Building energy audit 2025

City of Montvallier · Energy Office · municipal building portfolio of 24 buildings

Issued 27.02.2026 by Nadia Perrin, energy officer; reviewed by the Building Commission on 17.03.2026

Final energy	Energy cost	Greenhouse gases	Weighted intensity	Energy reference area
14,130 MWh	**CHF 2,367,059**	**1,854 t CO_2-eq**	**234 kWh/m²**	**75,040 m²**
vs 2024: -2.0% · vs 2019: -10.2%	CHF 31.54 per m² ERA	vs 2024: -2.4% · vs 2019: -21.1%	portfolio class F	24 buildings · 3,127 m² on average

Energy classes

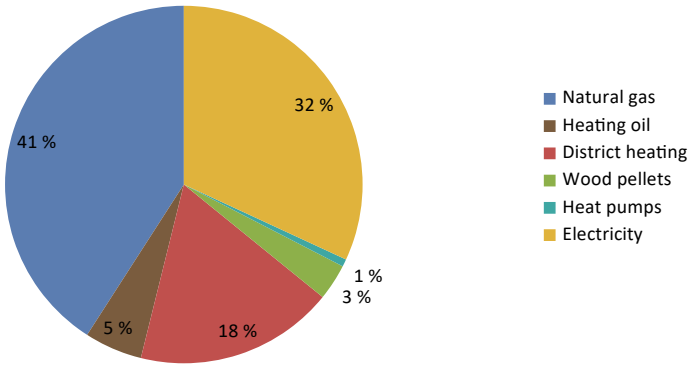
Class	Buildings	ERA m²	Share of ERA	Final energy MWh
A	1	680	0.9%	19.5
B	1	820	1.1%	25.1
C	4	18,000	24.0%	1,892.5
D	4	10,770	14.4%	1,610.9
E	9	27,610	36.8%	4,832.0
F	3	5,900	7.9%	1,222.5
G	2	11,260	15.0%	4,527.0
Total	**24**	**75,040**	**100.0%**	**14,129.5**

Highest weighted intensities

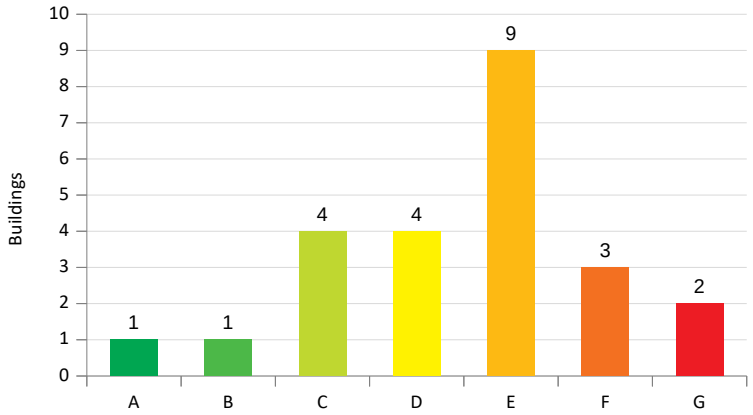
Rank	Building	kWh/m²·a	Class
1	Piscine couverte des Ecots	733	G
2	Patinoire de la Sorne	458	G
3	Musée de la Sorne	283	F
4	Théâtre du Bourg	266	F
5	Station d'épuration des Moulins	239	F
6	Centre administratif, Rue du Marché	221	E
7	Salle de gymnastique du Pré-Vert	217	E

Portfolio mean: 234 kWh/m²·a

Final energy by carrier



Buildings by energy class

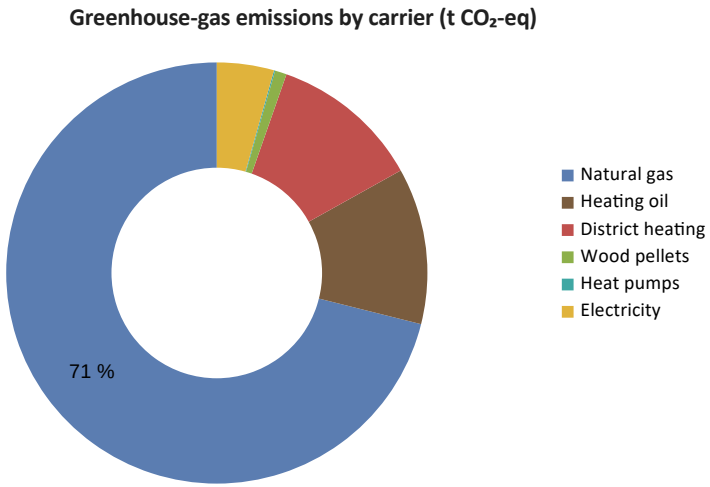


Final energy, cost and emissions by carrier

Carrier	MWh/a	Share	Cost CHF/a	t CO_2-eq/a
Natural gas	5,779.9	40.9%	CHF 757,167	1,317.8
Heating oil	739.0	5.2%	CHF 82,768	222.4
District heating	2,546.8	18.0%	CHF 376,926	213.9
Wood pellets	461.7	3.3%	CHF 41,091	16.6
Heat pumps	96.2	0.7%	CHF 23,184	1.7
Electricity	4,505.9	31.9%	CHF 1,085,922	81.1
Total	**14,129.5**	**100.0%**	**CHF 2,367,059**	**1,853.6**

Key findings

- The indoor pool and the ice rink use 32% of the final energy on 15% of the floor area.
- Natural gas and heating oil cause 83% of the emissions although they supply 46% of the final energy.
- Buildings in classes F and G: 5 · in classes A to C: 6 of 24.
- Heating energy is strongly weather-dependent (R^2 = 0,99); the base load is about 145 MWh per month.



Contents

Buildings	Register, energy by carrier, intensities, classes, emissions, cost
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Pivot	DataPilot tables by building type and by measure category
Factors	Emission factors, weighting, prices, class limits, assumptions

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Method: SIA 380 energy reference areas; final energy from invoices and smart meters; weighting and emission factors on the Factors sheet. Not weather-corrected unless stated.

Revision history

Version	Date	Author	Change
0.9	06.02.2026	N. Perrin	Internal review draft
0.95	19.02.2026	N. Perrin	Dec 2025 invoices added
1.0	27.02.2026	N. Perrin	Issued to the Council
1.1	17.03.2026	J.-M. Rossel	Measures 13, 25 updated

Municipal building portfolio – energy and emissions 2025

Final energy from invoices and smart meters, 1 January – 31 December 2025, not weather-corrected. ERA = energy reference area (SIA 380).

