Construction and U-values for the different age classes

The following tables include a description of typical construction materials and corresponding U-values for each building component and age class. The input data is collected from the "TABULA Master File" (http://episcope.eu/communication/download/) of the IEE projects TABULA/EPISCOPE (www.episcope.eu).

Table S1 AB_01 (before 1956): Construction and respective U-values for the different components of the initial building and for the standard renovation.

Component	Description initial built	U-value initial built (W/m²K)	Description standard renovation	U-value standard renovation (W/m²K)
Roof	150x200 mm beams with pugging (clay)	0.75	Replace pugging with 100 mm mineral wool	0.30
External wall	Bricks non-insulated or concrete with 75 mm wood fibre plate	0.82	50 mm additional min wool on the outside	0.41
Windows	Two ordinary panes in coupled frames	2.50	Double-glazed window, one LE-coating, air-filled	1.90
Floor	150x200 mm beams with pugging (clay)	0.75	Replace pugging with 100 mm mineral wool	0.30

Table S2 AB_02 (1956-1970): Construction and respective U-values for the different components of the initial building and for the standard renovation.

Component	Description initial built	U-value initial built (W/m²K)	Description standard renovation	U-value standard renovation (W/m²K)
Roof	Concrete slab, 100 mm mineral wool	0.32	50 mm additional mineral wool in cold attic	0.23
External wall	Concrete, 100 mm air-entrained concrete	0.96	100 mm additional mineral wool on the outside	0.29
Windows	Double-glazed window, regular glass, air-filled	2.60	Double-glazed window, one LE-coating, air-filled	1.90
Floor	Concrete floor, 50 mm mineral wool	0.49	50 mm additional min wool in cold basement	0.32

Table S3 AB_03 (1971-1980): Construction and respective U-values for the different components of the initial building and for the standard renovation.

Component	Description initial built	U-value initial built (W/m²K)	Description standard renovation	U-value standard renovation (W/m²K)
Roof	Concrete slab, 180 mm mineral wool, compact roof.	0.21	70 mm additional mineral wool (250 mm total)	0.14
External wall	Frame-built timber wall, 100 mm mineral wool, 50 mm thermal bridge barrier	0.34	50 mm additional mineral wool on the outside + brick veneer	0.18
Windows	Double-glazed window, regular glass, air-filled	2.60	Double-glazed window, one LE-coating, air-filled	1.90
Floor	Concrete floor, 100 mm mineral wool, unheated basement	0.31	50 mm additional min wool in cold basement	0.26

Table S4 AB_04 (1981-1990): Construction and respective U-values for the different components of the initial building and for the standard renovation.

Component	Description initial built	U-value initial built (W/m²K)	Description standard renovation	U-value standard renovation (W/m²K)
Roof	Concrete slab, 180 mm mineral wool, compact roof.	0.20	50 mm additional mineral wool in cold attic	0.16
External wall	Frame-built timber wall, 150 mm mineral wool, 50 mm thermal bridge barrier	0.29	50 mm additional mineral wool on the outside + brick veneer	0.17
Windows	Double-glazed window, one LE-coating, air-filled	1.90	No changes	1.90
Floor	Concrete floor, 120 mm mineral wool, unheated basement	0.25	No changes	0.25

Table S5 AB_05 (1991-2000): Construction and respective U-values for the different components of the initial building and for the standard renovation.

Component	Description initial built	U-value initial built (W/m²K)	Description standard renovation	U-value standard renovation (W/m²K)
Roof	Concrete slab, 180 mm mineral wool, compact roof.	0.20	50 mm additional mineral wool in cold attic	0.16
External wall	Frame-built timber wall, 150 mm mineral wool, 50 mm thermal bridge barrier	0.29	50 mm additional mineral wool on the outside + brick veneer	0.17
Windows	TEK 87-window	2.40	Double-glazed window, one LE-coating, air-filled	1.90
Floor	Concrete floor, 120 mm mineral wool, unheated basement	0.25	No changes	0.25

Table S6 AB_06 (2001-2010): Construction and respective U-values for the different components of the initial building and for the standard renovation.

Component	Description initial built	U-value initial built (W/m²K)	Description standard renovation	U-value standard renovation (W/m²K)
Roof	Concrete hollow core slab, 220 mm mineral wool	0.14	No changes	0.14
External wall	Frame-built timber wall, 150 mm mineral wool, 50 mm thermal bridge barrier	0.27	50 mm additional mineral wool on the outside + brick veneer	0.16
Windows	TEK 97-window	1.60	TEK 10-window	1.20
Floor	Concrete hollow core slab, 220 mm mineral wool	0.13	No changes	0.13

Table S7 AB_07 (2010-2020): Construction and respective U-values for the different components of the initial building.

Component	Description initial built	U-value initial built (W/m^2K)
Roof	Concrete hollow core slab, 220 mm mineral wool	0.14
External wall	Frame-built timber wall, 200 mm mineral wool, 100 mm thermal bridge barrier	0.22
Windows	TEK 10-window	1.20
Floor	250 mm insulation board, 100 mm reinforced concrete	0.14

Table S8 AB_08 (after 2020): Construction and respective U-values for the different components of the initial building.

Component	Description initial built	U-value initial built (W/m^2K)
Roof	Passive house, typical roof	0.09
External wall	Passive house, typical wall	0.12
Windows	Passive house window	0.80
Floor	Passive house, typical floor	0.14

Results from AB_01-02 and AB_06-08

The following graphs shows the simulated hourly values for supply and return temperature, indoor air temperature in the day room and total mass flow rate in the heating system relative to the outdoor temperature. The results are presented for the two dimensioning temperature levels 80/60 and 60/40 °C, as well as for each of the simulated building types, except for AB_04 and AB_05, which is similar to AB_03.

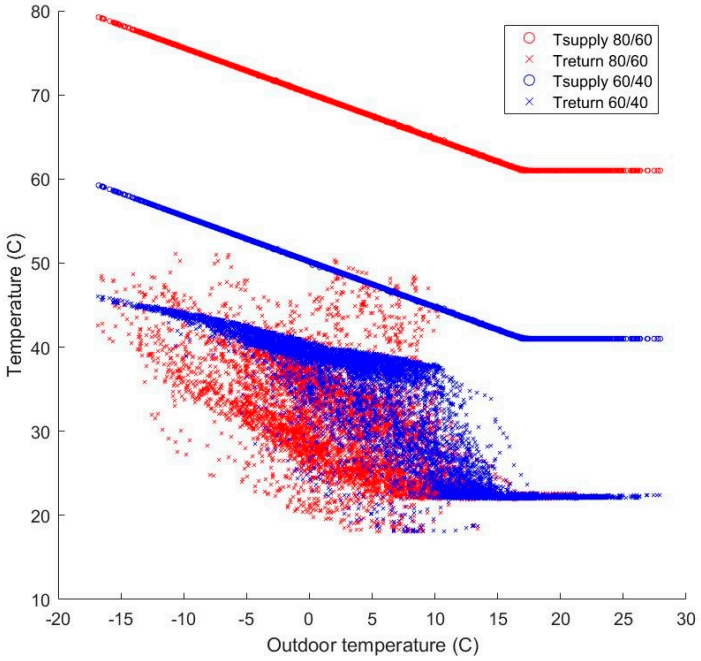

Figure S1 Radiator supply and return temperatures relative to outdoor temperature for AB_01 as-built.

