Building Assessment using Google Maps and Google Street View

Information

The calculations used in this tool are based on the document “Leitfaden für die Berechnung des Heizwärmebedarfs (HWB) für Wohngebäude im Jahresbilanzverfahren“ (Guideline for the calculation of the heating demand for residential buildings using the annual balance method). This guideline is provided by “Die Umweltberatung”, an organisation of “Die Wiener Volkshochschulen GmbH”, financed by the City of Vienna. (https://www.umweltberatung.at/download/?id=EBA_B2_LeitfadenHWBBerechnung2019.pdf)

As this tool uses a simplified calculation method and assumptions, the results may differ from reality. Nevertheless, it provides a first estimation and shows the comparability between different variants, especially for the application of measures to reduce the heating demand of buildings. All calculations are traceable and the tool modified as needed.

Adding rows

Rows can be added easily. Select the last row, go to the bottom right corner of the rightmost cell and drag and drop when the black cross appears. IMPORTANT: After you have done this, an icon called “Auto Fill Options” will appear in the bottom right corner of the rightmost cell. Always select “Copy Cells” instead of “Fill Series”.

Default values

All default values are assumptions and should be overwritten if more detailed information is available.

U-values

after 2010

https://www.oib.or.at/sites/default/files/richtlinie_6_12.04.19_1.pdf (improved)

Due to a lack in available data the U-values from the period 2000-2010 are improved following discussions with experts and professionals. It is assumed that these U-values will usually be significantly lower in new buildings.

2000-2010

https://www.oib.or.at/sites/default/files/richtlinie_6_12.04.19_1.pdf

The currently valid Guidelines of the Austrian Institute for Building Technology are chosen as a basis.

1990-2000

https://www.oib.or.at/sites/default/files/leitfaden_richtlinie_6_12.04.19.pdf

The average from the two highlighted columns.

Niederösterreich	KD	OD	AW	DF	FE	g	AT
ab 01.1982	0,80	0,30	0,70	0,30	2,50	0,67	2,50
ab 01.1988	0,70	0,25	0,50	0,25	2,50	0,67	2,50
ab 03.1996	0,50	0,22	0,40	0,22	1,80	0,67	1,80

1980-1990

https://www.oib.or.at/sites/default/files/leitfaden_richtlinie_6_12.04.19.pdf

The average from the two highlighted columns.

Niederösterreich	KD	OD	AW	DF	FE	g	AT
ab 01.1982	0,80	0,30	0,70	0,30	2,50	0,67	2,50
ab 01.1988	0,70	0,25	0,50	0,25	2,50	0,67	2,50
ab 03.1996	0,50	0,22	0,40	0,22	1,80	0,67	1,80

before 1980

https://www.oib.or.at/sites/default/files/leitfaden_richtlinie_6_12.04.19.pdf

The average from the two highlighted columns.

Epoche / Gebäudetyp	KD	OD	AW	DF	FE	g	AT
vor 1900 EFH	1,25	0,75	1,55	1,30	2,50	0,67	2,50
vor 1900 MFH	1,25	0,75	1,55	1,30	2,50	0,67	2,50
ab 1900 EFH	1,20	1,20	2,00	1,00	2,50	0,67	2,50
ab 1900 MFH	1,20	1,20	1,50	1,00	2,50	0,67	2,50
ab 1945 EFH	1,95	1,35	1,75	1,30	2,50	0,67	2,50
ab 1945 MFH	1,10	1,35	1,30	1,30	2,50	0,67	2,50
ab 1960 EFH	1,35	0,65	1,20	0,55	3,00	0,67	2,50
ab 1960 MFH	1,35	0,65	1,20	0,55	3,00	0,67	2,50
Systembauweise	1,10	1,05	1,15	0,45	2,50	0,67	2,50
Montagebauweise	0,85	1,00	0,70	0,45	3,00	0,67	2,50

Bei den angegebenen Werten handelt es sich grundsätzlich um Mittelwerte aus der Erfahrung und nicht um schlechtest denkbare Werte.

Legende:

KD ..... Kellerdecke
OD ..... Oberste Geschoßdecke
AW ..... Außenwand
DF ..... Dachfläche
FE ..... Fenster
g ..... Gesamtenergiedurchlass-grad
AT ..... Außentüren
EFH ... Einfamilienhaus
MFH ... Mehrfamilienhaus

Systembauweise .... Bauweise basierend auf systemisierter Mauerwerksbauweise o.ä.

Montagebauweise ... Bauweise basierend auf Fertigteilen aus Beton mit zwischenliegender Wärmedämmung

Für alle nicht erwähnten Bauteile wie z.B. Kniestockmauerwerk, Abseitenwände, Abseitendecken sind grundsätzlich die entsprechenden Werte für Außenbauteile zu verwenden.

