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# SCHWALM-EDER-WEST Intelligent Municipal Buildings

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## Energy Savings through Automation and AI

The research project aims to reduce energy consumption in municipal buildings without requiring costly upgrades to building standards or technical systems. A central element is intelligent and automated control enabled by artificial intelligence. This allows demand-driven adjustment of heating output and lighting based on actual room usage. For this purpose, CO<sub>2</sub> sensors and LoRaWAN technology are used to capture real-time occupancy data.

## Project focus areas

**Identification of effective measures for energy optimization** Through intelligent data use and demand-oriented control, significant energy savings can be achieved. In addition to technical and energetic potential, issues of practical feasibility and user acceptance play an important role, with the goal of enabling both high savings and smooth operation and acceptance.

**AI-based algorithms for automated control of heating and energy systems** The goal is to optimize energy consumption through intelligent data utilization. For this purpose, sensor systems, LoRaWAN-based communication infrastructure, and an existing energy management system are integrated into a unified control framework.

**Diverse fields of application** Municipal buildings - from town halls and sports facilities to schools - have very different usage profiles. These differences are explicitly considered in the project in order to develop tailored control strategies and increase energy efficiency across various building types.

**Model character for other municipalities** The project has a strong model character and is designed to be transferable to other municipalities. Open-source solutions are developed to ensure transparency, reproducibility, and straightforward replication.

**Contribution to a sustainable future** The project provides substantial added value through the introduction of innovative digital technologies, enabling a long-term and sustainable reduction in energy consumption. It supports municipalities in meeting current and future regulatory requirements related to energy efficiency and climate protection.