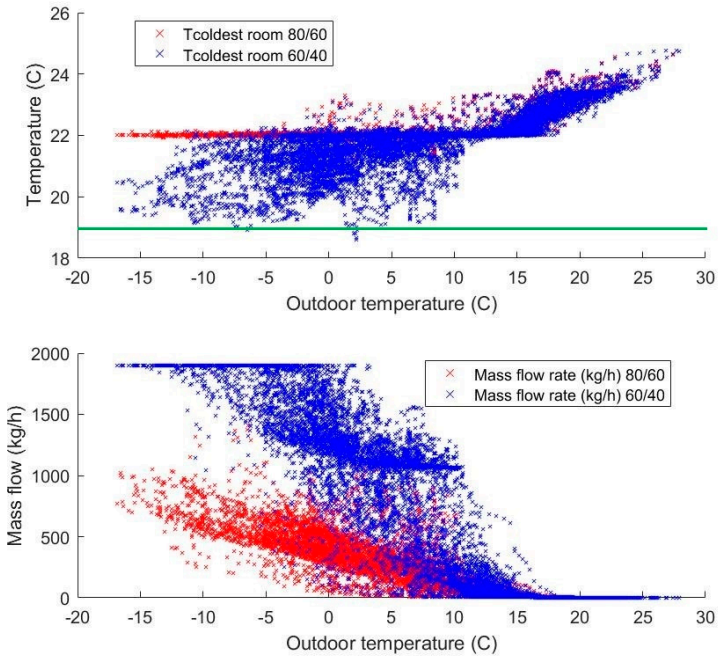

Figure S2 Temperature in the coldest room (top) and mass flow rates (bottom) relative to the outdoor temperature for AB_01 as-built.

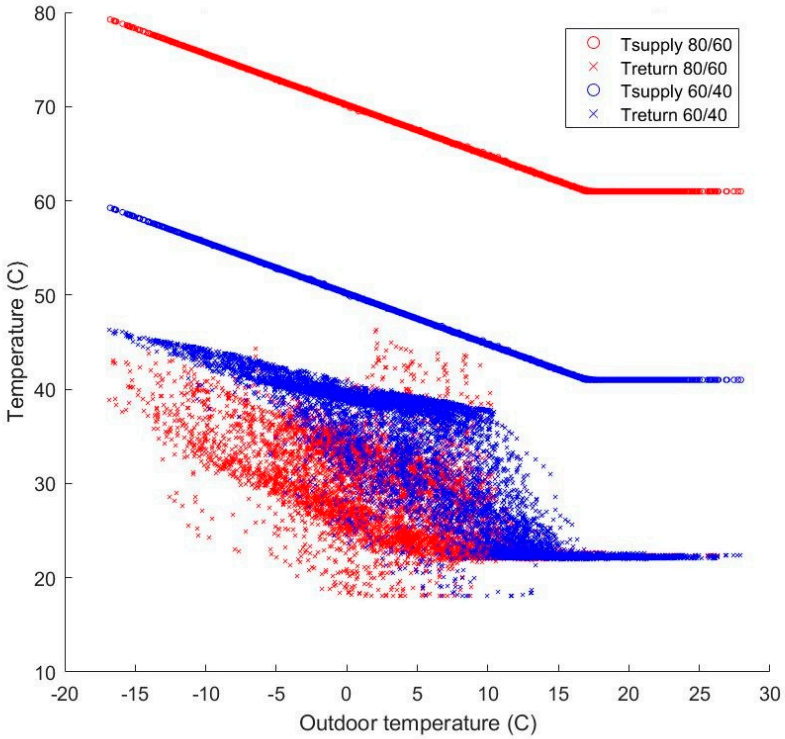

Figure S3 Radiator supply and return temperatures relative to outdoor temperature for AB_01 intermediate renovated.

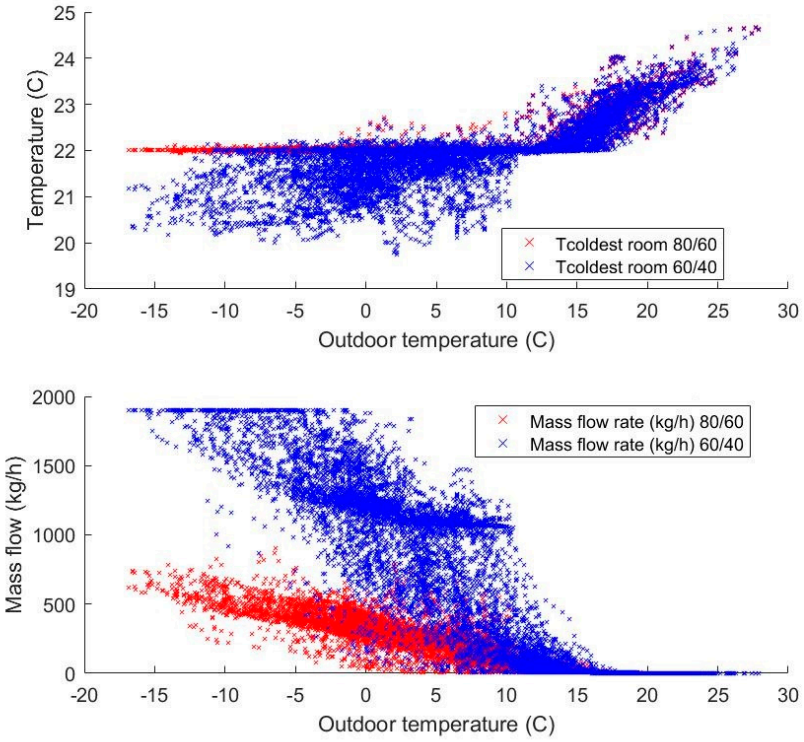

Figure S4 Temperature in the coldest room (top) and mass flow rates (bottom) relative to the outdoor temperature for AB_01 intermediate renovated.

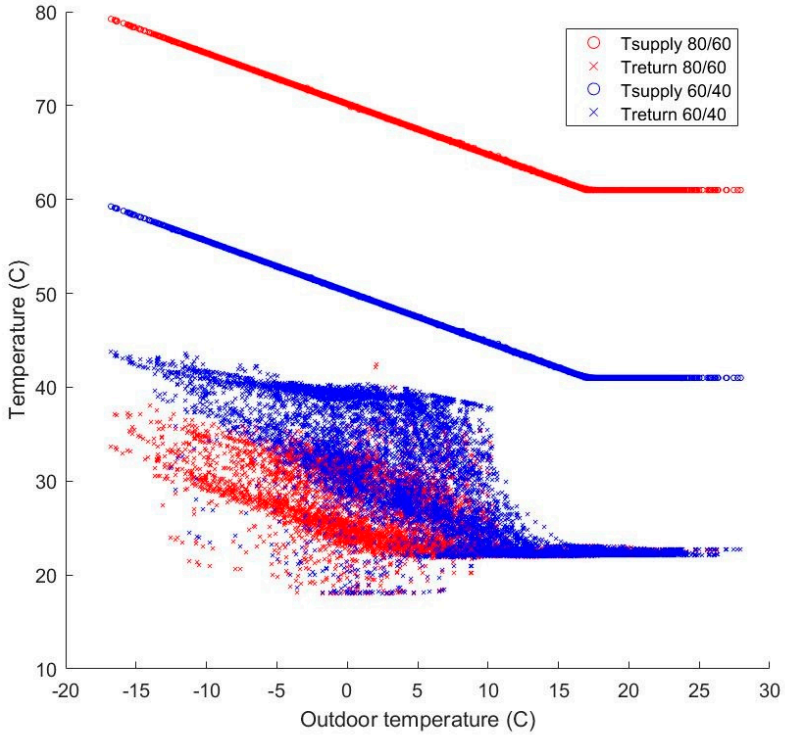

Figure S5 Radiator supply and return temperatures relative to outdoor temperature for AB_01 standard renovated.

