

HOLISTIC ENERGY MANAGEMENT AND THERMAL WASTE INTEGRATED SYSTEM FOR ENERGY OPTIMIZATION



KPIs for energy performance and waste heat recovery efficiency from IT infrastructure in buildings for the RISE pilot

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Disclaimer

Final draft after editing, ready for approval

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1. Executive Summary

This report is an addition to the previously submitted deliverable 3.3 and focuses on the RISE pilot. In total, the four KPIs: Waste heat utilization (WHU), Degree of coverage (DOC), Potential waste heat coverage (PWHC), and Coefficient of performance (COP), will be applicable to this pilot.

2. List of abbreviations

Acronym	Meaning
COP	Coefficient of performance
DOC	Degree of coverage
ERF	Energy reuse factor
KPI	Key performance indicator
PWHC	Potential waste heat coverage
WHU	Waste heat utilization

3. Introduction

This report focuses on the application of the different KPIs identified and developed in D3.3 to the RISE pilot. It is therefore encouraged to see D3.3 for the full overview of the different KPIs and how they are generally formulated.

The RISE pilot was added later to the project and was therefore not included in the D3.3, which is the reason for this deliverable 3.6.

4. KPI overview

To see the full overview of the different KPIs for waste heat in data centres integrated in buildings, see the previously published D3.3, as the implementations in this deliverable are the same.

4.1. Examples of using the selected KPIs on the RISE pilot

The RISE pilot will provide the waste heat from the datacentre to heat an independent heating circuit, as can be seen in Figure 4.1 and Figure 4.2. The system will not include any connection to district heating or include a heat pump, it is therefore not relevant to include any KPIs for this, meaning that the applicable KPIs for this pilot will be Waste heat utilization (WHU), Degree of coverage (DOC), Potential waste heat coverage (PWHC), and Coefficient of performance (COP). The formulation of each KPI has been applied to the RISE pilot and can be seen in Table 4.1.

Table 4.1: Applicable KPIs for the RISE pilot, and how the KPI is adapted to fit the system.

	$WHU_D = \frac{H_{DrC1}}{H_{LAcooler} + H_{HRU} + H_{DrC2}} = \frac{F1 * (T5 - T1)}{F2 * (T3 - T2) + F1 * (T5 - T4) + H_{DrC2}}$	(1)
	$DOC_{B,D} = \frac{H_{DrC1}}{H_{DrC1} + H_{Building}} = \frac{F1 * (T5 - T1)}{F1 * (T5 - T1) + H_{Building}}$	(2)
	$PWHC_{B,D} = \frac{H_{LAcooler} + H_{HRU}}{H_{DrC1} + H_{Building}} = \frac{F2 * (T3 - T2) + F1 * (T5 - T4)}{F1 * (T5 - T1) + H_{Building}}$	(3)
	$COP_{WHU,B,noHP,D} = \frac{H_{DrC1}}{E_{DrC1} + E_{DrC2} + E_{pumps} + E_{HRU} + E_{LAcooler}}$	(4)

