Decree of the Ministry of the Environment

on the energy performance of new zero-emission buildings

In accordance with the decision of the Ministry of the Environment, the following is enacted pursuant to Sections 37(4), 61(4) of the Construction Act (751/2023), as amended by Section 61(4) of Act 897/2024:

Chapter 1

General

Section 1

Scope

This decree applies to the design and construction of new buildings which are made of wall and roof structures and in which energy is used in order to maintain an appropriate indoor environment. It also concerns the expansion of a building and the increase of gross floor area. It applies to the extension of buildings with a useful floor area of less than 50 square metres only insofar as the useful floor area of the building, including any extension, exceeds 50 square metres.

Section 2

Definitions

For the purposes of this Decree, the following definitions shall apply:

1) *the heat quantity needed for the thermal ventilation*: the quantity of heat that is necessary for heating the ventilation air flow from outside temperature to room temperature;

2) *the net heating or cooling energy demand of a ventilation and air-conditioning system*: means the heating or cooling energy demand arising from the heating or cooling of air. The heating energy need is calculated from heating air after heat recovery to the temperature of the supply air, including possible heating prior to heat recovery. The cooling energy need is calculated from cooling air after heat recovery to the temperature of the supply air, including possible cooling prior to heat recovery;

3) *annual efficiency ratio of the heat recovery of the extract air of the ventilation*: the relation between the annual quantity of heat that is recovered with the heat recovery equipment and the heat quantity that is required for the heating of the ventilation, when there is no heat recovery;

4) *specific fan power of ventilation or air-conditioning system* (kW/(m^3/s)): the total electrical power drawn from the electricity network by all fans of the building's ventilation or air-conditioning system and their associated frequency converters and other power control devices, divided by the exhaust air flow rate or outdoor air flow rate during the planned operating period of the ventilation or air-conditioning system, whichever is greater;

5) *electric energy consumption of the ventilation or air-conditioning system:* the the electricity consumption of the fans and possible accessory units;

6) *air leakage rate* q_{50} (m^3/(h m^2)): the mean flow of air leakage per hour of the building envelope by a 50 Pa difference in pressure, calculated in accordance with the total internal dimensions, per area of the building envelope;

7) *climate-controlled cool space*: a space where an appropriate all-year round temperature of 17 °C is maintained with a cooling and possible heating system;

8) *energy consumption of the cooling system*: the energy consumption for the production of the cooling energy and the power consumption of the accessory units;

9) *district heating*: heat delivery through a distribution network to a customer property;
10) *cold bridge*: a decrease in the thermal transmittance coefficient in a small part of a building resulting from a structure's strength or joints;
11) *reference floor area* $A_{reference}$ (m^2): the sum of the floor areas of the storeys of the heated building's spaces required for the building's main intended use, calculated according to the inner surfaces of the external walls enclosing the storeys;
12) *unheated space*: a space that is not intended for continuous occupancy during the heating period, which is not planned to be heated;
13) *net heating energy need*: the total net energy need required for heating spaces, heating the ventilation and producing domestic hot water;
14) *heating energy need*: the amount of energy needed for maintaining indoor climate conditions, ventilation and heating domestic hot water;
15) *thermal transmittance coefficient*: the density of the air flow that, in a continuous state, penetrates the building component when the difference in temperature between the air spaces in the various building components is as big as the unit. Its symbol is U and $W/(m^2K)$ is the unit used;
16) *warm space*: a space with a temperature of +17 °C or higher;
17) *net heating energy requirement for domestic hot water*: the heating energy required to heat domestic hot water from the temperature of cold water to the temperature of hot water;
18) *solid timber wall*: a wall structure in which the average thickness of the homogeneous timber structure is at least 180 mm;
19) *solid timber building*: a building in which the principal construction material of the external walls is solid timber;
20) *semi-warm space*: a space that is not designed for constant occupancy by occupants dressed only in normal indoor clothes, and has a temperature that is maintained at a minimum of +5 °C but below +17 °C during the heating season;
21) *calculated purchased energy of the building*: energy that is calculated to be acquired to the building from the power grid, the district heating network, the district cooling network or from renewable energy or fossil fuels;
22) *building envelope*: the building components that separate the warm, semi-warm, very warm and climate-controlled cool spaces from the outdoor air, ground or unheated spaces;
23) *reference thermal loss of the building*: the sum of the thermal loss of the envelope, leakage air and the ventilation calculated in accordance with the formulae and reference values;
24) *relocatable building*: a movable building intended for temporary use;
25) *design solution*: the design to be implemented in the building in question;
26) *renewable fuels*: wood, wood-based and other biofuels, with the exception of peat;
27) *adaptive ventilation*: a system that can be used for guiding air flows according to loads or air quality based on the usage situation;
28) *energy obtained from energy in the environment*: thermal or electric energy obtained from sun, wind, soil, air or water by means of equipment that is part of or comparable to the building or near the building.
29) *air-conditioning system*: a combination of components required for the treatment of indoor air, by means of which the temperature may be regulated or reduced and by which the cleanliness, temperature, humidity and air movement of indoor air may be controlled through the treatment of supply air or recirculated air;
30) *heating system*: a combination of elements required to condition indoor air, thereby allowing the temperature to be controlled or increased;
31) *ventilation system*: a technical building system that supplies outdoor air to a space either naturally or mechanically;
32) *energy from renewable sources*: energy from renewable non-fossil sources, namely wind, solar (solar thermal and solar photovoltaic) and geothermal energy, osmotic energy, ambient energy, tidal energy, wave energy and other ocean energy, hydropower, biomass, gas and biogas produced at landfills and sewage treatment plants;
33) *energy type coefficient*: a national weighting factor representing the sum of the coefficients for renewable and non-renewable energy sources for a given form of energy;
34) *renewable energy source coefficient*: a national weighting factor used to obtain a comparative figure for energy from renewable sources for a specific form of energy by multiplying it by the calculated amount of purchased energy;

35) *non-renewable energy source coefficient*: a national weighting factor used to obtain a comparative figure for energy from non-renewable sources for a specific form of energy by multiplying it by the calculated amount of purchased energy;

36) *calculated in-use greenhouse gas emission reference value*:the calculated purchased energy consumption of the building per year per heated reference floor area of the building, weighted using the one-year emission factors from the national emissions database. Expressed in $kgCO_{2E}/(m^2a)$;

37) *weather zone*: an area in which the design outdoor air temperatures and other weather data are identical for the municipalities concerned. The zone has been defined on the basis of the long-term climatic annual average temperature, also taking administrative boundaries into account.

Section 3

Minimum energy performance requirements for zero-emission buildings

The principal designer, specialist designer and building designer must, in accordance with the respective duties, ensure that the newly designed building meets the following requirements, depending on its use:

1) compliance with the calculated energy performance reference value (*E-value*) or the structural energy performance;

2) creates conditions for little energy consumption with regard to thermal loss in the building;

3) optimised to enable the use of solar energy;

4) zero-emission; and

5) energy-efficient, in accordance with the findings of the energy declaration.