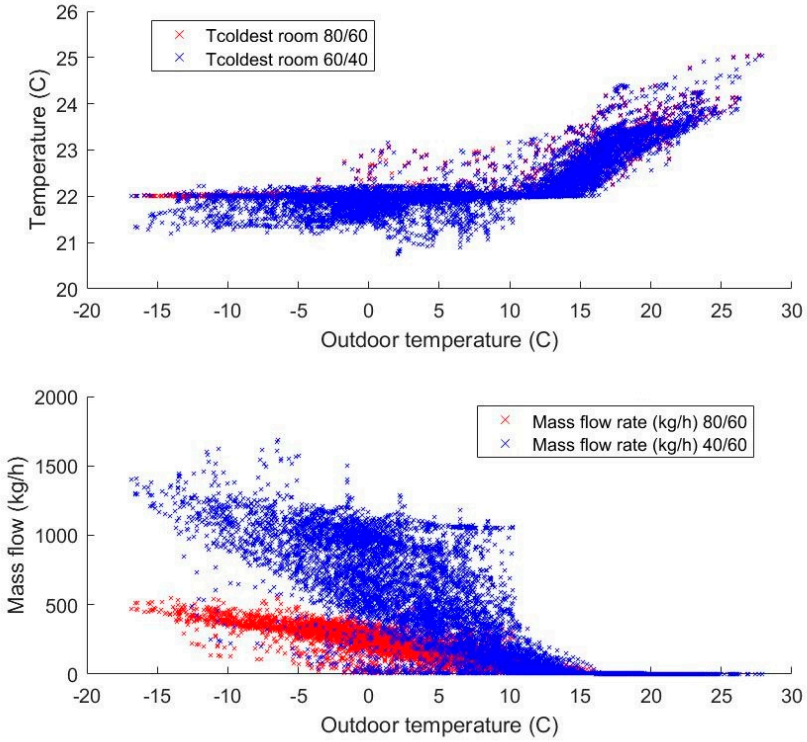

Figure S6 Temperature in the coldest room (top) and mass flow rates (bottom) relative to the outdoor temperature for AB_01 standard renovated.

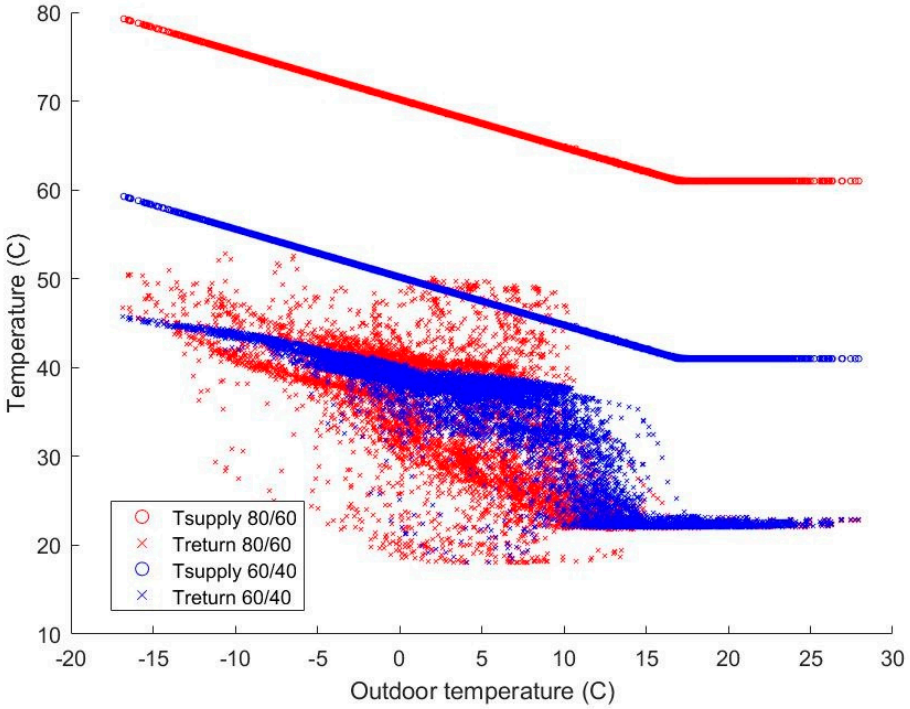

Figure S7 Radiator supply and return temperatures relative to outdoor temperature for AB_02 as-built.

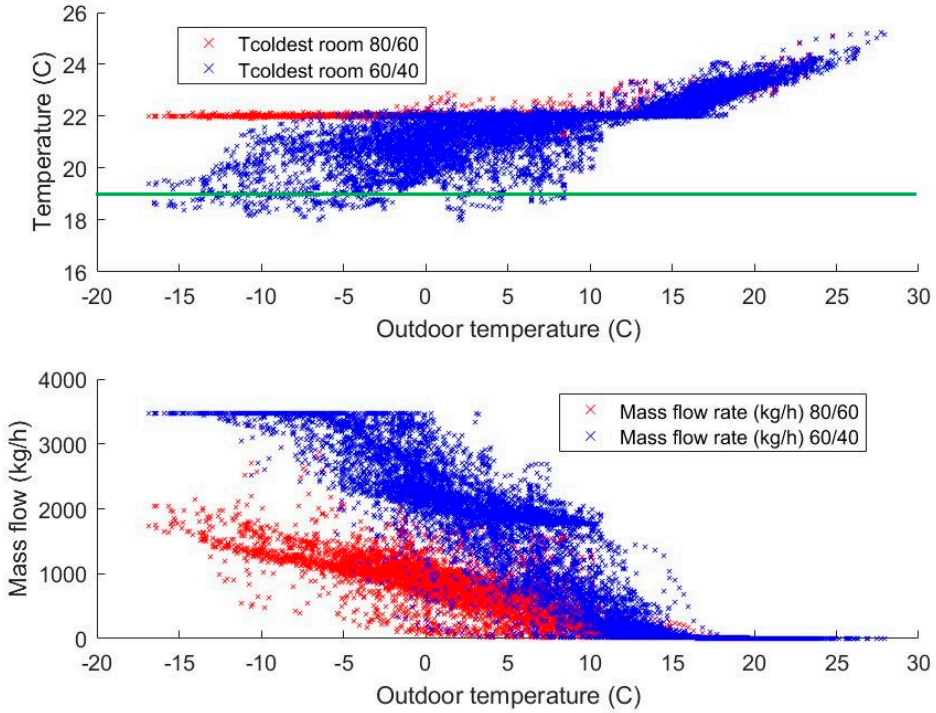

Figure S8 Temperature in the coldest room (top) and mass flow rates (bottom) relative to the outdoor temperature for AB_02 as-built.

