Supplementary Material S1:

Occupant Survey for Occupancy Schedules and Usage Patterns in a Residential Building

To support EnergyPlus simulations for assessing building performance metrics (Primary Energy Consumption, CO_2-equivalent Emissions, Indoor Air Quality, Predicted Percentage of Dissatisfied, and Visual Discomfort Hours) in a residential building occupied by three residents (a couple and their child), structured interviews were conducted to determine occupancy schedules and usage patterns. The following questionnaire, consisting of 15 questions, was designed to collect data from the residents, informing simulation inputs such as air flow rate (P9), glazing properties (P11), and HVAC system settings (P25). The survey captures typical behavior in a residential context, ensuring realistic modeling of sustainable building design.

Q1. Occupancy Schedule: During a typical week, what are the regular hours of presence for each resident (adult 1, adult 2, child) in the home? Please specify for each day (Monday–Sunday), including start and end times.

Q2. Absence Periods: How often and for how long is the home unoccupied by all residents (e.g., work hours, school hours)? Please provide average duration and frequency per day.

Q3. Lighting Usage: How frequently do you adjust lighting controls (e.g., turning lights on/off, dimming) in different rooms (e.g., living room, kitchen, bedrooms)? Do you primarily rely on natural daylight or artificial lighting? Please estimate daily hours of artificial lighting use per room.

Q4. HVAC Preferences: Do you adjust thermostat settings or ventilation controls (e.g., opening windows, using fans or air conditioning)? If yes, what are your preferred temperature ranges and ventilation habits (e.g., frequency of window opening)?

Q5. Equipment Usage: What electrical appliances (e.g., TV, kitchen appliances, computers) are used regularly, and for how many hours per day? Please list devices and their typical usage duration for each resident.

Q6. Comfort Feedback: On a scale of 1–5 (1 = very uncomfortable, 5 = very comfortable), how would you rate thermal comfort (e.g., temperature, humidity) and visual comfort (e.g., glare, lighting levels) in the home? Please specify any issues (e.g., too warm, excessive glare in specific rooms).

Q7. Seasonal Variations: Do occupancy patterns or equipment usage change significantly across seasons (e.g., increased heater use in winter)? Please provide details.

Q8. Window and Shading Usage: How often do you use window shades, blinds, or curtains to control daylight or temperature? Please specify frequency and times of day (e.g., morning, afternoon) for each room.

Q9. Child-Specific Activities: What activities does the child engage in that may affect energy use or comfort (e.g., studying with lights on, using electronic devices)? Please estimate duration and frequency per day.

Q10. Additional Comments: Are there any other factors affecting your home usage (e.g., remote work, school holidays, or special activities)? Please provide details.

Q11. Physical Activity Levels: What are the typical physical activity levels of each resident (adult 1, adult 2, child) while at home (e.g., sedentary activities like reading, moderate activities like cooking or cleaning, or high-intensity activities like exercising)? Please estimate the average duration and frequency of these activities per day for each resident.

Q12. Clothing Preferences: What types of clothing do residents typically wear at home in different seasons (e.g., light clothing like t-shirts, medium clothing like sweaters, or heavy clothing like coats)? Please specify the typical clothing insulation level (e.g., light, medium, heavy) for each resident and season, and how often these change (e.g., daily, weekly).

Q13. Activity-Related Ventilation Needs: Do specific activities (e.g., cooking, exercising, or other high-metabolic-rate activities) prompt residents to adjust ventilation (e.g., opening windows, turning on fans)? If yes, please specify the activity, frequency, and duration of ventilation adjustments.

Q14. Clothing and Thermal Comfort: Do residents adjust their clothing (e.g., adding or removing layers) in response to indoor temperature changes to maintain thermal comfort? If yes, please describe the frequency and types of clothing adjustments (e.g., adding a sweater, changing to lighter clothing) for each resident.

Q15. Interaction with Physical Activity and HVAC: How do physical activity levels influence your HVAC usage (e.g., adjusting thermostat settings or ventilation due to feeling warmer during exercise)? Please provide details on how often and in what way activity levels affect HVAC adjustments for each resident.