

Energy Balance and Analysis

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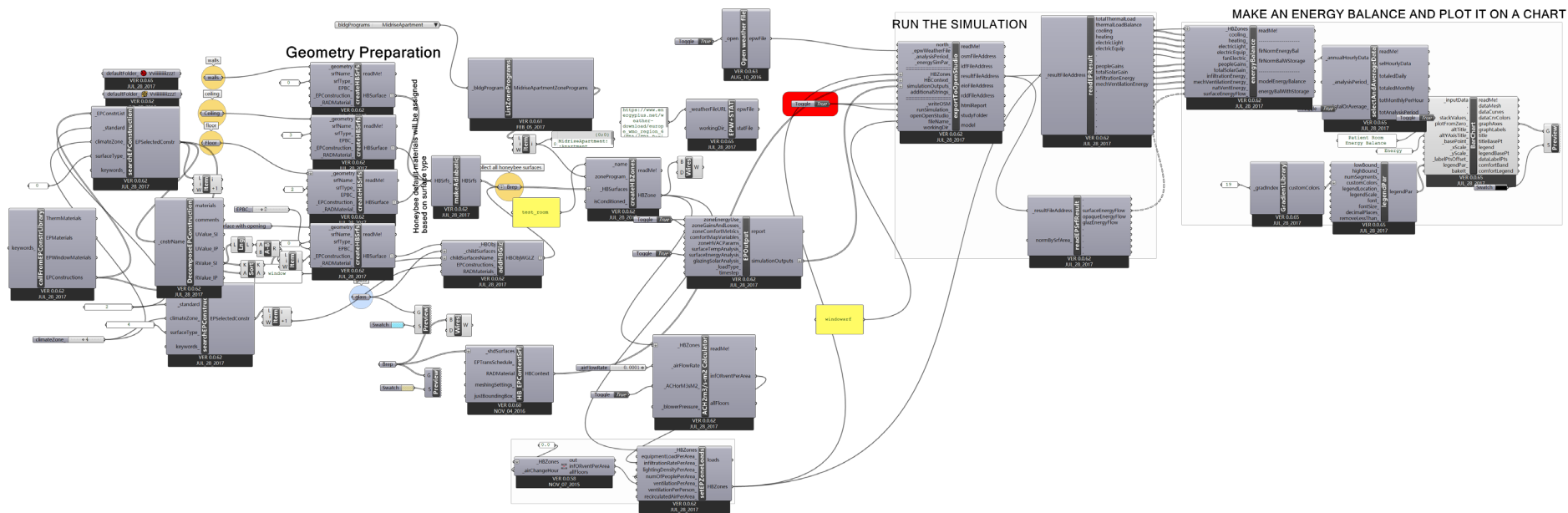
Arch 753 Building Performance Simulation

