



# MORE-CONNECT project newsletter

This project has received funding from the European Union's Horizon2020 framework programme for research and innovation under grant agreement no 633477.



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ISSUE #5 LATVIAN PILOT BUILDING



## Development and advanced prefabrication of innovative, multifunctional building envelope elements for MODular Retrofitting and CONNECTIONs

by MORE-CONNECT team

[www.more-connect.eu](http://www.more-connect.eu)

- retrofitting technology and the components for buildings' renovation in five geo-clusters across Europe: Portugal, Netherlands, Denmark, Czechia, Estonia and Latvia.

### Description of target building typology in Latvia

Latvian pilot building is typical brick multi apartment building built in 1967. The pilot building is silicate brick residential house with a lateral bearing system. The house has a wooden roof structure with slate covering. The building has simple, rectangular floor plan. It has two floors with similarly designed flats. The house has a hip roof with a number of chimneys. All old wooden windows are replaced by PVC windows 7 – 10 year ago. Building represents typical building constructed in 50ies – 60ies last century. This type of building is very common in rural areas and small cities.

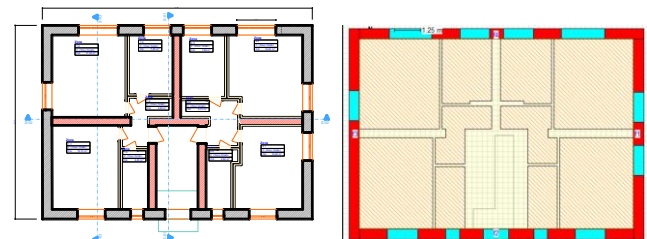


Figure 2. Typical layout

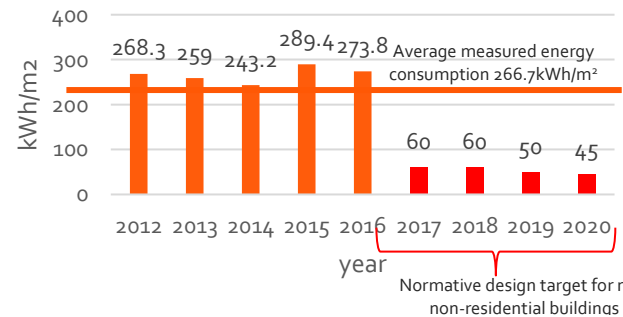


Figure 3. Comparison of real measured data on heat consumption before renovation and normative design targets



Figure 1. Pilot building

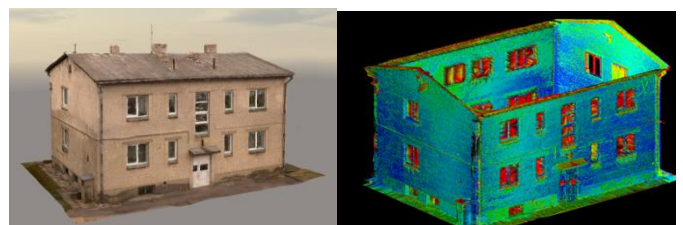


Figure 4. 3D scan results

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## Designed modules

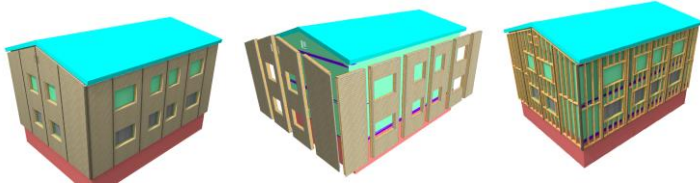
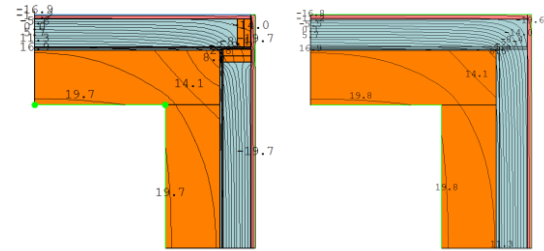


Figure 5. Panel layout

## BLOWERDOOR TEST RESULTS

Air flow at 50 Pa, $V_{50}$ [ $m^3/h$ ]	2550
Air changes at 50 Pa, $n_{50}$ [/h]	4,40
Permeability at 50 Pa, $q_{50}$ [ $m^3/h/m^2$ ]	4,803
Specific leakage at 50 Pa, $w_{50}$ [ $m^3/h/m^2$ ]	11,808
Effective leakage area at 50 Pa, $A_L$ [ $cm^2$ ]	777,5
Equivalent leakage area at 50 Pa, $A_L$ [ $cm^2$ ]	1275
Normalized Leakage Area [ $cm^2/m^2$ ]:	1,464
Air flow at 50 Pa, $V_{50}$ [ $m^3/h$ ]	2550

ID	Count	Description	Note
S01	2	Vertical element on main facades (south, north)	Without widows
S04	2	Vertical element on main facades (south, north)	Without widows
S02	5	Vertical element on main facades (south, north)	With widows
S011	1	Vertical element on main facade (north)	With widows
S07	2	Vertical element on side facades (east west)	Without widows. Right corner
S09	4	Vertical element on side facades (east, west)	With widows
S10	2	Vertical element on side facades (east, west)	Without widows. Left corner



a) heat flux 8.75 W/m<sup>2</sup>

b) heat flux 7.76 W/m<sup>2</sup>

Figure 7. Thermal bridge evaluation at ceiling slab/wall

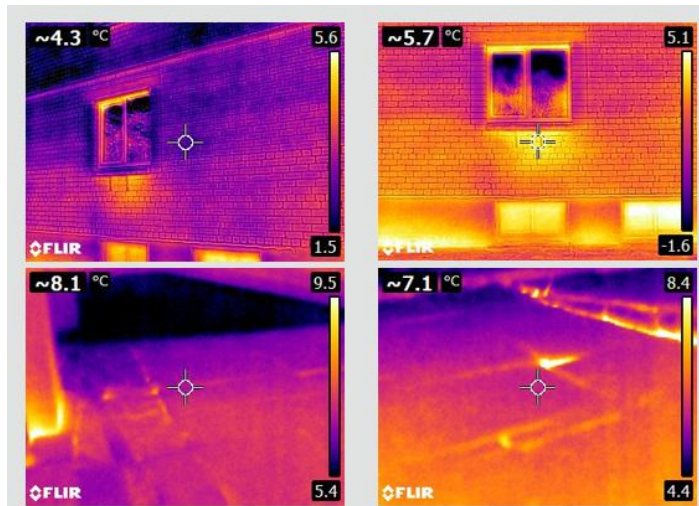


Figure 6. Thermal bridges

### More information is available on project web-page and publications:

- ✓ Zemītis, J., Borodiņecs, A., Geikins, A., Kalames, T., Kuusk, K. Ventilation System Design in Three European Geo Cluster. Energy Procedia, 2016, Vol.96, p. 285-293. ISSN 1876-6102 <http://doi:10.1016/j.egypro.2016.09.151>
- ✓ Dobelis, M., Kaļinka, M., Borodiņecs, A. 3D Modelling of Existing Buildings from Laser Scanner Data. In: Engineering Graphics BALTGRAF-14. Proceedings of the Fourteenth International Conference, Estonia, Tallina, 1-2 June, 2017. Tallinn, Estonia: Tallinn University of Technology, 2017, pp.10-14.

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