



ENERGY TYPOLOGY OF THE HUNGARIAN BUILDING SECTOR

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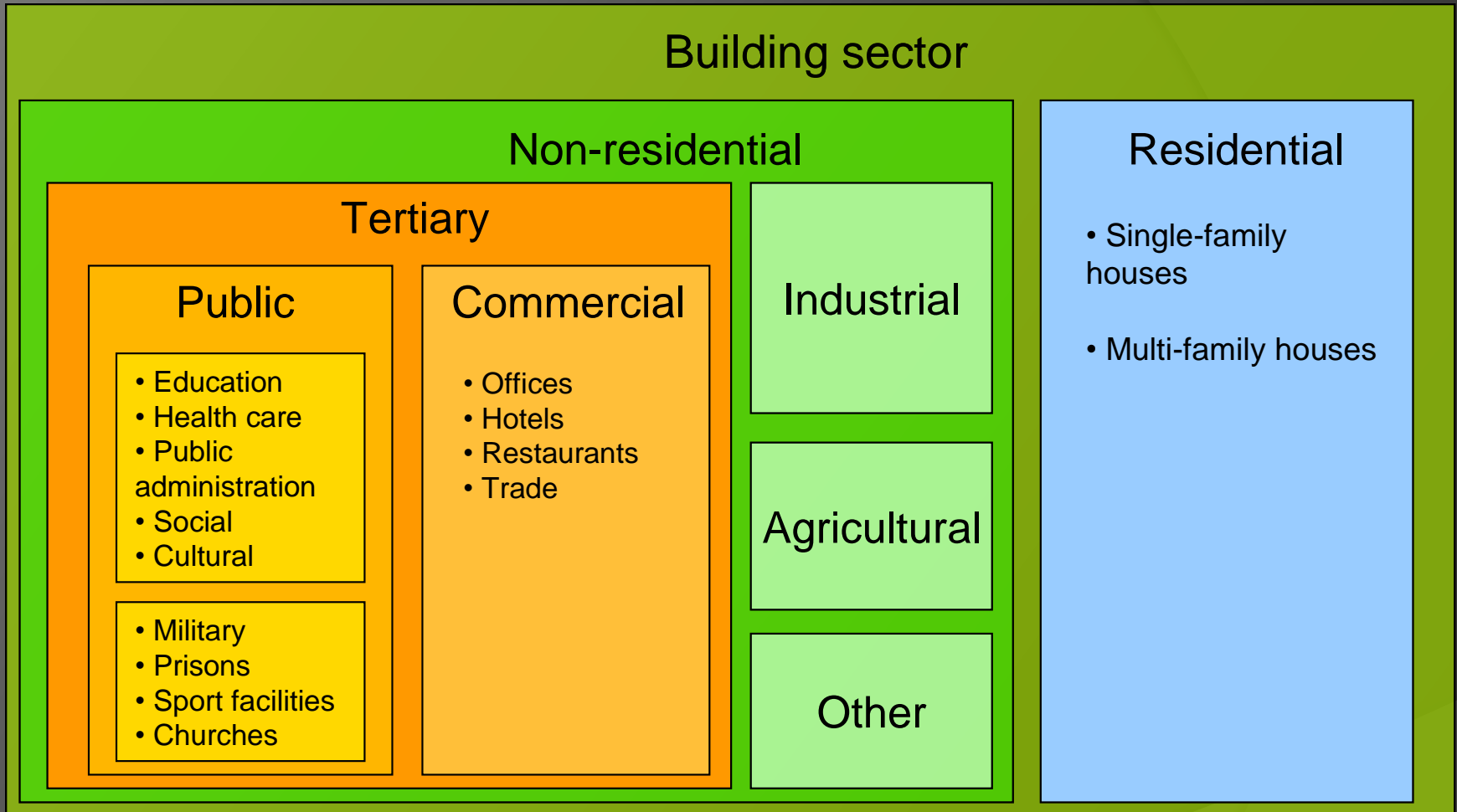
Overview

- Up till now the Hungarian state support programs concentrated most financial resources on buildings built with prefabricated technology.
- For the follow-up programs the question has been posed: **Is it really the most energy consuming building sector among residential buildings, or are there any other opportunities?**

Overview

- An analysis based on case studies has been elaborated to answer this question in order to give input for future decision makers.
- In order to have a clear picture about the energy consumption of existing buildings a **building typology** had to be set-up.