Instructor: Mostapha S. Roudsari

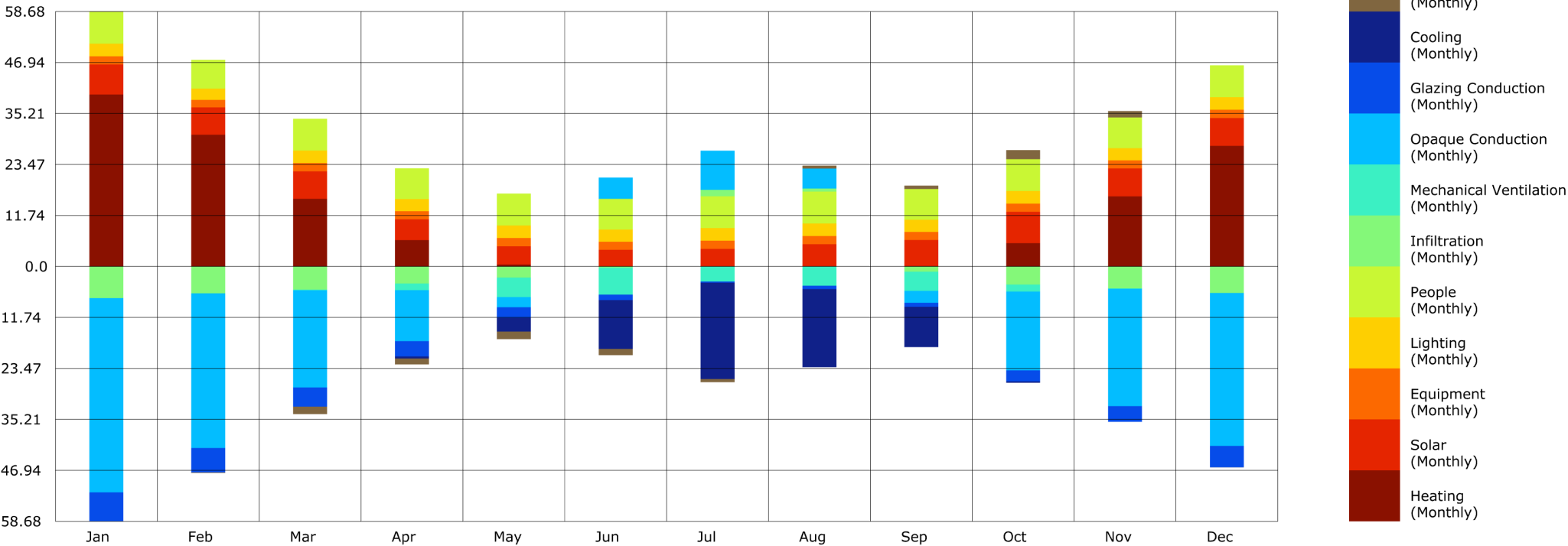
University of Pennsylvania

School of Design

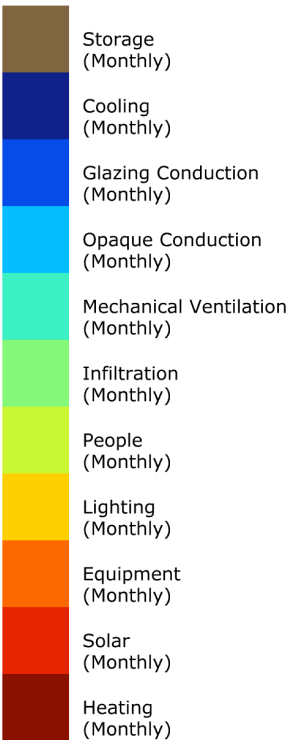
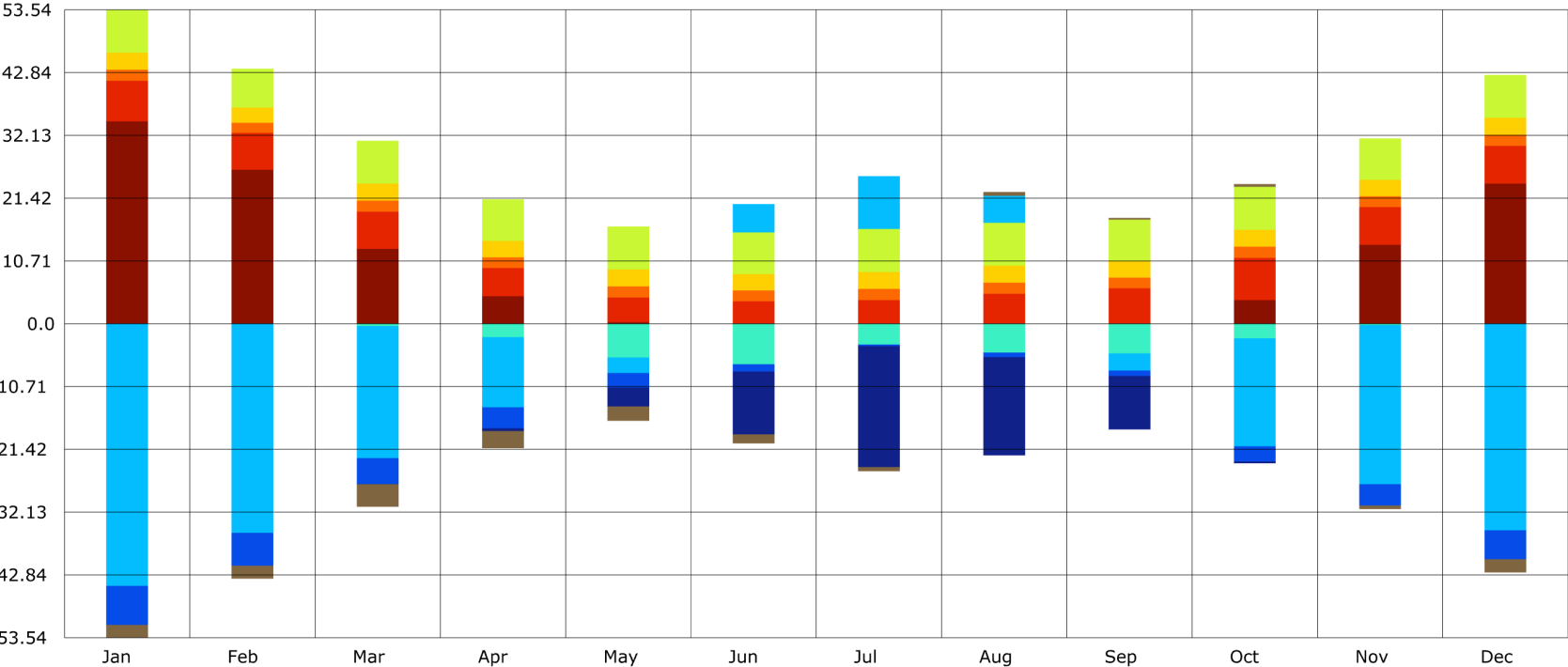
Energy Balance



