

SUPPLEMENTARY MATERIAL

The Supplementary Material is divided in two items (SMI and SMII).

SMI – Materials and Methods

Part of data used in Materials and Methods are presented in Tables S1 – S3.

Table S1. Datasets used in the Life cycle GHG emissions inventory.

Materials production	
Cement	Cement, limestone 6-10% {BR} market for cement, limestone 6-10% Cut-off, U
Fly ash	Supplementary cementitious materials {BR} market for supplementary cementitious materials Cut-off, U
Hydrated lime	Lime, hydrated, packed {BR} market for lime, hydrated, packed Cut-off, U
Metakaolin	Calcined clay {BR} market for calcined clay Cut-off, U
Earth	Clay {RoW} market for clay Cut-off, U
Sand	Sand {BR} market for sand Cut-off, U
Water	Tap water {BR} market for tap water Cut-off, U
Calcium chloride	Calcium chloride {RoW} market for calcium chloride Cut-off, U
Plasticiser	Plasticiser, for concrete, based on sulfonated melamine formaldehyde {GLO} market for Cut-off, U
Transportation	
Transportation	Transport, freight, lorry 16-32 metric ton, euro3 {RoW} market for transport, freight, lorry 16-32 metric ton, EURO3 Cut-off, U
Energy and fuels	
Electricity	Electricity, medium voltage ¹ {BR} market group for electricity, medium voltage Cut-off, U
Diesel	Diesel, burned in building machine {GLO} market for Cut-off, U
Waste Disposal	
Inert landfill	Process-specific burdens, inert material landfill {RoW} market for process-specific burdens, inert material landfill Cut-off, U

¹ It was adapted for two years according with data of on González-Mahecha et al. [33].

Table S2. Transportation distances.

Materials	Distance (km)
Earth	10
Cement	100
Hydrated lime	100
Metakaolin	200
Fly ash	400
Sand	30
Bamboo particles	200

Calcium Chloride	400
Plasticiser	400
Other	Distance (km)
Building to landfill	50

Table S3. Annual Electricity consumption for building.

Wall substrate	Options ¹	Cfb — Temperate/meso-thermal climate (kWh/building)	Aw — Tropical savanna climate with dry-winter (kWh/building)	Am — Tropical monsoon climate (kWh/building)
Concrete wall	EMB0 — 3	1163.8	5661.7	3487.8
	EMB3 — 3	1155.6	5637.1	3489.5
	EMB6 — 3	1161.1	5636.9	3453.7
	EMB9 — 3	1149.5	5644.9	3451.3
	CMS — 3	1186.1	5729.8	3489.5
	EMB0 — 5	1073.5	5287.6	3247.1
	EMB3 — 5	1059.3	5242.4	3245.1
	EMB6 — 5	1065.1	5172.5	3207.2
	EMB9 — 5	1050.0	5078.5	3213.9
	CMS — 5	1099.5	5474.6	3286.4
Ceramic block masonry	EMB0 — 3	1210.0	5816.0	3476.8
	EMB3 — 3	1209.6	5765.6	3473.4
	EMB6 — 3	1188.0	5757.3	3455.7
	EMB9 — 3	1188.0	5733.8	3442.7
	CMS — 3	1208.1	5792.3	3489.7
	EMB0 — 5	1070.3	5427.1	3257.6
	EMB3 — 5	1069.3	5443.7	3251.2
	EMB6 — 5	1066.6	5372.1	3260.0
	EMB9 — 5	1053.4	5343.1	3258.2
	CMS — 5	1077.6	5427.8	3340.5

¹3 – plaster thickness of 3 cm. 5 – plaster thickness of 5 cm

SMII — Results

Part of the results are presented in Figures S1—S4, considering two replacements of EMBs.