Chapter 2

Energy performance

Section 4

Requirement levels for the calculated energy performance reference value according to use categories

The calculated energy performance reference value (*E-value*), for which unit $kWh_E/(m^2\ a)$ is used, is the calculated annual net purchased energy consumption of the building weighted by the coefficients of the energy forms per heated reference floor area. An E-value calculated on the basis of a building's use class must not exceed the following limits:

Usage category	E-value limit $kWh_E/(m^2\ a)$
Category 1) Small residential buildings:	
a) Detached small house or part of a linked house, with a heated reference area ($A_{reference}$) of 50–150 m^2	143-0,45* $A_{reference}$
b) Detached small house or part of a linked house, with a heated reference area ($A_{reference}$) of more than 150 m^2 but not exceeding 600 m^2	80-0,03* $A_{reference}$
c) Detached small house or part of a linked house, with a heated net area ($A_{reference}$) of more than 600 m^2	62
d) Terraced houses and blocks of flats with no more than two storeys of living accommodation	71
Category 2) Block of flats with at least three residential floors	63
Category 3) Office building, healthcare facility	71

Class 4) Commercial building, department store, shopping centre, shop building with the exception of convenience stores less than 2 000 m² per unit, shopping hall, theatre, opera house, concert and conference hall, cinema, library, archive, museum, art gallery, exhibition hall	97
Category 5) Commercial accommodation building, hotel, hall of residence, hospitality building, nursing home, treatment centre	114
Category 6) School buildings and day-care centres	71
Category 7) Large gyms, excluding indoor swimming pools and ice rinks	71
Category 8) Hospital	230
Class 9) Other building, storage building, transport building, swimming pool, ice rink, convenience stores less than 2 000 m^2 per unit, mobile building	no limit values

In a building in use category 6 with a heated reference floor area of 1 000 m^2 or less, the E-value limit set out in subsection 1 above may be exceeded by 3 $kWh_E/(m^2\ a)$.

For solid wood buildings, the E-value limits stated in subsections 1 and 2 above may be exceeded by 20% in use category 1a buildings, by 15% in category 1b-c buildings, and by 10% in other buildings in use categories 1d–8.

For buildings in use category 1, the E-value limits stated in subsections 1 and 3 may be exceeded by 3 $kWh_E/(m^2\ a)$ if a building is connected to a heating system where heat is distributed through pipes outside of the building from a joint heat conveyance or heat generating system to three or more buildings.

The E-value for a category 9 building shall be calculated. Design values shall be used in the calculation.

The limit for the E-value does not apply to:

1) dwellings built in the attic of an block of flats;

2) a building expansion pursuant to category 1 or an addition to the floor area;

3) a building expansion pursuant to another category or an addition to the floor area where existing ventilation, air-conditioning or heating systems can be used for ventilation or heating;

4) a small house designed as a holiday home.

Section 4a

Calculation of the in-use greenhouse gas emission reference value

The in-use greenhouse gas emission reference value shall be calculated from the building's calculated purchased energy consumption, itemised by energy form, using emission factors for the energy forms.

As emission factor values, the specific greenhouse gas emissions for the year 2030 contained in the national emissions database at the time this Decree enters into force shall be used, arising from the consumption of purchased energy.

The in-use greenhouse gas emission reference value is calculated using the formula:

$$E_{CO2e} = \frac{f_{CO2e,\,district\,heating} Q_{district\,heating} + f_{CO2e,\,district\,cooling} Q_{district\,cooling} + ¿ \sum_i f_{CO2e,\,fuel,\,i} Q_{fuel,\,i} + f_{CO2e,\,electricity} W_{electricity}}{A_{net}}$$

where:

E_{CO2e} is the in-use greenhouse gas emission reference value, kg $CO_2/(m^2\ a)$;

$Q_{district\ heating}$ is the district heating consumption per year, kWh/a;

$Q_{district\ cooling}$ is the annual consumption of district cooling, kWh/a;

$Q_{fuel,i}$ is the amount of energy contained in fuel i consumed per year, kWh/a;

$W_{electricity}$ is the annual electricity consumption, taking into account deductions from energy obtained from freely utilisable environmental energy with building-related or comparable equipment, insofar as it has been used in the building to cover energy consumption based on standardised use, kWh/a;

$f_{CO2e,district\ heating}$ is the emission factor for district heating, kg CO_{2e} /kWh;

$f_{CO2e,district\ cooling}$ is the emission factor for district cooling, kg CO_{2e} /kWh;

$f_{CO2e,fuel,i}$ is the emission factor of fuel i, kg CO_{2e} /kWh;

$f_{CO2e,electricity}$ is the emission factor for electricity, kg CO_{2e} /kWh;

A_{net} is the heated reference floor area of the building, m².

Section 4 b

Limit value for the in-use greenhouse gas emission reference value

The in-use greenhouse gas emission reference value calculated according to the building's use category shall not exceed the following limit values:

Usage category	Limit value for the in-use greenhouse gas emission reference value kgCO_{2e}/(m² a)
Category 1) Small residential buildings: a) Detached small house or part of a linked house, with a heated reference area ($A_{reference}$) of 50–150 m² b) Detached house and building forming part of a row house, whose heated reference floor area ($A_{reference}$) is more than 150 m² but not more than 600 m² c) Detached house and building forming part of a row house, whose heated reference floor area ($A_{reference}$) is more than 600 m² d) Terraced houses and blocks of flats with no more than two storeys of living accommodation	19.15-0.057 * $A_{reference}$ 11.204 -0.004 * $A_{reference}$ 8.8 10.1
Category 2) Block of flats with at least three residential floors	7.0
Category 3) Office building, healthcare facility	7.2
Class 4) Commercial building, department store, shopping centre, shop building with the exception of convenience stores less than 2,000 m² per unit, shopping hall, theatre, opera house, concert and conference hall, cinema, library, archive, museum, art gallery, exhibition hall	9.0
Category 5) Commercial accommodation building, hotel, hall of residence, hospitality building, nursing home, treatment centre	13.7
Category 6) School buildings and day-care centres	8.1
Category 7) Large gyms, excluding indoor swimming pools and ice rinks	8.1
Category 8) Hospital	25.2
Category 9) Other building, storage building, traffic building, swimming pools and ice rinks, convenience stores of less than 2 000 m2 per unit, mobile building	No limit value

In a building in use category 6 with a heated reference floor area of 1 000 m2 or less, the limit value referred to in paragraph 1 may be exceeded by 5%.
For solid wood buildings, the E-value limits stated in subsections 1 and 2 above may be exceeded by 20% in use category 1a buildings, by 15% in category 1b-c buildings, and by 10% in other buildings in use categories 1d–8.

For buildings in use category 1, the limits stated in subsections 1 and 3 may be exceeded by 5% if a building is connected to a heating system where heat is distributed through pipes outside of the building from a joint heat conveyance or heat generating system to three or more buildings.

Section 5

Parts of a building belonging to different use categories

The E-value limits for the respective part shall apply to building components included in different use categories. If the heated reference area of part of a building is less than 10% of the total heated net area or the heated net area of such part is less than 50 m^2, the building may be included in a use category with the greatest surface area.

