

Greenhouse Gas Emissions Inventory

University of Pécs
2024



Has this inventory been verified by an accredited third party?
<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (if yes, fill in verifier contact information below and attach verification statement)

Have any facilities, operations and/or emissions sources been excluded from this inventory? If yes, please specify.
For mobile combustion, only fuel consumption data were available; therefore, CH4 and N2O data are not reported. For leased facilities where utility costs are included in the rental fee, natural gas and district heating consumption are not reported due to uncertainty in the identification of operational boundaries. These emissions are considered insignificant, as they account for 0.22% of the location-based inventory.
Reporting period covered by this inventory
From 01/01/2024 to 12/31/2024

ORGANIZATIONAL BOUNDARIES

Which consolidation approach was chosen?		
Equity Share <input type="checkbox"/>	Financial Control <input type="checkbox"/>	Operational Control <input checked="" type="checkbox"/>

OPERATIONAL BOUNDARIES

Are Scope 3 emissions included in this inventory?	
yes	<input type="checkbox"/>
no	<input checked="" type="checkbox"/>
If yes, which types of activities are included in Scope 3 emissions?	
Scope 3 activity types are not reported in this inventory.	

INFORMATION ON EMISSIONS

	Emissions in metric tons, by type of GHG			Emissions in metric tons of CO2 equivalent (tCO2e)		
	Scope 1	Scope 2 (location-based)	Scope 2 (market-based)	Scope 1	Scope 2 (location-based)	Scope 2 (market-based)
CO2	5056	10263	12914	5056	10263	12914
CH4	0.48	0.34	0.43	14	10	13
N2O	0.11	0.03	0.03	31	8	9
HFCs	0.06	0	0	101	0	0
PFCs	0	0	0	0	0	0
SF6	0	0	0	0	0	0
			TOTAL	5203	10281	12936

Direct CO ₂ emissions from Biogenic combustion (mt CO ₂)
0

BASE YEAR

Year chosen as base year
2024
Scope 2 method results used in base year
Location and market-based
Clarification of company-determined policy for making base year emissions recalculations
<p>Changes requiring recalculation:</p> <p>Significant changes in structure of organization Significant changes in calculation methodology Discovery of significant and collectively significant errors</p> <p>Changes NOT Requiring Recalculation:</p> <p>Changes involving facilities that did not exist in the base year Out-sourcing/in-sourcing of activities previously reported under a different Scope Organic growth or decline Significance threshold: 5%</p>
Context for any significant emissions changes that trigger base year emissions recalculations
There were no significant emissions changes that triggered base year emissions recalculations.

Base year emissions						
	Emissions in metric tons, by type of GHG			Emissions in metric tons of CO2 equivalent (tCO2e)		
	Scope 1	Scope 2 (location-based)	Scope 2 (market-based)	Scope 1	Scope 2 (location-based)	Scope 2 (market-based)
CO2	5056	10263	12914	5056	10263	12914
CH4	0.48	0.34	0.43	14	10	13
N2O	0.11	0.03	0.03	31	8	9
HFCs	0.06	0	0	102	0	0
PFCs	0	0	0	0	0	0
SF6	0	0	0	0	0	0
			TOTAL	5203	10281	12936