Building							Final energy by carrier (MWh/a)						Intensity			Energy class	Emissions		Cost
ID	Building	Type	Built	Renovated	ERA m²	Heating system	Natural gas	Heating oil	District heating	Wood pellets	Heat pump (electricity)	Electricity, general use	Total MWh/a	kWh/m²·a	Weighted kWh/m²·a	Class	t CO_2-eq/a	kg CO_2-eq/m²	Energy cost CHF/a
B01	Hôtel de Ville	Administration	1904	1988	2,840	District heating	–	–	332.1	–	–	105.4	**437.5**	154	144	D	29.8	10.5	CHF 74,552
B02	Centre administratif, Rue du Marché 12	Administration	1972		3,620	Natural gas	472.7	–	–	–	–	164.2	**636.9**	176	221	E	110.7	30.6	CHF 101,496
B03	Services industriels, Route des Ecots 4	Technical	1985		2,150	Natural gas	242.5	–	–	–	–	86.6	**329.1**	153	193	E	56.8	26.4	CHF 52,638
B04	Voirie – dépôt des Prés	Technical	1979		1,780	Heating oil	–	266.2	–	–	–	53.0	**319.2**	179	209	E	81.1	45.6	CHF 42,587
B05	École primaire des Tilleuls	School	1958	1994	4,260	Natural gas	559.8	–	–	–	–	89.0	**648.8**	152	173	D	129.2	30.3	CHF 94,783
B06	École primaire du Château	School	1912	2009	3,180	Wood pellets	–	–	–	345.2	–	61.5	**406.7**	128	115	C	13.5	4.3	CHF 45,544
B07	Collège de la Sorne	School	1976	2002	9,850	District heating	–	–	952.8	–	–	258.3	**1,211.1**	123	110	C	84.7	8.6	CHF 203,265
B08	École enfantine des Vergers	School	2011		820	Heat pump	–	–	–	–	10.5	14.6	**25.1**	31	61	B	0.5	0.6	CHF 6,049
B09	Collège du Pré-Vert	School	1968		7,420	Natural gas	1,075.7	–	–	–	–	179.2	**1,254.9**	169	193	E	248.5	33.5	CHF 184,104
B10	Salle de gymnastique du Pré-Vert	Sports	1968		2,240	Natural gas	346.4	–	–	–	–	69.4	**415.8**	186	217	E	80.2	35.8	CHF 62,104
B11	Piscine couverte des Ecots	Sports	1981	2008	4,960	Natural gas	1,979.2	–	–	–	–	828.1	**2,807.3**	566	733	G	466.2	94.0	CHF 458,847
B12	Patinoire de la Sorne	Sports	1995		6,300	District heating	–	–	395.9	–	–	1,323.8	**1,719.7**	273	458	G	57.1	9.1	CHF 377,629
B13	Salle omnisports de Montvallier-Est	Sports	2006		3,450	Heat pump	–	–	–	–	57.4	119.7	**177.1**	51	103	C	3.2	0.9	CHF 42,681
B14	Bibliothèque municipale	Culture	1932	1997	1,620	District heating	–	–	164.2	–	–	71.8	**236.0**	146	149	D	15.1	9.3	CHF 41,605
B15	Théâtre du Bourg	Culture	1896	1985	2,780	Natural gas	413.3	–	–	–	–	163.0	**576.3**	207	266	F	97.2	35.0	CHF 93,425
B16	Musée de la Sorne	Culture	1868	1992	1,940	Heating oil	–	310.1	–	–	–	119.5	**429.6**	221	283	F	95.5	49.2	CHF 63,531
B17	Conservatoire de musique	Culture	1961		1,360	Natural gas	189.0	–	–	–	–	40.5	**229.5**	169	199	E	43.8	32.2	CHF 34,520
B18	EMS Les Tilleuls (care home)	Social	1989	2015	5,640	District heating	–	–	701.8	–	–	381.7	**1,083.5**	192	210	E	65.8	11.7	CHF 195,856
B19	Crèche des Moulins	Social	2018		680	Heat pump	–	–	–	–	7.4	12.1	**19.5**	29	57	A	0.4	0.5	CHF 4,700
B20	Maison de quartier de Vernay	Social	1974		940	Heating oil	–	162.7	–	–	–	20.4	**183.1**	195	216	E	49.3	52.5	CHF 23,139
B21	Caserne des sapeurs-pompiers	Technical	1992		2,460	Natural gas	263.2	–	–	–	–	116.8	**380.0**	154	202	E	62.1	25.2	CHF 62,628
B22	Poste de police municipale	Administration	2003		1,520	Heat pump	–	–	–	–	20.9	76.7	**97.6**	64	128	C	1.8	1.2	CHF 23,522
B23	Station d'épuration des Moulins	Technical	1987		1,180	Wood pellets	–	–	–	116.5	–	100.1	**216.6**	184	239	F	6.0	5.1	CHF 34,493
B24	Salle des fêtes	Culture	1956	1990	2,050	Natural gas	238.1	–	–	–	–	50.5	**288.6**	141	165	D	55.2	26.9	CHF 43,362
	Total / area-weighted mean				**75,040**		**5,779.9**	**739.0**	**2,546.8**	**461.7**	**96.2**	**4,505.9**	**14,129.5**	**188**	**234**	F	**1,853.6**	**24.7**	**CHF 2,367,059**