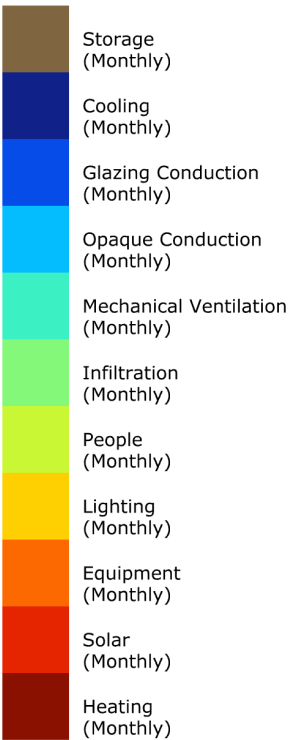
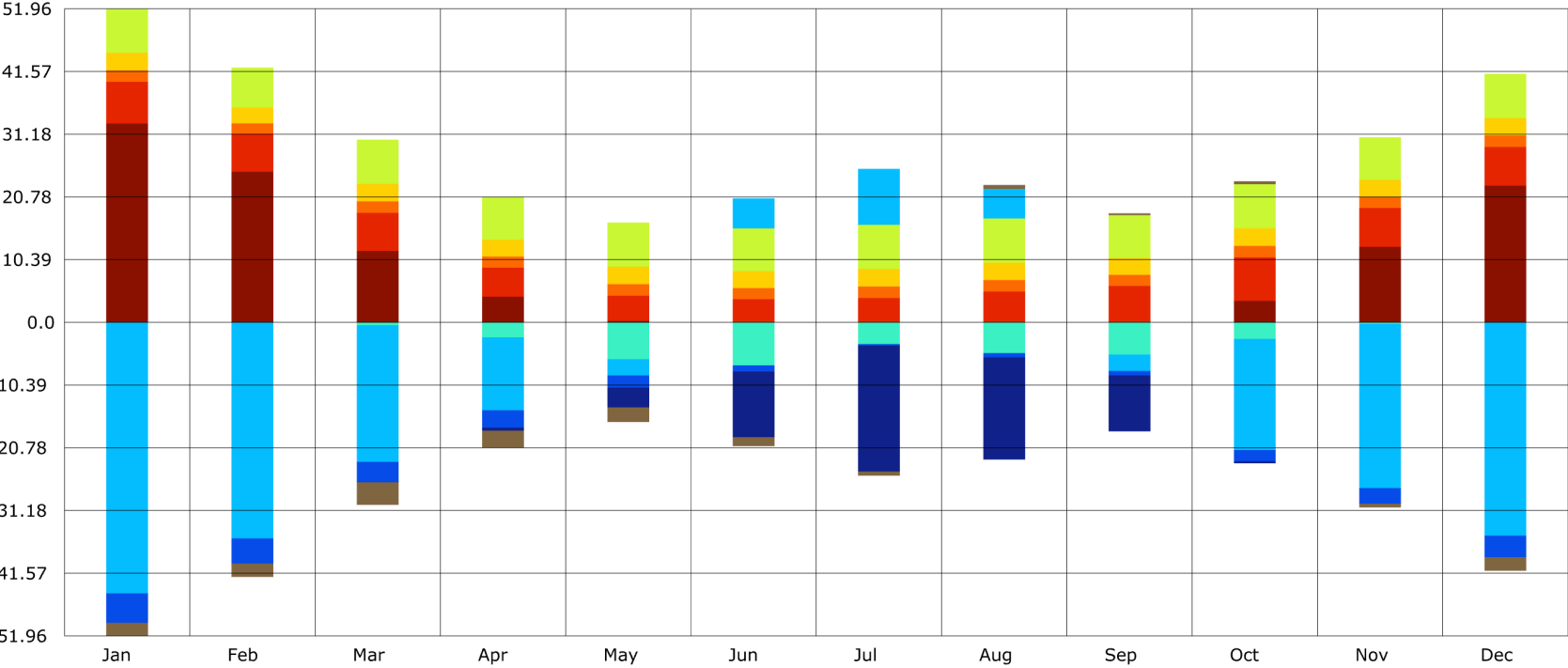
Default: Ventilation Rate = 1ACH