Energy Typology



Building sector and its subsectors [Korytarova]

Energy Typology

These types are:

- the family houses,
- the multi-residential buildings built with traditional technology,
- the multi-residential buildings built with industrialized technology.

Energy Typology

Present paper focuses on the opportunities of the setting-up of a building typology. **It contains only family houses and buildings built with industrialized technology only.**

The analysis **does not involve multi-residential buildings built with traditional technology**; this stock will be analyzed in a forthcoming phase of the research.

Building Type 03

Type 1

Traditional family house
with linear layout,
before 1945

Type 2

Uniform family house,
“cubic type”, 1945-1990

Type 3

Two-storey family
house, “cubic type”,
1960-1990

Type 4

New family house, 1991-
2006

Type 5

Classical downtown
multi-flat building,
before 1945

Type 6

Building built with
prefabricated medium-
sized blocks, 1950-1970

Type 7

4-5 storey building built
with prefabricated
sandwich panels, 1967-
1990

Type 8

10-11 storey building
built with prefabricated
sandwich panels, 1967-
1990

Type 9

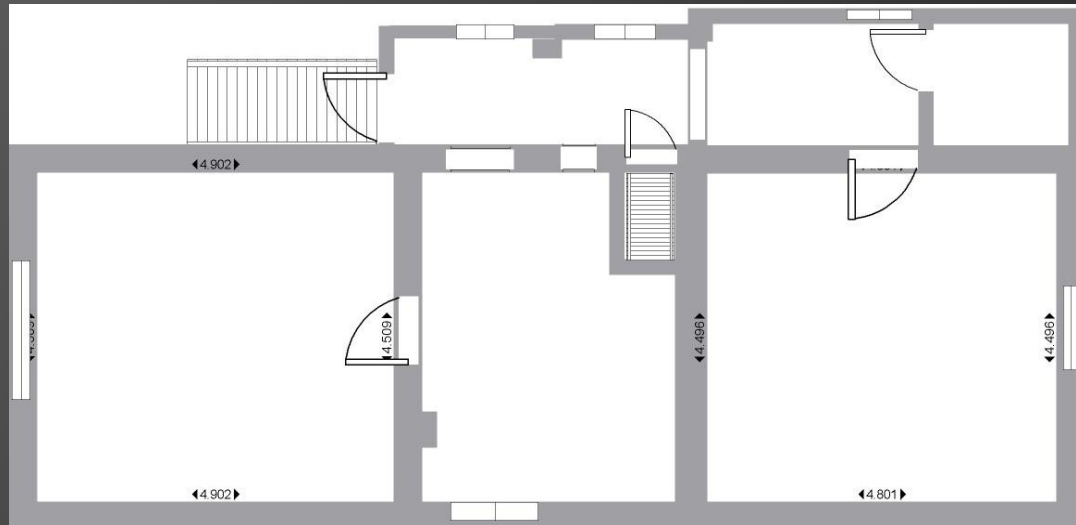
Modern multi-flat
building, 1991-2006

Building Type 01



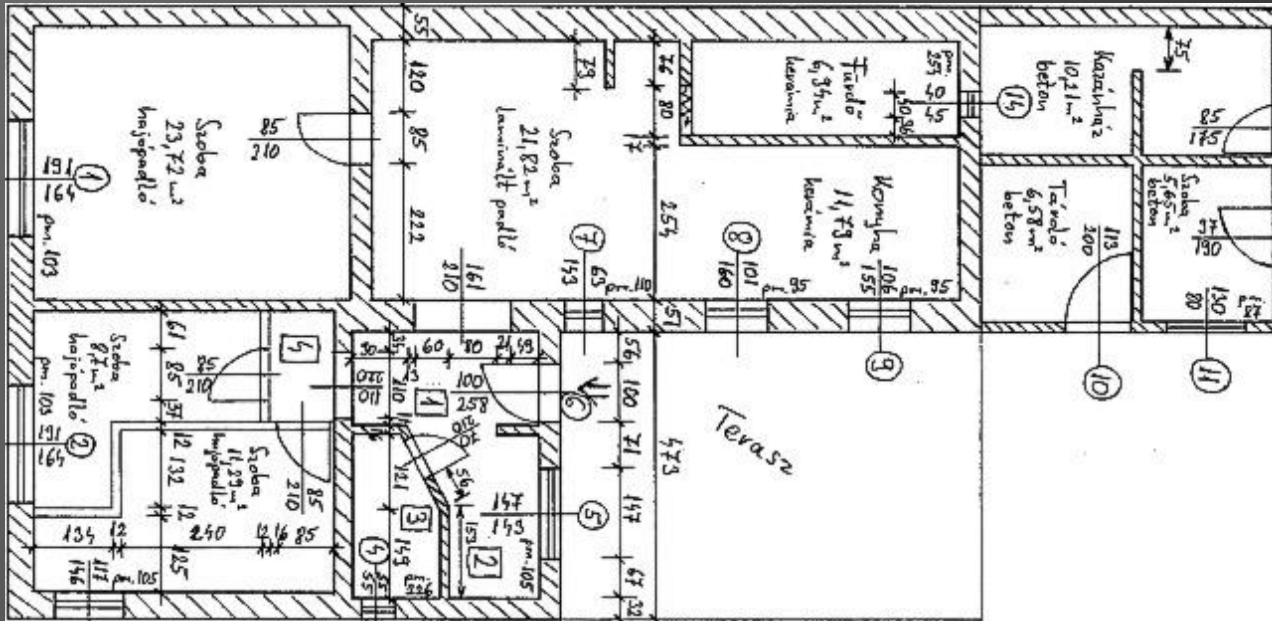
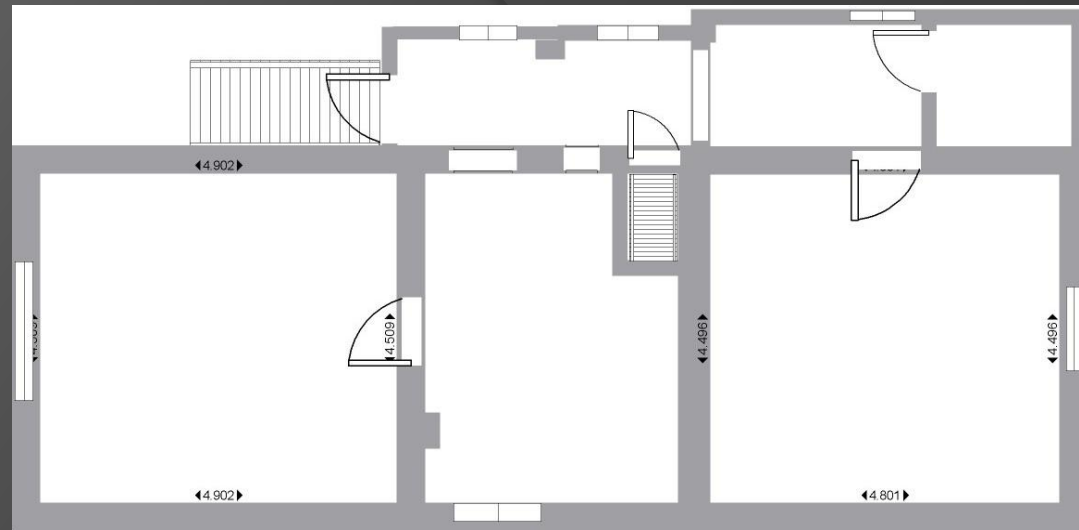
Traditional family house with linear layout, before 1945

Building Type 01



Traditional family house with linear layout, before 1945

Building Type 02



Uniform family house, “cubic type”, 1945-1990

Building Type 01

- 75 m2 house
- unheated cellar and an unheated roof attic
- there is only one heated floor.
- It was built between the wars,
- the exact date is unknown.

The applied construction material of the walls is limestone, typical for the area. The roof slab is made of wooden beams, reed and sand filling.

The heating system was built in the 70s'...80s', the room heat and the heat for DHW is produced by a wall-mounted boiler without storage tank.