METHODOLOGIES AND EMISSION FACTORS

Methodology for calculating emissions	
Scope 1: Direct Emissions from Owned/Controlled Operations	
a. Direct Emissions from Stationary Combustion	Natural gas consumption is determined in kWh based on its calorific value and converted into carbon dioxide equivalent using the IPCC 2006 emission factors. Gasoline consumption is determined based on the quantity of fuel consumed and converted into carbon dioxide equivalent using the IPCC 2006 emission factors.
b. Direct Emissions from Mobile Combustion	Fuel consumption is determined in liters based on the quantity of fuel consumed and converted into carbon dioxide equivalent using the IPCC 2006 emission factors. For mobile combustion, only fuel consumption data were available; therefore, CH4 and N2O data are not reported.
c. Direct Emissions from Process Sources	Industrial gas consumption is determined in kilograms based on the density of the gases and converted into carbon dioxide equivalent using AR6 100-year GWP values.
d. Direct Emissions from Fugitive Sources	For fugitive emissions, leakage from cooling and air-conditioning systems is estimated based on system capacity, assuming a 1% leakage rate, and converted into carbon dioxide equivalent using AR6 100-year GWP values.
Scope 2: Indirect Emissions from the Use of Purchased Electricity, Steam, Heating and Cooling (location-based method)	
e. Indirect Emissions from Purchased/Acquired Electricity	Purchased electricity data are collected for facilities in kWh and converted into carbon dioxide equivalent using the ENTSO-E production mix emission factor for Hungary. For leased facilities where utility costs are included in the rental fee, purchased electricity is estimated using energy consumption per unit area data from the portfolio of self-operated facilities, expressed in kWh/m ² /year.
f. Indirect Emissions from Purchased/Acquired Heating	District heating data are collected for facilities in kWh based on the heat energy consumed and converted into carbon dioxide equivalent using heat-centre-specific emission factors in Hungary.

Scope 2: Indirect Emissions from the Use of Purchased Electricity, Steam, Heating and Cooling (market-based method)	
g. Indirect Emissions from Purchased/Acquired Electricity	Purchased electricity data are collected for facilities in kWh and converted into carbon dioxide equivalent using the Hungarian Energy and Public Utility Regulatory Authority (MEKH) residual mix emission factor for Hungary. For leased facilities where utility costs are included in the rental fee, energy consumption is estimated using energy consumption per unit area data from the portfolio of self-operated facilities, expressed in kWh/m ² /year
h. Indirect Emissions from Purchased/Acquired Heating	District heating data are collected for facilities in kWh based on the heat energy consumed and converted into carbon dioxide equivalent using heat-centre-specific emission factors in Hungary.

Emission factors			
Scope 1: Direct Emissions from Owned/Controlled Operations	Emission sources	Emission factors for 2024	Source
a. Direct Emissions from Stationary Combustion	Natural gas	203 gCO ₂ e/kWh	2006 IPCC Guidelines, Emission Factors for Cross Sector Tools V2.0
	Gasoline	2.928 kgCO ₂ e/liter	2006 IPCC Guidelines, Emission Factors for Cross Sector Tools V2.0
b. Direct Emissions from Mobile Combustion	Petrol	2.331 kgCO ₂ /liter	2006 IPCC Guidelines, UK, Emission Factors for Cross Sector Tools V2.0
	Diesel	2.626 kgCO ₂ /liter	2006 IPCC Guidelines, UK, Emission Factors for Cross Sector Tools V2.0
c. Direct Emissions from Process Sources	CO ₂	1	GWP (AR6 100-year)
	N ₂ O	273	GWP (AR6 100-year)
d. Direct Emissions from Fugitive Sources	R-407C	1526	ASHRAE Standard 34
	HFC-134a	1530	GWP (AR6 100-year)
	R-410A	1725	ASHRAE Standard 34
	HCFC-22	1760	GWP (AR6 100-year)
	R-404A	3260	ASHRAE Standard 34
	HFC-134	1260	GWP (AR6 100-year)
	R449A	1504	GWP (AR6 100-year)
	R-32 (HFC-32)	771	GWP (AR6 100-year)
	R-422D	2917	GWP (AR6 100-year)
R-454B	466	GWP (AR6 100-year)	