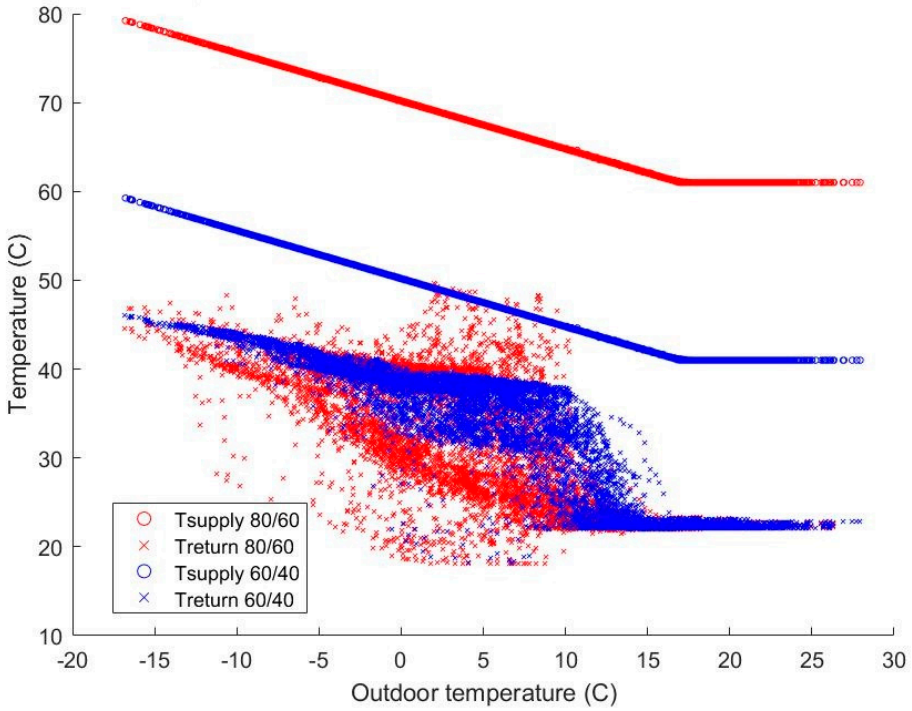

Figure S9 Radiator supply and return temperatures relative to outdoor temperature for AB_02 intermediate renovated.

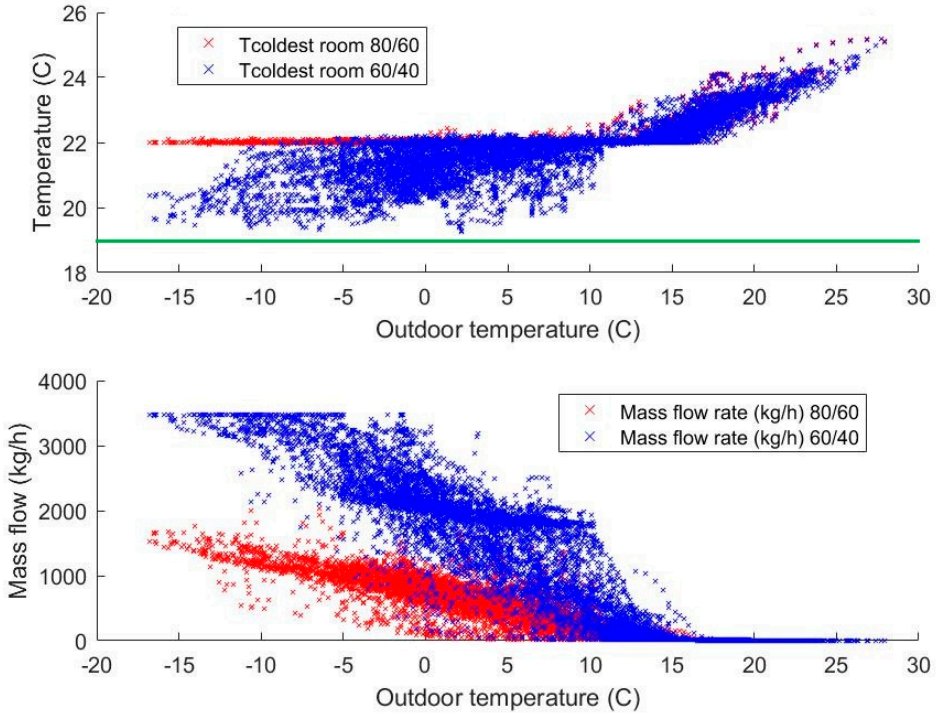

Figure S10 Temperature in the coldest room (top) and mass flow rates (bottom) relative to the outdoor temperature for AB_02 intermediate renovated.

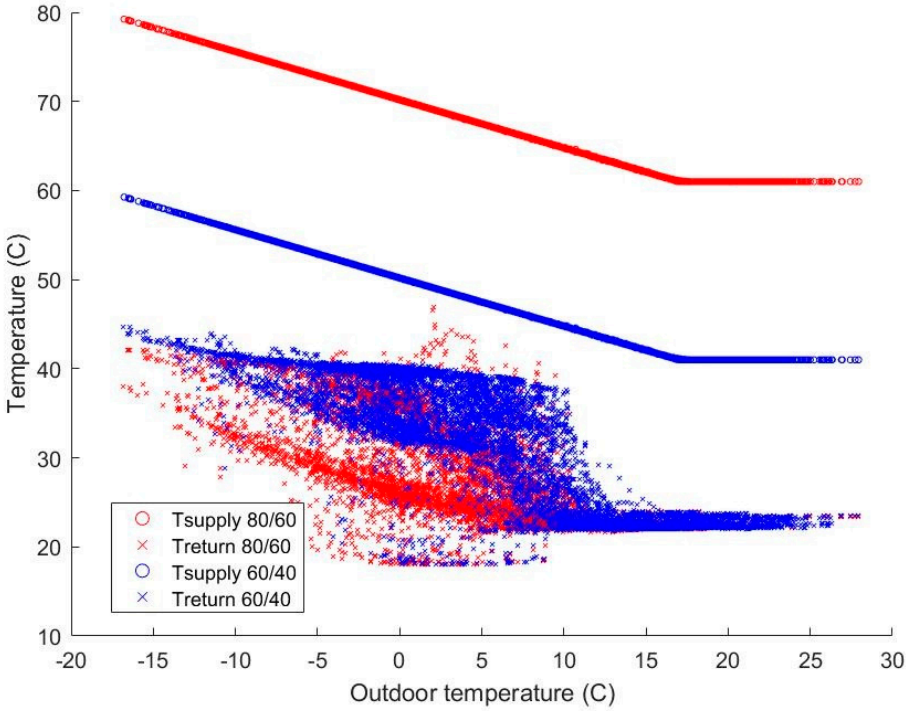

Figure S11 Radiator supply and return temperatures relative to outdoor temperature for AB_02 standard renovated.

