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Sustainable Energy – the Energy of the Future: International Experience in Advancing and Implementing Innovative Energy Efficiency and Renewable Energy Technologies in Residential and Public Buildings

02 September 2025 (hybrid format)

State Energy Institute of Turkmenistan, Mary

Designing Sustainable Buildings Using BREEAM Certification – Strategies and Examples

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Sustainable Energy Connectivity in Central Asia

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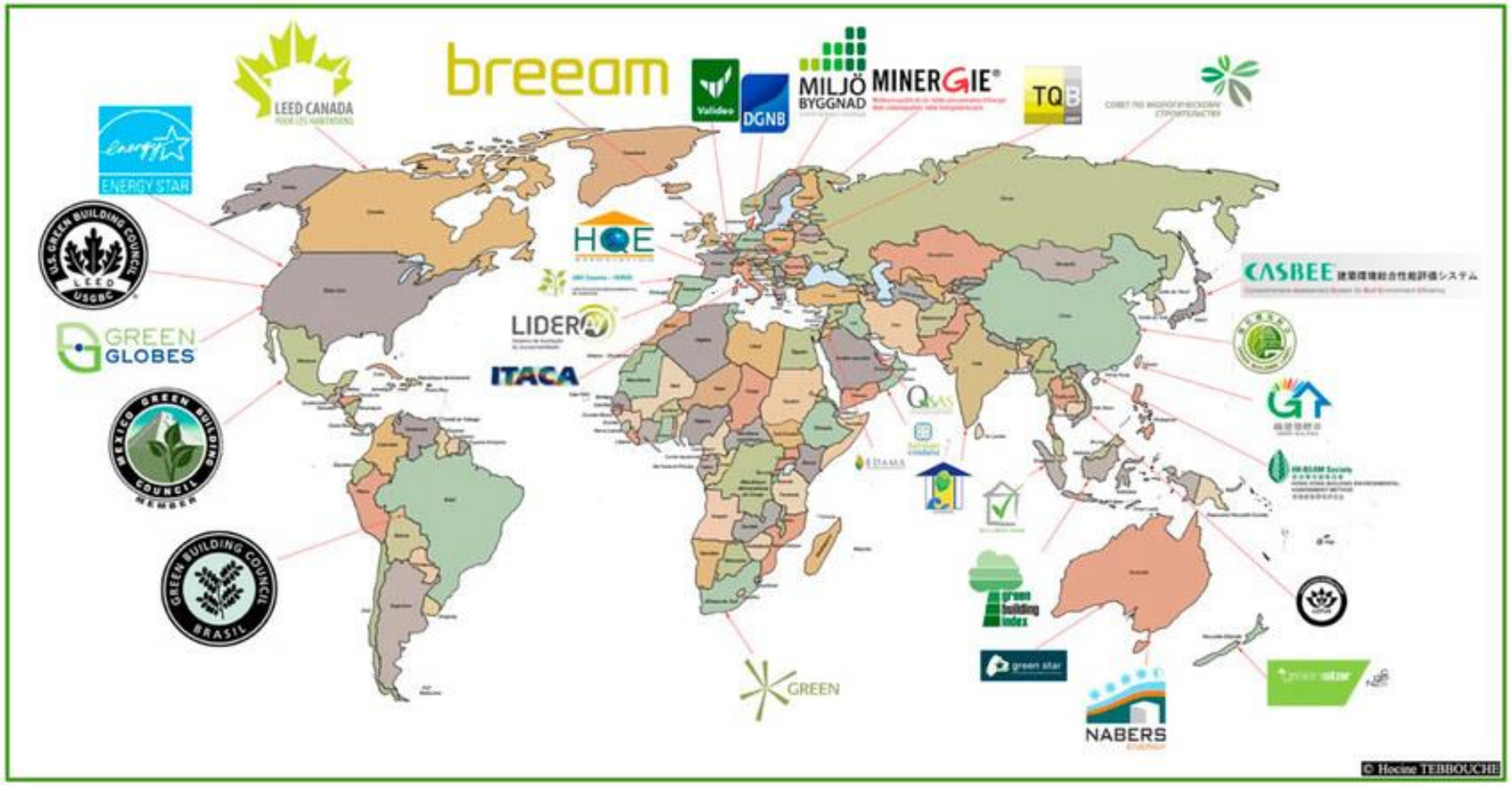
About Green Building Certification