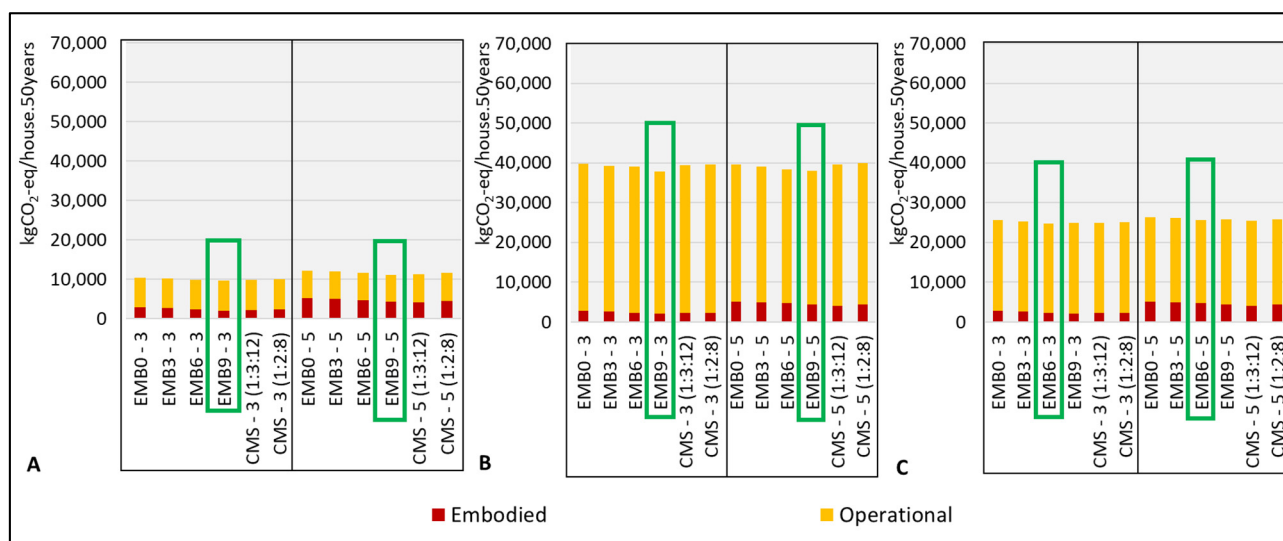


Figure S1. Total GHG emissions (embodied and operational) of all cases considering a concrete wall substrate and mortar thickness of 3 cm and 5 cm and EF_{min} — 0.130 kgCO₂-eq/kWh. (A) Cfb — Temperate/mesothermal climate. (B) Aw — Tropical savanna climate with dry-winter. (C) Am — Tropical monsoon climate. EMB — Earth mortar. CMS — Conventional, mortar. The green rectangles represent the option with smaller GHG emissions.

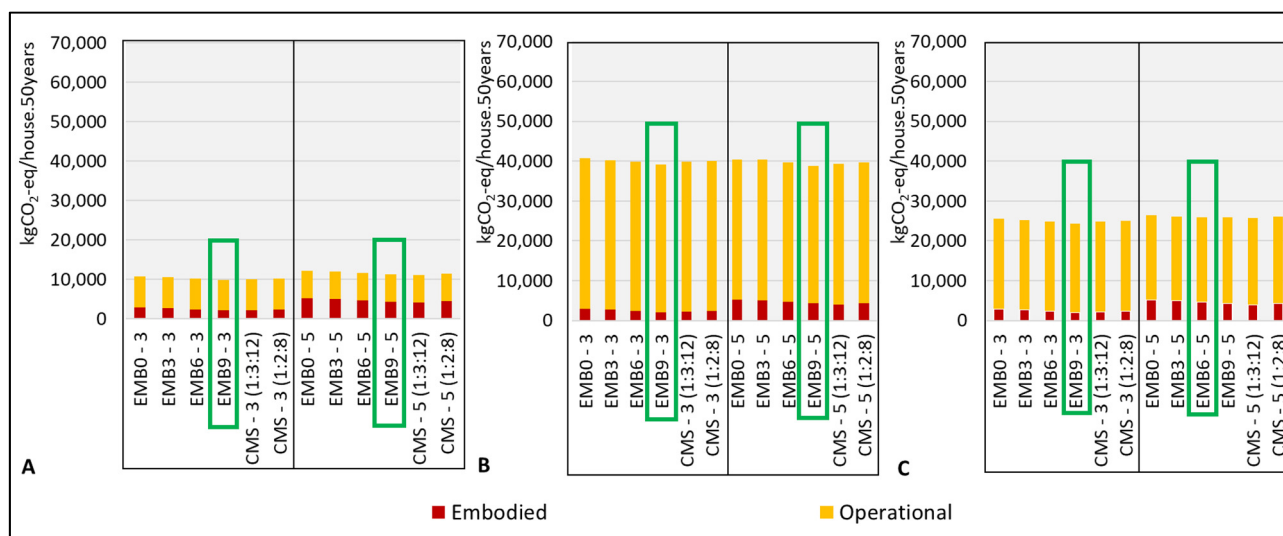


Figure S2. Total GHG emissions (embodied and operational) of all cases considering a concrete block masonry substrate and mortar thickness of 3 cm and 5 cm EF_{min} — 0.130 kgCO₂-eq/kWh. (A) Cfb — Temperate/mesothermal climate. (B) Aw — Tropical savanna climate with dry-winter. (C) Am — Tropical monsoon climate. EMB — Earth mortar. CMS — Conventional, mortar. The green rectangles represent the option with smaller GHG emissions.

