
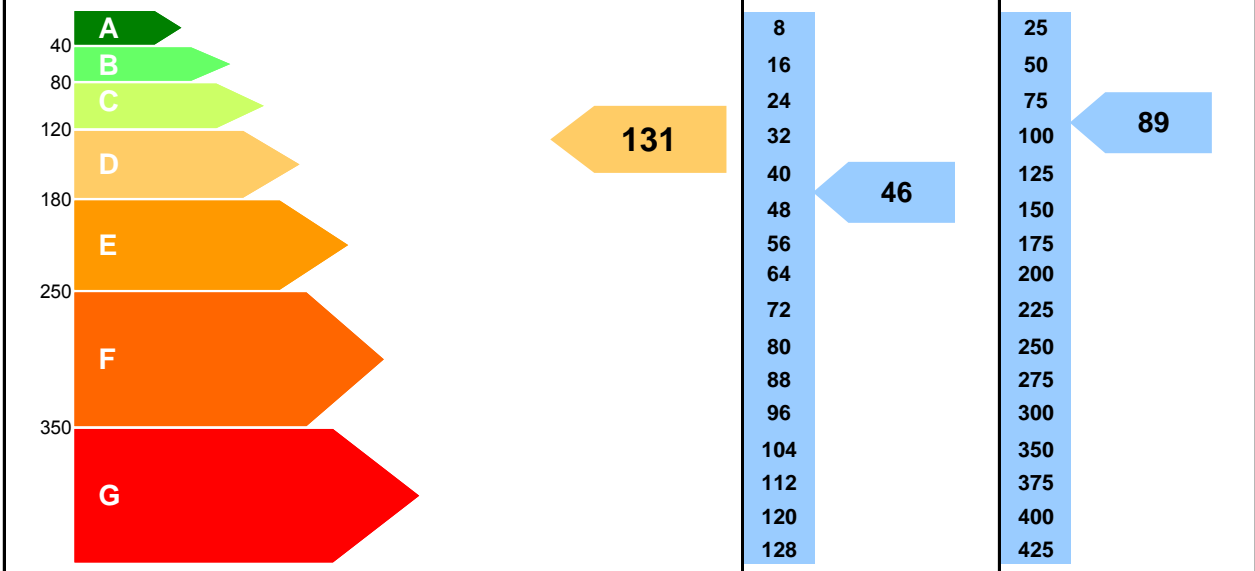


WP3 PUBLIC BUILDINGS

asset and operational rating

BASIC BUILDING DATA			
Type of the building	Office building		
Address	Slovenski trg 11, Kranj		
Heated area	8926 m ²		
Building manager	Doni d.o.o.		
Building owner	Mestna občina Kranj		
Number of stories	3		
Year of construction	1965		
Year of renovation	-		
Delivered energy and CO ₂ emission		Asset rating	Operational rating
Class	Q [kWh/m ² a]	CO ₂ [kg/m ² a]	Q [kWh/m ² a]
	A	8	25
	B	16	50
	C	24	75
	D	32	100
	E	40	125
	F	48	150
	G	56	175
		64	200
		72	225
		80	250
		88	275
		96	300
		104	350
		112	375
	120	400	
	128	425	
CERTIFICATE INFORMATION			
Issued by	EIE BUDI	Certificate number	2006 - 0011
Company	GI ZRMK	Date of validity	26.5.2006
Purpose of certificate	Display in a public building	Place of issue	Ljubljana



ENERGY CERTIFICATE



ASSET RATING METHOD DETAILS		Building description
Shape factor A/V_e	0,26 1/m	Massive construction Roof with 5 cm of insulation Facade without insulation Partly heated basement
Heated area A_u	8926 m ²	
Gross volume V_e	27894 m ³	
Type of dimensions used	external	
Air exchange rate n	0,7 1/h	
Thermal capacity C	5021 MJ/K	
Internal temperature	20 °C	
		Regulations
Heat transmission H_T'	1,0 W/m ² K	0,7 W/m ² K
Heating demand Q_H	90 kWh/m ²	96 kWh/m ²
Domestic hot water demand Q_{DHW}	16 kWh/m ²	20 kWh/m ²