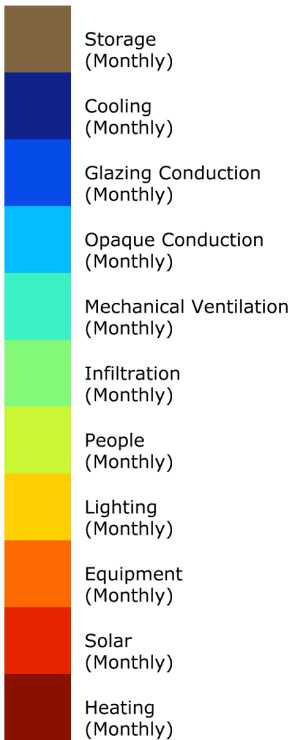
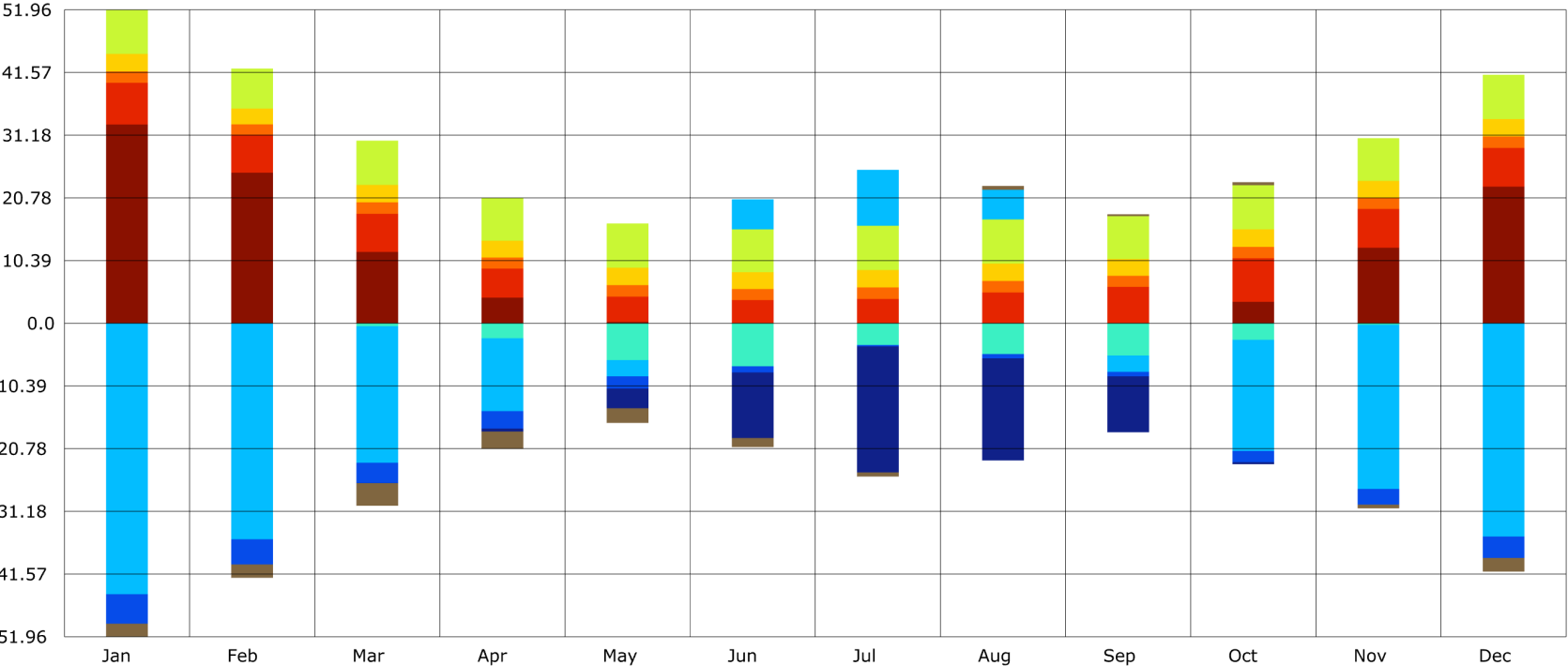
Infiltration Rate = 0.0001m³/m²