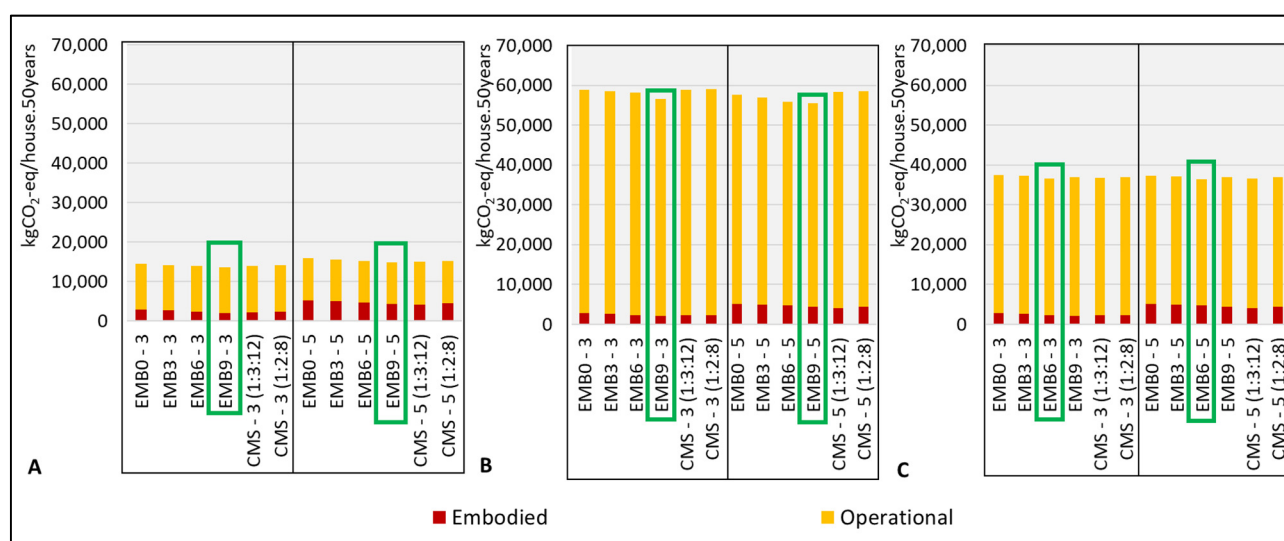


Figure S3. Total GHG emissions (embodied and operational) of all cases considering a concrete wall substrate and mortar thickness of 3 cm and 5 cm and EFmax = 0.198 kgCO₂-eq/kWh. (A) Cfb — Temperate/mesothermal climate. (B) Aw — Tropical savanna climate with dry-winter. (C) Am — Tropical monsoon climate. EMB — Earth mortar. CMS — Conventional, mortar. The green rectangles represent the option with smaller GHG emissions.

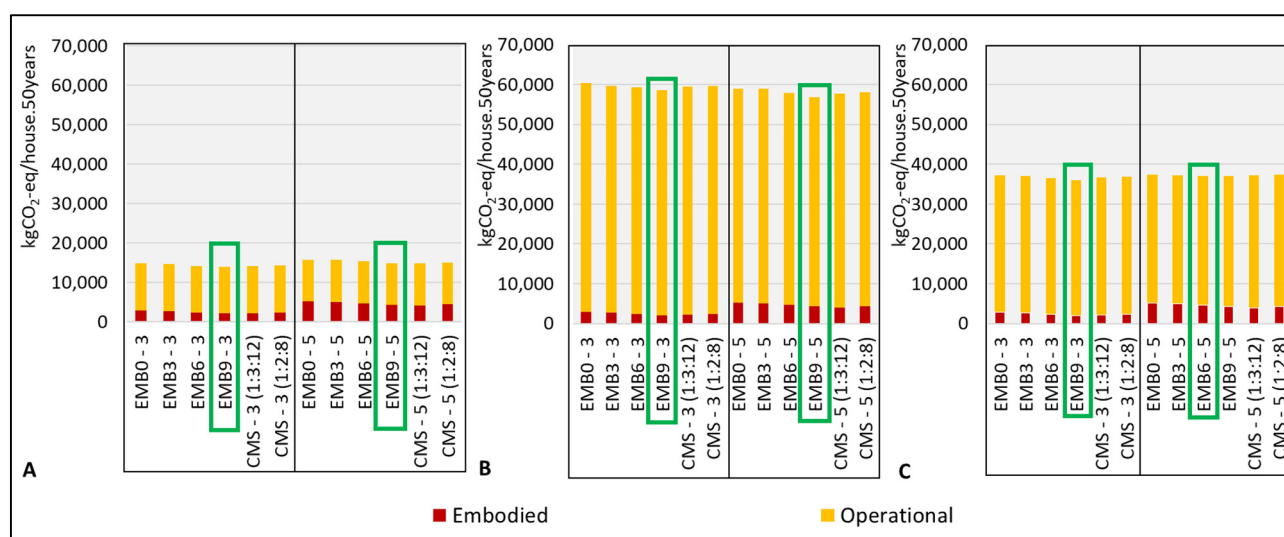


Figure S4. Total GHG emissions of all cases considering a concrete block masonry and mortar thickness of 3 cm and 5 cm. EFmax = 0.198 kgCO₂-eq/kWh. (A) Cfb — Temperate/mesothermal climate. (B) Aw — Tropical savanna climate with dry-winter. (C) Am — Tropical monsoon climate. EMB — Earth mortar. CMS — Conventional, mortar. The green rectangles represent the option with smaller GHG emissions.