BUILDING ENVELOPE	Area	U
EXTERNAL WALL WITHOUT INSULATION	1731 m ²	0,90 W/m ² K
WINDOWS FACING EAST	72 m ²	2,90 W/m ² K
WINDOWS FACING WEST	72 m ²	2,90 W/m ² K
WINDOWS FACING SOUTH	113 m ²	2,90 W/m ² K
WINDOWS FACING NORTH	149 m ²	2,90 W/m ² K
FLOOR ON THE GROUND WITH INSULATION	2510 m ²	0,27 W/m ² K
ROOF	2715 m ²	0,83 W/m ² K
DOORS	18 m ²	2,9 W/m ² K

HEATING SYSTEM		Energy performance factor	
Fuel used for heating	District heating	Primary energy	1,58
Heat generation	Boiler for district heating	Generation	0,95
Heat distribution	Pipes	Distribution	0,95
Heat emissivity	Radiators	Emissivity	0,89

DHW SYSTEM		Energy performance factor	
Fuel used for DHW	Electricity	Primary energy	2,15
Generation	Local boilers	Generation	0,87
Distribution	No circulation	Distribution	0,98

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ENERGY CERTIFICATE



ENERGY SAVING SCENARIO 1

Installing thermostatic valves

Installing new windows, $U_{\min} = 1,4 \text{ W/m}^2\text{K}$

Insulating external walls with 10 cm insulation

Initial energy demand	131 kWh/m² a	Final energy demand	93 kWh/m² a
Initial CO₂ emission	46 kg/m² a	Final CO₂ emission	31 kg/m² a
Initial benchmark	D	Final benchmark	C

ENERGY SAVING SCENARIO 2

Installing thermostatic valves

Installing new windows, $U_{\min} = 1,4 \text{ W/m}^2\text{K}$

Insulating external walls with 10 cm insulation

Insulating roof with 20 cm insulation

Insulating floor on the ground with 5 cm insulation

Initial energy demand	131 kWh/m² a	Final energy demand	71 kWh/m² a
Initial CO₂ emission	46 kg/m² a	Final CO₂ emission	23 kg/m² a
Initial benchmark	D	Final benchmark	B



ENERGY CERTIFICATE



BASIC BUILDING DATA

Type of the building	Public elementary school
Address	Cesta na Brdo 45, Kranj
Heated area	5519 m ²
Building manager	Mestna občina Kranj
Building owner	Mestna občina Kranj
Number of stories	2
Year of construction	1973
Year of renovation	1987



Delivered energy and CO₂ emission

Class	Q [kWh/m ² a]	Asset rating		Operational rating	
		CO ₂ [kg/m ² a]	Q [kWh/m ² a]	CO ₂ [kg/m ² a]	Q [kWh/m ² a]
A	40	8	25		
B	80	16	50		
C	120	24	75		
D	180	32	100		
E	250	40	125		121
F	350	48	150		
G		56	175		
		64	200	71	
		72	225		
		80	250		
		88	275		
		96	300		
		104	350		
		112	375		
		120	400		
		128	425		

CERTIFICATE INFORMATION

Issued by	EIE BUDI	Certificate number	2006 - 0012
Company	GI ZRMK	Date of validity	29.5.2006
Purpose of certificate	Display in a public building	Place of issue	Ljubljana



ENERGY CERTIFICATE



ASSET RATING METHOD DETAILS		Building description
Shape factor A/V_e	0,56 1/m	Massive construction
Heated area A_u	6225 m ²	Flat roof with 5 cm of insulation
Gross volume V_e	19453 m ³	Facade with 5 cm of insulation
Type of dimensions used	external	Heated basement
Air exchange rate n	0,7 1/h	
Thermal capacity C	3615 MJ/K	
Internal temperature	20 °C	Regulations
Heat transmission H_T'	0,7 W/m ² K	0,6 W/m ² K
Heating demand Q_H	103 kWh/m ²	117 kWh/m ²
Domestic hot water demand Q_{DHW}	16 kWh/m ²	20 kWh/m ²