Scope 2: Indirect Emissions from the Use of Purchased Electricity, Steam, Heating and Cooling (location-based method)			
e. Indirect Emissions from Purchased/Acquired Electricity	Hungarian production mix	194 gCO2e/kWh	ENTSO-E production mix
f. Indirect Emissions from Purchased/Acquired Heating	District heating heat-centres	Cities: Pécs: 69.09 gCO2e/kWh, Kaposvár: 252.38 gCO2e/kWh, Komló:139.00 gCO2e/kWh, Mohács:174.89 gCO2e/kWh, Siklós: 374.00 gCO2e/kWh, Szigetvár: 360.45 gCO2e/kWh, Szombathely: 248.67 gCO2e/kWh	Data reporting by district heating service providers to the Lechner Knowledge Center in accordance with Decree 9/2023 (V.25.) of the Ministry of Construction and Transport
Scope 2: Indirect Emissions from the Use of Purchased Electricity, Steam, Heating and Cooling (market-based method)			
g. Indirect Emissions from Purchased/Acquired Electricity	Hungarian residual mix	274.69 gCO2e/kWh	Hungarian Energy and Public Utility Regulatory Authority (MEKH) residual mix
h. Indirect Emissions from Purchased/Acquired Heating	District heating heat-centres	Cities: Pécs: 69.09 gCO2e/kWh, Kaposvár: 252.38 gCO2e/kWh, Komló:139.00 gCO2e/kWh, Mohács:174.89 gCO2e/kWh, Siklós: 374.00 gCO2e/kWh, Szigetvár: 360.45 gCO2e/kWh, Szombathely: 248.67 gCO2e/kWh	Data reporting by district heating service providers to the Lechner Knowledge Center in accordance with Decree 9/2023 (V.25.) of the Ministry of Construction and Transport

SCOPE 2 INFORMATION

Instruments used in market-based method
No further instruments were used.
Additional information:
<ul style="list-style-type: none"> • Disclose which method's total used in single corporate inventory total, if single scope 1 +2 total reported
Location-based
<ul style="list-style-type: none"> • Disclose that contractual instruments meet Scope 2 Quality Criteria
No contractual instruments were used.
<ul style="list-style-type: none"> • Disclose if residual mix is not available
Residual mix is available.
<ul style="list-style-type: none"> • Disclose which total used for goal setting
Location-based
<ul style="list-style-type: none"> • Disclose which total used for scope 3, category 3 calculations
Not applicable

ORGANIZATIONAL BOUNDARIES

Facility/Entity ID	List of legal entities	% equity share in legal entity	Does reporting company have financial control? (yes/no)	Does reporting company have operational control? (yes/no)
AKTH	Akác Street Site	100%	YES	YES
ALTH	Alkotmány Street Site	100%	YES	YES
APTH	Apáca Street Site	100%	YES	YES
BATH	Bajnok Site (Children's Clinic)	100%	YES	YES
BETH	Berek Street Site	100%	YES	YES
BMTH	Marcell Breuer Site	100%	YES	YES
BOTH	Boszorkány Road Site	100%	YES	YES
BTTH	Balatonlelle Site			YES
DATH	Damjanich Site	100%	YES	YES
DITH	Dischka 5 Site	100%	YES	YES
DOTH	Dohány Street Site	100%	YES	YES
EDTH	Mothers' Site	100%	YES	YES
HATH	Hajnóczy Road (Laterum Dormitory) Site	100%	YES	YES
IFTH	Ifjúság Road (Faculty of Humanities and Faculty of Sciences) Site	100%	YES	YES
JHTH	Jakabhegy Road Site	100%	YES	YES
JITH	József Site	0%	NO	YES
JUTH	Jurisics Road Site (Hunyor Guest House)	0%	NO	YES
KATH	Kaposvár Site	100%	YES	YES
KPTH	Kaposvár SZESZI Site 14/D			YES
MKTH	Archives	100%	YES	YES
MSTH	Mária Street (Faculty of Health Sciences) Site	100%	YES	YES
MUTH	Munkácsy Mihály Street Site	100%	YES	YES