Green Building Certification Systems



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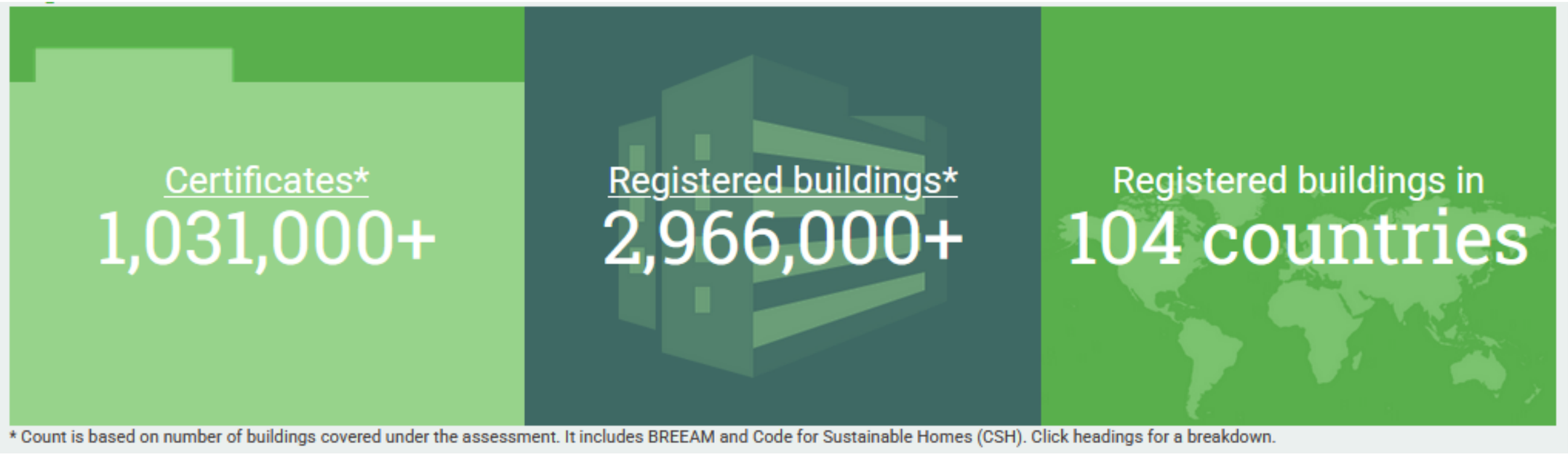
Certified Breeam Buildings



https://tools.breeam.com/projects/explore

Certified Breeam Buildings

Certified BREEAM Assessments — 2008 schemes onwards plotted on a map

https://tools.breeam.com/projects/explore

Breeam Criteria Categories And Main Intent

Management Category (MAN)

		Sub credits	Stages of work in the new build construction process*						
			Stage A	Stage B	Stage C	Stage D	Stage E	Stage F	Stage G
			Strategic Definition	Prepartion and Brief	Concept Design	Developed Design	Technical Design	Construction	Handover and Close Out
Management									
Man 01	Project brief and design	Stakeholder consultation			Consultations		Feedback		
		Sustainability champion (design)		Appointment	Agree BREEAM target				
		Sustainability champion (monitoring progress)							
Man 02	Life cycle cost and service life planning	Life cycle cost			Elemental LCC		Component level LCC plan		
		Capital cost reporting							
Man 03	Responsible construction practices	Environmental management							
		Considerate construction							
		Sustainability champion							
		Monitoring of construction site impacts							
Man 04	Commissioning and handover	Commissioning and testing					Appointment		
		Handover							
Man 05	Aftercare								

Management Category
Life cycle cost and service life planning (MAN02)