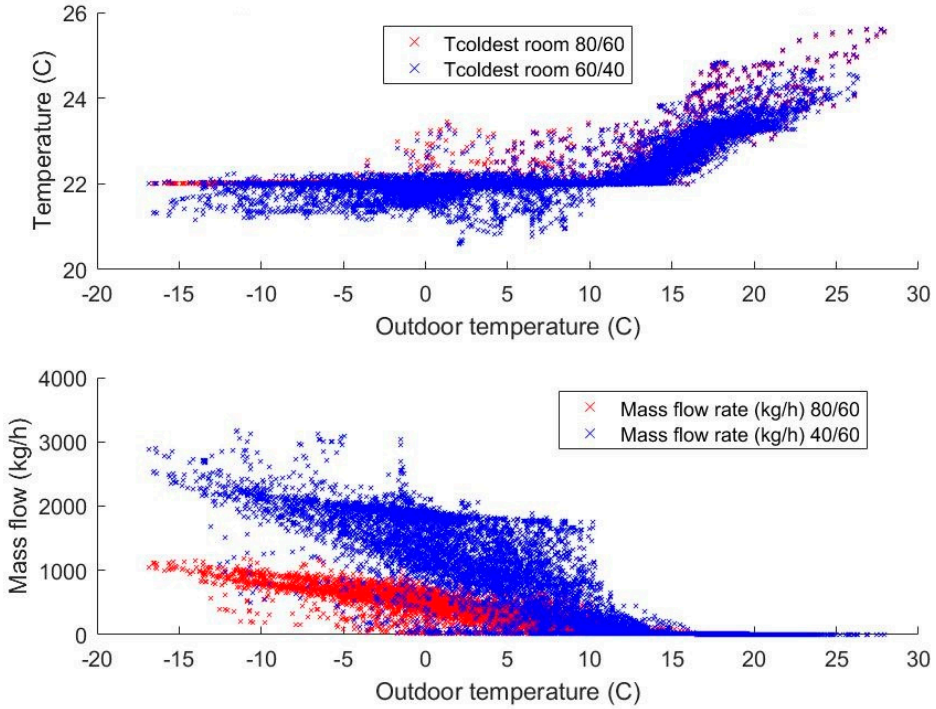

Figure S12 Temperature in the coldest room (top) and mass flow rates (bottom) relative to the outdoor temperature for AB_02 standard renovated.

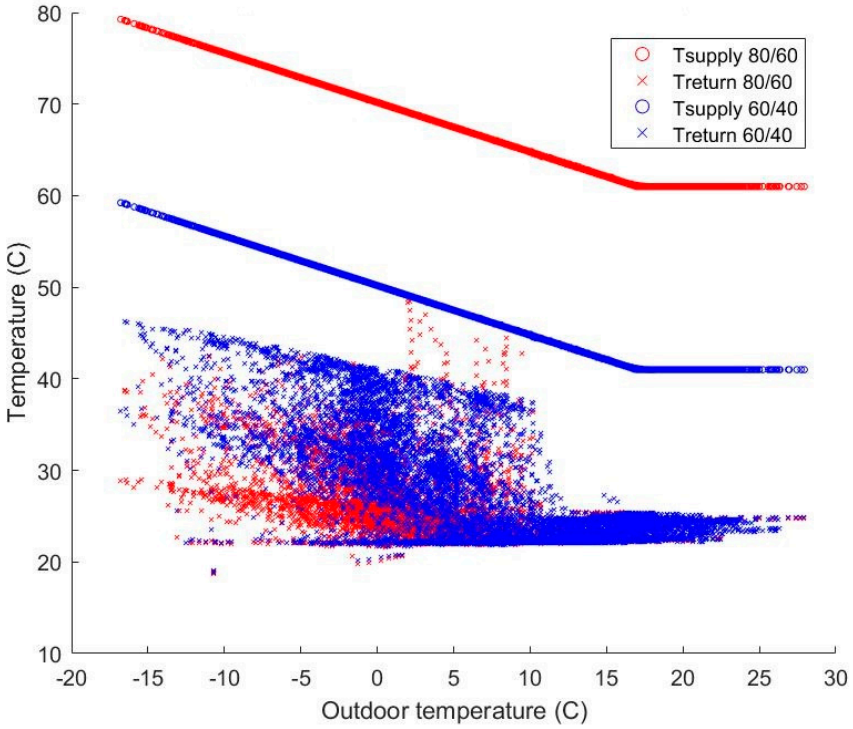

Figure S13 Radiator supply and return temperatures relative to outdoor temperature for AB_06 as-built.

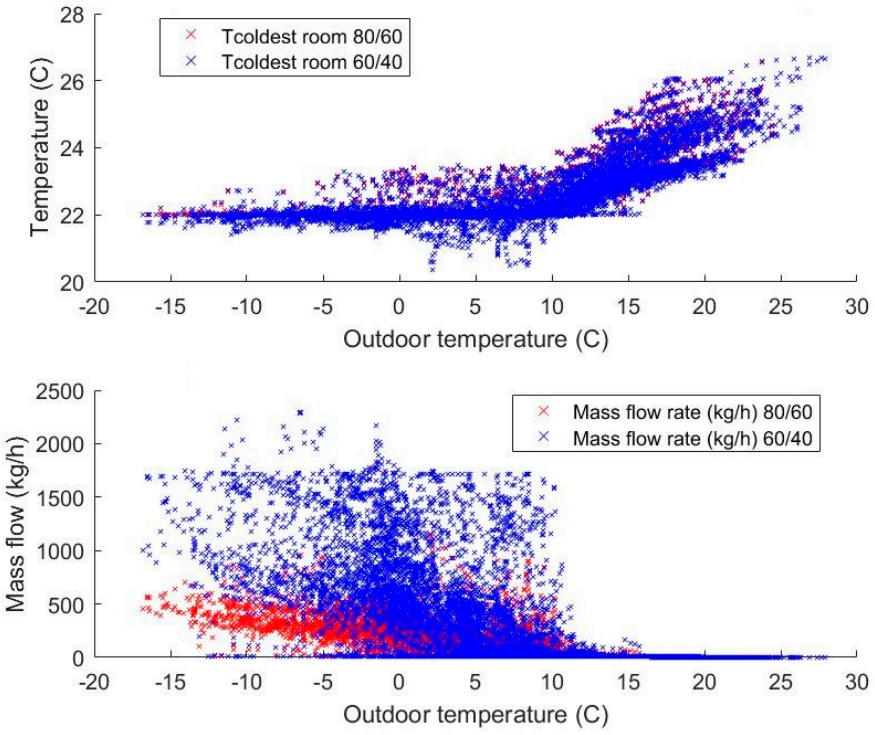

Figure S14 Temperature in the coldest room (top) and mass flow rates (bottom) relative to the outdoor temperature for AB_06 as-built.

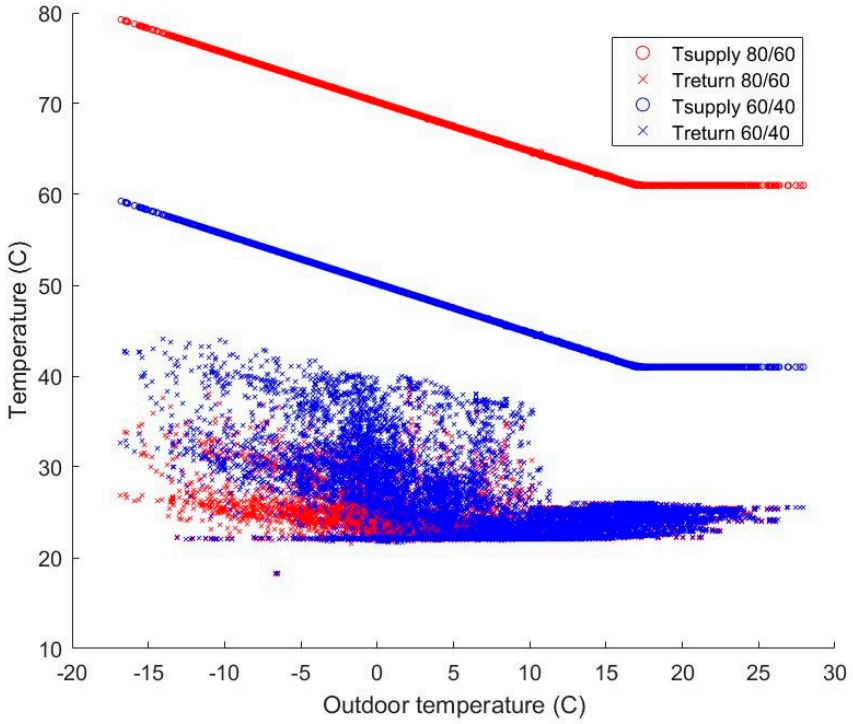

Figure S15 Radiator supply and return temperatures relative to outdoor temperature for AB_06 intermediate renovated.