NYTH	Nyár Site	100%	YES	YES
ORTH	Orfű Site	100%	YES	YES
OZTH	Őz Street Site	100%	YES	YES
PATH	Pacsirta Street Site	100%	YES	YES
PPTH	Viticulture – Pázmány Péter Street Site	0%	NO	YES
RATH	Rákóczi Site (Faculty of Law and Faculty of Business and Economics)	100%	YES	YES
RCTH	Rácváros Road Site	100%	YES	YES
RETH	Rét Street (Clinical) Site	100%	YES	YES
RKTH	Rákóczi Site (Clinical Centre)	100%	YES	YES
RSTH	Rókus Street 4 Site	100%	YES	YES
RUTH	Rókus Street 2 Site	100%	YES	YES
SATH	Szekszárd – Mátyás Király Site (Practice Kindergarten)	100%	YES	YES
SDTH	Faculty of Health Sciences, Szombathely Dózsa Site	100%	YES	YES
SETH	Szepes (Faculty of Health Sciences) Site	100%	YES	YES
SGTH	Viticulture – Magyarürög Site	100%	YES	YES
SITH	Szekszárd – Szent István Site	100%	YES	YES
SJTH	Faculty of Health Sciences, Szombathely Jókai Site	100%	YES	YES
SKTH	Szántó Site	100%	YES	YES
SLAK	Service Apartments	0%	NO	YES
SLTH	Siklós Site	100%	YES	YES
SMTH	Szekszárd – Mátyás Király Site (Practice School and Dormitory)	100%	YES	YES
SNTH	Stadion Street Site	0%	NO	YES
SOTH	Viticulture – Szentmiklós Site	0%	NO	YES
SPTH	Sport Street Site	100%	YES	YES
SRTH	Szekszárd – Rákóczi Site (IGYK)	100%	YES	YES
SSTH	Szekszárd – Szent-Györgyi Site	100%	YES	YES
SVTH	Vasas Site	0%	NO	YES
SZTH	Szigeti Road Site	100%	YES	YES
TZTH	Tüzér Street Site	100%	YES	YES
UNTH	Universitas Site	100%	YES	YES
URTH	Ürög Site	0%	NO	YES
VATH	Vasvári Site	100%	YES	YES
VETH	Veress Endre Street Site	100%	YES	YES
VOTH	Vörösmarty (Faculty of Health Sciences) Site	100%	YES	YES
ZATH	Faculty of Health Sciences, Zalaegerszeg Landorhegyi 23 Site	100%	YES	YES
ZLTH	Faculty of Health Sciences, Zalaegerszeg Landorhegyi 33 Site	100%	YES	YES
ZSTH	Zsolnay Site	0%	NO	YES
MYTH	Megyeri Road Site	0%	NO	YES

KOTH	Komló Site	100%	YES	YES
MOTH	Mohács Site	100%	YES	YES
PSTH	Sfântu Gheorghe Site	0%	NO	YES
STTH	Szigetvár Site	100%	YES	YES
HRTH	Harkány Site	100%	YES	YES
PETH	Pellérd Site	0%	NO	YES
VPTH	Pécs District Health Visitor Service	0%	NO	YES
SKUT	J. Szentágothai Research Centre	100%	YES	YES
BPAL	Palatinus Gallery	0%	NO	YES
BKOL	Pécs, 4–6 Koller Street	0%	NO	YES
BXAV	Pécs, 19 Xavér Street	0%	NO	YES
BIFJ	Pécs, 11 Ifjúság Road	0%	NO	YES
BZSP	Pécs, 37 Zsolnay Vilmos Street	0%	NO	YES
BZSO	Zsolnay E15	0%	NO	YES
BMPK	Hungarian Civic Casino, Zombor	0%	NO	YES
BPSZ	Cathedral Chapter of Pécs	0%	YES	YES
BSEM	Semmelweis University Lease	0%	NO	YES
BTOL	Tölösi Péter Foundation Lease	0%	NO	YES
JUDE	JuridEco Zrt.	100%	YES	YES
PTUD	PÉCSI TUDÁSKÖZPONT Kft.	100%	YES	YES
PSER	PTE Services Nonprofit Kft.	100%	YES	YES
PINN	PTE Inno-Capital Kutatáshasznosító és Fejlesztő Kft.	100%	YES	YES
PPOL	PTE Politechnika Kutató, Fejlesztő és Tervező Kft.	100%	YES	YES