Section 6

Calculated purchased energy consumption of the building

The calculated purchased energy consumption of the building based on standardised use consists of the energy consumption of heating, ventilation, air-conditioning and cooling systems, as well as system auxiliary devices, consumer devices and lighting, itemised by energy form, from which the energy obtained from environmental energy by equipment belonging to the building or comparable equipment has been deducted insofar as it has been used in the building to cover energy consumption based on standardised use.

The utilisation of energy obtained from environmental energy by equipment belonging to the building or comparable equipment shall be calculated on a monthly basis or over shorter periods.

Section 6a

Solar energy and renewable energy systems of buildings and their calculation

In the calculation of the solar energy production potential of a new building, the properties of the building, its location and site conditions shall be taken into account.

The percentage reducing purchased electricity consumption produced by a solar photovoltaic system shall be calculated using the power levels and operating times corresponding to the building's intended use, taking into account possible energy storage. In the calculation of buildings and parts of buildings belonging to use categories 1 and 2, the usage profiles set out in Annex 2 shall be used. The resulting share of electricity reducing purchased energy may be used in the calculation of the E-value.

Renewable energy produced in an energy community or recovered from the environment shall, in proportion to the ownership share, be treated in calculations as energy produced by equipment belonging to the building, only if the ownership share used in the calculation is an easement burdening the property. The energy, when acquiring an ownership share, must be new or free capacity.

Heat produced by a solar thermal system shall be calculated using standardised values according to the use category or planned usage profiles. In the calculation of buildings and parts of buildings belonging to use categories 1 and 2, the usage profiles set out in Annex 2 shall be used.

Other renewable energy sources shall be subject to the same calculation rules as solar energy.

Section 7

Calculation of the E-value and reference values for renewable and non-renewable energy

Values laid down in the Construction Act shall be used as values for energy type factors.

The E-value shall be calculated on the basis of the calculated purchased energy consumption by energy form, using the coefficients for each energy form:

$$E = \frac{f_{district\ heating} Q_{district\ heating} + f_{district\ cooling} Q_{district\ cooling} + \sum_i f_{fuel,i} Q_{fuel,i} + f_{electricity} W_{electricity}}{A_{reference}}$$

where:

E energy performance reference number, $kWh_E/(m^2\ a)$;
$Q_{district\ heating}$ is the district heating consumption per year, kWh/a;
$Q_{district\ cooling}$ is the annual consumption of district cooling, kWh/a;
$Q_{fuel,i}$ is the amount of energy contained in fuel i consumed per year, kWh/a;
$W_{electricity}$ is the annual electricity consumption, taking into account deductions from energy obtained from freely utilisable environmental energy with building-related or comparable equipment, insofar as it has been used in the building to cover energy consumption based on standardised use, kWh/a;
$f_{district\ heating}$ is the coefficient for the energy form of district heating, -;
$f_{district\ cooling}$ is the coefficient for the energy form of district cooling, -;
$f_{fuel,i}$ is the coefficient for the energy form of fuel i, -;
$f_{electricity}$ is the coefficient for the energy form of electricity, -;
$A_{reference}$ is the reference floor area of the building, m².

The renewable energy reference value ($E_{renewable}$) shall be calculated on the basis of the calculated purchased energy consumption of the building by energy form, using the values of the coefficients of renewable energy sources laid down pursuant to the Construction Act.

The renewable energy reference value is calculated using the following formula:

$$E_{renewable} = \frac{f_{district\ heating,renewable} Q_{district\ heating} + f_{district\ cooling,renewable} Q_{district\ cooling} + ¿ \sum_i f_{fuel,i,,renewable} Q_{fuel,i} + f_{electricity,,rene}}{A_{reference}}$$

where:

$E_{renewable}$ is the reference value for renewable energy, $kWh_{E,renewable}/(m^2\ a)$;
$Q_{district\ heating}$ is the district heating consumption per year, kWh/a;
$Q_{district\ cooling}$ is the annual consumption of district cooling, kWh/a;
$Q_{fuel,i}$ is the amount of energy contained in fuel i consumed per year, kWh/a;
$W_{electricity}$ is the annual electricity consumption, taking into account deductions from energy obtained from freely utilisable environmental energy with building-related or comparable equipment, insofar as it has been used in the building to cover energy consumption based on standardised use, kWh/a;
$f_{district\ heating,\ renewable}$ is the coefficient for the renewable energy form of district heating, -;
$f_{district\ cooling,\ renewable}$ is the coefficient for the renewable energy form of district cooling, -;
$f_{fuel,i,\ renewable}$ is the coefficient for the renewable energy form of fuel i, -;
$f_{electricity,\ renewable}$ is the coefficient for the renewable energy form of electricity, -;
$Q_{renewable}$ is the self-sufficient heat energy from renewable sources, kWh/a;
$W_{renewable}$ Is self-sufficient electricity from renewable sources, kWh/a;
$A_{reference}$ is the reference floor area of the building, m².

The reference figure for non-renewable energy ($U_{non\text{-}renewable}$) shall be calculated from the calculated purchasing energy consumption of the building, broken down by energy form, using the numerical values of the coefficients for non-renewable energy forms laid down under the Construction Act.

The non-renewable energy reference value is calculated using the following formula:

$E_{non\text{-}renewable}$

$$¿ \frac{f_{district\ heating,non-renewable} Q_{district\ heating} + f_{district\ cooling,non-renewable} Q_{district\ cooling} + ¿ \sum_i f_{fuel,i,,non-renewab}}{A_{reference}}$$

where:

$E_{non\text{-}renewable}$ is the reference value for non-renewable energy, $kWh_{E,renewable}/(m^2\ a)$;

$Q_{district\ heating}$ is the district heating consumption per year, kWh/a;

$Q_{district\ cooling}$ is the annual consumption of district cooling, kWh/a;

$Q_{fuel,i}$ is the amount of energy contained in fuel i consumed per year, kWh/a;

$W_{electricity}$ is the annual electricity consumption, taking into account deductions from energy obtained from freely utilisable environmental energy with building-related or comparable equipment, insofar as it has been used in the building to cover energy consumption based on standardised use, kWh/a;

$f_{district\ heating,\ non\text{-}renewable}$ is the coefficient for the non-renewable energy form of district heating, -;

$f_{district\ cooling,\ non\text{-}renewable}$ is the coefficient for the non-renewable energy form of district cooling, -;

$f_{fuel,i,\ non\text{-}renewable}$ is the coefficient for the non-renewable energy form of fuel i, -;

$f_{electricity,\ non\text{-}renewable}$ is the coefficient for the non-renewable energy form of electricity, -;

$A_{reference}$ is the reference floor area of the building, m^2.

Section 8

Calculation method requirements

The calculation shall be carried out using a calculation method that takes into account at least the following factors:

a) heat losses of building components and their joints, the airtightness of the building, and ventilation airflow;

b) indoor air temperature;

c) need for hot domestic water;

d) ventilation heat recovery;

e) thermal loads from occupants, lighting, electrical devices, domestic hot water and solar gains;

f) heat and electric energy need of the space and ventilation heating system;

g) the heat and electric energy need of the domestic hot water system;

h) the electrical energy demand of the ventilation or air-conditioning system;

i) electric energy need of consumer devices and lighting.

