The “Climate Design Days” Method

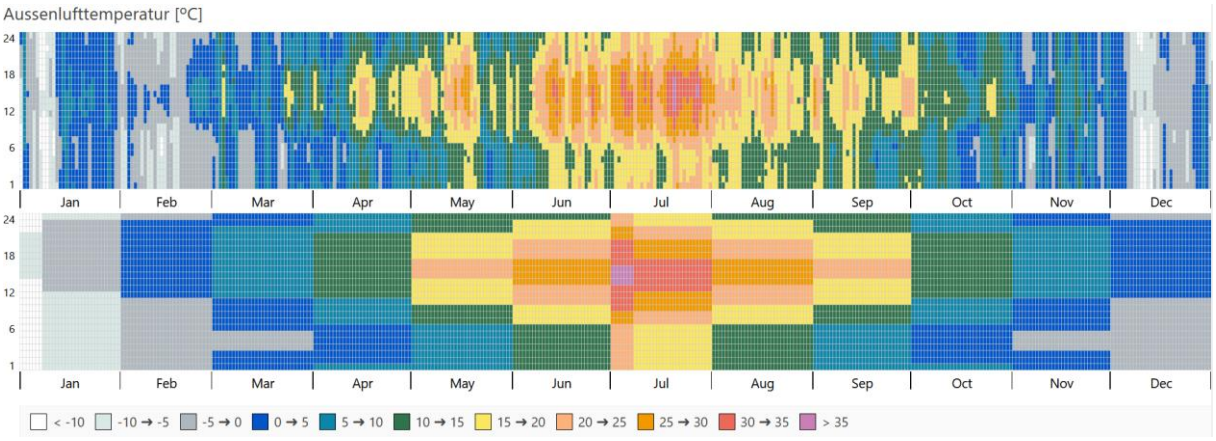
From hourly climate data, reliable design days for winter, summer, and energy are derived.

For the sizing of heating and cooling systems, in addition to the relevant building characteristics, the applied climate at the building site is the essential boundary condition. *Climate Design Days (CDD)* provide this boundary condition in the form of an idealized, schematic climate dataset.

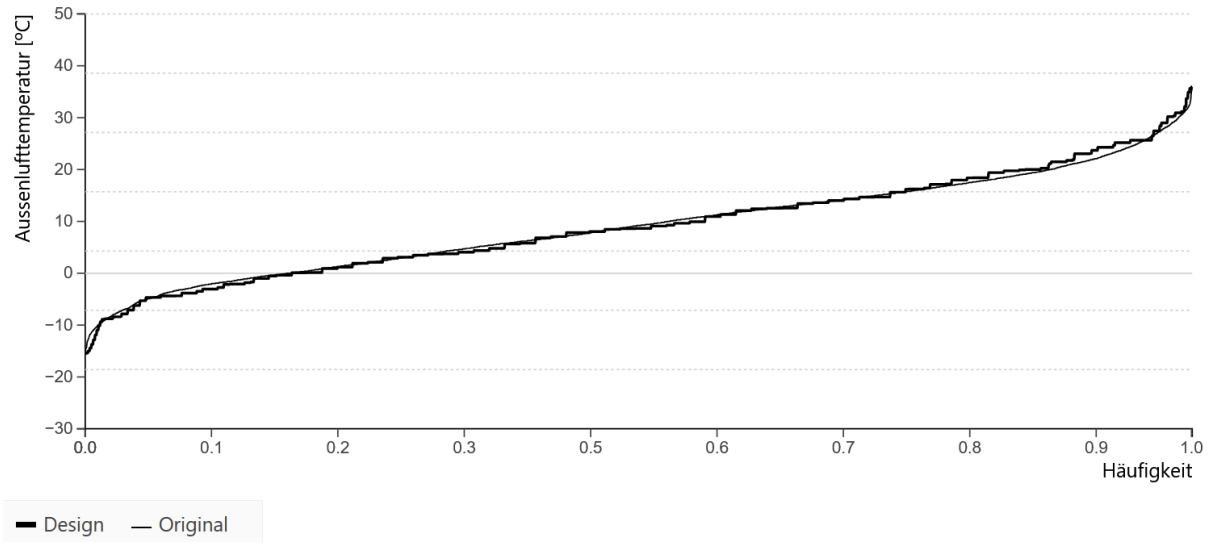
Instead of relying on a climate dataset with locally high variability, the *CDD* are generated from just a few input values. They systematically and essentially represent the underlying climate dataset (e.g., from TRY, PVGIS, etc.) (cf. Fig. 1).

The *CDD* match the original data in terms of frequency, extremes, and totals. They can be adapted to specific requirements with very little effort, enabling quick “what-if” scenario analyses for the assumed climate or for future climate change scenarios.

The CDD account for the following climate variables: Outdoor air temperature [°C], Solar radiation [W/m²] (direct and diffuse), Outdoor air humidity (humidity ratio [g/kg], relative humidity [%]), Enthalpy [kJ/kg]



▲ *Fig. 1: The carpet plots display each outdoor temperature value for the 8,760 hours of the year, arranged by 365 days (x-axis) and time of day (y-axis). Top: Original climate data (TRY, DWD). Bottom: Climate Design Day data.*



▲ *Fig. 2: The cumulative curves show the frequency distribution of each outdoor temperature value across the 8,760 hours of the year, comparing original climate data (TRY, DWD) with Climate Design Day data.*

Comparison of boundary conditions between CDD and standard specifications

For the location Potsdam, the CDD inputs are presented here as an example, in comparison with those required by existing standards, guidelines, and further verification methods.

Klimadaten Ort: Potsdam

Außenluft-Temperatur

Design Parameter

	Ziel	Jahr	Beschreibung	Region	Winter			Sommer			Jahr	Monat
					T x win	T m d w	t x win	T x som	T m d s	t x som	T m y	dT mon
					°C	°C	-	°C	°C	-	°C	K/mon
1.	**heute**	2020	CDD, TRY 04, Potsdam	TRY 04, extrem	-15,5	-11,9	6	35,9	28,4	15	9,2	4,83
2.	Heizlast	2024-12	DIN EN 12831	Potsdam	-12,5	-12,5					9,6	
3.	Kühllast	2015-06	VDI 2078	KLZ 3: Juli				33,0	25,0	15		
4.	Energie	2018-09	DIN EN 18599 für GEG	TRY 04, normal	-12,0	-12,0		25,0	25,0		9,5	
5.	Komfort	2013-02	DIN 4108-2	Region B, TRY 04, normal	-13,4	-9,4	7	35,4	26,5	15	9,5	3,48
6.	**Zukunft**	2035	CDD, TRY 04, Potsdam	TRY 04, extrem	-9,8	-8,1	6	37,3	28,8	15	10,8	3,90

▲ *Table 1: Outdoor air temperature – design parameters of the Climate Design Days in comparison*

Outlook: Building Design Days + Energy

With the newly developed *Building Design Days + Energy (BDD+E)* method, heating is dimensioned based on the extreme winter daily profile, and cooling based on the extreme summer daily profile. The Climate Design Days provide the ideal climate boundary conditions for this. For more information on the BDD+E method, see "*2 Building Design Days + Energy (Teaser).pdf*".

Further information and contact

The current state of development can be found in more detail here:

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