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# Thermal and Power Microgrids in Public Buildings - Case Study LNEG

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Greenhouse gas emissions, caused by the burning of fossil fuels, are one of the main causes of climate change. Thus, an energy transition is needed, through the shift of the energy sector from fossil-based systems of energy production and consumption to renewable energy sources. The building sector is the largest energy consumer in Europe, making it essential to achieve the desired energy transition. Nearly zero-energy buildings have a very high energy performance, while the nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources. The aim of my thesis is to analyze data from the thermal and power microgrid implemented in building C of the Portuguese National Laboratory of Energy and Geology (LNEG), which includes solar photovoltaic, solar thermal, battery, thermal storage, and heat pump technology; and improve the performance of the system. This includes the development of models in Polysun and/or TRNSYS and the evaluation of new solutions, such as the use of an absorption chiller or seasonal thermal storage.

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