And, where the building is designed with a solar collector, solar panel, wastewater heat recovery, energy storage or automation:

j) heat generation of a solar collector and its use in the building;

k) electric energy generation of a solar panel and its use in the building;

l) wastewater heat recovery system and its use in the building;

m) energy storage and its utilisation in the building;

n) utilisation of automation in the building.

The calculated purchased energy consumption of the building may be calculated using a monthly calculation method for a building in which indoor air temperature control does not require cooling, or cooling is only required in spaces whose heated reference floor area is less than 10 per cent of the building's heated reference floor area or less than 50 square metres.

If indoor air temperature control in the building requires cooling, then for buildings other than those in use category 1, the calculated purchased energy consumption shall be calculated using a calculation method which, in addition to the factors referred to in paragraph 1, takes into account the heat and electrical energy demand of the cooling system, and in which the heat transfer calculation takes into account the heat storage capacity of structures as time-dependent with a time step of at most one hour (dynamic calculation method).

If advanced control and automation systems are to be utilised in the calculation of the building's E-value, a dynamic calculation method shall be used, and it shall be demonstrated that the indoor environmental quality meets the requirements set for it in the building regulations during the building's period of use.

Section 9

Weather data

The E-value shall be calculated using the weather data for climate zone I set out in Annex 1.

Section 10

Outdoor air flow rates and indoor temperatures

The E-value shall be calculated using the following outdoor air flows and cooling and heating limits for room temperatures:

Usage category	Outdoor air flow $dm^3/(s\ m^2)$	Heating limit °C	Cooling limit °C
Category 1)	0.4	21	27
Category 2)	0.5	21	27
Category 3)	2	21	25
Category 4)	2	18	25
Category 5)	2	21	25
Category 6)	3	21	25
Category 7)	2	18	25
Category 8)	4	22	25

Exhaust air flows shall be calculated using values equivalent to those of outdoor air flows.

For buildings not classified as use categories 1 or 2, the outdoor air flow rate for ventilation must be calculated as at least 0.15 dm^3/s per square metre outside operating hours.

In ventilation systems of blocks of flats in use category 2, in which residents can control the air flows in their flats so that they can be increased by at least 30% and reduced by at least 40% of the air flows of the designed period of use, a value of 0,4 dm^3/s per square metre may be used as the buildings' outdoor air flow.

For buildings equipped with an adaptive ventilation system that is controlled by the building's automatic system on the basis of presence or environmental measurements, the outdoors air flow value may be 20 % less or, based on the ventilation design, the relative effect of the adaptive ventilation may be defined according to the outdoor air flow value referred to in subsection 1. In the ventilation design-based assessment, the ventilation rate of a space may, however, be reduced in the calculation to a maximum value of 0.35 dm^3/s per square metre during the building's period of use. The calculation of the outdoor air flow for the entire building can be reduced in proportion to the adaptive ventilation effect, taking into account the ratio of the building area equipped with adaptive ventilation to the surface area of the entire building.

Section 11

Standard use of a building

When calculating the E-value, the daily and weekly periods of use, average lighting, devices and degree of use due to the presence of people in the building during the periods of use, as well as the internal thermal loads per heated reference area are as follows:

Use category	Time	Period of use		Rate of application	Internal thermal loads per heated reference area		
		Daily h/24h	Weekly d/7d	-	Lighting W/m^2	Consumer electronics W/m^2	People W/m^2
Category 1)	00:00-24:00	24	7	lighting 0.1 other 0.6	6	3	2
Category 2	00:00-24:00	24	7	lighting 0.1	9	4	3

				other 0.6			
Category 3)	07:00-18:00	11	5	0.65	10	12	5
Category 4)	08:00-21:00	13	6	1	19	1	2
Category 5)	00:00-24:00	24	7	0.3	11	4	4
Category 6)	08:00-16:00	8	5	0.6	14	8	14
Category 7)	08:00-22:00	14	7	0.5	10	0	5
Category 8)	00:00-24:00	24	7	0.6	7	9	8

The annual thermal load Q (kWh/m^2)caused by lighting, consumer devices and people shall be calculated using the following equation:

$$Q = kP \frac{\tau_d}{24} \frac{\tau_w}{7} \frac{8760}{1000}$$

where:

k is the average degree of use of lighting and consumer devices, as well as the presence of people in the building during the period of use;

P is the thermal load W/m^2;

τ_d is a building's number of usage hours per day h;

τ_w the number of days of use of the building per week d.

The monthly thermal load caused by lighting, consumer devices and people shall be calculated on the basis of the number of days in the month.

In lieu of the thermal load of lighting value in subsection 1 above, a value according to the lighting design may be used, provided that the thermal load can be determined per space type on the basis of lighting power density and lighting control. A building's thermal load of lighting shall be calculated as a weighted average of space type-specific surface areas.

The operating time of a ventilation or air-conditioning system shall be calculated by adding an hour each to the beginning and end of the operating times referred to in subsection 1. The addition is not made to buildings that are used continuously.

Section 12

Standard use of domestic hot water

The net heating energy need for the standard use of domestic hot water is calculated using the following use class-specific net heating energy needs per heated reference area:

Usage category	Net energy need for heating domestic hot water per year kWh/(m^2 a)
Category 1)	35
Category 2)	35
Category 3)	6
Category 4)	4
Category 5)	40
Category 6)	11
Category 7)	20
Category 8)	30

In category 1, the net heating energy need of domestic hot water does not exceed 4 200 kWh/year per flat.

Section 13

Calculation zones

When calculating the E-value for a building in one use category, the entire building can be considered as one calculation zone. In the calculation of the E-value of a multi-purpose

building, the building shall be divided into calculation zones corresponding to the purpose of use and the periods of use.

Section 14

Special spaces and certain technical systems

Restaurants, catering establishments, cafés, laboratories and other specialised spaces are not included in the calculations, and the E-value calculation is performed with the initial data corresponding to the use of the building or part thereof.

Other technical systems not listed in this calculation method are not taken into account in the E-value calculation. The heat produced by equipment in the building and its utilisation through heat recovery for heating the building may be taken into account in the calculation of the building's E-value, provided that the energy consumption of the heat-producing equipment is included in the building's standardised energy consumption with respect to the recovered heat, or that the emission factor for district heating is used as the energy form coefficient for the recovered energy.

In the dimensioning and design of building systems, the design temperatures and indoor environmental conditions corresponding to the building's location and intended use shall be taken into account. The systems shall be balanced and insulated to at least a cost-effective level.

The ventilation system of a building in use category 2 shall be insulated at least to the cost-effective level of insulation required for cooled supply air.

The person responsible for the construction phase shall make an entry in the inspection record section of the energy declaration concerning the compliance of the implementation of building technical systems with the design.

