

Waste Heat Recovery investments



Market and stakeholder analysis

Barriers to WHR investments

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The purpose of the stakeholder interview

- Identification of the **main stakeholders** involved in waste heat recovery (WHR) investments;
- Highlighting the **main barriers** encountered and predicted in developing of WHR solutions;
- Assessment of **drivers and entry points for stimulating the uptake of WHR** solutions;
- Analysing how different factors (heat demand, supply temperature in the grid, distance to the heat networks etc.) affect the **profitability** of the investments;

Interviews conclusions –Barriers to WHR investments

DH Operators:

Technical knowledge

- Lack of technical knowledge, lack of equipment providers, are not considered, by the majority of DH stakeholders as an important barrier. Only lack of knowledge for large Heat Pumps could be a barrier.
- The lack of experienced suppliers, limited number of companies that can provide the consultancy services, equipment affordability, lack of qualified staff to install the technology for WHR, lack of qualified operators for its installation, maintenance are considered barriers in developing WHR projects
- The technology is not tested, customers do not understand the new technology represents for some of interviewees an important barrier,

Interviews conclusions –Barriers to WHR investments

DH Operators:

Maturity and replicability of the existing solutions

- The vast majority of stakeholders mentioned that the concept of cooling/heating recovery provided to DH is not mature.
- The technologies that allow waste heat recovery do not have the same degree of maturity. Heat pump technology has high maturity while capacity and temperature ranges of urban waste heat are not mature.
- The maturity of the WHR solutions is an important factor that influence the possibility to obtain funds for financing the investment.
- The vast majority of stakeholders mentioned that waste heat recovery solutions are replicable, whether it is heat recovered in the existing district heating system, or whether it is recovered from waste water plant or incineration plant, gas decompression stations, etc.

Interviews conclusions –Barriers to WHR investments

DH Operators:

The legal framework in place to manage urban waste heat sources/ make efficient contracts

- All interviewees have pointed out that there is no legal framework in place to manage urban waste heat sources/ make efficient contracts that responds to all the specific issues of this type of project.
- In France there's a legal framework for waste plant that valorises the heat recovery for the company own use (and incentive for energetically efficiency) but no specific framework for external user of this heat recovery.
- In Spain there is a legal framework related to waste without specifying clear obligations for those who are developing waste heat recovery solutions to be efficient in terms of energy & footprint.

Interviews conclusions –Barriers to WHR investments

DH Operators:

The legal framework in place to manage urban waste heat sources/ make efficient contracts

- In Italy, there is not at the present stage a legal framework. A legislative barrier exist in the Company's specific case: due to unbundling process, a DSO cannot be an energy producer, reason why it was necessary to start-up a new company.
- In Germany, the stakeholder mentioned that there are not enough incentives for urban excess heat recovery, there are framework gaps.
- In Romania there is a legal framework that, generally could manage the urban waste heat sources. Many gaps have been identified in the specific field.
- In Sweden the stakeholder mentioned that there isn't a legal framework.
- In Belgium there is no legislative framework for heat in contrast to what exists for electricity, gas and fuels.

Interviews conclusions –Barriers to WHR investments

DH Operators:

The right value of the heat

- A bad estimate of the resource is on the top reason for not implementing the project.
- Swedish companies: the value of heat is based on the companies forecasted marginal production costs and the customers projected margin costs for operation
- The Italian stakeholder: the value of heat depends on the business model, different prices can be agreed depending on who is realizing the investment
- Spain: an annual fixed fee for the waste heat recovery from sewage was established and both parties agreed to.
- The German stakeholder: prices of other energy sources, and a payback 10 years.
- The French stakeholder: the value calculation has taken into account other possibility to valorize its waste heat.
- The Danish stakeholders: the recovered WH price is the heat price that can be bought from elsewhere;

Interviews conclusions –Barriers to WHR investments

DH Operators:

Comments and suggestions addressing the barriers

- The contract period has to be defined and respected by all the parties, the customer has to remain in the contract for the entire period.
- One of the most important barriers: to guarantee the use of thermal energy provided and consumed during the contract and the project's period;
- Any change in consumption or contractual conditions may influence the feasibility of the project, in bad or good for the investor.
- Incentives for investments in low temperature heat recovery is a must as there is alternative technology incentivized, such as high efficiency CHP technology, energy efficiency
- Taxes and tariffs imposed by the governmental institutions
- The companies producing waste heat intends to generate large profit from the delivered wasted heat.
- There are also political barriers

Interviews conclusions –Barriers to WHR investments

Policy makers:

- The main waste heat recovery objective is considered the reduction of CO₂ emissions, focusing also on the sustainability.

Technical knowledge

- The lack of technical knowledge amongst technical providers is not a barrier;
- Lack of equipment providers is not a barrier, but lack of integrated solution providers could be a barrier on national level;
- Lack of subsidies for acquisition of equipment and the very high operational costs represent barriers for the development of WHR.
- Lack of qualified staff to install technology for urban WHR could be a barrier.

