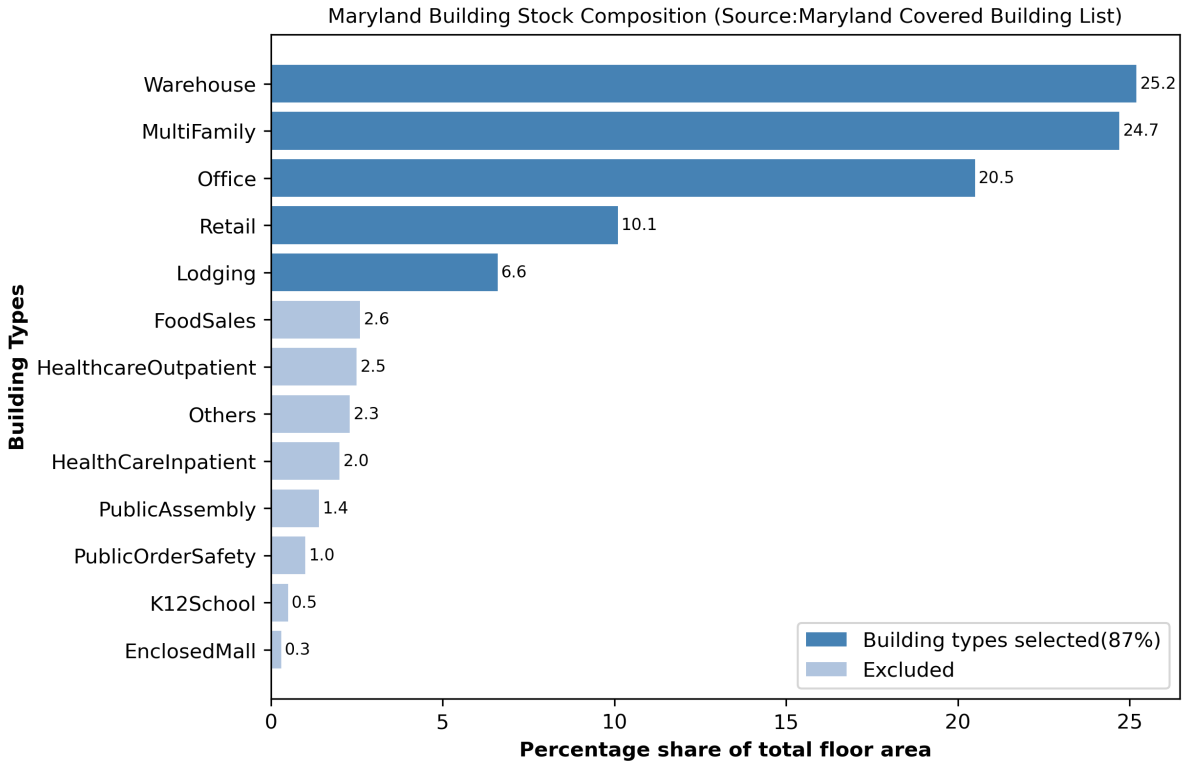
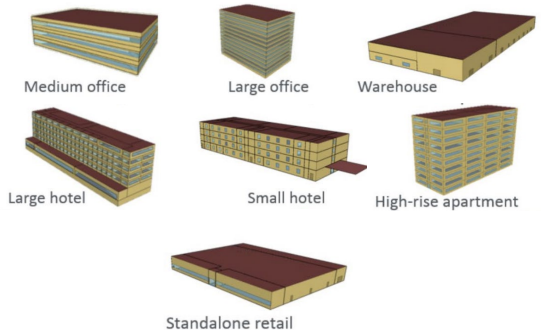
Impact of Maryland's BEPS Targets on Peak Loads

Overview of Peak Loads Analysis

- Develop representative physics-based models for building stock (typology, sizes, energy use, electric-to-site use ratios)
- Policy scenarios (electrification targets, electrification and energy efficiency targets)
- Estimate peak load impacts using building energy simulation under each scenario