BUILDING ENVELOPE	Area	U
EXTERNAL WALL WITH INSULATION	3214 m ²	0,50 W/m ² K
WINDOWS FACING EAST	145 m ²	2,00 W/m ² K
WINDOWS FACING WEST	52 m ²	2,00 W/m ² K
WINDOWS FACING SOUTH	768 m ²	2,00 W/m ² K
WINDOWS FACING NORTH	93 m ²	2,00 W/m ² K
FLOOR ON THE GROUND	3236 m ²	0,20 W/m ² K
ROOF	3429 m ²	0,60 W/m ² K
DOORS	14 m ²	3,10 W/m ² K

HEATING SYSTEM		Energy performance factor	
Fuel used for heating	District heating	Primary energy	1,58
Heat generation	Boiler for district heating	Generation	0,90
Heat distribution	Pipes	Distribution	0,76
Heat emissivity	Radiators	Emissivity	0,78

DHW SYSTEM		Energy performance factor	
Fuel used for DHW	Electricity	Primary energy	2,15
Generation	Local boilers	Generation	0,87
Distribution	No circulation	Distribution	0,98



ENERGY CERTIFICATE



ENERGY SAVING SCENARIO 1

Installing thermostatic valves

Installing new windows, $U_{\min} = 1,2 \text{ W/m}^2\text{K}$

Insulating roof with 20 cm insulation

Initial energy demand	183 kWh/m² a	Final energy demand	131 kWh/m² a
Initial CO₂ emission	71 kg/m² a	Final CO₂ emission	49 kg/m² a
Initial benchmark	E	Final benchmark	D

ENERGY SAVING SCENARIO 2

Installing thermostatic valves

Installing new windows, $U_{\min} = 1,2 \text{ W/m}^2\text{K}$

Insulating roof with 20 cm insulation

Insulating pipes for heating distribution

Initial energy demand	183 kWh/m² a	Final energy demand	101 kWh/m² a
Initial CO₂ emission	71 kg/m² a	Final CO₂ emission	35 kg/m² a
Initial benchmark	E	Final benchmark	C

EPA – NR

Example of calculation for school Franceta Preserna, Kranj

OS Franceta_Preserna.xml - EpaNr

Select condition: Heating

Energy Demand	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Heating, GJ													
1 Transmission	581,84	453,87	423,15	281,53	158,68	76,78	26,45	52,89	153,56	290,92	409,50	528,94	3458,13
2 Ventilation	107,04	83,50	77,85	51,79	29,19	14,13	4,87	9,73	28,25	53,52	75,34	97,31	632,50
3 Total Loss	688,88	537,36	501,00	333,33	187,88	90,91	31,31	62,63	181,82	344,44	484,84	626,25	4070,64
4 Solar Heat	22,62	30,41	32,53	31,66	31,80	31,67	32,77	34,83	34,05	27,39	20,79	17,34	347,85
5 Sun Space	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
6 Internal Heat Sources	95,63	86,38	95,63	92,54	95,63	92,54	95,63	95,63	92,54	95,63	92,54	95,63	1125,96
7 Total Gain	118,25	116,79	128,16	124,20	127,43	124,21	128,40	130,46	126,59	123,02	113,33	112,97	1473,81
8 Utilisation Factor	1,000	1,000	1,000	1,000	0,995	0,725	0,244	0,480	0,993	1,000	1,000	1,000	0,870
9 Energy Demand	570,62	420,58	372,84	209,13	61,11	0,91	0,00	0,01	56,06	221,42	371,51	513,29	2797,48
10													
11 Energy Consumption, GJ													
12 Heating	932,39	687,22	609,22	341,71	99,86	0,00	0,00	0,00	91,60	361,80	607,04	838,70	4569,54
13 - Solar Col. Contr, heating	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
14 Cooling	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
15 Humidification	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
16 Hot Water	112,63	101,73	112,63	109,00	112,63	109,00	112,63	112,63	109,00	112,63	109,00	112,63	1326,11
17 - Solar Col. Contr, dhw	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
18 Lighting	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
19 Auxiliary electricity	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
20 Total	1033,76	778,78	710,58	439,80	201,22	98,10	101,37	101,37	189,69	463,17	705,14	940,07	5763,04
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