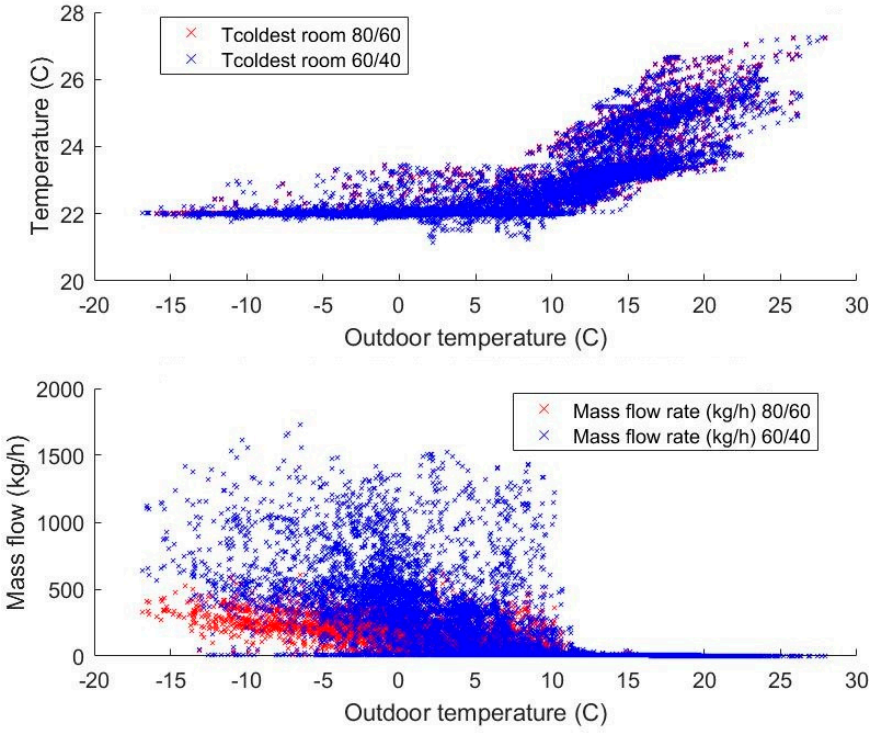

Figure S16 Temperature in the coldest room (top) and mass flow rates (bottom) relative to the outdoor temperature for AB_06 intermediate renovated.

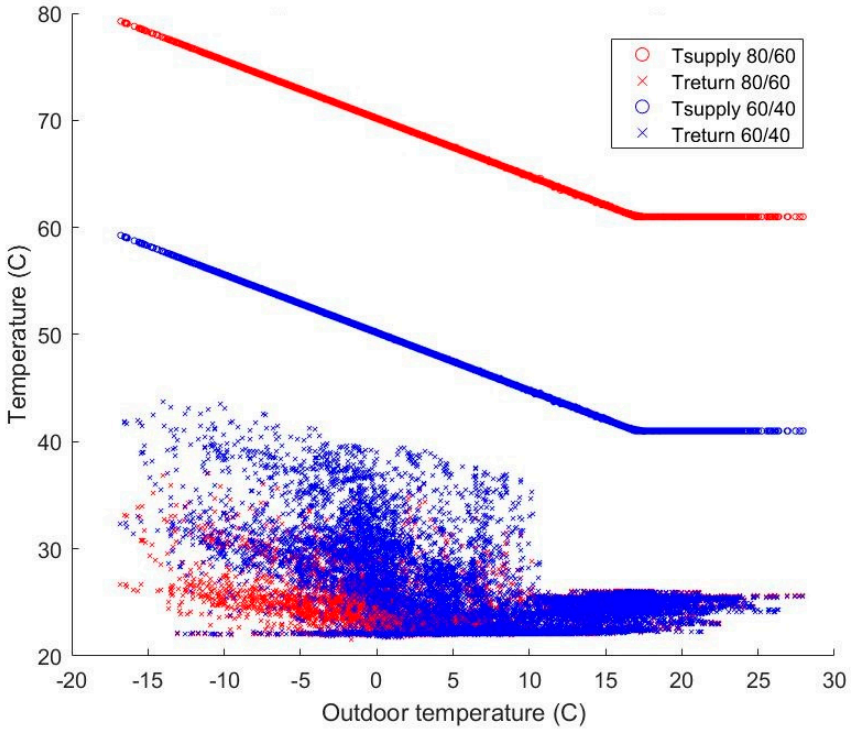

Figure S17 Radiator supply and return temperatures relative to outdoor temperature for AB_06 standard renovated.

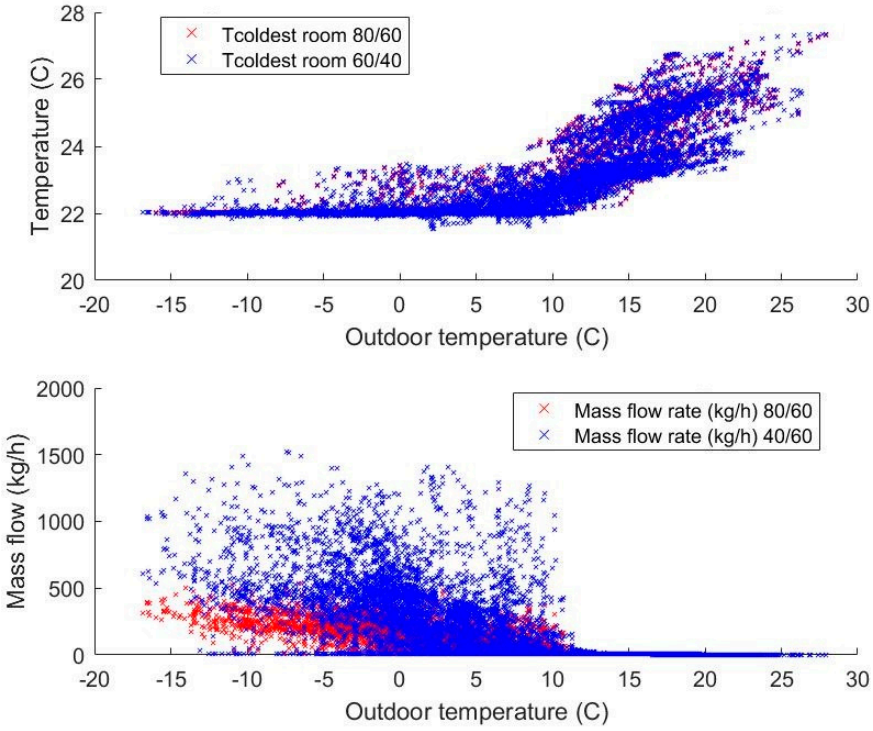

Figure S18 Temperature in the coldest room (top) and mass flow rates (bottom) relative to the outdoor temperature for AB_06 standard renovated.