G-values

The g-values are obtained from the table below.

Examples of g-values depending on glazing:

type of glazing	g-value
single glazing	0.75 - 0.87
double glazing	0.65 - 0.70
double-pane thermal insulation glazing	0.52 - 0.65
3-pane thermal insulation glazing	0.38 - 0.55
solar protection glazing	0.25 - 0.5

https://www.fensterblick.de/g-wert-gesamtenergiedurchlassgrad.html?srsltid=AfmBOoqYrU2-unOUr2oThNdccPzip9srGb0o08cBcAPYm6hbdUoGxO8F

after 2010: average from “3-pane thermal insulation glazing”

2000-2010: average from “double-pane thermal insulation glazing”

1990-2000: lower value from “double glazing”

1980-1990: higher value from “double glazing"

before 1980: average from “singe glazing”

Year of Construction	g-values [-]
after 2010	0.465
2000-2010	0.585
1990-2000	0.650
1980-1990	0.700
before 1980	0.810

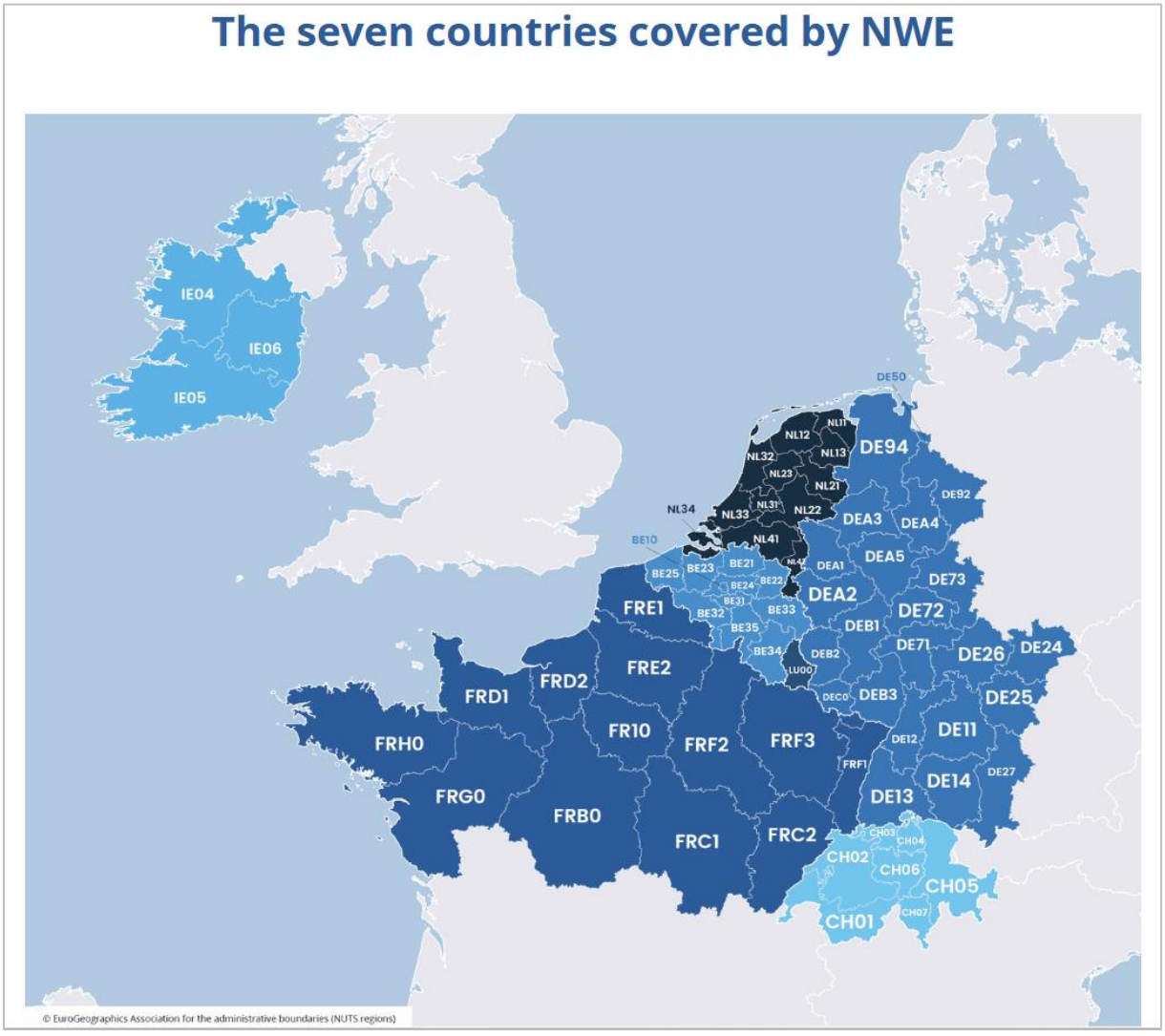
Heating Degree Days

Different countries use different base temperatures for heating degree days. For this tool 15.5°C is chosen as a base temperature for all five countries.

https://www.eea.europa.eu/en/analysis/maps-and-charts/heating-degree-days?activeTab=6fbd444d-c422-4a78-8492-fd496bd61b7a

“A base temperature of 15.5 °C is considered here as representative for the pan-European scale.”