INFORMATION ON EMISSIONS

Emissions disaggregated by source types in metric tons of CO2 equivalent (tCO2e)			
Operational boundaries	Emissions (tCO2e)	% of the location-based inventory	% of the market-based inventory
Scope 1: Direct Emissions from Owned/Controlled Operations	5203	33.60%	28.68%
Direct Emissions from Stationary Combustion	4 858	31.37%	26.78%
Direct Emissions from Mobile Combustion	214	1.38%	1.18%
Direct Emissions from Process Sources	29	0.19%	0.16%
Direct Emissions from Fugitive Sources	102	0.66%	0.56%
Direct Emissions from Agricultural Sources	0	0%	0%
Scope 2: Indirect Emissions from the Use of Purchased Electricity, Steam, Heating and Cooling (location-based method)	10281	66.40%	
Indirect Emissions from Purchased/Acquired Electricity	6384	41.23%	
Indirect Emissions from Purchased/Acquired Steam	0	0%	
Indirect Emissions from Purchased/Acquired Heating	3896	25.16%	
Indirect Emissions from Purchased/Acquired Cooling	0	0%	
Scope 2: Indirect Emissions from the Use of Purchased Electricity, Steam, Heating and Cooling (market-based method)	12936		71.32%
Indirect Emissions from Purchased/Acquired Electricity	9040		49.84%
Indirect Emissions from Purchased/Acquired Steam	0		0%
Indirect Emissions from Purchased/Acquired Heating	3896		21.48%
Indirect Emissions from Purchased/Acquired Cooling	0		0%
Total Scope 1+2 emissions (location-based method)	15484	100%	
Total Scope 1+2 emissions (market-based method)	18139		100%

Emissions disaggregated by facility type according to an area-based allocation, in metric tons of CO2 equivalent (tCO2e)	
Operational boundaries	Emissions (tCO2e)
Scope 1: Direct Emissions from Owned/Controlled Operations	5203
Higher education facilities	1888
Clinical Centre	2394
Central and other facilities	636
Public education institutions	285
Scope 2: Indirect Emissions from the Use of Purchased Electricity, Steam, Heating and Cooling (location-based method)	10281
Higher education facilities	3369
Clinical Centre	5198
Central and other facilities	1445
Public education institutions	269
Scope 2: Indirect Emissions from the Use of Purchased Electricity, Steam, Heating and Cooling (market-based method)	12936
Higher education facilities	4333
Clinical Centre	6491
Central and other facilities	1816
Public education institutions	296
Total Scope 1+2 emissions (location-based method)	15484
Higher education facilities	5257
Clinical Centre	7592
Central and other facilities	2080
Public education institutions	555
Total Scope 1+2 emissions (market-based method)	18139
Higher education facilities	6221
Clinical Centre	8885
Central and other facilities	2452
Public education institutions	581

Relevant ratio performance indicators			
Indicator	Location-based inventory	Market-based inventory	Metric
Scope 1+2 emissions per unit energy consumption	151.14	177.06	gCO2e/kWh
Scope 1+2 emissions per gross internal area	26.79	31.39	kgCO2e/m2
Scope 1+2 emissions per employee	1.41	1.65	tCO2e/employee
Scope 1+2 emissions per university citizen	441.96	517.76	kgCO2e/university citizen

An outline of any GHG management/reduction programs or strategies

University of Pécs (UP) publishes its first GHG inventory for the reporting year 2024 in accordance with the GHG Protocol. We are in the process of establishing methodologies and processes to measure and estimate emissions for Scope 1 and Scope 2 categories. We aim to establish a baseline for our climate strategy scenarios in order to define targets for GHG emission reduction. Later, we plan to expand the inventory to Scope 3 as information availability increases among our external partners in Hungary. Meanwhile, we continue to invest in energy efficiency and have implemented a wide range of energy-saving measures across the campus. In addition, we promote sustainable behavior through campus-wide awareness campaigns, addressing actions relevant to all three Scopes.

Stationary combustion: The modernization of buildings, comprising external façade and roof slab insulation, replacement of windows and doors, renovation of mechanical (HVAC) systems, and the replacement of fossil fuels, may result in an estimated reduction of approximately 664 tCO₂e per annum over the past 12 months.

Structural renovation of buildings: -495 tCO₂e per annum

Replacement of fossil fuels: -169 tCO₂e per annum

The University of Pécs continuously invests in the structural renovation of buildings and the replacement of fossil fuels in order to reduce reliance on stationary combustion equipment operating on natural gas.