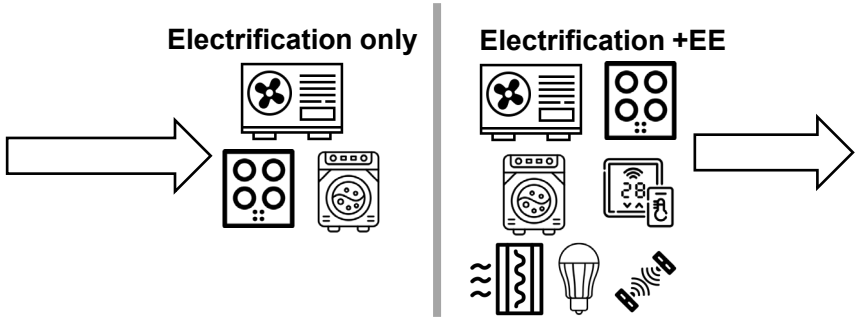


Methodology

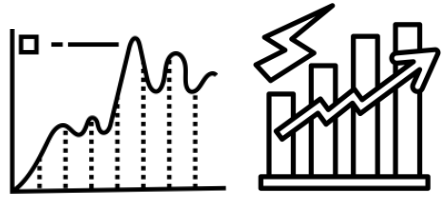


Generating baseline models
16 calibrated DOE prototype building models of different typologies and vintages [1]

Representative building stock
Baseline models scaled to match total square footage from CBL data



Applying scenario packages
Two policy scenarios considered- Electrification only & Electrification combined with EE [2]



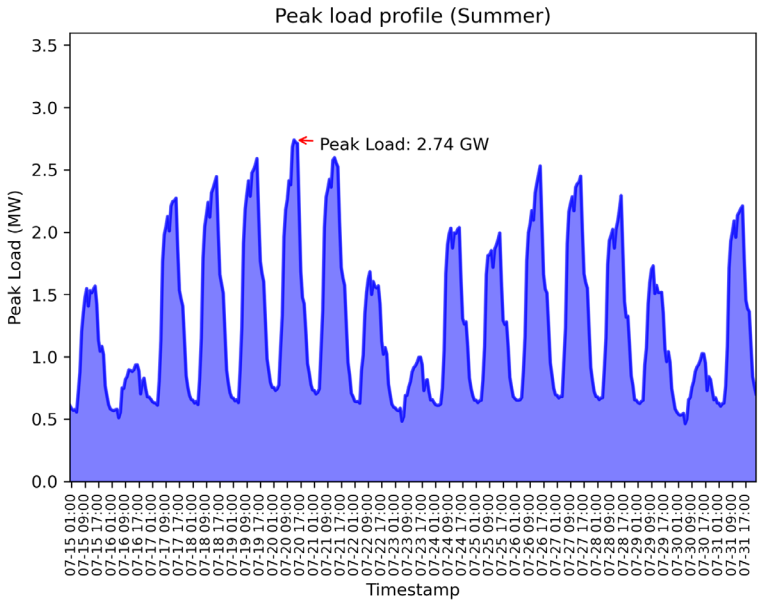
Estimating peak load impacts
Magnitude, temporal/seasonal shifts under each scenario

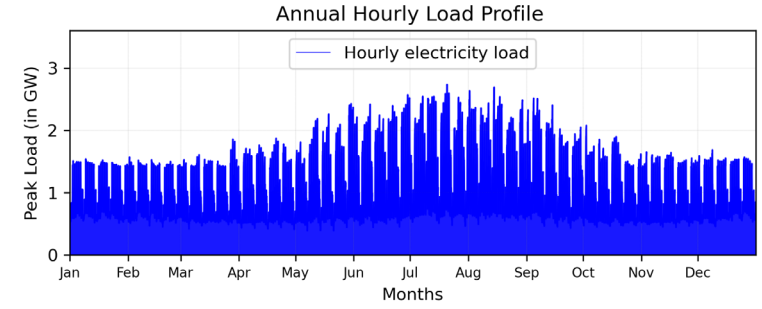
[1] *Site EUI and electric/site ratios of building models calibrated from the EPA dataset.*