Section 15

Net requirement of heating energy

The net heating energy requirement for the building's spaces must be calculated on the basis of conductive heat loss, heat loss due to air leakage, and the heating of make-up air and supply air to room temperature, from which the effects of solar gain and internal thermal loads must be deducted. Sun shading solutions in the building shall be taken into account when calculating the sun energy entering the building. The net heating energy need for ventilation shall be calculated from heating air after heat recovery to the temperature of the supply air and possibly from heating prior to heat recovery.

The net requirement of heating energy of domestic hot water shall be calculated in accordance with section 12.

Section 16

Taking thermal loss into account during the E-value calculation

When calculating the E-value, the thermal loss of the building envelope must be calculated using the envelope's inner dimensions. The cold bridges of structures and their joints shall be taken into account in the calculation. Individual cold bridges of the building envelope shall not be taken into account in the calculation.

The effect of ground and crawl spaces shall be taken into account during the thermal loss calculation.

Section 17

Consideration of leakage air exchange in the E-value calculation

When calculating the E-value, the design value for the air leakage rate of the building envelope must be used, and compliance with this value must be demonstrated by measuring the building in its entirety or in part. Measurement may be replaced by an industrialised

building construction quality assurance procedure. Leakage air $q_{v,air\ leakage}$ is calculated according to the following equation:

$$q_{v,leakage\,air} = \frac{q_{50}}{3600 \cdot x} A_{envelope}$$

where:

$q_{v,\ leakage\ air}$ is the leakage air flow, m³/s;

q_{50} is the air leakage number of the building envelope, $m^3/(h \cdot m^2)$;

$A_{envelope}$ is the surface area of the building envelope, m^2;

x is a coefficient, which is 35 for buildings with one floor, 24 for buildings with two floors, 20 for buildings with three and four floors, and 15 for buildings with more floors. In non-residential buildings, the coefficient may be used as follows for buildings less than 3 metres high: 35, for buildings 3–6 metres high: 24, for buildings 6–12 metres high: 20, and for buildings over 12 metres high: 15.

Airflow in the unit m³/h is converted to the unit m³/s using a coefficient of 3600.

Section 18

Energy consumption of the heating system

The energy consumption of a building's heating system includes the energy used for heating spaces, heating the ventilation and producing domestic hot water.

Calculation of the heating system's energy consumption takes into account the heat distribution losses inside and outside of the building, heat transfer losses, heating energy production losses and conversions, losses in the transfer and circulation of domestic hot water inside and outside of the building, storage losses as well as the electricity consumption of auxiliary devices.

If a building is connected to a heating system where heat is routed through pipes outside of the building from a joint heat conveyance or heat generating system to several buildings, the thermal loss of the respective heat pipes shall be divided between buildings according to the surface area ratio.

If a building belonging to use categories 1 and 2 has hydronic heating in residential rooms and electric underfloor heating in wet rooms, 15 per cent of the net heating energy demand of residential spaces in buildings in use category 1 and 35 per cent in buildings in use category 2 shall be allocated to the underfloor heating of wet rooms. The remaining heating energy shall be calculated for the heating system of the residential rooms, unless the share of the electric underfloor heating in wet rooms of the net space heating demand is determined more precisely using a dynamic calculation tool, taking into account the designed airflows and air transfer flows between spaces. For wet rooms, 22 °C shall be used as the inside temperature. The proportion of electric floor heating in wet rooms as a share of heating energy of the living areas shall not exceed the installation power of electric floor heating calculated on the basis of the design plan and 8,760 hours of use. If the wet rooms in use categories 1 and 2 have a heating device connected to the building's main heating distribution that can independently maintain the design temperature, the electric underfloor heating shall not be taken into account in the calculation.

If the domestic hot water circuit is located outside the insulation of the building envelope, the calculated heat loss of the domestic hot water circuit does not generate a thermal load on the premises of the building. If the circulation duct of domestic hot water is located inside the building envelope insulation, 25 % of the calculated thermal loss of the domestic hot water circulation shall be added to the thermal load. If the circulation duct of domestic hot water is located inside the building envelope, 50 % of the calculated thermal loss of the domestic hot water circulation shall be added to the thermal load. If the domestic hot water tank is located inside the building envelope, 50 % of the calculated thermal loss of the domestic hot water circulation shall be added to the thermal load.

Additional heating energy resulting from potential temperature restrictions and partial effect dimensioning of the heating system shall be included in the heating system's energy consumption.

Section 19

Fireplaces and air source heat pumps

The amount of heating energy generated by a heat-storing fireplace in a residential flat may be calculated as a maximum of 3,000 kilowatt-hours per year per fireplace.

If there is an air-air source heat pump, a maximum of 3 000 kWh per year can be calculated as the heating energy produced by the device, unless the device's operation in the building is calculated by a more accurate dynamic calculation tool, taking into account the air flows between spaces and temperature differences.

Section 19 a

Reference value for renewable and emission-free energy

The reference value for renewable and emission-free energy in a zero-emission building shall be equal to or greater than the calculated reference value for energy performance on an annual basis. Renewable and emission-free energy consists of renewable energy produced on site, nearby or in an energy community, environmental energy captured by a heat pump insofar as the heat pump $SCOP_{cold}$ value is above 2.4, purchased energy from efficient district heating and cooling, and the share of emission-free and renewable energy in electricity purchased from the grid. In this calculation, the reference value used for renewable and emission-free energy is 1 for efficient district heating, 0.87 for other district heating, and 0.96 for district cooling and electricity.

Energy from combustion of renewable fuels is considered on-site produced renewable energy if the combustion of the renewable fuel takes place on site for heating of the building under calculation. The calculation of the reference value for renewable and zero-emission energy shall follow the calculation rules of the Decree and is calculated using the formula:

$$E_{u,p} = \frac{Q_{district\ heating} + Q_{district\ cooling} + Q_{environment} + Q_{renewable} + W_{renewable} + W_{electricity,u,p}}{A_{reference}}$$

where:

$E_{u,p}$ renewable and zero-emission energy reference value, kWh/(m^2 a);

$Q_{district\ heating}$ is the renewable and zero-emission energy of district heating per year, kWh/a;

$Q_{district\ cooling}$ is the renewable and zero-emission energy of district cooling per year, kWh/a;

$Q_{environment}$ is the amount of renewable energy extracted from the environment by the heat pump per year, insofar as the heat pump's $SCOP_{cold}$ value is greater than 2.4, kWh/a;

$Q_{renewable}$ is the annual thermal energy produced on site from renewable fuels, in kWh/a;

$W_{renewable}$ the amount of renewable electricity generated on-site, in the local area or within the energy community per year, in kWh/a;

$W_{electricity,u,p}$ is the renewable and zero-emission energy of purchased electricity, kWh/a;

$A_{reference}$ is the reference floor area of the building, m².

Section 20

Ventilation and air-conditioning system

The air flows and operating times of ventilation and air-conditioning systems shall be calculated according to sections 10 and 11. The electric energy consumption of the ventilation and air-conditioning system is calculated using the air flows, the specific efficiency ratio and the operational times of all the ventilation devices and extractors in the building.