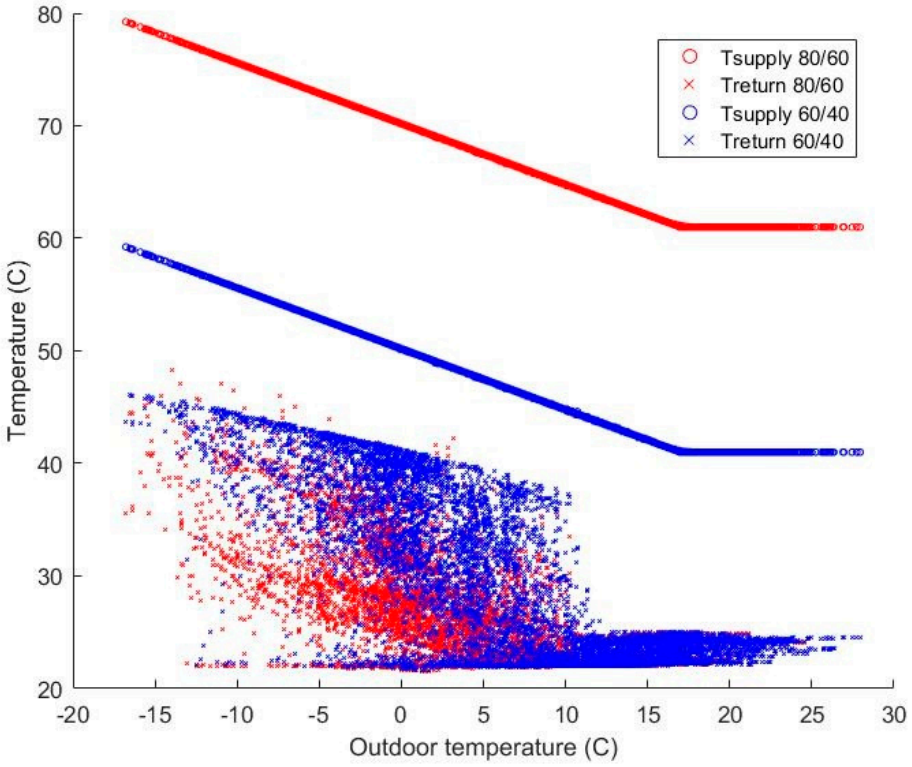

Figure S19 Radiator supply and return temperatures relative to outdoor temperature for AB_07 as-built.

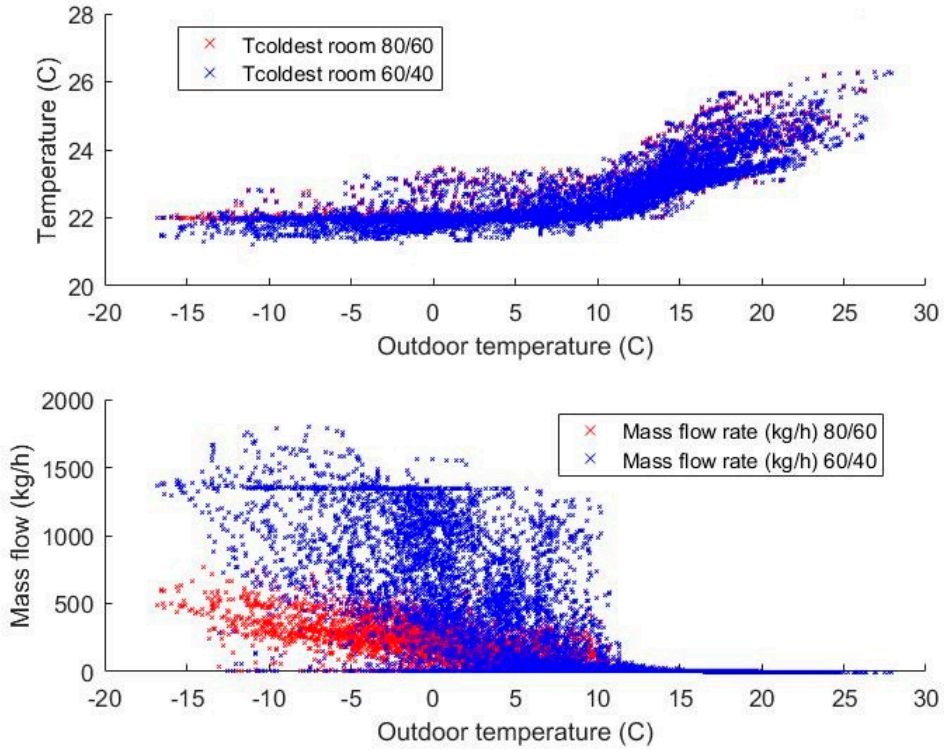

Figure S20 Temperature in the coldest room (top) and mass flow rates (bottom) relative to the outdoor temperature for AB_07 as-built.

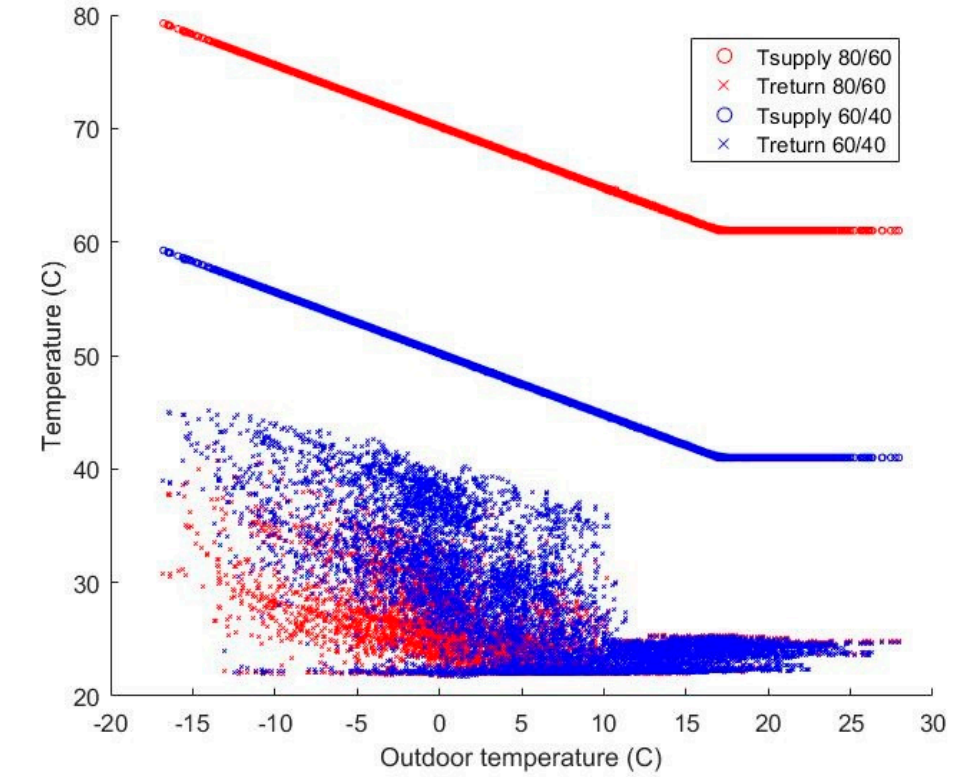

Figure S21 Radiator supply and return temperatures relative to outdoor temperature for AB_07 intermediate renovated.