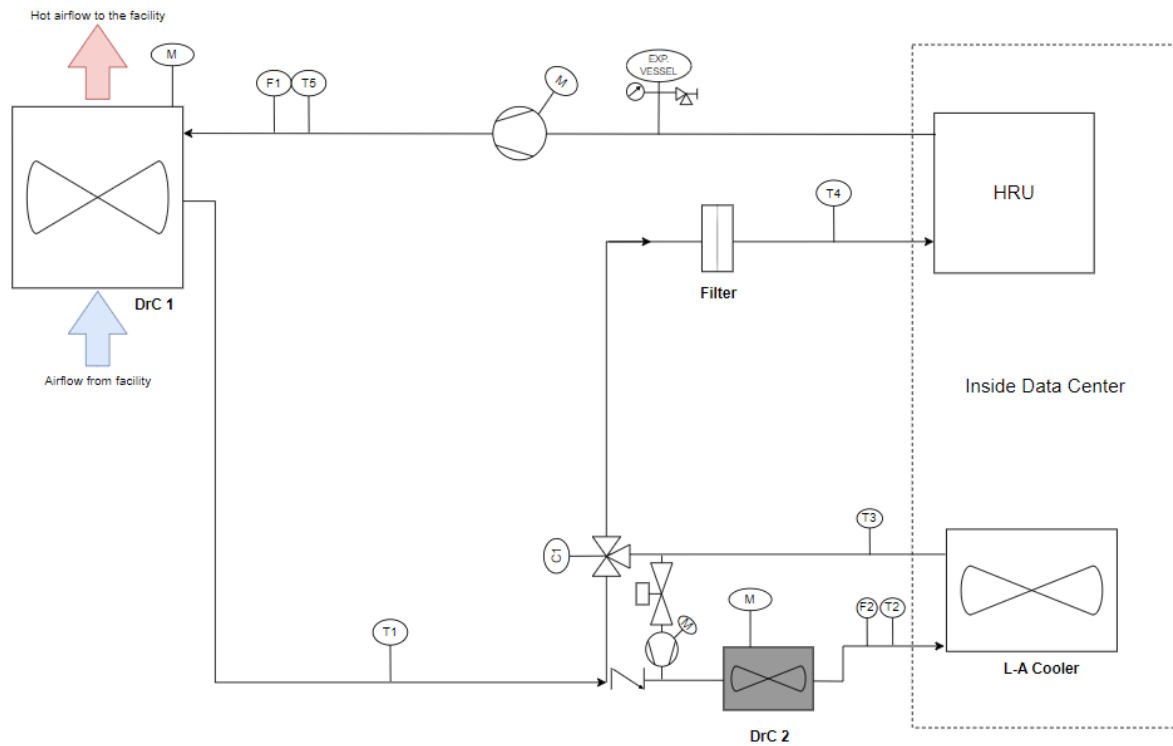


Figure 4.1: RISE heat recovery system

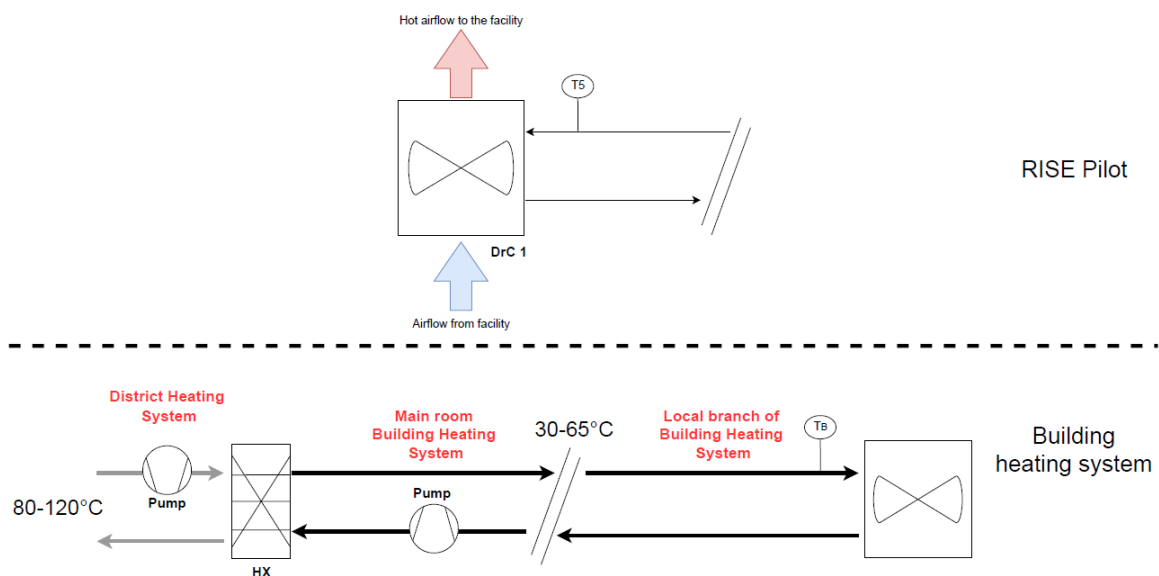


Figure 4.2: Diagram of connection between RISE pilot and the building heating system

5. Conclusion

The RISE pilot will be able to assess many of the relevant KPIs for the data centre integrated in buildings. It will not be possible to assess the building-related performance for only the RISE part, but in relation to the entire building, including other tenants, might be possible. In general, the four KPIs that will be able to be assessed should provide a good overview of the performance of the data centre in a building context.

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