Section 21

Cooling system

In calculating the cooling requirement, free cooling, which operates under the control of automation and the active sun protection of the windows, may be taken into account.

Calculating the energy use of the cooling system shall take into account the energy consumption of the cooling energy generation and the electricity consumption of auxiliary devices to the extent that indoor temperature maintenance requires such systems.

Section 22

Electricity use of lighting and devices

The annual electricity consumption of lighting and appliances used in the building shall be calculated in accordance with section 11 based on their thermal load. The electricity use of the lighting and devices is equal to their thermal load.

Chapter 3

Thermal loss of a building

Section 23

Determining the thermal loss of a building

The thermal loss of a building is the sum of the thermal loss of the envelope, leakage air and the ventilation. The thermal loss of a building may be at most 90 per cent of the reference heat loss determined for the building using the reference values. The thermal loss of a detached house intended for holiday use may be at most equal to the heat loss determined for the building using the reference values. Conformity with thermal loss requirements is shown with a calculation that is made separately for warm and semi-warm spaces.

In a semi-detached house and row house, the heat loss of each dwelling may be at most 90 per cent of the reference heat loss determined for each dwelling using the reference values. In a nearly zero-energy level semi-detached house and row house, the heat loss of each dwelling may be at most equal to the reference heat loss determined for each dwelling using the reference values.

For a building expansion or addition to the floor area where existing ventilation or heating systems can be used for ventilation or heating, the thermal loss requirements only apply to the envelope. For small houses intended as holiday homes to be occupied for at least four months a year, the thermal loss requirements only apply to the envelope. The thermal loss requirement does not apply to mobile buildings made from prefabricated components prior to 1 January 2018 and which are still used for the same purpose.

Section 24

Thermal loss of a building envelope

The thermal loss of a building envelope shall be calculated on the basis of the surface areas and thermal transmittance coefficients of various building components, using the following equation:

$$\sum H_{cond} = \sum \left(U_{externalwall} A_{externalwall}\right) + \sum \left(U_{ceiling} A_{ceiling}\right) + \sum \left(U_{basefloor} A_{basefloor}\right) + \sum \left(U_{window} A_{window}\right) + \sum \left(U_{d}\right.$$

where:

$\sum H_{cond}$ is the heat loss through the building envelope, W/K;

U is the coefficient of thermal transmittance of a building part, W/(m²K);

A is the surface area of a part of a building, m².

The reference value of a building envelope's thermal loss of a warm or climate-controlled cool space shall be calculated using the following reference values as the thermal transmittance coefficients for building components:

a) wall	0.17 W/(m^2 K);
b) solid timber wall with an average thickness of at least 180 mm	0.40 W/(m^2 K);

c) ceiling and floor butting against outdoor air 0.09 W/(m^2 K);
d) base floor bordering on crawl space 0.17 W/(m^2 K);
e) building component against the ground 0.16 W/(m^2 K);
f) window, roof window, door, roof light, smoke extraction and emergency exit hatch 1.0 W/(m^2 K).

The reference value of a building envelope's thermal loss of a mobile building or a semi-warm space shall be calculated using the following reference values as the thermal transmittance coefficients for building components:

a) wall 0.26 W/(m^2 K);
b) solid timber wall whose structure has an average thickness of at least 180 mm 0.60 W/(m^2 K);
c) ceiling and floor butting against outdoor air 0,14 W/(m^2 K);
d) base floor bordering on crawl space 0.26 W/(m^2 K);
e) building component against the ground 0.24 W/(m^2 K);
f) window, roof window, door, roof light, smoke extraction and emergency exit hatch 1.4 W/(m^2 K).

For small houses intended as holiday homes to be occupied for at least four months a year, the reference value of a building envelope's thermal loss shall be calculated using the following reference values as the thermal transmittance coefficients for building components:

a) wall 0.24 W/(m^2 K);
b) solid timber wall whose structure has an average thickness of at least 130 mm 0.80 W/(m^2 K);
c) ceiling and floor butting against outdoor air 0.15 W/(m^2 K);
d) base floor bordering on crawl space 0.19 W/(m^2 K);
e) building component against the ground 0.24 W/(m^2 K);
f) window, roof window, door, roof light, smoke extraction and emergency exit hatch 1.4 W/(m^2 K).

The reference value of the total window area in the building is 15 % of the floor area of the floors that are wholly or partly on the ground, but may not exceed 50 % of the total area of outside walls. The window area shall be calculated in accordance with the external frame dimensions.

The dimensional and geometry data of the design building shall be used in the calculation. The areas of the different building components of the building envelope shall be determined according to the overall internal dimensions of the building.

When calculating the thermal loss of the design solution of the building, the designed building component-specific thermal transmittance coefficients and window areas shall be used.

Section 25

Calculation of a building's thermal loss due to air leakage

A building's thermal loss due to air leakage is calculated using the following equation:

$$H_{air\ leakage} = \rho_i c_{\mathrm{pi}}\, q_{\mathrm{v,\ leakage\ air}}$$

where:
$H_{\mathrm{leakage\ air}}$ is the thermal loss of the leakage air, W/K;
ρ_i is air density, 1.2 kg/m^3;
c_{pi} is the specific heat capacity of air, 1000 Ws/(kg K);
$q_{\mathrm{v,\ leakage\ air}}$ is the leakage air flow, m^3/s.

Leakage air flow $q_{\mathrm{v,leakage\ air}}$ shall be determined according to section 17. When calculating the reference thermal loss of a building, the value to be used as the reference value for the envelope air leakage is 2.0 m^3/(h m^2).

When calculating the heat loss of the building's design solution, a design value shall be used as the air leakage rate of the building envelope.

The achievement of the design value for airtightness shall be demonstrated in accordance with section 17 of this Decree.

Section 26

Calculation of the thermal loss of a building's ventilation and air-conditioning system

A building's ventilation thermal loss is calculated using the following equation:

$$H_{iv} = \rho_i c_{\mathrm{pi}} q_{\mathrm{v,\ extract}} t_d t_V \left(1 - \eta_a\right)$$

where:
H_{iv} is the specific thermal loss of ventilation, W/K;
ρ_i is air density, 1.2 kg/m³;
c_{pi} is the specific heat capacity of air, 1 000 Ws/(kg K);
$q_{v,\ extract}$ is the calculated extract air flow for standardised use, m³/s;
t_d is the average daily running time ratio of the ventilation or air-conditioning system, h/24h;
t_v is the weekly running time ratio of the ventilation or air-conditioning system, day/7 days;
η_a is the annual efficiency of heat recovery from exhaust air in a ventilation system.

When calculating the reference value of the thermal loss of ventilation and the thermal loss of the design solution, the same air flow values and operating times shall be used.

The ventilation air flow shall be calculated in accordance with section 10. Adaptive ventilation is not included in the calculation of thermal loss of ventilation and the thermal loss of the design solution. The operating time of a ventilation system shall be calculated by adding an hour each to the beginning and end of the operating times referred to in section 11. The addition is not made to buildings that are used continuously. For buildings in use category 9, the design values of the building shall be used in terms of air flows and ventilation operation time.