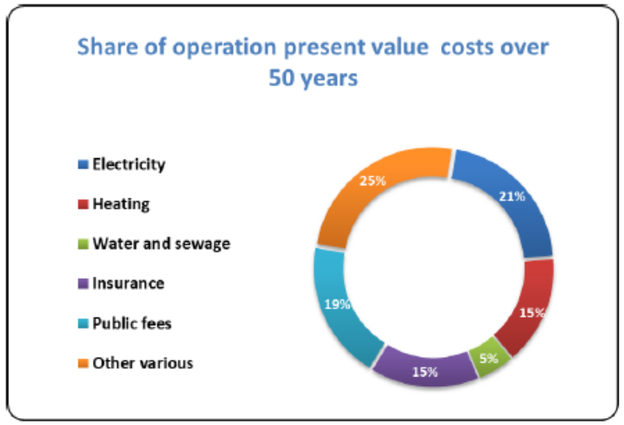


Figure 4.2 Share of each total present value (PV) operation cost from the total cost over the 50-year period

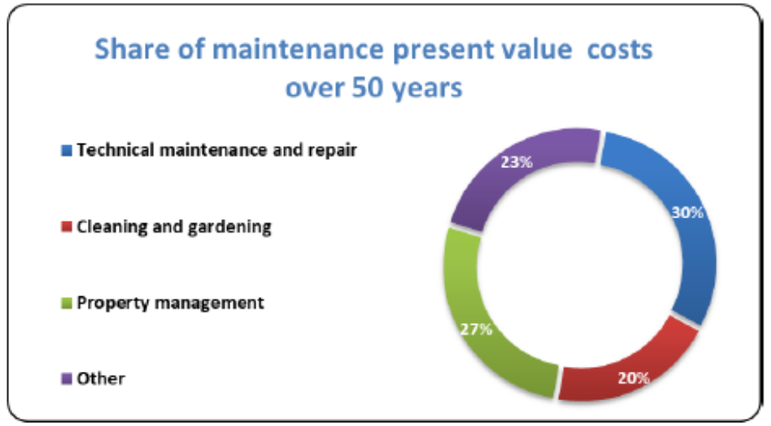


Figure 4.3 Share of each total present value (PV) maintenance cost from the total cost over the 50-year period

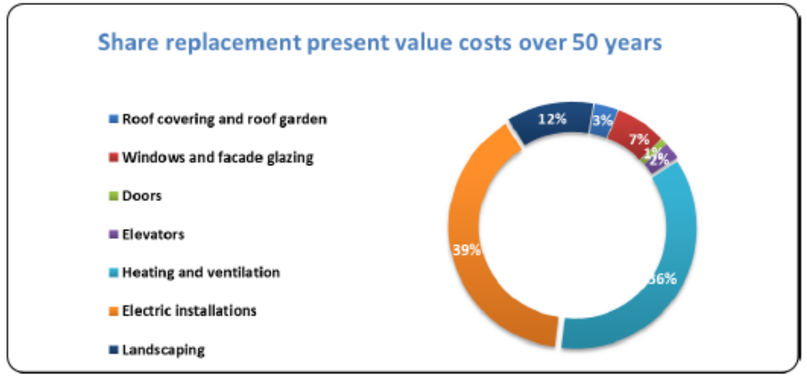


Figure 4.4 Share of each individual building element total present value (PV) replacement cost from the total cost over the 50-year period

Management Category
Responsible construction practices (MAN03)

Management Category
Responsible construction practices (MAN03)







Health and Wellbeing (HEA)

		Sub credits	Stages of work in the new build construction process*						
			Stage A	Stage B	Stage C	Stage D	Stage E	Stage F	Stage G
			Strategic Definition	Prepartion and Brief	Concept Design	Developed Design	Technical Design	Construction	Handover and Close Out
Hea 01	Visual comfort								
Hea 02	Indoor air quality	Minimising sources of air pollution							
		Potential for natural ventilation							
Hea 03	Safe containment in laboratories	Laboratory containment devices and containment areas				Risk assessment			
Hea 04	Thermal comfort								
Hea 05	Acoustic performance								
Hea 06	Accessibility	Safe access							
		Inclusive and accessible design							
Hea 07	Hazards			Risk assessment					
Hea 08	Private Space								
Hea 09	Water Quality								