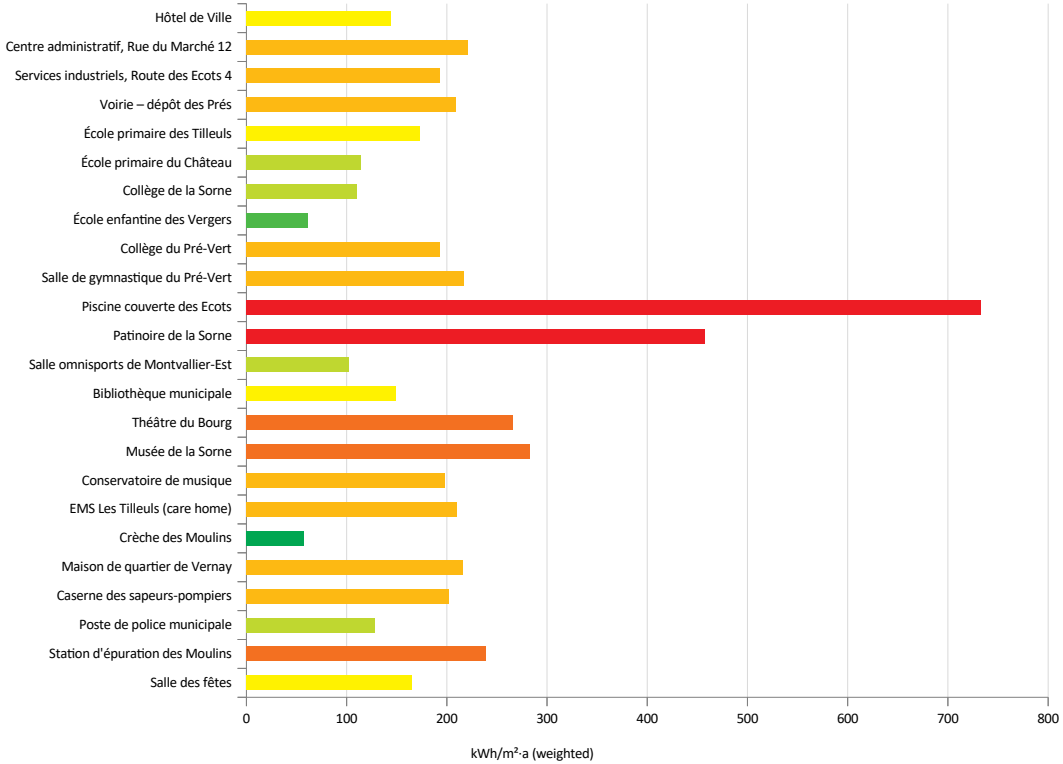
Weighted final energy by building (kWh/m²·a)

1 Final energy of each carrier is taken from the Monthly sheet; the heating system chosen in column G decides to which carrier the heating energy is allocated (drop-down list).

2 Weighted final energy applies the national weighting factors (electricity 2.0, district heating 0.6, wood 0.7, fossil fuels 1.0) and is the basis of the energy class A–G.

3 Emissions use life-cycle emission factors (KBOB). Since 2022 all municipal meters are supplied with certified hydropower; this explains the low factor for electricity.

4 Costs are energy costs including grid fees and taxes but excluding maintenance of the heating plants.



Data quality and special events 2025

ID	Event	Effect
B11	Gas meter replaced on 14.03.2025, March combined from two meters	checked, ±1.8 %
B11	Pool closed 30.06.–20.07.2025 for draining and tile repairs	electricity −52 % in July
B12	Ice rink summer break 26.04.–10.08.2025	seasonal profile
B01	ERA re-measured after attic conversion (+180 m²)	intensity −6 %
B19	PV 18 kWp in operation since 05.2023, self-consumption netted	electricity net of PV
B07	District heating since 09.2022; 2019–2021 values were natural gas	series break in Trend

Monthly final energy 2025

Meter and invoice data allocated to calendar months (MWh). Heating energy is the final energy of each building's heating system; for heat pumps it is their electricity.

A. Heating energy (MWh final energy)

ID	Building	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Oct–Mar share
B01	Hôtel de Ville	55.3	46.8	36.2	29.6	12.6	6.0	3.3	4.3	10.5	30.0	40.4	57.1	**332.1**	80.0%
B02	Centre administratif, Rue du Marché 12	79.6	68.4	50.8	41.0	18.0	8.3	4.1	5.6	14.5	41.2	58.2	83.0	**472.7**	80.6%
B03	Services industriels, Route des Ecots 4	38.6	34.9	26.0	21.5	10.0	4.4	2.5	3.3	7.7	20.9	30.1	42.6	**242.5**	79.6%
B04	Voirie – dépôt des Prés	41.5	37.9	30.1	24.1	10.1	4.5	2.3	3.3	8.7	23.4	33.1	47.2	**266.2**	80.1%
B05	École primaire des Tilleuls	94.1	79.2	59.7	51.4	20.9	7.9	2.8	4.8	16.4	50.0	71.2	101.4	**559.8**	81.4%
B06	École primaire du Château	57.9	50.5	38.4	29.3	12.6	4.8	1.7	2.9	10.1	30.8	44.3	61.9	**345.2**	82.2%
B07	Collège de la Sorne	162.4	136.9	109.0	87.7	33.6	13.7	5.5	8.6	28.1	87.0	117.4	162.9	**952.8**	81.4%
B08	École enfantine des Vergers	1.7	1.6	1.2	0.9	0.4	0.2	0.1	0.1	0.3	1.0	1.3	1.7	**10.5**	81.0%
B09	Collège du Pré-Vert	185.3	155.8	118.6	96.9	39.3	15.3	5.4	9.4	31.7	96.8	138.6	182.6	**1,075.7**	81.6%
B10	Salle de gymnastique du Pré-Vert	53.4	48.5	38.8	31.7	14.4	7.1	3.8	4.9	11.4	30.0	42.9	59.5	**346.4**	78.8%
B11	Piscine couverte des Ecots	255.3	246.7	198.0	175.6	106.5	80.1	66.4	72.0	102.1	168.6	215.7	292.2	**1,979.2**	69.5%
B12	Patinoire de la Sorne	52.8	50.4	40.4	33.1	20.7	15.3	12.8	13.2	18.9	35.4	43.7	59.2	**395.9**	71.2%
B13	Salle omnisports de Montvallier-Est	8.7	8.0	6.1	4.9	2.4	1.2	0.7	0.9	2.0	5.2	7.4	9.9	**57.4**	78.9%
B14	Bibliothèque municipale	26.5	24.3	18.4	14.9	6.2	2.5	1.0	1.6	4.9	14.5	20.0	29.4	**164.2**	81.1%
B15	Théâtre du Bourg	66.0	58.2	44.6	35.3	16.0	6.8	2.8	4.2	12.2	38.8	55.5	72.9	**413.3**	81.3%
B16	Musée de la Sorne	48.3	44.2	32.0	27.5	13.2	6.7	4.1	5.0	11.1	28.6	36.6	52.8	**310.1**	78.2%
B17	Conservatoire de musique	29.9	27.7	20.5	17.5	6.9	3.0	1.3	1.8	5.5	16.2	24.4	34.3	**189.0**	81.0%
B18	EMS Les Tilleuls (care home)	106.6	92.2	73.1	63.6	32.8	21.0	15.6	18.4	29.6	61.8	83.0	104.1	**701.8**	74.2%
B19	Crèche des Moulins	1.1	1.1	0.8	0.6	0.3	0.2	0.1	0.1	0.3	0.7	0.9	1.2	**7.4**	78.4%
B20	Maison de quartier de Vernay	26.6	23.2	18.8	14.5	6.0	2.5	1.1	1.6	5.0	15.0	20.1	28.3	**162.7**	81.1%
B21	Caserne des sapeurs-pompiers	43.3	36.7	28.3	23.8	10.0	4.8	2.7	3.5	8.3	24.2	33.2	44.4	**263.2**	79.8%
B22	Poste de police municipale	3.4	3.0	2.2	1.8	0.8	0.4	0.2	0.3	0.7	1.9	2.6	3.6	**20.9**	79.9%
B23	Station d'épuration des Moulins	18.4	16.2	13.1	10.0	4.7	2.4	1.3	1.7	3.9	10.1	15.1	19.6	**116.5**	79.4%
B24	Salle des fêtes	39.2	34.7	27.4	22.0	8.7	3.6	1.6	2.3	6.9	21.4	28.9	41.4	**238.1**	81.1%
	Total portfolio	**1,495.9**	**1,327.1**	**1,032.5**	**859.2**	**407.1**	**222.7**	**143.2**	**173.8**	**350.8**	**853.5**	**1,164.6**	**1,593.2**	**9,623.6**	**77.6%**
	Heating degree days 20/12 (Kd)	548	462	405	256	128	22	0	9	96	268	446	572	3,212	