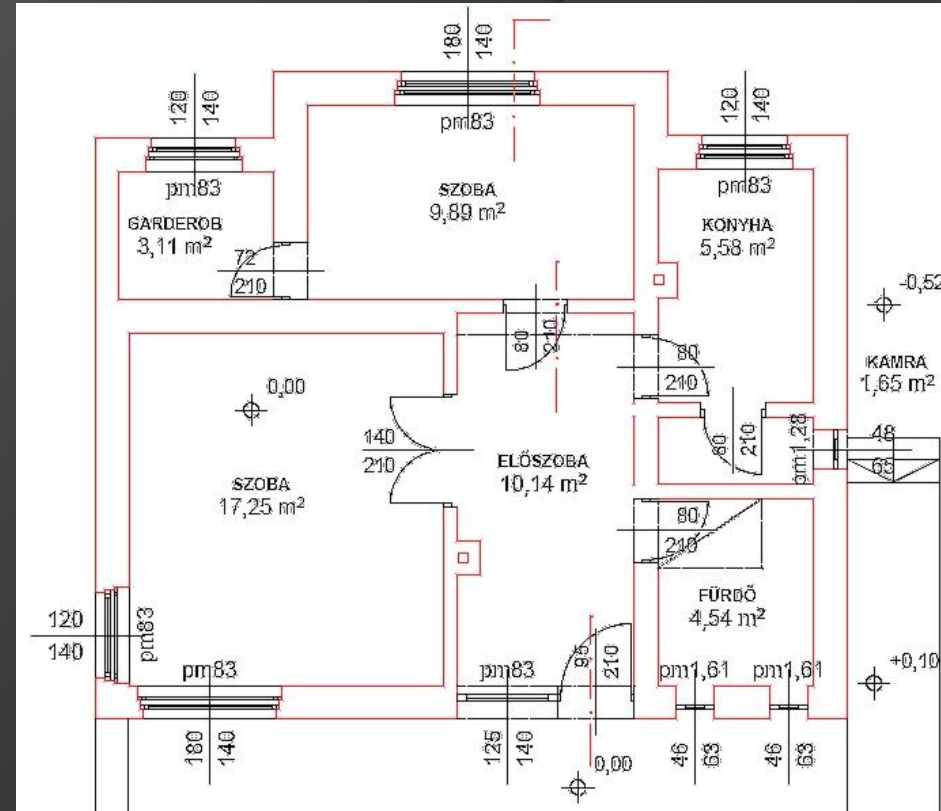
The heating system is built with central control only.

Building Type 02



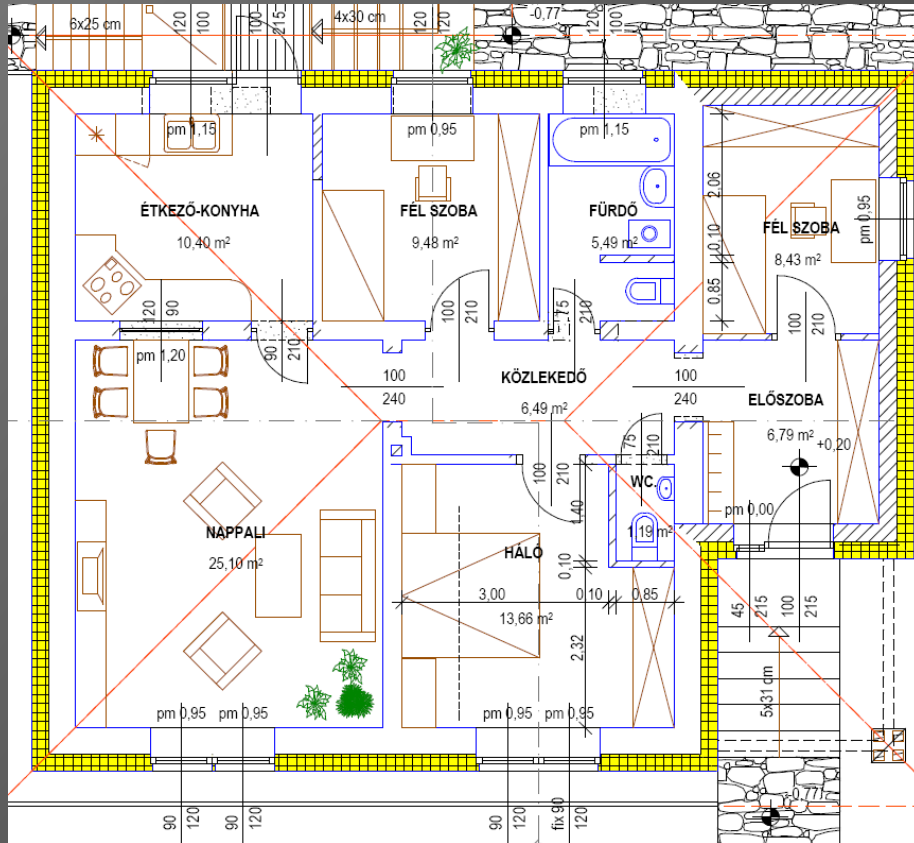
Uniform family house, “cubic type”, 1945-1990