Health and Wellbeing Category
Visual comfort (HEA01) and Acoustic performance (HEA05)

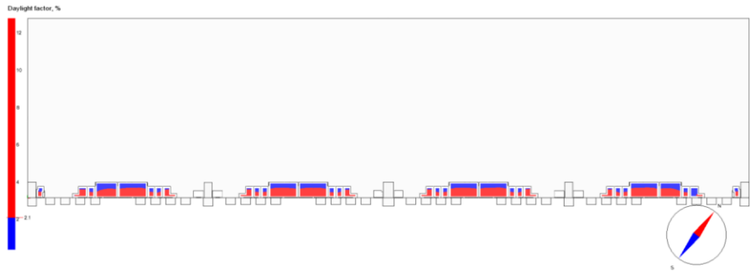
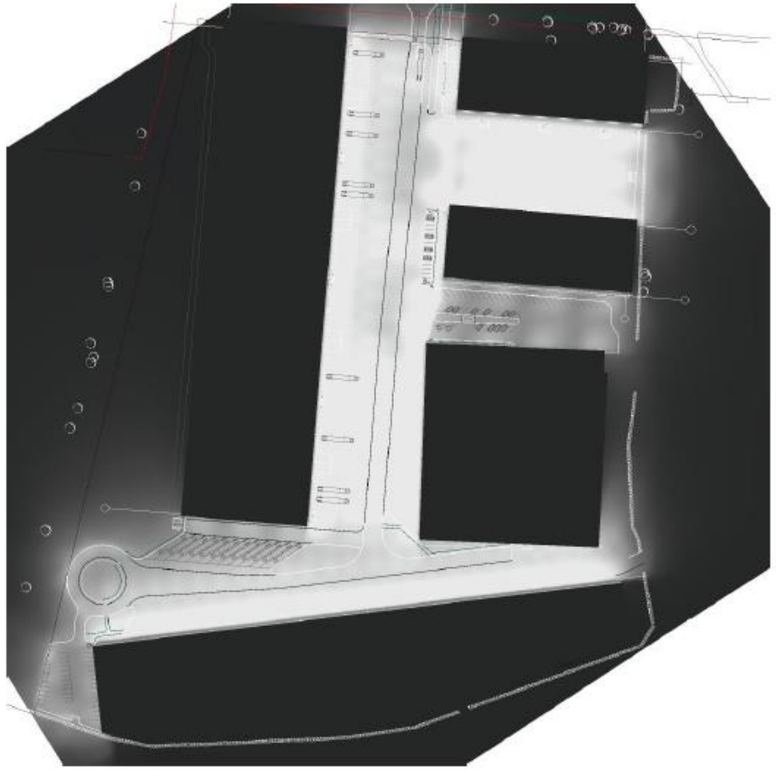
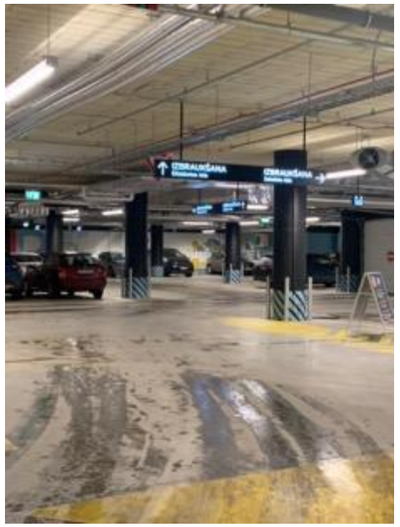