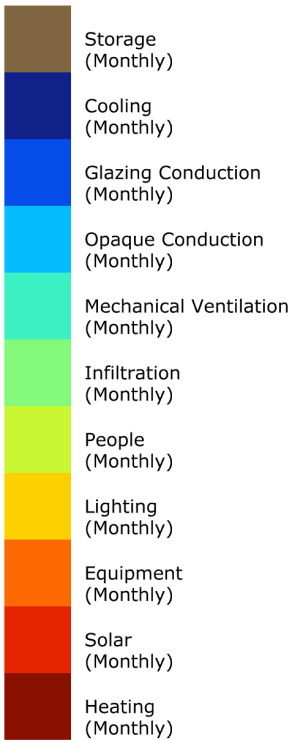
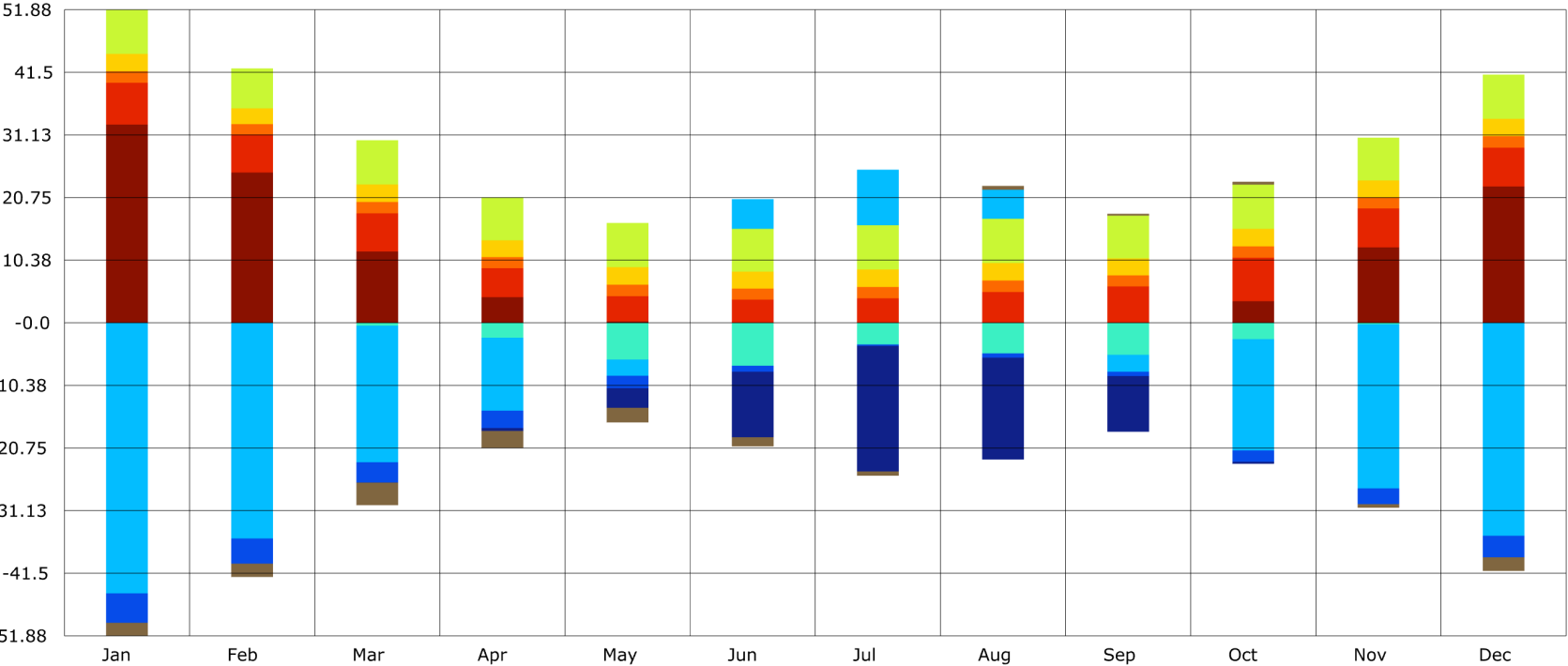
Non-Metal Window



