Optimising Data Centre Energy Performance in Ireland
K00273039 John Andrew Paz

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Aim of the Project

To analyse, and increase energy efficiency, Irish data centres through cooling solutions, renewable energy adoption, location and HVAC equipment.

Background

- Rapid Growth: Data centres in Ireland are expanding due to increasing digital demands, raising electricity consumptions and environmental impact.

- Energy Concerns: Cooling systems within data centres mark for **40 – 50%** of their total energy use, representing an area for improving efficiency and sustainability.
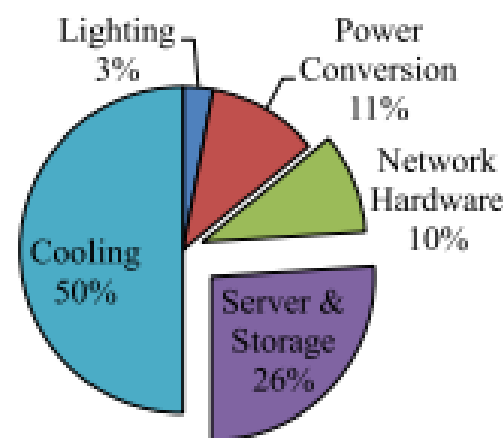

Figure 1: Data Centre Energy Consumption Breakdown

Research Aim

To analyse and improve the energy efficiency of data centres in Ireland by integrating advanced cooling solutions, renewable energy systems, and innovative monitoring technologies to achieve sustainability

Objectives

- Analyse Current Energy Practices

- Explore Innovative Cooling Technologies

- Evaluate Renewable Energy Integration

- Implement Real-time Monitoring using BIM

- Assess Barriers and Opportunities

Methodology

Online Case Study was done to understand the assess barriers and opportunities, implement using BIM, cooling solutions and sustainability.

EU Sustainability Regulation 2024 :

Focuses on standardized reporting of energy, renewable use, water and waste heat reuse.