Interviews conclusions –Barriers to WHR investments

Policy makers:

Maturity and replicability of the existing solutions

- The maturity of the solutions could be a barrier when the applicant wants to have credit for implementing a WHR solution;
- There are no barriers related to the replicability of solutions, if a solution demonstrates to be technically and economically feasible;
- All stakeholders interviewees pointed that the four demonstrators are relevant and may be very replicable - the challenge is to disseminate this information and bring it easily to policy makers and other relevant stakeholders

Interviews conclusions –Barriers to WHR investments

Policy makers:

The legal framework in place to manage urban waste heat sources/ make efficient contracts

- About 86% of those who responded to the question related to the existing of the legislative or regulatory gaps said yes, it is a legislative gap and some clarifications are needed in the legislation in force.
- This legislative gap represents a barrier to apply for implementing a WHR solution, especially if state-owned companies are involved;
- There are no WHR specific regulations, the majority of stakeholders consider that this is a barrier for urban waste recovery;

Interviews conclusions –Barriers to WHR investments

Policy makers:

Incentives for alternative technology

- At national level, alternative technology is encouraged (egg. for high efficiency cogeneration).
- There has been two funding programs in Germany that funded innovative renewable heat generation systems (solutions like solar-thermal generation, heat pump solutions including urban waste heat usage)
- From 1st July 2017, the German Federal government is funding not only single technologies, but entire local district heating networks of the 4th Generation. It will subsidy pilot projects that at least produce 50% of renewable heat or waste heat, innovative technologies such as seasonal thermal energy storage and power-to-heat strategies.
- In Sweden there is a national regulation on buildings that is much discussed. It is claimed that it supports heat pumps at the detriment of district heating. Also there are climate investments (Naturvårdsverket) that can be an alternative venue for urban waste heat investment

Interviews conclusions –Barriers to WHR investments

Policy makers:

Incentives for alternative technology

- In Spain there are national incentives carried out by IDAE (Institute for Diversification and Saving of Energy), but not specific for waste heat recovery
- Some EBRD facilities for financing energy efficiency (EEFF programmes) that can offer commercial loans with better financing conditions for implementing energy efficiency or the use of renewables.
- There are already favorable legislative policies in France as the VAT reduction for projects which provide heating/cooling from more than 50% renewable sources.
- In Italy there are incentives to energy efficiency and sustainability projects, which could also be applicable also to WHR.
- More accelerated development of the WHR solutions, an incentive would be welcome or the inclusion of urban WHR solutions in the national support programs.

Interviews conclusions – Barriers to WHR investments

Policy makers:

Comments and suggestions addressing the barriers

- The tax regime (Belgium) that includes surcharges for financing energy efficiency and renewable energy support schemes.
- To make some changes, in the specific legislation to complement the current law on energy efficiency (Romanian stakeholders)
- To provide municipalities with knowledge about the low temperature heat sources (the French pointed)
- the use of EPC contracts when Public Administration is implementing waste heat recovery measures (Spanish stakeholder)
- Political good intentions (since always all the parties of the council have pushed to develop these types of projects) (Spanish stakeholder)
- Regulation that clearly establishes the owner (German stakeholder)
- inter-ministry actions meaning by this, that at least the ministry of economy and the ministry for energy coordinate their policies (France),

Interviews conclusions –Barriers to WHR investments

Investors:

Technical and economic feasibility

- From an economic point of view, the feasibility is related to the level of taxation, the cost of producing energy, as well as the price at which this recovered energy will be sold.
- An investor should be ensured on
 - a long-term contract, moral engagement of both parties (energy generator and final consumer),
 - a guarantee that payments will be made in due time,
 - the established amount of heat that will be consumed throughout the contract period;
 - the existence of a cash flow security (a long-term contract);
 - no operational and commercial barriers
- The possible incentives or permissive loans could be favorable for WHR investments:
 - financing schemes and specific programs involving EU at national authorities level
 - Risk Sharing Facilities, where a public entity provides funding to cover possible defaults of borrowers
 - Green loans that finance projects with clear green consequences, such as reduced CO₂ emissions or energy efficiency;
 - CEE (Certificat d'Economie d'Energie - Energy Efficiency Certificates).