Monthly final energy 2025

Meter and invoice data allocated to calendar months (MWh). Heating energy is the final energy of each building's heating system; for heat pumps it is their electricity.

B. Electricity, general use (MWh)

ID	Building	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Jun–Aug share
B01	Hôtel de Ville	9.6	9.5	8.9	8.6	8.4	8.0	7.5	7.7	8.5	8.8	9.8	10.1	**105.4**	22.0%
B02	Centre administratif, Rue du Marché 12	15.3	14.5	14.4	12.9	12.7	12.1	12.0	12.4	13.2	14.2	15.0	15.5	**164.2**	22.2%
B03	Services industriels, Route des Ecots 4	8.2	7.5	7.6	7.0	6.9	6.4	6.2	6.2	7.0	7.5	7.8	8.3	**86.6**	21.7%
B04	Voirie – dépôt des Prés	5.0	4.6	4.5	4.3	4.1	3.9	3.8	4.0	4.4	4.5	4.8	5.1	**53.0**	22.1%
B05	École primaire des Tilleuls	8.4	8.4	8.2	7.5	7.6	7.2	4.1	5.1	7.9	7.7	8.6	8.3	**89.0**	18.4%
B06	École primaire du Château	6.1	5.7	5.7	5.3	5.2	4.9	2.7	3.4	5.4	5.2	6.0	5.9	**61.5**	17.9%
B07	Collège de la Sorne	25.4	23.6	23.4	22.5	21.9	20.0	11.9	14.4	23.2	22.6	24.7	24.7	**258.3**	17.9%
B08	École enfantine des Vergers	1.4	1.4	1.3	1.3	1.3	1.1	0.6	0.8	1.3	1.3	1.4	1.4	**14.6**	17.1%
B09	Collège du Pré-Vert	16.8	16.7	16.4	15.3	15.7	14.5	7.9	10.0	16.1	15.2	17.6	17.0	**179.2**	18.1%
B10	Salle de gymnastique du Pré-Vert	6.5	6.4	6.5	6.1	6.1	5.5	3.0	4.0	6.2	6.1	6.6	6.4	**69.4**	18.0%
B11	Piscine couverte des Ecots	74.6	73.9	75.4	68.8	67.9	68.9	32.9	68.0	70.9	74.2	74.6	78.0	**828.1**	20.5%
B12	Patinoire de la Sorne	166.9	161.3	138.5	55.9	25.3	24.9	32.0	93.2	145.5	158.7	160.6	161.0	**1,323.8**	11.3%
B13	Salle omnisports de Montvallier-Est	11.1	10.4	10.5	9.5	9.3	8.9	8.6	9.0	9.7	10.1	11.0	11.6	**119.7**	22.1%
B14	Bibliothèque municipale	6.5	6.2	6.0	5.8	5.5	5.4	5.3	5.4	5.9	6.1	6.7	7.0	**71.8**	22.4%
B15	Théâtre du Bourg	15.0	14.5	13.6	12.9	12.6	12.5	11.9	12.3	13.4	13.7	14.7	15.9	**163.0**	22.5%
B16	Musée de la Sorne	9.9	9.7	10.2	9.8	9.7	9.9	10.6	10.6	9.7	10.0	9.7	9.7	**119.5**	26.0%
B17	Conservatoire de musique	4.0	3.7	3.6	3.5	3.4	3.3	1.8	2.3	3.6	3.6	3.8	3.9	**40.5**	18.3%
B18	EMS Les Tilleuls (care home)	31.6	31.2	31.7	32.0	31.3	31.6	34.2	32.9	31.0	31.1	31.0	32.1	**381.7**	25.9%
B19	Crèche des Moulins	1.1	1.1	1.0	1.0	0.9	0.9	0.9	0.9	1.0	1.0	1.1	1.2	**12.1**	22.3%
B20	Maison de quartier de Vernay	1.9	1.8	1.8	1.7	1.5	1.6	1.5	1.5	1.7	1.7	1.8	1.9	**20.4**	22.5%
B21	Caserne des sapeurs-pompiers	10.9	10.4	10.0	9.3	9.0	8.7	8.3	8.5	9.3	10.3	10.9	11.2	**116.8**	21.8%
B22	Poste de police municipale	6.7	6.2	6.3	6.2	6.2	6.4	6.7	6.7	6.1	6.5	6.4	6.3	**76.7**	25.8%
B23	Station d'épuration des Moulins	9.4	8.6	8.4	8.0	7.8	7.7	7.3	7.5	8.0	8.7	8.9	9.8	**100.1**	22.5%
B24	Salle des fêtes	4.8	4.7	4.5	4.5	4.4	4.0	2.3	2.8	4.4	4.5	4.9	4.7	**50.5**	18.0%
	Total portfolio	**457.1**	**442.0**	**418.4**	**319.7**	**284.7**	**278.3**	**224.0**	**329.6**	**413.4**	**433.3**	**448.4**	**457.0**	**4,505.9**	**18.5%**

Monthly final energy 2025

Meter and invoice data allocated to calendar months (MWh). Heating energy is the final energy of each building's heating system; for heat pumps it is their electricity.

