Thesis Title	**High Temperature Heat Pumps: Advancements in Technology and Application**
Programme of Studies	MSc in Sustainable Energy Systems
Course	MES 580 MSc Thesis
Area of Study	Sustainable Energy Technologies – Heat Pump
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Short Description	In recent years, high temperature heat pumps garnered significant interest as a promising solution for enhancing energy efficiency and curbing greenhouse gas emissions in diverse industries, including food processing, chemical manufacturing, and building heating and cooling systems. The aim of this MSc thesis was to provide a comprehensive overview of the state-of-the-art high temperature heat pumps and explore technological advancements and their applications. The literature review covered fundamental concepts such as thermodynamic principles, working fluids, and components used in high temperature heat pumps. Additionally, recent advancements in the technology, like magnetic refrigeration, multi-stage compression, and integration of renewable energy sources, were highlighted. The review also critically analyzed challenges and limitations, including performance at high temperatures, stability and safety of working fluids, and cost-effectiveness. The methodology involved a case study of a high temperature heat pump application in a selected industry, like food processing or chemical manufacturing. This case study evaluated energy savings potential, cost analysis, and the environmental impact of the high temperature heat pump system. To aid in the study, simulation using software like TRNSYS or EES was performed. The results and discussion section presented findings from the literature review and case study, emphasizing technological advancements and applications of high temperature heat pumps. It also discussed challenges and limitations while providing recommendations for future research and development. In conclusion, this research highlighted the potential of high temperature heat pumps in bolstering energy efficiency and mitigating greenhouse gas emissions in various industries. Furthermore, it underscored the importance of further research in this field to tackle challenges and contribute to the global effort to combat climate change.