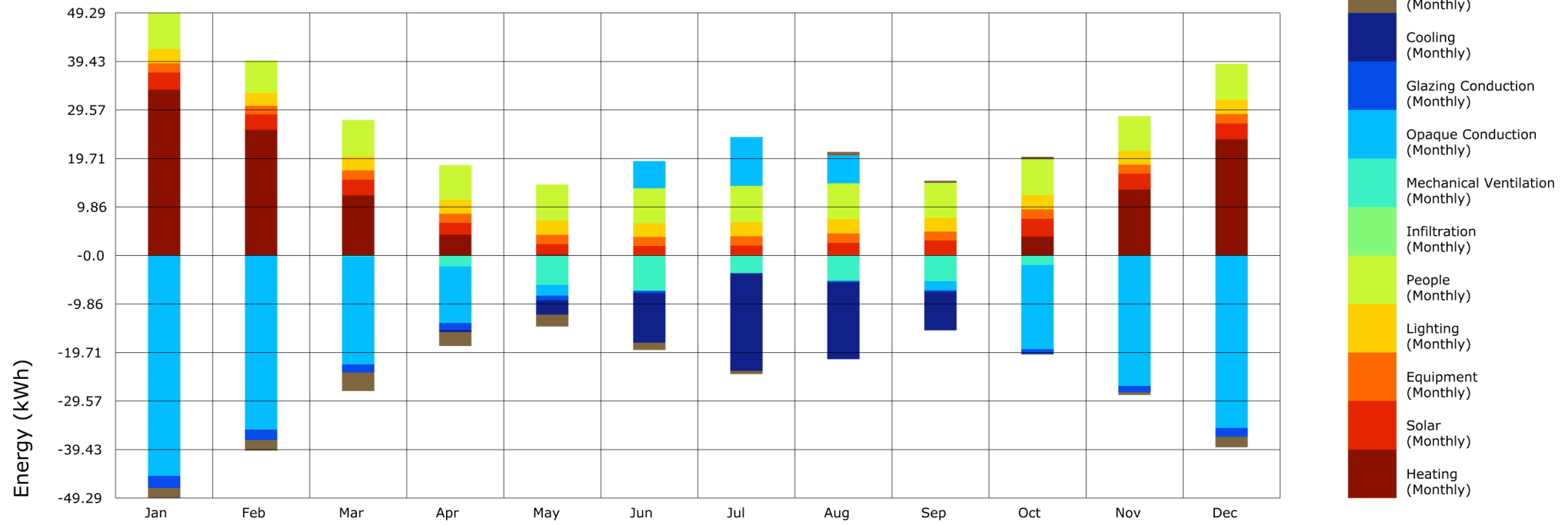
Exterior Wall: Mass



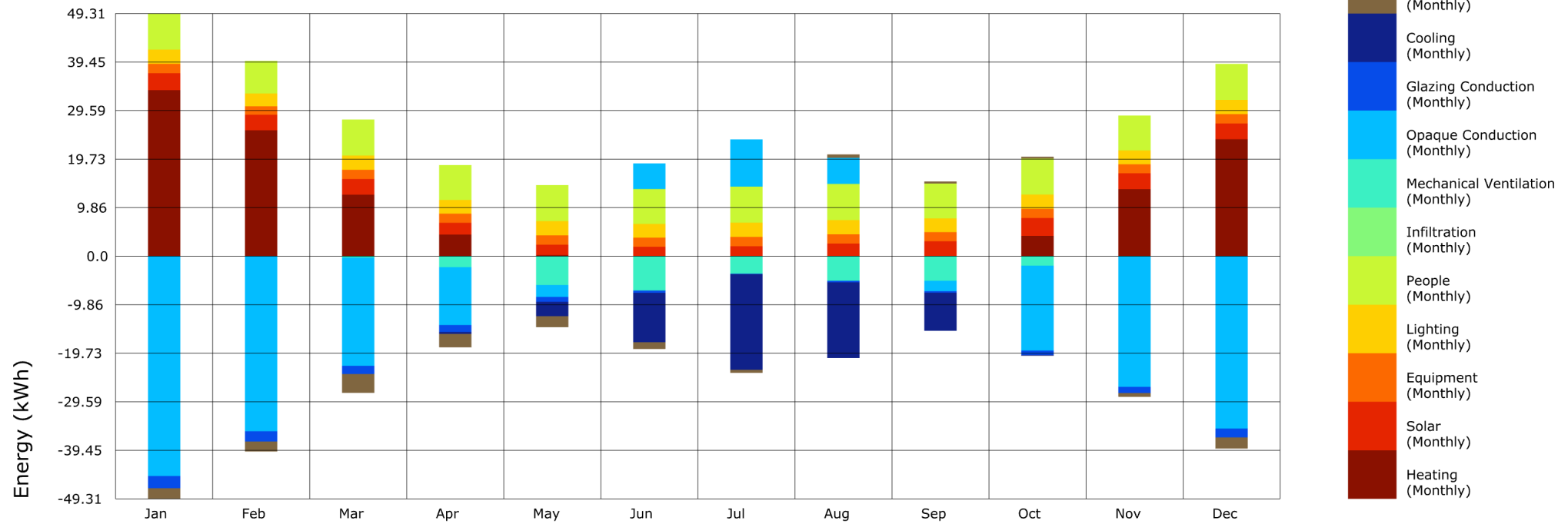
Exterior Wall: Mass Alt Res



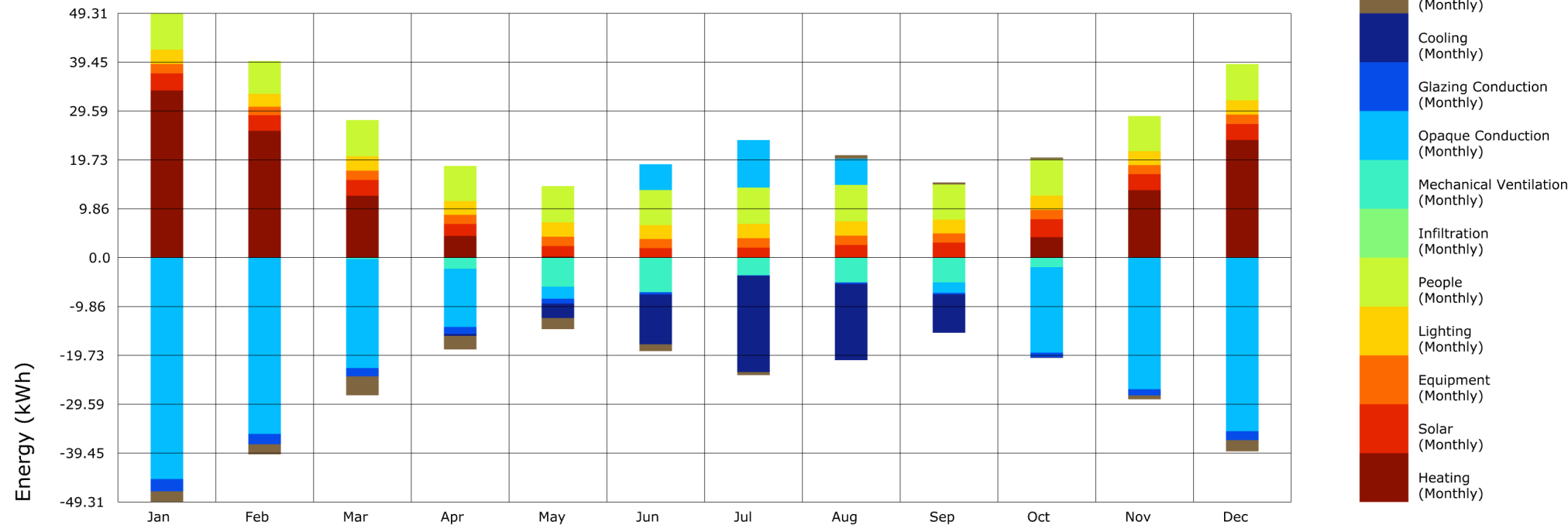
Window Area Halfed