C. Portfolio by month and weather dependence

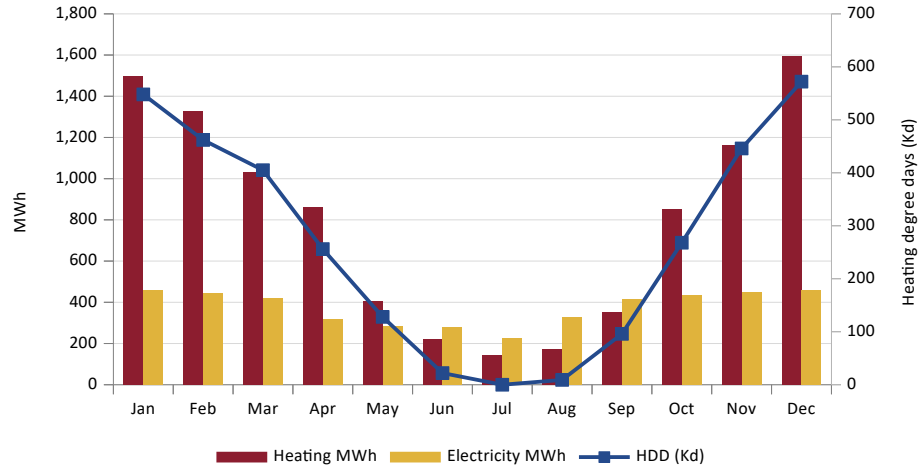
Month	HDD (Kd)	Heating MWh	Electricity MWh
Jan	548	1,495.9	457.1
Feb	462	1,327.1	442.0
Mar	405	1,032.5	418.4
Apr	256	859.2	319.7
May	128	407.1	284.7
Jun	22	222.7	278.3
Jul	0	143.2	224.0
Aug	9	173.8	329.6
Sep	96	350.8	413.4
Oct	268	853.5	433.3
Nov	446	1,164.6	448.4
Dec	572	1,593.2	457.0

Slope (MWh/Kd)	Base load (MWh)	R²
2.46	**144.58**	**0.989**

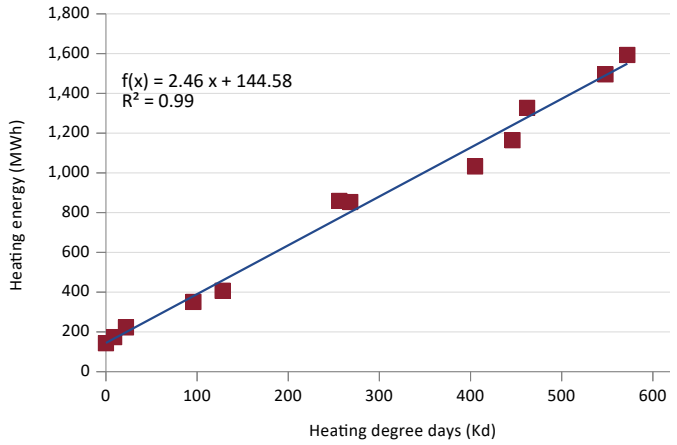
Linear regression of monthly heating energy on degree days (array form

Weather-normalised heating energy 2025 (HDD 3 385 Kd): 10 048 MWh, i.e. +4,4% compared with the measured 9 624 MWh.

Portfolio energy and heating degree days, 2025



Heating energy vs degree days (monthly)



Energy-saving measures and investment programme 2026–2030

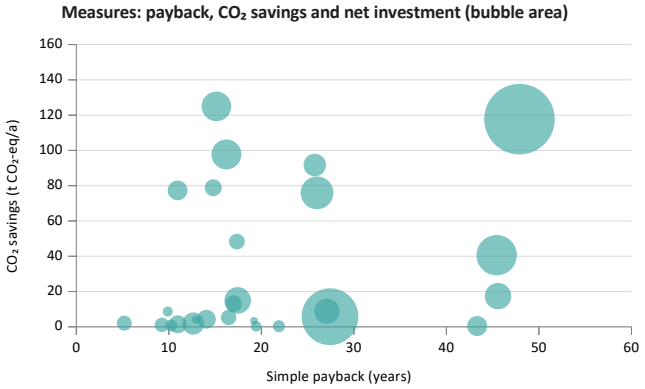
Savings are annual values against the 2025 consumption of each building. Negative electricity savings are the additional electricity of heat pumps replacing fossil boilers.