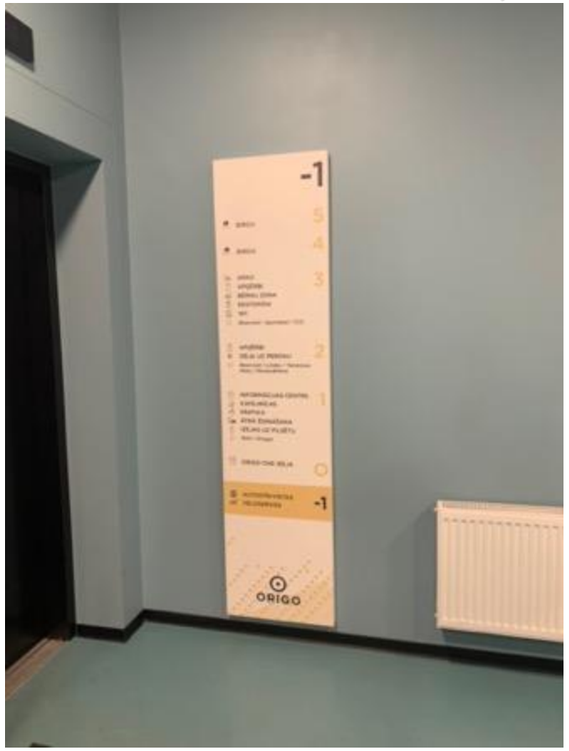
Figure 4. Daylight map with 2.1% average daylight factor 2nd floor.

Exterior Scene 1 / 3D Rendering



Health and Wellbeing Category
Accessibility (HEA06)

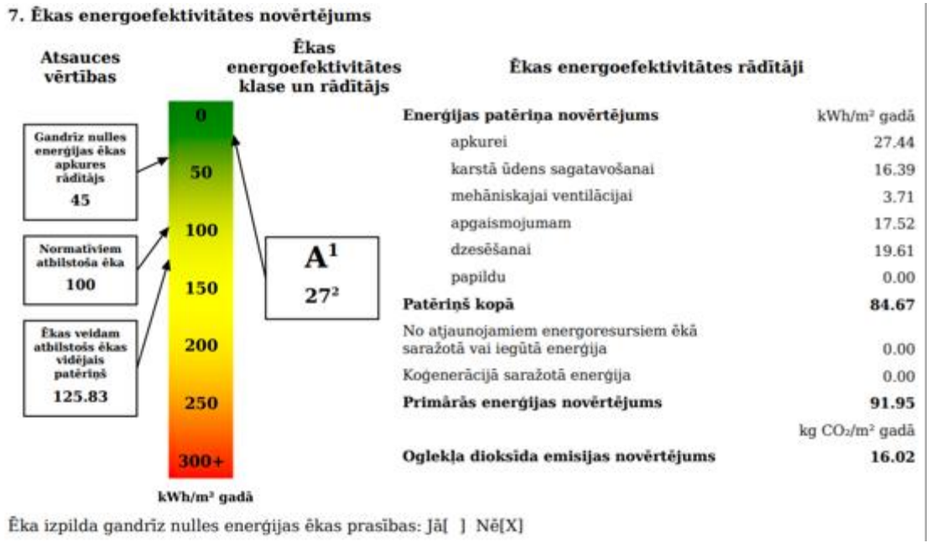




Energy Category

Energy			
Ene 01	Reduction of energy use and carbon emissions		
Ene 02a	Energy monitoring		
Ene 02b	Energy monitoring		
Ene 03	External lighting		
Ene 04	Low carbon design	Passive design	Passive design analysis
		Low and zero carbon technologies feasibility	Feasibility study
Ene 05	Energy efficient cold storage	Energy efficient design, installation and commissioning	Strategy for design and Installation
Ene 06	Energy efficient transportation systems		
Ene 07	Energy efficient laboratory systems	Design specification	Client engagement
Ene 08	Energy efficient equipment		
Ene 09	Drying space		

Energy Category
Reduction of energy use and carbon emissions (ENE01)



7. Ēkas energoefektivitātes novērtējums

Atsauces vērtības	Ēkas energoefektivitātes klase un rādītājs	Ēkas energoefektivitātes rādītāji	
Gandrīz nulles energijas ēkas apkures rādītājs 45	0	**Enerģijas patēriņa novērtējums**	kWh/m² gadā
	50	apkurei	27.44
	100	karstā ūdens sagatavošanai	16.39
Normatīviem atbilstoša ēka 100	150	mehāniskajai ventilācijai	3.71
	200	apgaismojumam	17.52
	250	dzesēšanai	19.61
Ēkas veidam atbilstošs ēkas vidējais patēriņš 125.83	300+	papildu	0.00
	A¹ 27²	**Patēriņš kopā**	**84.67**
		No atjaunojamiem energoresursiem ēkā saražotā vai iegūtā enerģija	0.00
		Koģenerācijā saražotā enerģija	0.00
		Primārās enerģijas novērtējums	**91.95**
			kg CO_2/m² gadā
		Oglekļa dioksīda emisijas novērtējums	**16.02**

kWh/m² gadā

Ēka izpilda gandrīz nulles enerģijas ēkas prasības: Jā[ ] Nē[X]