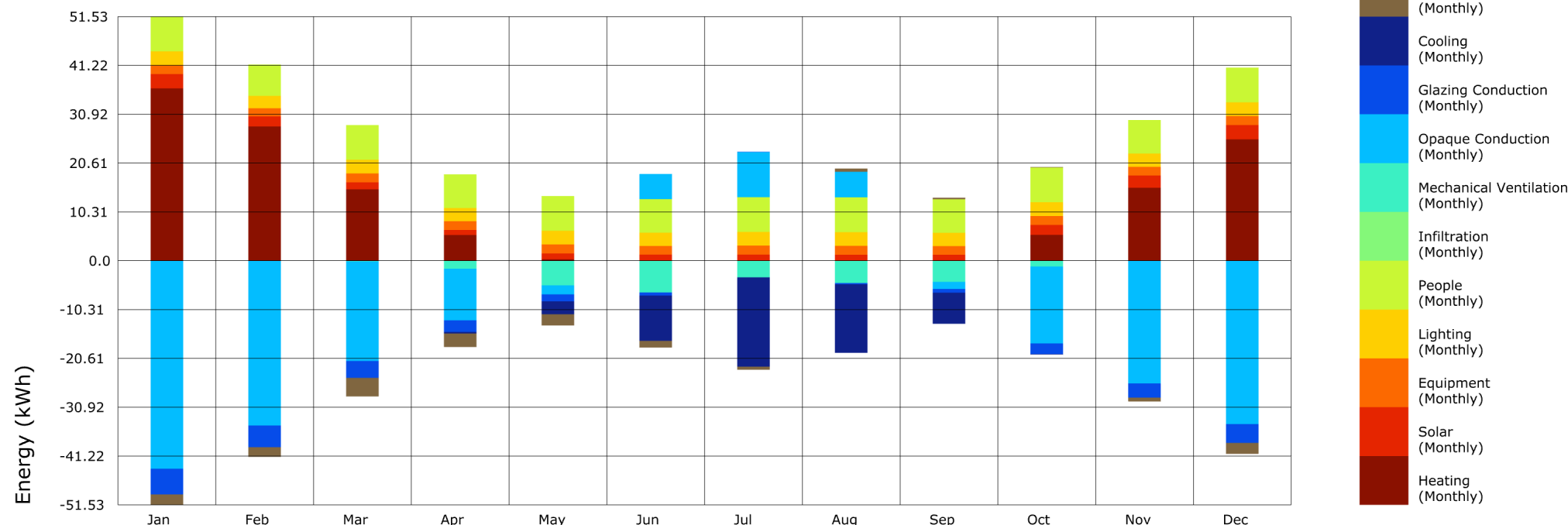
Exterior Wall: Max R Value



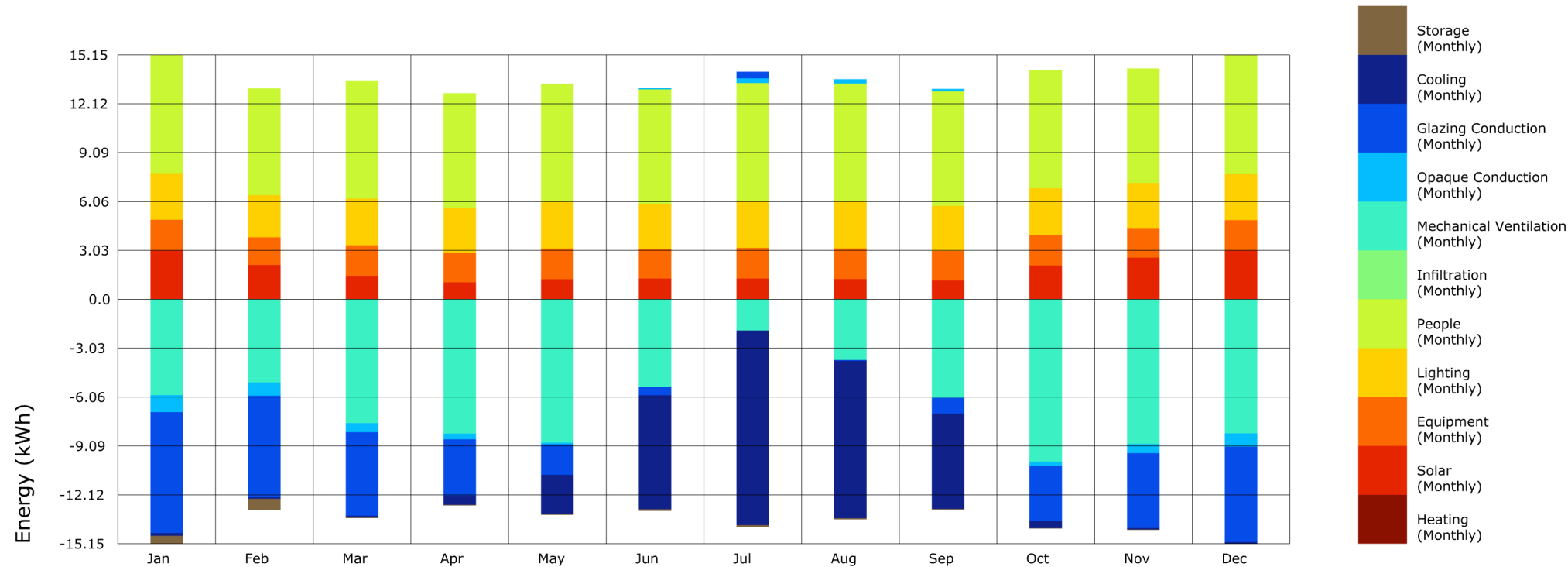
Air Change Rate: 1/Day



With Shading



Inner Walls, Roof and Slabs Set Adiabatic



From the analysis above, heat conduction of the enclosure within the building contributes the most to the energy loss, while human activities tops after setting the indoor enclosure components adiabatic. Other factors only slightly affect the energy balance.