Building Type 02



Uniform family house, “cubic type”, 1945-1990

Building Type 02



Uniform family house, "cubic type", 1945-1990

Building Type 02

- This type of houses were built short after the 2nd world war.
- It has a square-shape layout, it built in large number in the sixties, it is only 50-60 m².
- The building walls were built with small bricks.
- The heating system is similar to type 1, the DHW-supply is similar to type 1.

Building Type 03



Two-storey family house, “cubic type”, 1960-1990

Building Type 03



Two-storey family house, “cubic type”, 1960-1990

Building Type 03

This type of buildings is usually made with

- hollow-ceramic blocks, B30**
- or with small bricks.**

The energetic quality of the two wall type is similar.

Building Type 04



New family house, 1991-2006

Building Type 05



Classical downtown multi-flat building, before 1945

Building Type 06



**Building built with prefabricated medium-sized blocks,
1950-1970**

Building Type 07



4-5 storey building built with prefabricated sandwich panels, 1967-1990

Building Type 07



4-5 storey building built with prefabricated sandwich panels, 1967-1990

Building Type 08



10-11 storey building built with prefabricated sandwich panels, 1967-1990

Building Type 08



10-11 storey building built with prefabricated sandwich panels, 1967-1990

Building Type 09



Modern multi-flat building, 1991-2006

Comparison 1

example	type	location	year of construction	A_N m^2	A/V -	q W/m^3K	q_{max} W/m^3K	q_F kWh/m^2a
1	1	Budaörs	1930	75	1,24	1,93	0,56	403
2	1	Budapest, 4th	1920	122	1,41	1,69	0,58	373
3	2	Budapest, Sasad	1950	52	1,30	1,95	0,58	398
4	2	Gödöllő	1965	99	1,25	1,39	0,56	395
5	3	Siófok	1980	143	0,78	1,76	0,38	316
6	4	Budapest	1991	119	1,49	0,38	0,58	105
7	4	Budapest, 18th	2005	90	1,20	0,54	0,54	124
8	4	Budapest	1995	189	0,91	0,68	0,43	163
9	4	Dombóvár	1988	166	1,10	0,79	0,53	141
10	7	Budapest 17th	1982	3816	0,38	0,41	0,23	125
11	8	Budapest, 3rd	1977	7071	0,43	0,51	0,25	119

Comparison 2

example	type	location	E_F kWh/m ² a	$E_{H MV}$ kWh/m ² a	E_P kWh/m ² a	E_{pmax} kWh/m ² a	E_P/E_{pmax} %	energy category -
1	1	Budaörs	565	62	627	223	281%	H
2	1	Budapest, 4th	509	66	575	230	250%	G
3	2	Budapest, Sasad	581	70	651	230	283%	H
4	2	Gödöllő	574	43	617	224	275%	H
5	3	Siófok	417	43	460	168	273%	H
6	4	Budapest	131	55	187	230	81%	B
7	4	Budapest, 18th	162	79	240	218	110%	D
8	4	Budapest	176	66	242	183	132%	E
9	4	Dombóvár	169	48	217	240	90%	B
10	7	Budapest 17th	162	50	212	119	178%	F
11	8	Budapest, 3rd	154	50	204	126	163%	F

Acknowledgement

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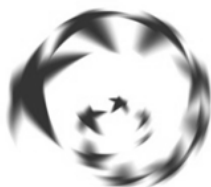
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Thank you for your attention!

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