Heating and cooling, room by room, in context

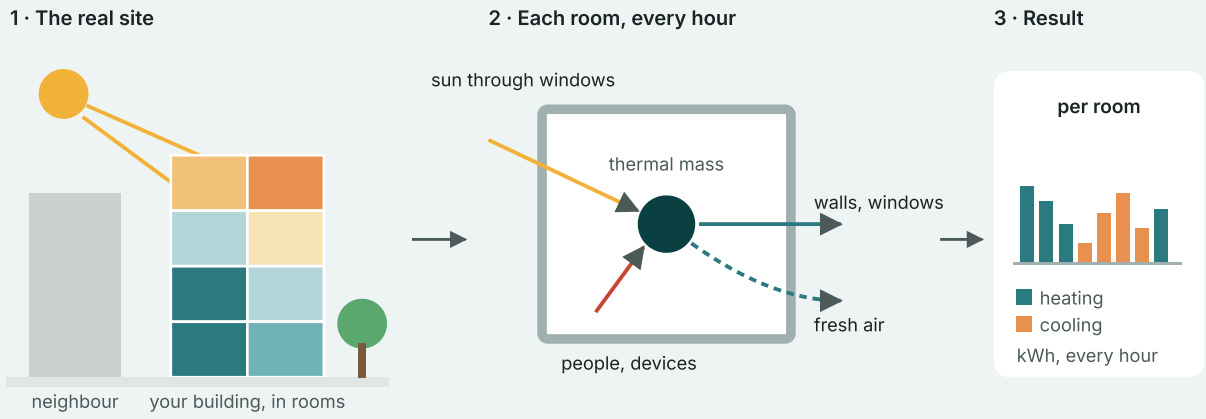
Heating and cooling need for every room of a building, hour by hour, with the real site around it: neighbours, trees, terrain, PV and shading devices.

21 of 22
ASHRAE 140 test values in the reference band. EnergyPlus itself: 19 of 22

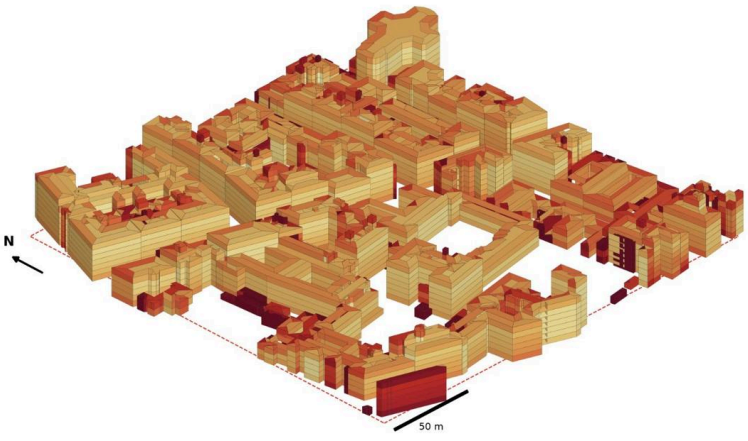
0 to 8 %
from EnergyPlus on annual heating, 4 to 6 % on cooling, same inputs

≈ 3 s
for 4,000 rooms, a full year, hour by hour

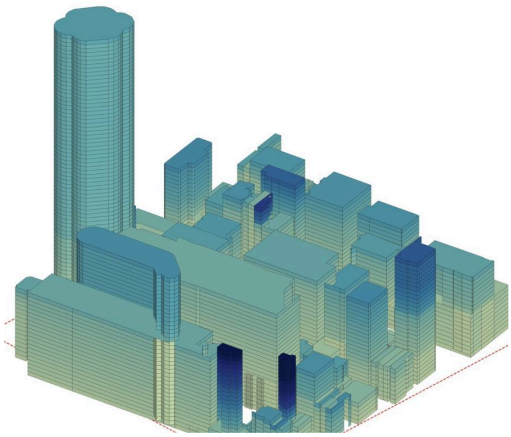
Hourly ISO 13790 method (5R1C), with sun and sky from a Perez model on 145 sky patches. Tested against ASHRAE 140 (BESTEST), EN 15265, EnergyPlus 26.1 and Radiance. Aligned with ISO 13790, ISO 52016-1, ISO 6946 and ISO 13370.



Sun, shade and reflected light come from the real site. Each room runs its own heat balance, hour by hour, with the rooms next to it.

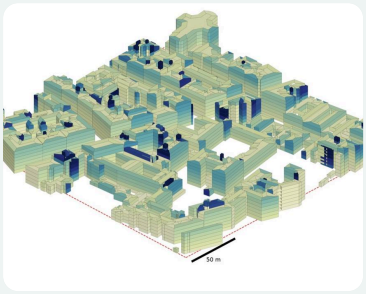


Vienna inner city: cooling need for every room over a year. Dark red = the most cooling.



Hong Kong, a dense high-rise district: cooling need per room.

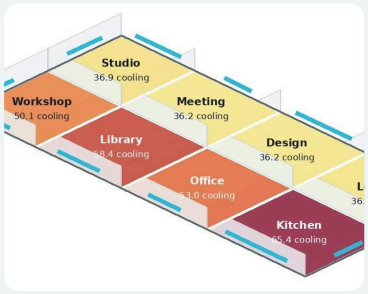
What your users could get from it



Which massing or facade needs less energy?

Compare massing, facade and window share side by side. Heating and cooling for each option, in the real site.