The key to this case is to understand easier and pressure on older data centres to upgrade systems and track metrics such as EDC, ERES WIN and EREUSE.
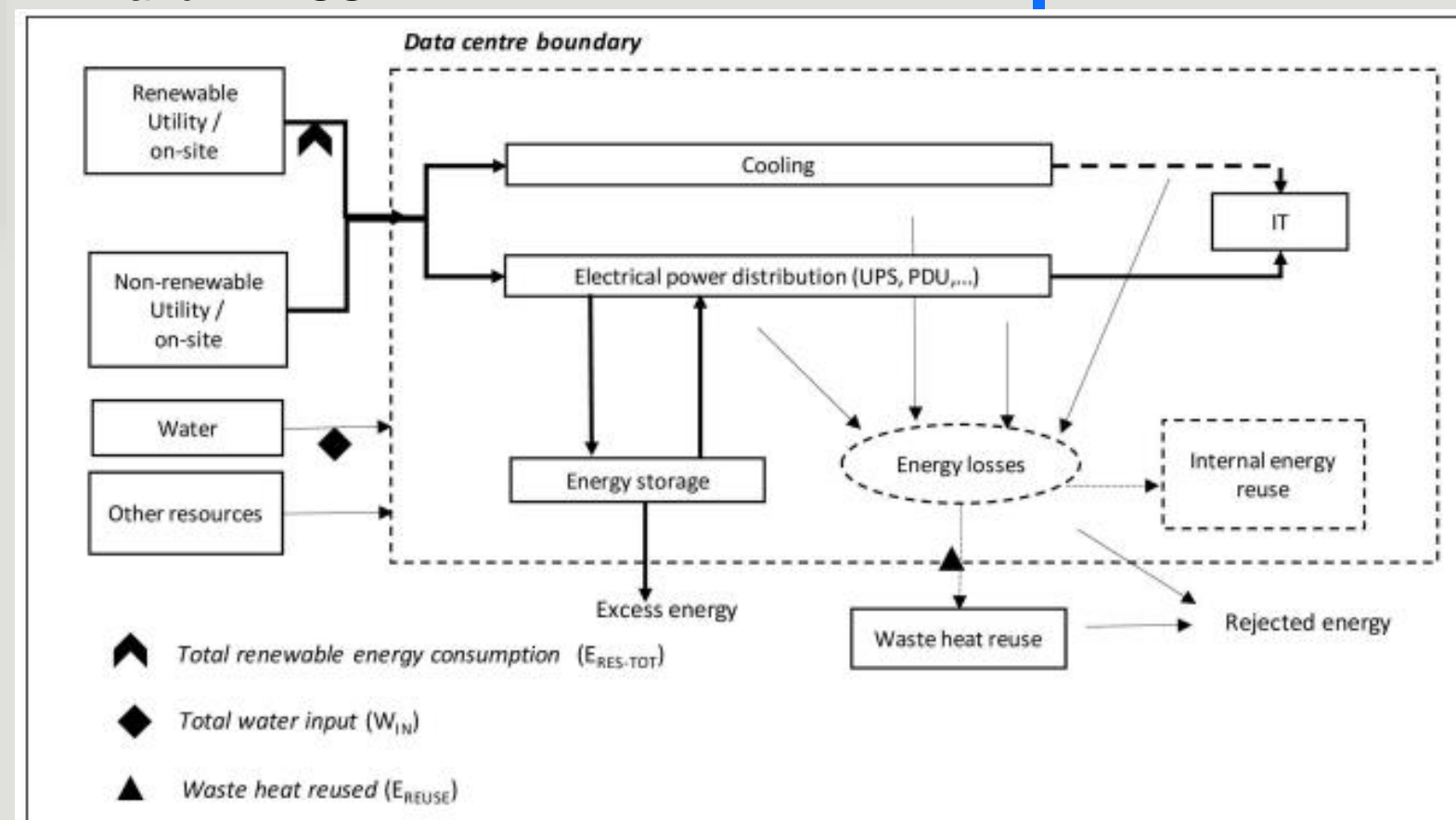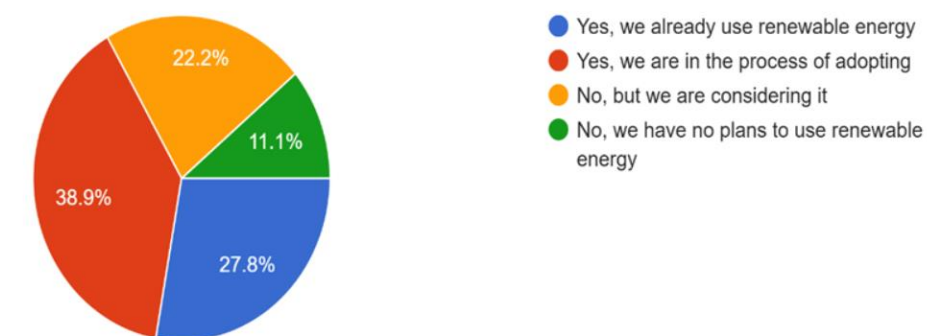

Figure 2 : EU Measurement Boundary for Energy and Waste Heat

Figure 3: Survey Question

Survey was also done to investigate the energy performance of data centres. Figure 3 is focused on the use of renewable energy.

The survey question highlights adopting barriers and momentum that is useful for identifying where the motives or support are needed.

It also validates the effectiveness and reach of policy on real world operational decisions demonstrates how Irish data centres are transitioning toward more sustainable.

Conclusion

This dissertation set out to critically analyse and improve energy efficiency in data centres across Ireland, with a particular focus on cooling systems, renewable energy integration, and real time operational monitoring using BIM.

Objective 1: Review energy consumption patterns→ **Achieved** by analysing case studies and survey results, confirming that cooling systems account for 40–50% of total energy use.

Objective 2: Assess feasibility of renewable energy→ **Achieved** through survey responses and interviews that showed growing adoption, despite financial and infrastructure barriers.

Objective 3: Evaluate waste heat recovery→ **Partially achieved**. Regulatory data was reviewed, but lack of local industry implementation limited deeper analysis.

References

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