[2] *EUI targets and electrification targets considered from Maryland's BEPS .*

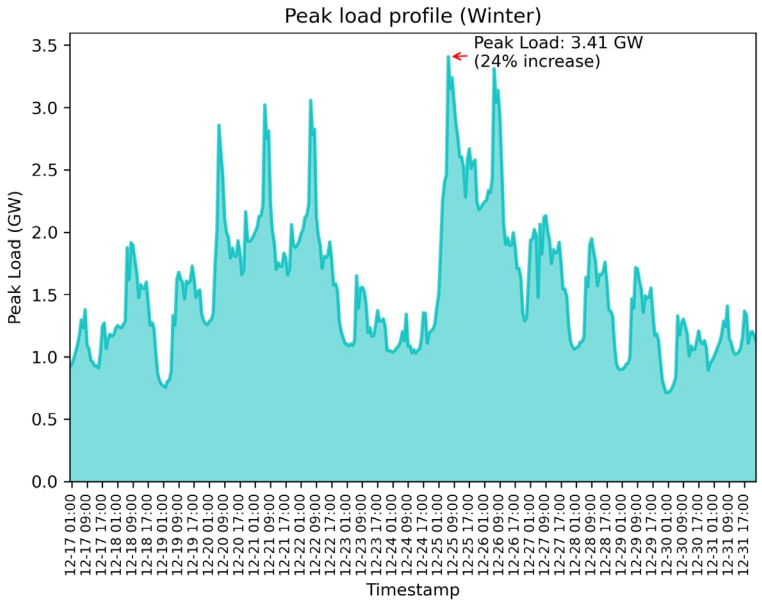
Peak load impacts

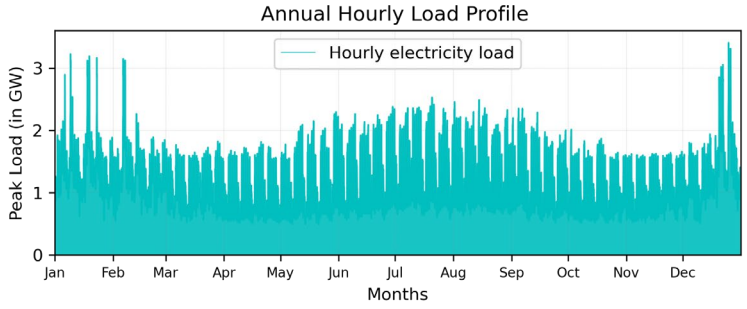
- Peak loads: Shift from summer to winter peaks and increase in magnitude for both scenarios.
- EE targets can not only mitigate electrification-induced peak loads but also marginally reduce existing peaks.



