



Harvard Dataverse is (tentatively) back in operation after the migration work on Thursday, March 5. ×
All Logins, local and federated, should be working now. As numerous unexpected problems were encountered in the course of the transition, we continue monitoring the services for any remaining issues.

The Repository is utilizing a **"Submit for Review"** workflow (please see support page for more information). Deposits will be reviewed within 24 hours, Monday - Friday from 9am to 5pm. All deposits after hours and on weekends will be reviewed the next business day. ×

SBD Lab
(Liege University - (ULiege / ULg))

Harvard Dataverse > SBD Lab >

Development of an Energy Performance Model for a Nearly Zero-Energy Timber House with Integrated Phase Change Materials

Version 1.0



Hammouma, Thanina; Attia, Shady, 2026, "Development of an Energy Performance Model for a Nearly Zero-Energy Timber House with Integrated Phase Change Materials", <https://doi.org/10.7910/DVN/E1SEX>, Harvard Dataverse, V1

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The dataset documents the development and validation of an EnergyPlus-based building energy model for a nearly zero-energy timber-frame house located in Aalter, Belgium. The study focuses on evaluating the role of bio-based phase change materials (BioPCM) in improving the energy efficiency and thermal performance of lightweight residential buildings. Timber-frame buildings typically exhibit low thermal mass, making them sensitive to temperature fluctuations and increasing dependence on active heating systems. To enhance passive thermal energy storage and stabilize indoor conditions, phase change materials were integrated into selected wall and ceiling assemblies within the building envelope. The dataset includes detailed information on building geometry, construction assemblies, PCM thermophysical properties, ventilation rates, occupancy schedules, and heating system configurations. The building is equipped with hybrid energy systems including photovoltaic panels, solar thermal collectors, a gas-fired condensing boiler, underfloor heating, radiators, and mechanical ventilation with heat recovery. Measured operational data, including monthly electricity consumption, gas use, and photovoltaic production between 2019 and 2022, are provided to calibrate and validate the simulation model. Model validation was conducted using ASHRAE calibration metrics (MBE and Cv(RMSE)), confirming strong agreement between simulated and measured energy performance. The dataset enables reproducible building energy simulations and supports research on the integration of phase change materials as a passive strategy to improve energy efficiency, reduce heating demand, and enhance thermal stability in nearly zero-energy timber residential buildings. (2026-03-03)

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Subject

Engineering

Keyword

Energy efficiency, Timber buildings, Nearly zero-energy buildings, Phase change materials

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Modeling files