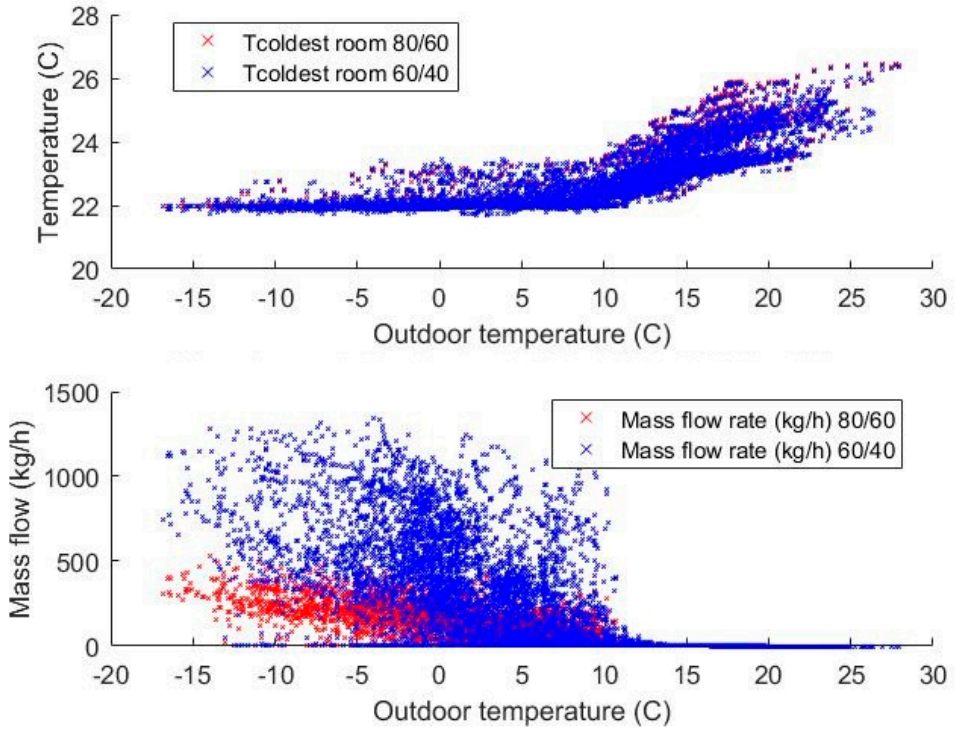

Figure S22 Temperature in the coldest room (top) and mass flow rates (bottom) relative to the outdoor temperature for AB_07 intermediate renovated.

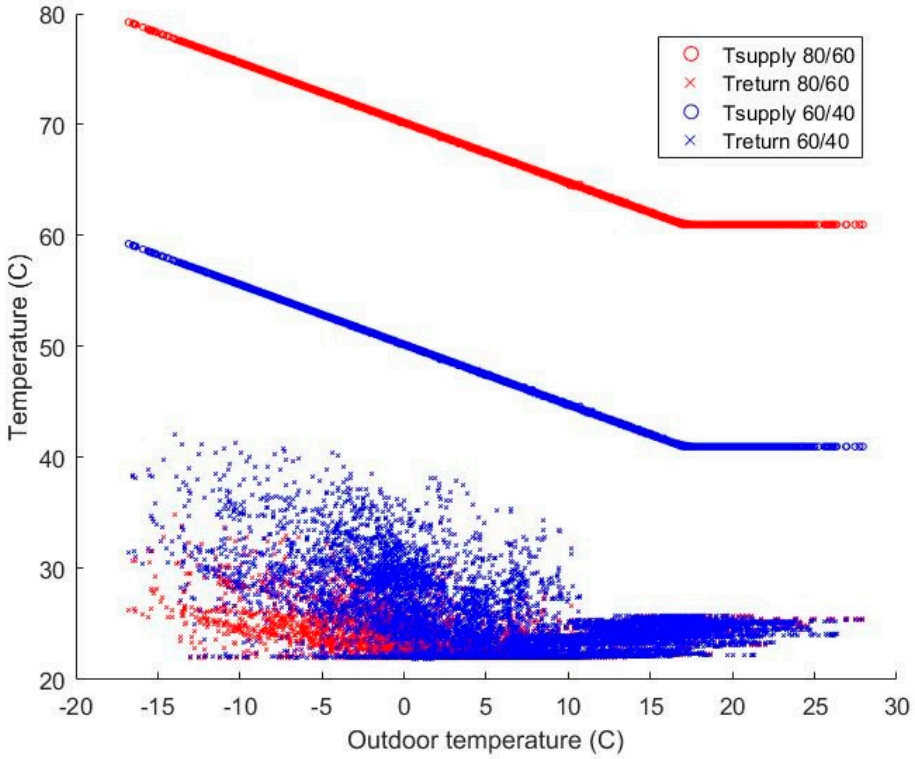

Figure S23 Radiator supply and return temperatures relative to outdoor temperature for AB_08 as-built.

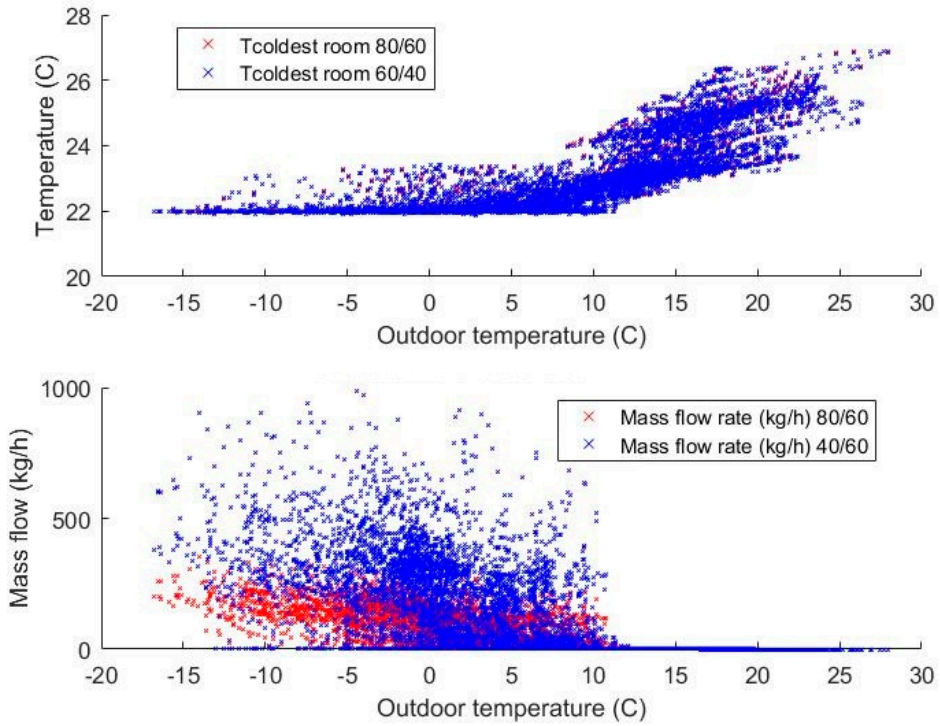

Figure S24 Temperature in the coldest room (top) and mass flow rates (bottom) relative to the outdoor temperature for AB_08 as-built.