End use	Energy type	Units	Proposed	Baseline
Internal lighting	Electricity	MWh	362.62	469.09
Space heating	Purchased heat	MWh	11.96	1580.47
Space heating	Electricity	MWh	43.06	0
Domestic hot water	Electricity	MWh	34.11	34.11
Space cooling	Electricity	MWh	150.81	88.92
Pumps	Electricity	MWh	10.22	19.13
Heat rejection**	Electricity	MWh	0	60.27
Fans interior	Electricity	MWh	166.46	291.29
Total energy		MWh	779.24	2543.28
Improvement			-69%	

Energy Category
Reduction of energy use and carbon emissions (ENE01)

Element	Best practice specification
Roof U-value (W/m².K)	0.15*
Wall U-value (W/m².K)	0.2*
Floor U-value (W/m².K)	0.2*
Window U-value (W/m².K)	1.2*
G-Value (%)	0.67
Light Transmittance (%)	0.71
Roof light U-value (W/m².K)	2.2*
G-Value (%)	0.6
Light Transmittance (%)	0.7
Air-permeability (m³/m²/hour)	2*
Gross Internal Area less than 10,000m²	
Air-permeability (m³/m²/hour)	1.5*
Gross Internal Area greater than or equal to 10,000m²	
Lighting Luminaire (lm/ circuit watt)	65*
Occupancy control (Yes/No)	where appropriate
Daylight control (Yes/No)	dimming where appropriate
Heating efficiency (Heating and hot water) 1) Heat pump (Electricity) 2) Heat pump (Ground/water) 3) Heat pump (Biogas) 4) LTHW boiler(Oil) 5) LTHW boiler (Natural gas) 6) LTHW boiler default 6) LTHW boiler (biomass) 7) Cooling-heat pump (Electricity) 8) Air cooled chiller 9) Chiller default	 4.5 4.5 4.5 0.9 0.92 0.9 0.85 3.5 3.5 3.5
Central Ventilation SFP (W/l/s)	1
Terminal Unit SFP (W/l/s)	0.5
Heat recovery efficiency (%)	0.75 (for medium/small systems)
Variable speed control of fans and pumps, controlled via multiple sensors	Yes where appropriate
Demand control (mechanical ventilation only). Variable speed control of fans via CO_2 sensors	Yes where appropriate
On site electrical generation	Please see further guidance below

*See further guidance below

Energy Category
Energy monitoring (ENE02)

Fuel type	Main end uses	End-use/area/system/circuit or tenant to be measured	Meter code	Meter type	Location	Measurement method	Calculation
Electricity							
	Incoming grid, main meter		Sadale	Electrical meter	1-23	Direct	
	Incoming, Solar panels		SPS	Electrical meter	1-30	Direct	
	Small power, lighting						
		Subfunction - registry	DZNS	Electrical meter	2-17	Direct	
		Subfunction- small scale restaurant	KFS	Electrical meter	1-23	Direct	
		Subfunction - workshop	GS-1	Electrical meter	1-23	Direct	
		Main function - library	MFL	Electrical meter		Estimated	Sadale + SPS - all other meters
	Fire safety sprinkler system		SSS	Electrical meter	1-30	Direct	
	Electrical charging station		S1	Electrical meter	1-23	Direct	
	Ventilation		PN1S	Electrical meter	1-28	Direct	
			PN2S	Electrical meter	1-12	Direct	
	Heat pumps		SS1	Electrical meter	1-28	Direct	
			SS2	Electrical meter	1-28	Direct	
	Heating convectors		APS1	Electrical meter	1-28	Direct	
			APS2	Electrical meter	1-28	Direct	
			APS3	Electrical meter	1-28	Direct	
	Sewerage heat use pit		APS6	Electrical meter	1-28	Direct	
	Water pumps		UKS	Electrical meter	1-28	Direct	
Heat/ cold from sewerage							
	Incoming						
			SS.6	Heat meter	1-28	Direct	
	Space heating						
		Convectors	SS.1	Heat meter	1-28	Direct	
		AHU	SS.2	Heat meter	1-28	Direct	
	Space cooling	Convectors	SS.3	Heat meter	1-28	Direct	
		AHU	SS.4	Heat meter	1-28	Direct	
	Hot water		SS.7	Heat meter	1-28	Direct	
	Space heating or cooling, floor pipe system		SS.5	Heat meter	1-28	Direct	

