circulating pumps, piping, etc. What could be missing under a technological perspective is their integration supply-side in case of recovery of specific heat/cold sources or demand-side in case of provision of thermal energy to specific buildings or district heating/cooling systems, or the availability of dedicated tools supporting a standardised feasibility assessment in the preliminary project phases and the monitoring, operation and maintenance of systems in the project operation phase.

To this aim, the implementation of pilot projects such as those supported by the European Commission through its different programmes including but not limited to Horizon 2020 (now

Horizon Europe) plays a key role. This kind of projects aim not only at demonstrating and testing the technical feasibility of excess heat/cold recovery but also at evaluating their environmental and economic sustainability and at shaping the most suitable business models for the engagement of the different stakeholders involved in heating and cooling projects. Moreover, the lessons learnt from these projects, built upon real hands-on experience in all project phases (feasibility assessment, design, permitting, procurement, installation, commissioning and operation), properly disseminated to external stakeholders, could contribute to the creation of knowledge thus making easier the replication of waste heat/cold recovery projects.

3 Conclusions

This document constitutes D6.7 of the SO WHAT project and is the positioning paper presenting the policy recommendations for the promotion of WH/C recovery projects, developed based on the results of the regulatory and policy analyses at EU and Member State level and on the experience developed in the whole project.

The policy recommendations developed are presented in detail in the previous Chapter 2 and include:

- define and standardize "waste heat/cold", to support energy planning activities at urban and industrial site level and align WH/C with renewable energy sources, in order to increase its inclusion in energy plans;
- integrate recovered heat/cold in building energy performance calculation, in order to increase the exploitation of this sustainable source of energy for H&C of buildings;
- simplify procedures for permitting and connection to electricity and DHC networks, with the aim of making clearer and shorter the authorization procedures that obstacle the realization of this kind of projects;
- make waste heat/cold recovery attractive for investors, by increasing its profitability through investments but also reducing the risk perceived for these projects;
- abate residual technological gaps to waste heat/cold recovery by continuing demonstrating their technical feasibility and their profitability.