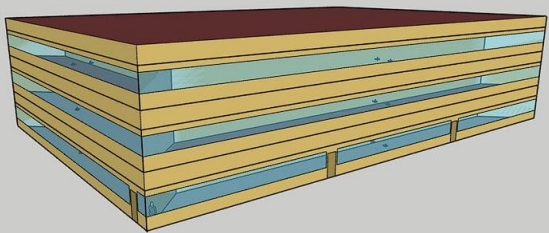


# Thermoenergetic performance of a building with phase change materials in future climates



DOE's medium office building prototype (steel frame).

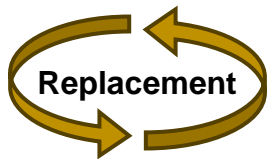
*Morphing* process of climate files using CCWorldWeatherGen



**A2 Emissions Scenario**

Projected climates 2050 & 2080

Phase change material (PCM) **SP24E**



ASHRAE 90.1 (2019) thermal insulation

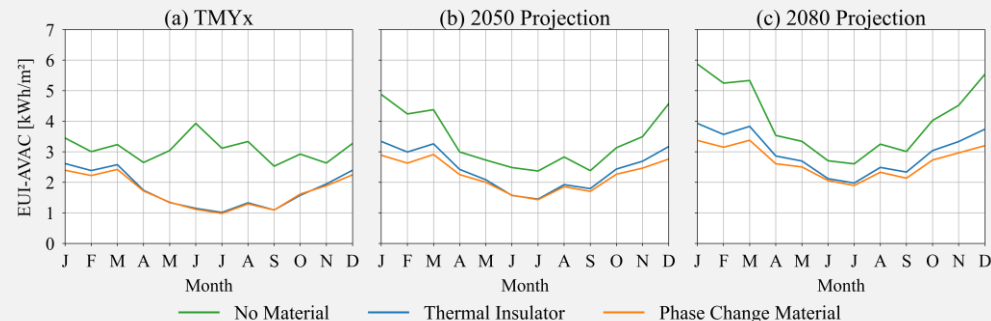


**Curitiba, PR (3A)**  
**Rio de Janeiro, RJ (1A)**

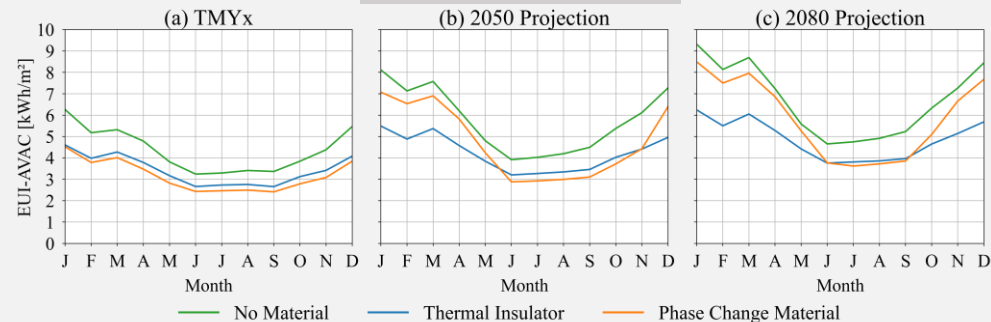


*Lorenzo O. Filippini, Letícia J. Rodrigues, Marcelo Schramm (2023)*

## Curitiba, PR



## Rio de Janeiro, RJ



## PCM vs. Insulation

Annual HVAC EUI comparison

**Curitiba, PR**

**2050: -8.2%**

**2080: -10%**

**Rio de Janeiro, RJ**

**2050: +12.1%**

**2080: +20.7%**

**PCM performs better in Curitiba (mild climate) compared to thermal insulation in projected climates but worse in Rio de Janeiro (warmer climate), unable to go through phase change**

# Energy and Built Environment