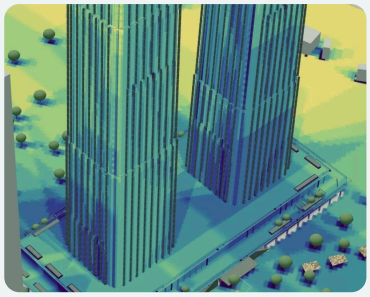
Sell it as: option energy check



What does a better wall or roof buy?

Change U-values, thermal mass or window share. See the change in every room, not one number for the building.

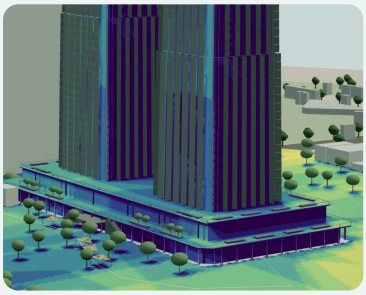
Sell it as: envelope check



How do neighbours and trees change it?

Shade from buildings, terrain and tree crowns, and the light they reflect. Evergreen and deciduous trees act differently.

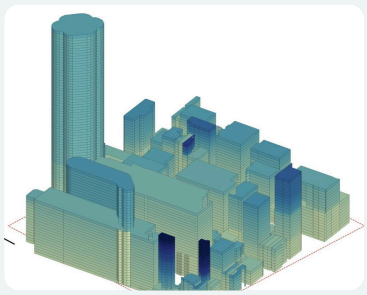
Sell it as: in-context energy check



Do PV, fins or screens cut the cooling?

Add PV, fins, screens or green facades. See how much solar gain they stop on each window, and the cooling need that is left.

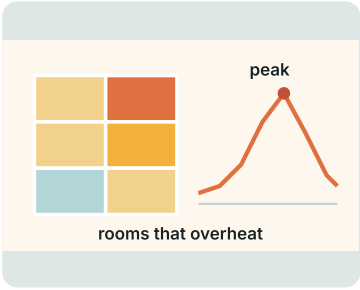
Sell it as: shading device check



What does a whole district need?

Every building of a district, each in its real context, in seconds. Annual kWh/m² per building on one map.

Sell it as: district energy map



Which rooms overheat, and what is the peak? Next

Flag hot rooms and peak loads while the design is still open.

Sell it as: overheating check

Three ways into your web app

1 · A layer while you design

Rooms coloured by heating and cooling, in the 3D view. Move a wall or add a fin and see the effect of every design move.

2 · One number per option

kWh/m² a year per building, with the balance: transmission, ventilation, internal and solar gains. Easy to compare.

3 · A whole district

Every building of a district in seconds, each with its neighbours, trees and terrain.

Python and TypeScript SDK. gbXML in. Bad input is refused before any charge. The price preview equals the bill.

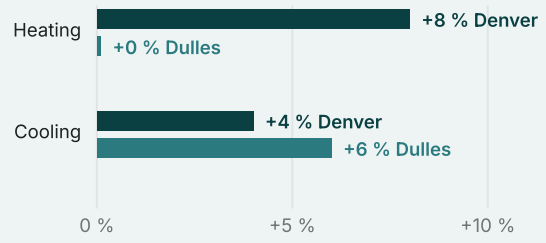
One upload, more answers. The same buildings, trees and ground also give sun hours, daylight, solar radiation, wind and thermal comfort. Your users do no extra work.

What goes in, and how it is tested

INPUT	WE GET IT AUTOMATICALLY	BETTER, IF YOU HAVE IT
Rooms Now	Zones from your massing: one per storey, or perimeter and core	Your own rooms, with windows, doors and skylights (gbXML)
Construction Now	Standard U-values, thermal mass, window share and storey height	Your own U-values and wall and roof build-ups
Use Now	Standard set-points, internal gains and air change	Your schedules, with intermittent operation
Neighbours and terrain Now	Buildings, far context and terrain from open city data	Your own context model
Trees and installations Now	Open tree data, evergreen or deciduous crowns	PV, fins, screens and green facades from your design
Ground Now	Ground materials that reflect light, from open map data	Your design surfaces
Weather Now	Hourly weather file for the site	Your own weather file

Against EnergyPlus 26.1, same inputs

3 storeys, 840 m². Difference in annual need.



Standard test cases

21 of 22 ASHRAE 140 (BESTEST) 600 to 950 values in the reference band. EnergyPlus 26.1: 19 of 22

11 of 12 EN 15265 cases at level C or better

Solar gains on windows and walls against Radiance: −2.6 % to +1.9 % a year in shaded scenes; −1.7 % Vienna, −0.4 % Hong Kong for a free building.

What it does

- Heating and cooling need per room and month (kWh), hour by hour; kWh/m² a year per building
- Balance terms: transmission, ventilation, internal gains, solar gains on windows and walls
- Hourly ISO 13790 (5R1C) by default; a monthly method for speed; ground slab to ISO 13370
- Heat exchange between rooms; schedules and intermittent operation
- Perez sky on 145 patches, one mask per window, wall and roof; one light bounce
- Shade from buildings, far context, terrain, trees, PV, fins, screens and green facades
- 4,000 rooms, a full year hour by hour: about 3 s
- Python and TypeScript SDK, gbXML in; the price preview equals the bill

Limits: this is energy need for early design. It does not give plant energy, energy bills or peak loads.

Next step: pick one of your sample projects. We run it in its real site and show you the result, room by room.

Images: demo projects and design studies, simulated with our models. Tests: ASHRAE 140, EN 15265.