Interviews conclusions–Barriers to WHR investments

Investors:

Proposal to complete the current legislation

- The stakeholders proposed the completion of the current legislation, based on their experience and examples in other domains:
 - the development of the “Guarantee funds” granted by a public fund or others. This fund could be used to mitigate the identified risk of the techno-economical implication of industrial stakeholders from a long term perspective.
 - the integration of the notion “waste heat recovery” in the specifications of the Climate Air and Energy Plan
 - local regulations could be put in place to secure the economic performances, exemption from having to pay the full taxes
 - the regulatory framework could be enriched with technical specifications and methodologies
 - Stability of the regulatory framework (as were applied for renewable energies) unexpected changes can be an important barrier in the future development for urban WHR projects
- Procurement procedure to be adapted to energy efficiency projects to allow energy service companies to be interested in participating in the procurement process;
 - Support scheme for such investments is needed; a legislation or a regulation for promoting the WHR projects, guidelines for drafting urban waste heat recovery investment contracts;

Interviews conclusions –Barriers to WHR investments

Customers (end consumers):

Barriers

- The affordability of the equipment could be a barrier, depending on the complexity of the projects
- Usually, the maturity of WHR solutions is considered a barrier (for e.g. this aspect is essential when getting credits from banks for installing WHR solutions)
- The existing legal framework does not explicitly address UHR, many gaps has identified
- For some countries, taxes constitute a large barrier
- The lack of incentives for WHR could represents a barrier in choosing heat recovery solutions, as long as other renewable sources generally have such incentives
- Heat injection from different sources in DH networks is not guaranteed or regulated
- No guarantee regarding the continuous use of thermal energy during the contract
- There is no framework contract for this type of transaction, as there are many conditions to be stipulated (egg. the contract period must be defined and respected by all the parties, the customer must remain in the contract for the entire period) so that the solution of WHR remains feasible;

Interviews conclusions –Barriers to WHR investments

Customers (end consumers):

Customers are interested in purchasing heat from UWHR

- A tighter customer-district heating provider relationship is envisaged to be necessary
- The price model is crucial for this kind of business (different value at different times)
- Methodology for calculating the right value of the heat
- The customers are interested in investing in heat recovery and its use, if this energy will be cheaper and more environmentally friendly.
- The customer needs to be sure that the heat is delivered on time, uninterrupted and at right temperature levels.
- The respondent would invest if it was part of determining the quality of the equipment and system

Interviews conclusions –Barriers to WHR investments

Urban waste heat owners:

Barriers

The interviewees highlighted that it is very important to develop the waste heat recovery solutions, but there are a number of barriers that impede their development in some way

- Lack of information at decision makers level is a considerable barrier;
- The profitability can be an obstacle, given that investment is considerable, and the contribution to the system of the city is not well defined;
- Lack of the overall planning of integrated urban heating systems; The DH companies are not concerned to take over the recovered heat, because they only takes into account the summer situation and does not have an overview for a one-year period.
- The absence of economic incentive for this kind of interventions
- There is no legal specific framework in place to manage urban waste heat sources/ make efficient contracts and no legal problems, just ordinary negotiation to reach an agreement.

Interviews conclusions –Barriers to WHR investments

Urban waste heat owners: Barriers

- Lack of technical could be a barrier, opinions are divided among respondents;
- Affordability of equipment: Generally, the equipment costs could be a barrier, but it depends on the project case, even the costs are high, the payback period is pursued;
- A real barrier is to find a location that is suitable with WHR project
- Lack of qualified technical employees is a gap in all areas, not only in the case of excess heat recovery. The lack of staff to install technology for urban waste heat recoveries may be a barrier.
- The maturity of the WHR is very important, and could represent a barrier when taking the investment decision.

Interviews conclusions –Barriers to WHR investments

Urban waste heat owners: Comments and suggestions

- From the point of view of the majority of owners of excess heat, the value of waste heat recovery project is the economic sustainability followed by environmental benefits.
- The overall planning of integrated urban heating systems; The DH companies are not concerned to take over the recovered heat, because they only takes into account the summer situation and does not have an overview for a one-year period.
- When analyzing the replicability of solutions it must be taken into account the specificity of the project due to the implementation site and the economic feasibility;
- Methods of calculating the real value of waste heat recovery. The Owners excess heat companies pointed that the District Heating Company and Energy Company has a pricelist and specific requirements, WHR being considered a greener heat production.
- Specific contract for this type of transaction is needed
- Economic incentives for this kind of interventions
- Involving an ESCO would be a good option - Usually, the payback is difficult to estimate

Interviews conclusions – Barriers to WHR investments

Conclusions – Specific answers

DH Companies:

Implementing UWHR is not common but, in order to be competitive on the market, subsidies for investment are necessary.

Policy makers:

The legal framework should be completed (including the UWHR issues)
New financial and fiscal policies should be adopted to promote UWHR projects.

Investors:

Investors are interested in the subject but they consider that such projects represent high risks, due to their novelty and the lack of a history for the implemented solutions.

Customers:

Customers are willing and interested in purchasing heat from UWHR, if the price is comparable or lower than the current price they are paying for heat.

Urban waste heat owners

The main objective of recovering excess heat is to reduce the costs for the companies. The UWHR projects are technically feasible, but from economic point of view, subsidies are needed.

Thank you for your attention!

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