When calculating the reference thermal loss, a value of 55 % is used as the annual efficiency ratio of the heat recovery of the air-conditioning extract air. When calculating the reference thermal loss of an individual space, the annual efficiency ratio is 0%, e.g. when the exceptional uncleanness of the extract air prevents heat recovery or if the temperature of the space during the heating season is below +10 °C and the heat of the extract air cannot be recovered in a cost-effective manner, or if the system operates on the basis of differences in pressure caused by differences in height and temperature, and by wind.

If mechanical ventilation is used, the annual efficiency ratio of heat recovery of the extract air shall be determined using the properties of the heat recovery devices and the designed air flows of the ventilation machine as well as the weather data for climate zone I set out in Annex 1.

The annual efficiency ratio of heat recovery of the extract air of two or more ventilation machines shall be determined as an annual efficiency ratio of weighted design air flows and operating times. The ventilation heat loss of the building's design solution shall be calculated using the annual efficiency of exhaust air heat recovery determined in this manner and the airflow values and operating times referred to in paragraph 3.

Chapter 4

Miscellaneous provisions

Section 27

Airtightness of the building

The air leakage rate of the building envelope (q_{50}) must not exceed 2.0 $m^3/(h\ m^2)$. The air leakage rate may exceed 2.0 $m^3/(h\ m^2)$ if the structural solutions required for the use of the building so require.

Section 28

Frost insulation, thermal insulation of the foundation wall, insulation between certain spaces and insulation of the base floor structure

The thermal insulation of the base floor must be designed together with the frost insulation and the thermal insulation of a possible base wall that does not form part of the building envelope, and be installed so as to avoid frost damage.

The thermal transmittance coefficient of the wall and intermediate floor between the cold space and the other spaces to be cooled may not exceed 0.27 W/(m^2 K) and that of the door 1.4 W/(m^2 K).

The thermal transmittance coefficient of the wall and intermediate floor between the warm space and the semi-warm spaces may not exceed 0.60 W/(m^2 K) and that of the door and window 2.8 W/(m^2 K), with the exception of small houses intended as holiday homes.

For buildings in use category 1, the thermal transmittance of the ground floor shall not exceed 0.10 W/(m^2K) where the ground-supported floor is equipped with underfloor heating.

Section 29

Calculated summer season room temperature

The calculated summer season room temperature must not exceed the cooling limit of 27 °C in category 2, and 25 °C in categories 3–8 for more than 150 degree hours between 1 May and 31 August, using air flow according to the design solution. Compliance with the indoor temperature in the summer shall be demonstrated using a temperature calculation for different space types. In the calculation, the input data used for the calculation of the E-value shall be used, with the exception of the airflow rate, together with the hourly weather data referred to in Annex 1. The requirement concerning room temperature during the summer period shall not apply to buildings belonging to use category 9. A dynamic calculation tool shall be used when calculating the summer season room temperature.

For use category 1, the assessment need not be carried out if the window area is less than 20 per cent of the floor area, the g-value of the glazing is less than 0.40, and the windows are fitted with solar shading either within or outside the glazing, for example venetian blinds within the glazing or an awning, or if the building is equipped with a cooling system.

Section 30

Specific fan power of the building's mechanical ventilation and air-conditioning system

If the building is equipped with a mechanical ventilation or air-conditioning system, the specific fan power of a mechanical supply and exhaust air system may not exceed 1.8 kW/(m^3/s), and the specific fan power of a mechanical exhaust air system may not exceed 0.9 kW/(m^3/s). Fans of air-conditioning systems that are not part of the building's ventilation system shall not be taken into account in the calculation of the specific fan power.

The specific fan power of a ventilation or air-conditioning system may exceed the above values where required in order to maintain an indoor climate appropriate to the intended use of the building.

Section 31

Measuring energy consumption in a building

A building shall have the facilities to measure the energy consumption so that the building's energy consumption can be monitored with regard to the most important consumption points and building size; such a monitoring option must be easy to implement.

Section 32

Need for heat and electricity in a building

The power of the building's heating system shall be designed to maintain the planned temperature conditions for the building spaces according to the local climate zones as designed according to the outdoor temperatures stated in Annex 1.

The plans shall take into account possibilities to reduce the peak power needs for electricity and improve electric power management.

Section 33

Structural energy performance

Compliance requirements regarding a building's energy performance set out in section 4 may be demonstrated using structural energy performance.

A building in use categories 1 and 2 meets the energy performance requirements if:

1) the maximum thermal loss of a building does not exceed the reference thermal loss specified for a building if calculated using the energy performance reference values stated in sections 24, 25 and 26. The reference values for the thermal transmittance coefficient, air leakage rate and annual ratio of heat recovery of the extract air are:

a) wall, use category 1	0.12 W/(m^2 K);
b) wall, use category 2	0.14 W/(m^2 K);
c) ceiling and floor butting against outdoor air	0.07 W/(m^2 K);
d) ventilated floor separating from a crawl space and ground-based building component	0.10 W/(m^2 K);
e) window, roof window, door, roof light, smoke extraction and emergency exit hatch	0.70 W/(m^2 K);
f) building air leakage rate (q_{50})	0.60 m^3/(h m^2);
g) annual ratio of heat recovery of the extract air	65 %;

2) The building is equipped with a mechanical supply and extract air exchange system with a specific electric power not exceeding 1.5 kW/(m^3/s);

3) The building's heating system shall be a system that does not produce on-site carbon dioxide emissions from fossil fuels, or electric heating supported by one or more room-specific air-source heat pumps.

Section 34

Energy declaration

An energy declaration shall be drawn up when planning a building. The energy declaration generally includes the following inspections:

a) E-value in accordance with section 4 and the key input data and results of the E-value calculation, compliance of the building heat loss in accordance with section 23 and the specific fan power of the mechanical ventilation or air-conditioning system in accordance with section 30; or

b) compliance with structural energy performance rules under section 33.

In addition, the energy declaration includes the following assessment:

a) greenhouse gas emission reference value during use in accordance with section 4a;

b) solar energy assessment in accordance with section 6a;

c) calculation of the E-value, reference values for renewable and non-renewable energy in accordance with section 7, and the reference value for renewable and emission-free energy in accordance with section 19a;

d) calculated summer indoor temperature in accordance with section 29;

e) thermal conditions in occupancy zones during the heating season in accordance with the Ministry of the Environment Decree on indoor climate and ventilation in new buildings (1009/2017);

f) daylight factor to be calculated and reported for those spaces for which the summer indoor temperature assessment has been carried out:

g) energy certificate of the building, if required by legislation on energy performance certificates;

h) content of the inspection record entry concerning compliance with system requirements.

The party undertaking the construction project shall ensure that the energy declaration is updated before the building is taken into use if changes have been made to the plans on which the permit-stage energy declaration is based. The person responsible for the construction phase shall mark the inspection document for construction work to the effect that the

construction work corresponds to the energy declaration and shall ensure that the inspection document marking is updated when the balancing work has been carried out.