Measure						Investment (CHF)			Annual savings					Economics			Planning	
No.	Bldg	Building	Type	Category	Measure	Gross investment	Subsidies	Net investment	Heat MWh/a	Electricity MWh/a	Cost CHF/a	t CO_2-eq/a	Life (years)	Payback (years)	Net present value	CHF per t CO_2	Status	Target year
1	B11	Piscine couverte des Ecots	Sports	Heat supply	Heat recovery from pool water and shower drains with heat pump	680,000	95,000	585,000	435.4	-87.1	36,046	97.7	20	16.2	4,409	-2	Approved	2026
2	B11	Piscine couverte des Ecots	Sports	Envelope	Replace glazed façade of the pool hall (Uw 0.8 W/m²K)	1,240,000	180,000	1,060,000	178.1	0.0	23,331	40.6	40	45.4	-421,767	260	Planned	2028
3	B11	Piscine couverte des Ecots	Sports	Electricity	Variable-speed drives for filtration and circulation pumps	145,000	0	145,000	0.0	115.9	27,932	2.1	15	5.2	213,904	-6,836	In progress	2026
4	B12	Patinoire de la Sorne	Sports	Heat supply	Waste-heat recovery from ice-rink refrigeration for hot water and stands	520,000	60,000	460,000	178.2	0.0	26,374	15.0	20	17.4	-28,754	96	Approved	2027
5	B12	Patinoire de la Sorne	Sports	Electricity	Replace R-404A refrigeration plant by a CO_2 (R-744) plant	2,350,000	250,000	2,100,000	0.0	317.7	76,566	5.7	20	27.4	-848,041	7,415	*Under study*	2030
6	B12	Patinoire de la Sorne	Sports	Lighting	LED floodlighting of the rink, dimmable	210,000	0	210,000	0.0	79.4	19,135	1.4	15	11.0	35,876	-1,673	Completed	2025
7	B09	Collège du Pré-Vert	School	Envelope	Roof and façade insulation, triple glazing	3,850,000	610,000	3,240,000	516.3	0.0	67,635	117.7	40	47.9	-1,389,804	295	Planned	2029
8	B05	École primaire des Tilleuls	School	Heat supply	Air-water heat pumps (2 × 120 kW) replacing gas boilers	690,000	120,000	570,000	559.8	-148.2	37,618	125.0	20	15.2	45,102	-18	Approved	2026
9	B05	École primaire des Tilleuls	School	Lighting	LED lighting with presence control in classrooms	260,000	0	260,000	0.0	24.9	6,001	0.4	15	43.3	-182,893	–	Completed	2025
10	B10	Salle de gymnastique du Pré-Vert	Sports	Heat supply	Air-water heat pump replacing gas boiler	310,000	55,000	255,000	346.4	-91.7	23,279	77.3	20	11.0	125,640	-81	Planned	2027
11	B10	Salle de gymnastique du Pré-Vert	Sports	Envelope	Roof insulation 24 cm and skylight replacement	540,000	85,000	455,000	76.2	0.0	9,982	17.4	40	45.6	-181,932	262	Planned	2027
12	B02	Centre administratif, Rue du Marché 1	Administration	Controls	Building automation upgrade, night and weekend set-back	180,000	0	180,000	56.7	13.1	10,585	13.2	10	17.0	-84,921	645	In progress	2026
13	B02	Centre administratif, Rue du Marché 1	Administration	Renewables	Photovoltaic system 96 kWp on the roof (self-consumption 62 %)	168,000	32,000	136,000	0.0	61.0	14,701	1.1	25	9.3	151,014	-5,501	Approved	2026
14	B07	Collège de la Sorne	School	Renewables	Photovoltaic system 240 kWp on gym and classroom wing	395,000	78,000	317,000	0.0	104.0	25,064	1.9	25	12.6	172,336	-3,682	Planned	2027
15	B07	Collège de la Sorne	School	Ventilation	Heat recovery for ventilation of sports and assembly halls	460,000	40,000	420,000	104.8	0.0	15,510	8.8	20	27.1	-166,383	945	*Under study*	2029
16	B15	Théâtre du Bourg	Culture	Envelope	Interior insulation of stage tower and roof (listed building)	720,000	110,000	610,000	74.4	0.0	9,746	17.0	40	62.6	-343,383	506	*Under study*	2030
17	B15	Théâtre du Bourg	Culture	Heat supply	Ground-source heat pump (6 boreholes) replacing gas boiler	860,000	160,000	700,000	338.9	-72.6	26,899	76.0	20	26.0	-260,158	171	*Under study*	2030
18	B16	Musée de la Sorne	Culture	Heat supply	Air-water heat pump cascade replacing oil boiler	420,000	90,000	330,000	310.1	-91.0	12,800	91.7	20	25.8	-120,698	66	Approved	2027
19	B16	Musée de la Sorne	Culture	Controls	Climate set-points per conservation zone (EN 15757)	65,000	0	65,000	27.9	14.3	6,571	8.7	10	9.9	-5,975	69	Completed	2025
20	B04	Voirie – dépôt des Prés	Technical	Heat supply	Air-water heat pump replacing oil boiler	240,000	52,000	188,000	266.2	-71.0	12,703	78.8	20	14.8	19,719	-13	Planned	2028
21	B20	Maison de quartier de Vernay	Social	Heat supply	Heat pump replacing oil boiler, attic insulation	210,000	48,000	162,000	162.7	-36.9	9,330	48.3	20	17.4	-9,449	10	Approved	2026
22	B18	EMS Les Tilleuls (care home)	Social	Electricity	Kitchen and laundry equipment with heat recovery	230,000	0	230,000	42.1	42.0	16,353	4.3	15	14.1	-19,879	309	Planned	2028
23	B18	EMS Les Tilleuls (care home)	Social	Renewables	Solar thermal collectors 120 m² for hot water	190,000	36,000	154,000	63.2	0.0	9,354	5.3	25	16.5	28,615	-216	Planned	2028
24	B23	Station d'épuration des Moulins	Technical	Lighting	LED lighting and demand-controlled ventilation	95,000	0	95,000	0.0	18.0	4,338	0.3	15	21.9	-39,260	–	In progress	2026
25	B21	Caserne des sapeurs-pompiers	Technical	Renewables	Photovoltaic system 72 kWp (self-consumption 52 %)	118,000	24,000	94,000	0.0	38.0	9,158	0.7	25	10.3	84,796	-4,959	Approved	2026
26	B01	Hôtel de Ville	Administration	Envelope	Attic floor insulation and secondary glazing (listed building)	590,000	95,000	495,000	53.1	0.0	7,859	4.5	40	63.0	-280,019	1,569	Planned	2029
27	B17	Conservatoire de musique	Culture	Controls	Hydronic balancing and thermostatic valves	38,000	0	38,000	15.1	0.0	1,978	3.4	10	19.2	-20,232	588	Completed	2025
28	B24	Salle des fêtes	Culture	Envelope	Roof insulation and new entrance doors	460,000	70,000	390,000	45.2	0.0	5,921	10.3	40	65.9	-228,023	553	Planned	2028
29	B14	Bibliothèque municipale	Culture	Lighting	LED lighting with daylight control	74,000	0	74,000	0.0	15.8	3,808	0.3	15	19.4	-25,073	–	Approved	2026
30	B03	Services industriels, Route des Ecots 4	Technical	Controls	Energy monitoring and optimisation contract (3 years)	45,000	0	45,000	17.0	5.2	3,480	4.0	10	12.9	-13,739	346	In progress	2026
		Total programme			**30 measures**	**16,353,000**	**2,290,000**	**14,063,000**	**3,867.8**	**250.8**	**560,057**	**878.8**		**25.1**	**-3,788,970**			

Programme by category

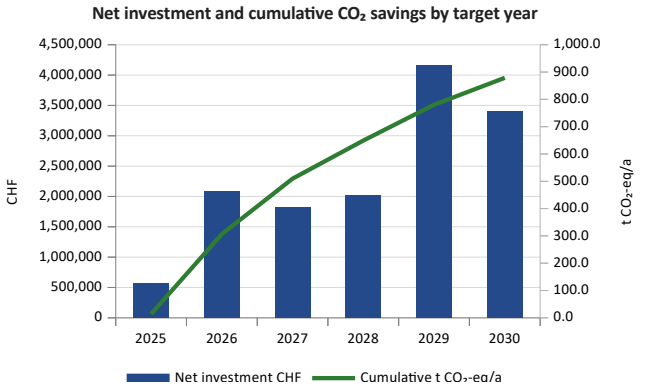
Category	Measures	Net investment CHF	Share of net investment	Cost savings CHF/a	t CO_2-eq/a	Mean payback (years)
Envelope	6	6,250,000	44.4%	124,475	207.4	50.2
Heat supply	8	3,250,000	23.1%	185,049	609.8	17.6
Ventilation	1	420,000	3.0%	15,510	8.8	27.1
Controls	4	328,000	2.3%	22,614	29.2	14.5
Lighting	4	639,000	4.5%	33,282	2.5	19.2
Electricity	3	2,475,000	17.6%	120,850	12.1	20.5
Renewables	4	701,000	5.0%	58,277	9.0	12.0
Total	**30**	**14,063,000**	**100.0%**	**560,057**	**878.8**	**25.1**

The programme of 30 measures requires a net investment of CHF 14.1 million and saves 879 t CO_2-eq per year, 47% of the 2025 emissions of the portfolio.