Energy Category
Low carbon design (ENE04)

Technology and Description	Investment costs (Euro)	Simple payback (Years)	Equity payback (Years)	CO2 Savings per year (tCO2/ year)	Recommended for Further Consideration
Solar Photovoltaic - 50 kW	50500	10.7	8.8	21.8	Yes
Solar Thermal 8.76kW of roof mounted solar collectors	2000	3.4	4	2.21	Yes
Air Source Heat Pump -sized for tenants peak cooling demand	171000	8.6	7.3	171	Yes
Combined Heat and Power (CHP) - Gas Fired	437.5	12.6	10.1	601.9	No
Ground Source Heat Pump (GSHP)	381400	20.6	14.9	114.7	Yes

Energy Category
Energy efficient transportation systems (ENE06)

Elevator energy efficiency according to ISO 25745-2 (Component calculation)

Manufacturer: Schindler
Location: Building
Street
Riga, Latvia
Lift model: S3300
Lift type: Electric operated passenger elevator

Schindler

Rated load: 675 kg
Rated speed: 1 m/s
Travel height: 4,5 m
Operating days per year: 365 days
Number of starts: 125 1/d

Energy efficiency class

B

Idle power
129,1 W
(Performance level 3)

Specific running energy for the average cycle:
1,33 mWh/(kg·m)
(Performance level 3)

Standby power 5min
64,67 W
(Performance level 2)

Specific running energy for the reference cycle:
1,52 mWh/(kg·m)

Standby power 30min
64,67 W
(Performance level 2)

Date of evaluation:
2021-08-30

Usage category **2**

Estimated annual energy consu
866,7 kWh

Comparison of energy efficiency classes is only possible under equal usage.
Reference: ISO 25745-2:2015

Product File KA	Official Version - KA 993015
Release Status System	Alpha
Release Status Energy	Alpha

VDI 4707 Part 1 Lifts Energy efficiency §5 Testing the characteristic values on the lift and determining the consumption values of existing lifts - Note that, when comparing with the original values given by the manufacturer, there may be deviations of up to ±20% as a result of scatter and slight differences in settings.

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Water Category

		Sub credits	Stages of work in the new build construction process*						
			Stage A	Stage B	Stage C	Stage D	Stage E	Stage F	Stage G
			Strategic Definition	Prepartion and Brief	Concept Design	Developed Design	Technical Design	Construction	Handover and Close Out
Wat 01	Water consumption								
Wat 02	Water monitoring								
Wat 03	Water leak detection								
Wat 04	Water efficient equipment								

Water Category

Fitout type	Sanitary fixtures											
	WC	WC for disabled persons	Urinal	Taps (two for one basin)	Tap (one for basin)	Tap with basin for disabled persons	Tap and basin for cleaning stuff	Tap with basin for office kithcen	Tap with basin for 14.floor kitchen	Shower	Tap for floor or teritory cleaning	Comercial kitchen dishwasher
ConsumPtion	3,75 effective flushing	3,75 effective flushing	0,75 liters/flush	3,75 liters/minute	3,75 liters/minute	3,75 liters/minute	5,7 liters/minute	5 liters/minute	5,7 liters/minute	5,7 liters/minute	-	-

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Thank you!

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