Mobile combustion:

Assessment and optimization of fleet utilization, fleet electrification, fleet sharing: The UP is actively reducing fossil fuel dependency – especially in its fleet – by incorporating electric vehicles, resulting in a lowered fossil fuel proportion

Fugitive emissions: For the purpose of energy and cost savings, air conditioning units are centrally regulated and cannot be operated below 26 °C. In accordance with legal requirements, we have initiated the audit of leakages from refrigeration equipment with a capacity above 70 kW, which are registered by the National Climate Protection Authority of Hungary (NKVH). Leakages of lower-capacity refrigeration equipment are also monitored.

Purchased electricity:

Installation of photovoltaic systems: Following the successful photovoltaic projects of prior years, further systems were installed across multiple University of Pécs sites in 2024. In 2024, the solar panel systems generated 1,989,277 kWh of electricity, which is 3.5 times higher than the previous year's production.

As of 2019, more than half of the university's energy came from renewable sources—primarily biomass district heating, followed by geothermal and solar energy. The PV systems installed in 2024 may contribute to the avoidance of an estimated 52 tCO₂e of emissions per annum.

Energy-saving interventions across campus, including:

- Installation and modernization of building management systems
- Intelligent control and measurement of building energy consumption
- Enhanced control over heating and cooling systems
- Elimination of supplemental heating/cooling
- Curtailing exterior and decorative lighting
- Installation of solar-powered outdoor lighting systems
- Minimizing nighttime and security lighting
- Upgrading to LED lighting and phasing out traditional bulbs
- Rolling out an energy management system
- Encouraging sustainable energy behavior through campus-wide awareness campaigns and competitions—especially among dormitories

Energy assessment and optimization of buildings: The systematic energy assessment and optimization of the buildings and the implementation of energy efficiency investments directly contribute to the reduction of Scope 2 emissions. Through energy performance certificates, comprehensive energy audits, the University is able to identify inefficiencies, optimize energy use, and reduce the demand for purchased electricity and heating. External experts conduct inspections of our buildings, provide recommendations for refurbishments, and evaluate the potential extent of energy and cost savings. The University of Pécs also participates in the Hungarian energy trading system (EKR) to facilitate and accelerate the implementation of energy investments through the utilization of certified energy savings (HEM). These measures enable data-driven decision-making and support continuous improvements in the energy performance of buildings.

Implementation of building automation, management and monitoring systems: We are continuously expanding and modernizing our building management systems. Intelligent control and measurement of buildings' energy consumption is among our key priorities. By using an energy management software, energy consumption can be continuously monitored, providing up-to-date information on every point and moment of operations. Currently, 100% of electricity consumption meters and 95% of gas consumption meters are equipped with transmitters, providing real-time, time-series data at 15-minute intervals. We continue to make efforts to integrate data transmitters into the main water and district heating meters, aiming to equip every building with smart meters for each energy type. This data availability enables evidence-based decision-making and supports the implementation of further energy efficiency improvement measures.

District Heating: 91,82% of energy consumed for district heating are generated with clean biomass.

ADDITIONAL INFORMATION

Information on the quality of the inventory and an outline of policies in place to improve inventory quality		
Uncertainty	Estimated magnitude as a percentage of location-based inventory-	Mitigation policy
Estimation of fugitive emissions	0.66% - 1.3%	In accordance with legal requirements, we have initiated the audit of leakages from refrigeration equipment with a capacity above 70 kW, which are registered by the National Climate Protection Authority of Hungary (NKVH). We have also initiated the recording of leakages from lower-capacity refrigeration equipment for inventory preparation purposes.
CH ₄ , N ₂ O emissions of fuel consumption	0.07% - 0.14%	In addition to fuel consumption data, we have also started collecting distance data in order to calculate CH ₄ and N ₂ O emissions from fuel consumption.
Energy consumption of leased facilities where utility costs are included in the rental fee	0.06%-0.08%	We have initiated the identification of operational boundaries for leased facilities where utility costs are included in the rental fee.
Level of uncertainty	0.79%-1.52%	