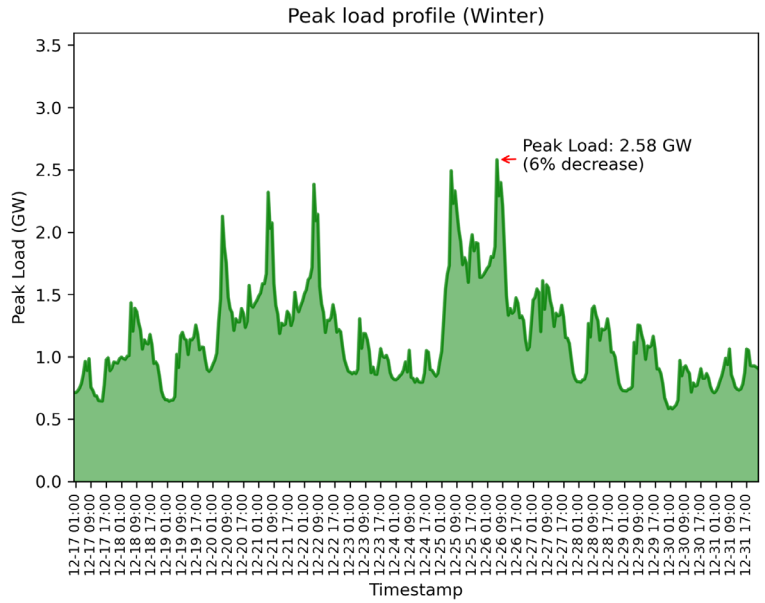


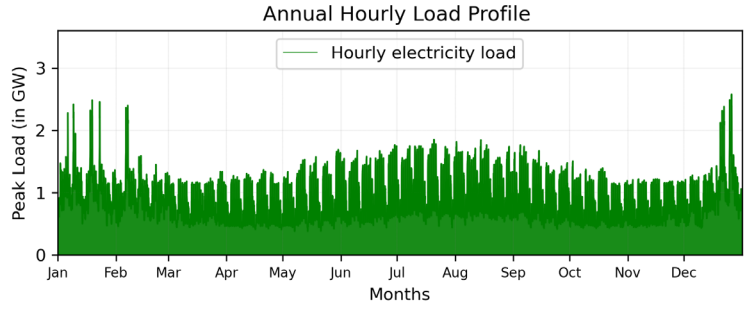
Baseline 2025





Electrification 2040

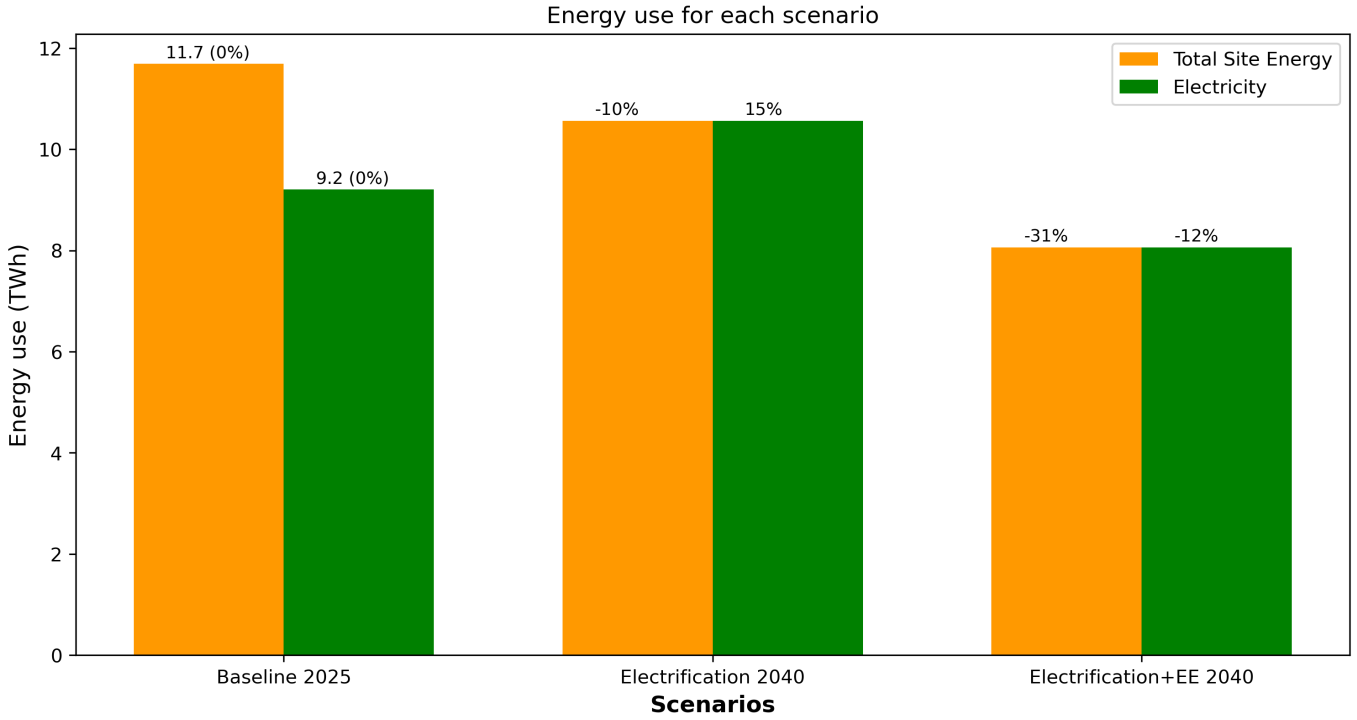




Electrification +EE 2040

Energy use impacts

- Site energy use: Implementing EE targets alongside electrification targets can result in a threefold reduction in site energy use compared to electrification-only targets.
- Electricity Use: Parallel EE targets can lead to a 31% decrease in annual site energy and 12% electricity use compared to the 2025 baseline scenario.



Assumptions and boundaries

- Absolute values of the results may vary from ground truth data due to sampling and upscaling errors.
- Impacts of changing climate and extreme weather events have not been accounted for.
- Typical energy efficiency packages considered. The analysis is sensitive to assumptions related to Heat Pump COPs, lighting, and system upgrades.