Schedule by target year

Target year	Measures	Net investment CHF	Cumulative net investment	Cost savings CHF/a	t CO_2-eq/a	Cumulative t CO_2-eq/a
2025	4	573,000	573,000	33,686	14.0	14.0
2026	10	2,086,000	2,659,000	156,995	292.6	306.6
2027	5	1,817,000	4,476,000	97,499	203.2	509.8
2028	5	2,022,000	6,498,000	67,662	139.4	649.2
2029	3	4,155,000	10,653,000	91,005	131.0	780.2
2030	3	3,410,000	14,063,000	113,211	98.6	878.8
Total	**30**	**14,063,000**		**560,057**	**878.8**	



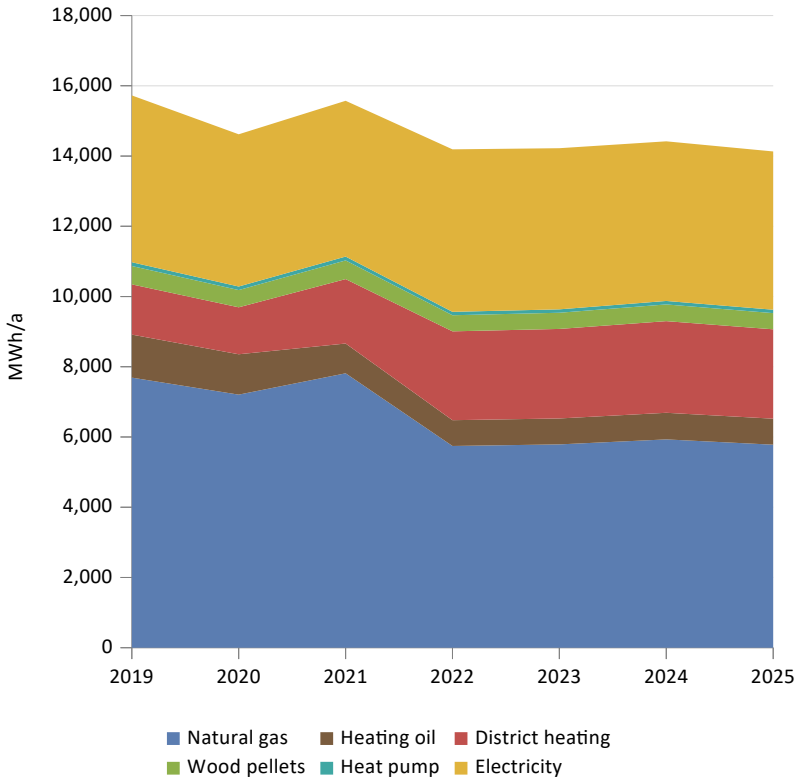
Portfolio trend 2019–2025 and climate target path

Final energy by carrier (MWh/a), emissions (t CO_2-eq/a) and the reduction path of the Plan climat Montvallier 2040.

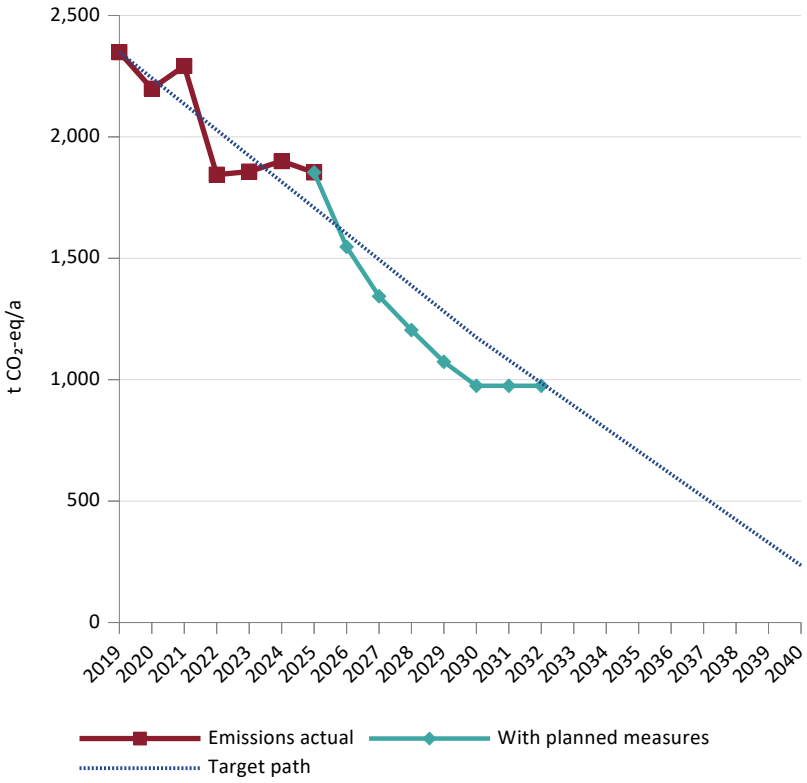
Year	HDD (Kd)	Natural gas	Heating oil	District heating	Wood pellets	Heat pump	Electricity	Total MWh/a	Heat, weather-normalised	Emissions actual	With planned measures	Target path	vs 2019
2019	3,402	7,688	1,228	1,429	523	109	4,749	15,726	10,930	2,349		2,349	0.0%
2020	3,198	7,204	1,151	1,339	490	102	4,332	14,618	10,797	2,199		2,242	-6.4%
2021	3,566	7,812	850	1,834	531	111	4,435	15,573	10,657	2,292		**2,135**	-2.4%
2022	3,047	5,743	734	2,531	459	96	4,628	14,191	10,465	1,844		2,029	-21.5%
2023	3,121	5,787	740	2,550	462	96	4,587	14,222	10,328	1,857		1,922	-20.9%
2024	3,260	5,929	758	2,613	474	99	4,546	14,419	10,195	1,900		**1,815**	-19.1%
2025	**3,212**	**5,780**	**739**	**2,547**	**462**	**96**	**4,506**	**14,130**	**10,064**	**1,854**	**1,854**	**1,708**	**-21.1%**
2026											1,547	1,601	
2027											1,344	1,495	
2028											1,204	1,388	
2029											1,073	1,281	
2030											975	1,174	
2031											975	1,080	
2032											975	986	
2033												893	
2034												799	
2035												705	
2036												611	
2037												517	
2038												423	
2039												329	
2040												235	

Emissions 2025: 1,854 t CO_2-eq (-21% vs 2019). Target 2030: 1,174 t. With the planned measures the portfolio reaches 975 t in 2030, which meets the target.