Chapter 5

(Entry into force and transitional provisions)

Section 35

Entry into force

This decree shall enter into force on __ January 202__.

This decree shall apply to new buildings owned by public bodies from 1 January 2028 at the latest and to all new buildings from 1 January 2030 at the latest.

This Decree enters into force on [day] [month] 2026.

Helsinki xx xx 20xx

Minister of ... First name Last name

Title First name Last name

Annex 1.

Weather data used in the calculation of the E-value and heating power

The weather data presented in this Annex shall be used in the calculation of the E-value and in the calculation of heating power. Hourly weather data is available from the Ministry of the Environment's website.

The heating power need is calculated using the outdoor temperature of the climate zone corresponding to the building's geographical location (Figure L1.1 and Table L1.1).

Pohjoinen (P)	North (N)
Koillinen (Ko)	North-east (NE)
Itä (I)	East (E)
Kaakko (Ka)	South-east (SE)
Etelä €	South (S)
Lounas (Lo)	South-west (SW)
Länsi (L)	West (W)
Luode (Lu)	North-west (NW)

Figure L1.1. Climate zones and compass point abbreviations.

Table L1.1. Design outdoor air temperatures in the different climate zones.

Climate zone	Design outdoor air temperature, °C
I	-26
II	-29
III	-32
IV	-38

Table L1.2. Monthly weather data for climate zone I Helsinki-Vantaa.

Month	Average temperature of the outdoor air, T_u, °C	The total solar radiation energy on a horizontal plane, $G_{radiation,\ horizontal\ plane}$, kWh/m²	
January	-1.26	7.6	
February	-2.45	22.3	
March	0.72	67.6	

April	12.37	163.4	
May	15.72	176.6	
June	15.72	170.8	
July	18.98	179.1	
August	17.62	130.5	
September	13.03	84.4	
October	7.26	32.3	
November	3.62	10.0	
December	-0.04	4.2	
Entire year	7.64	1048.8	

Total solar radiation energy on vertical plane in different compass directions,
$G_{radiation,\ vertical\ plane}$, kWh/m²

Month	N	NE	E	SE	S	SW	W	NW
January	3.3	3.4	5.3	12.8	17.0	13.3	5.6	3.4
February	9.1	9.7	17.2	31.6	39.6	30.7	16.5	9.5
March	21.5	27.5	51.0	81.9	101.6	87.3	55.7	28.6
April	34.0	50.6	81.3	105.5	114.4	112.0	87.8	53.2
May	54.9	82.5	117.6	128.0	119.8	124.8	112.6	78.6
June	68.4	88.6	116.0	117.7	108.3	118.2	118.2	91.0
July	67.6	94.0	129.5	134.4	121.6	131.3	128.3	95.3
August	43.1	65.7	100.7	116.9	109.5	103.0	86.8	60.2
September	23.9	33.6	60.6	89.4	102.1	88.2	59.6	33.4
October	11.4	12.6	26.2	49.1	60.7	46.3	24.5	13.0
November	4.0	4.1	7.6	15.8	20.2	15.2	7.2	4.1
December	1.9	1.9	2.9	8.6	11.6	9.0	3.1	1.9
Entire year	343.3	474.1	715.7	891.5	926.4	879.4	705.8	472.2

Conversion factor $F_{direction}$, by which total solar radiation energy to the

	horizontal plane is converted to total solar radiation energy to the vertical surface at different points of the compass							
Month	N	NE	E	SE	S	SW	W	NW
January	0.526	0.526	0.760	1.783	2.357	1.858	0.814	0.526
February	0.487	0.504	0.848	1.534	1.931	1.511	0.829	0.500
March	0.405	0.477	0.807	1.263	1.557	1.350	0.890	0.507
April	0.302	0.441	0.702	0.909	0.988	0.964	0.756	0.462
May	0.285	0.456	0.678	0.750	0.702	0.724	0.640	0.429
June	0.371	0.487	0.642	0.652	0.602	0.667	0.666	0.505
July	0.333	0.483	0.678	0.707	0.633	0.681	0.658	0.480
August	0.316	0.489	0.748	0.866	0.807	0.762	0.644	0.446
September	0.272	0.384	0.709	1.058	1.221	1.058	0.713	0.389
October	0.356	0.393	0.790	1.463	1.802	1.375	0.732	0.399
November	0.425	0.427	0.749	1.545	1.983	1.512	0.725	0.426
December	0.489	0.489	0.686	2.099	2.846	2.211	0.765	0.489
Entire year	0.425	0.464	0.704	0.884	0.923	0.875	0.696	0.461

Annex 2 on profiled utilisation rates for consumer devices, lighting and domestic hot water in use categories 1 and 2.

Tables L2.1 and L2.2 set out the utilisation rates, operating times and monthly weighting factors to be taken into account in the calculation of the share of electricity produced by a solar photovoltaic system that reduces purchased electricity consumption.

Table L2.1. Profiled daily utilisation rates for consumer devices.

Time	Rate of application
0 -1	0.38
1-2	0.33
2-3	0.30
3-4	0.30
4-5	0.34
5-6	0.38
6-7	0.45
7-8	0.52
8-9	0.55
9-10	0.58
10-11	0.60
11-12	0.61
12-13	0.62
13-14	0.65
14-15	0.69
15-16	0.76
16-17	0.83
17-18	0.87
18-19	0.91
19-20	0.93
20-21	0.90
21-22	0.79
22-23	0.62
23-24	0.47

Table L2.2. Monthly weighting factors for consumer equipment and lighting occupancy rates.

Month	Weighted coefficient
January	1.15
February	1.075
March	1.025
April	0.95
May	0.875
June	0.85
July	0.875
August	0.9
September	0.99
October	1.075
November	1.125
December	1.15

Tables L2.3 and L2.4 show the utilisation rates, operating times and monthly weighting factors for the usage profiles to be taken into account when calculating the heat generated by the solar heating system.

Table L2.3. Daily and weekend usage profiles for domestic hot water.

Time	Week day utilisation rate	Weekend utilisation rate
0 -1	0.58	0.35
1-2	0.10	0.69
2-3	0.03	0.38
3-4	0.00	0.07
4-5	0.00	0.04
5-6	0.01	0.00
6-7	0.20	0.01
7-8	0.48	0.04
8-9	7.73	0.26
9-10	6.75	0.95
10-11	1.74	2.20
11-12	0.58	3.92
12-13	0.84	7.32
13-14	0.87	3.44
14-15	0.35	1.96
15-16	0.15	3.45
16-17	0.15	2.25
17-18	1.10	1.53
18-19	1.65	0.96
19-20	1.99	1.40
20-21	7.01	3.59
21-22	7.35	6.40
22-23	3.69	3.53
23-24	2.60	1.27

Table L2.4. Monthly weighting factors for domestic hot water occupancy rates.

Month	Weighted coefficient
January	1.105
February	1.04
March	1.033
April	1.005
May	0.977
June	0.895
July	0.88
August	0.964
September	0.969
October	0.98
November	1.111
December	1.041