Ireland, France, Germany, Belgium and the Netherlands are taking part in CIRCUS. France and Germany were divided into two regions (North-West and North-East for France; North-West and South-West for Germany). A location in the centre of each country/region was chosen to represent the Heating Degree Days in each country/region. A map with the chosen locations can be seen below.



Then the Heating Degree Days have been generated from degreedays.net for the year 2022.

https://www.degreedays.net/

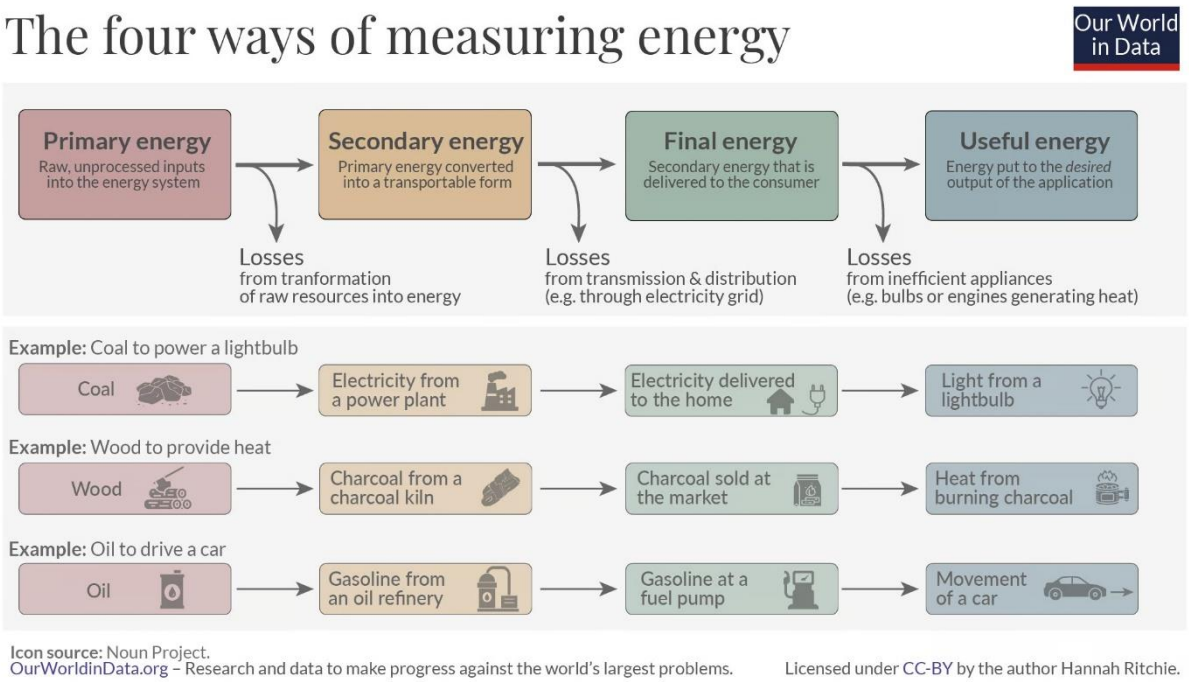
Heating Days and Solar Irradiance

Heating Days and Solar Irradiance for North, East, South and West have been obtained from the PHPP Software.

https://passivehouse.com/04_phpp/04_phpp.htm

Final Energy vs. Useful Energy

The difference between Final Energy and Useful Energy is explained below:



For traditional energy sources such as oil, gas, biomass and electric boilers, the useful energy is less than the final energy due to energy losses. In contrast, heat pumps have a useful energy greater than the final energy because they make use of free energy from the outside air, the soil or groundwater. The final energy in this case is electricity and the useful energy is, for example, one part electricity and three parts energy from the outside air.

Conversion Factors CO_2

The conversion factors for the calculation of the CO_2 emissions are gained from the following source:

https://www.seai.ie/data-and-insights/seai-statistics/conversion-factors

For the CO_2 emission intensity of electricity generation the EU-average of 210 g/kWh (year 2023) is used for all five countries.

https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emission-intensity-of-1/greenhouse-gas-emission-intensity-of-electricity-generation-country-level?activeTab=265e2bee-7de3-46e8-b6ee-76005f3f434f

Attention: EU average 210 g/kWh (year 2023) is used for all five countries to keep it simple, even if data for each country would be available.