Final energy by carrier (MWh/a)



Emissions and target path (t CO_2-eq/a)



Analysis by building type and by measure category

DataPilot tables on the Buildings and Measures sheets (refresh after changes: Data ► Pivot Table ► Refresh).

Portfolio by building type

	Data				
Type	Buildings	ERA m²	MWh/a	t CO_2-eq/a	Cost CHF/a
Administration	3	7 980	1,172.0	142.3	CHF 199,570
Culture	5	9 750	1,760.0	306.8	CHF 276,443
School	5	25 530	3,546.6	476.4	CHF 533,745
Social	3	7 260	1,286.1	115.5	CHF 223,694
Sports	4	16 950	5,119.9	606.7	CHF 941,261
Technical	4	7 570	1,244.9	206.0	CHF 192,346
Total Result	**24**	**75 040**	**14,129.5**	**1,853.6**	**CHF 2,367,059**

Benchmark by type (weighted kWh/m²·a)

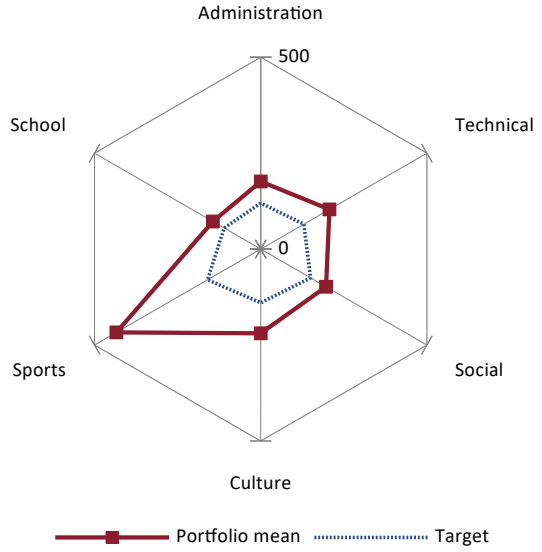
Type	Portfolio mean	Target	Attainment
Administration	176	120	68%
School	144	110	76%
Sports	434	160	**37%**
Culture	219	140	**64%**
Social	197	150	76%
Technical	207	130	**63%**

Investment programme by category and status (net investment, CHF)

Type - all -

Net investment	Status					
Category	Approved	Completed	In progress	Planned	Under study	**Total Result**
Controls		103 000	225 000			**328 000**
Electricity			145 000	230 000	2 100 000	**2 475 000**
Envelope				5 640 000	610 000	**6 250 000**
Heat supply	2 107 000			443 000	700 000	**3 250 000**
Lighting	74 000	470 000	95 000			**639 000**
Renewables	230 000			471 000		**701 000**
Ventilation					420 000	**420 000**
Total Result	**2 411 000**	**573 000**	**465 000**	**6 784 000**	**3 830 000**	**14 063 000**

Weighted intensity vs target by type



Parameters and conversion factors

Values used by all calculation sheets. Yellow cells are inputs; the sheet is protected without password so that formulas cannot be overwritten by accident.

A. Energy carriers (2025)

Parameter	Natural gas	Heating oil	District heating	Wood pellets	Heat pump	Electricity	Unit	Source
Greenhouse-gas emission factor	0.228	0.301	0.084	0.036	0.018	0.018	kg CO_2-eq/kWh	*KBOB 2022; DH: network operator 2025; electricity: certified hydropower*
National weighting factor	1.0	1.0	0.6	0.7	2.0	2.0	–	*Cantonal energy ordinance, Annex 2*
Energy price incl. grid fees and taxes	0.131	0.112	0.148	0.089	0.241	0.241	CHF/kWh	*Invoices 2025, average*
Price change vs 2024	+4.8%	-6.2%	+2.1%	+1.4%	-3.5%	-3.5%	%	*Invoices 2024/2025*

B. Energy classes (weighted final energy, kWh/m²·a)

Class	From	Below	Typical building
A	0	60	New building, very high standard
B	60	100	New building / complete retrofit
C	100	140	Good retrofit standard
D	140	180	Partial retrofit
E	180	230	Original 1960–1990 building
F	230	290	Poor envelope, old systems
G	290	–	Very high use or very poor

C. Economic and technical assumptions

Assumption	Value	Unit	Note
Real discount rate	2.0%	%	*Municipal finance plan 2026–2030*
Seasonal COP, air-water heat pumps	3.4	–	*Measured average of B08, B13*
Seasonal COP, ground-source heat pumps	4.2	–	*Design value*
Heating degree days, reference 1991–2020	3,385	Kd	*MeteoSwiss norm, station Montvallier*
Heating degree days 2025	3,212	Kd	*Monthly sheet, row 31*
Weather-dependent share of heat	85%	%	*Portfolio average (hot water excluded)*
Specific PV yield	1,020	kWh/kWp	*Measured, Collège de la Sorne 2019–2025*
CO_2 target 2030 vs 2019	-50%	%	*Plan climat Montvallier 2040, measure B-1*

D. Building types: targets and occupancy

Building type	Target kWh/m²·a	Occupied from	Occupied until	Hours per day	Buildings	ERA m²
Administration	120	06:30	18:30	12.0	3	7,980
School	110	06:00	17:30	11.5	5	25,530
Sports	160	07:00	22:30	15.5	4	16,950
Culture	140	08:00	23:00	15.0	5	9,750
Social	150	00:00	23:59	24.0	3	7,260
Technical	130	06:00	17:00	11.0	4	7,570
Total					**24**	**75,040**

E. Data sources

Data set	Extracted	Records	Responsible
Gas and district heating invoices	09.01.2026 10:15	216	Energy Office, N. Perrin
Heating oil and pellet deliveries	12.01.2026 14:40	38	Property management, L. Vuilleumier
Electricity, smart meters (15-min data)	06.01.2026 07:42	288	SI Montvallier, metering
Heating degree days, station Montvallier	03.01.2026 09:05	12	MeteoSwiss data portal
Energy reference areas (ERA)	20.11.2025 16:30	24	Architecture office, F. Gerber