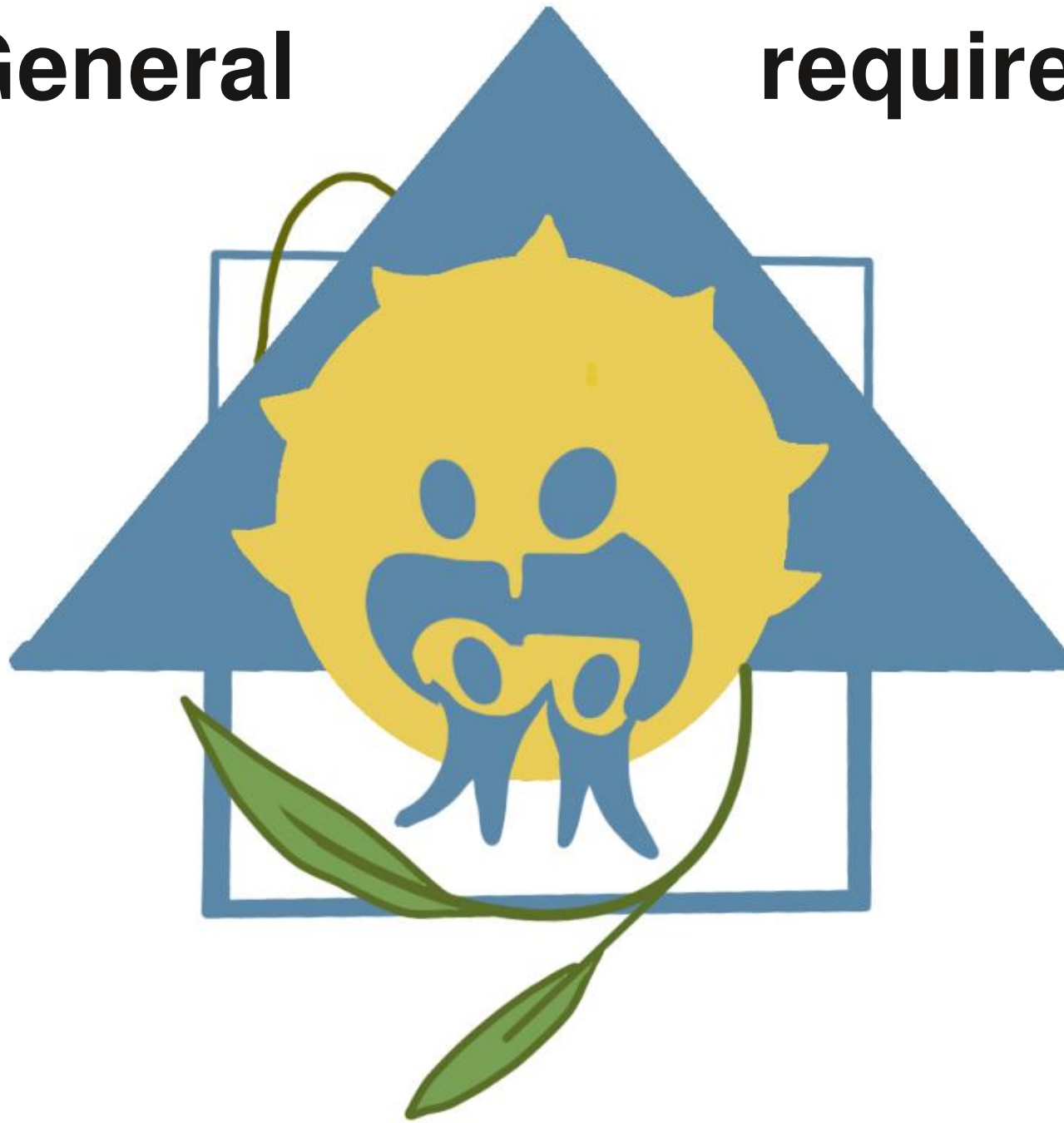


**General**

**requirements**

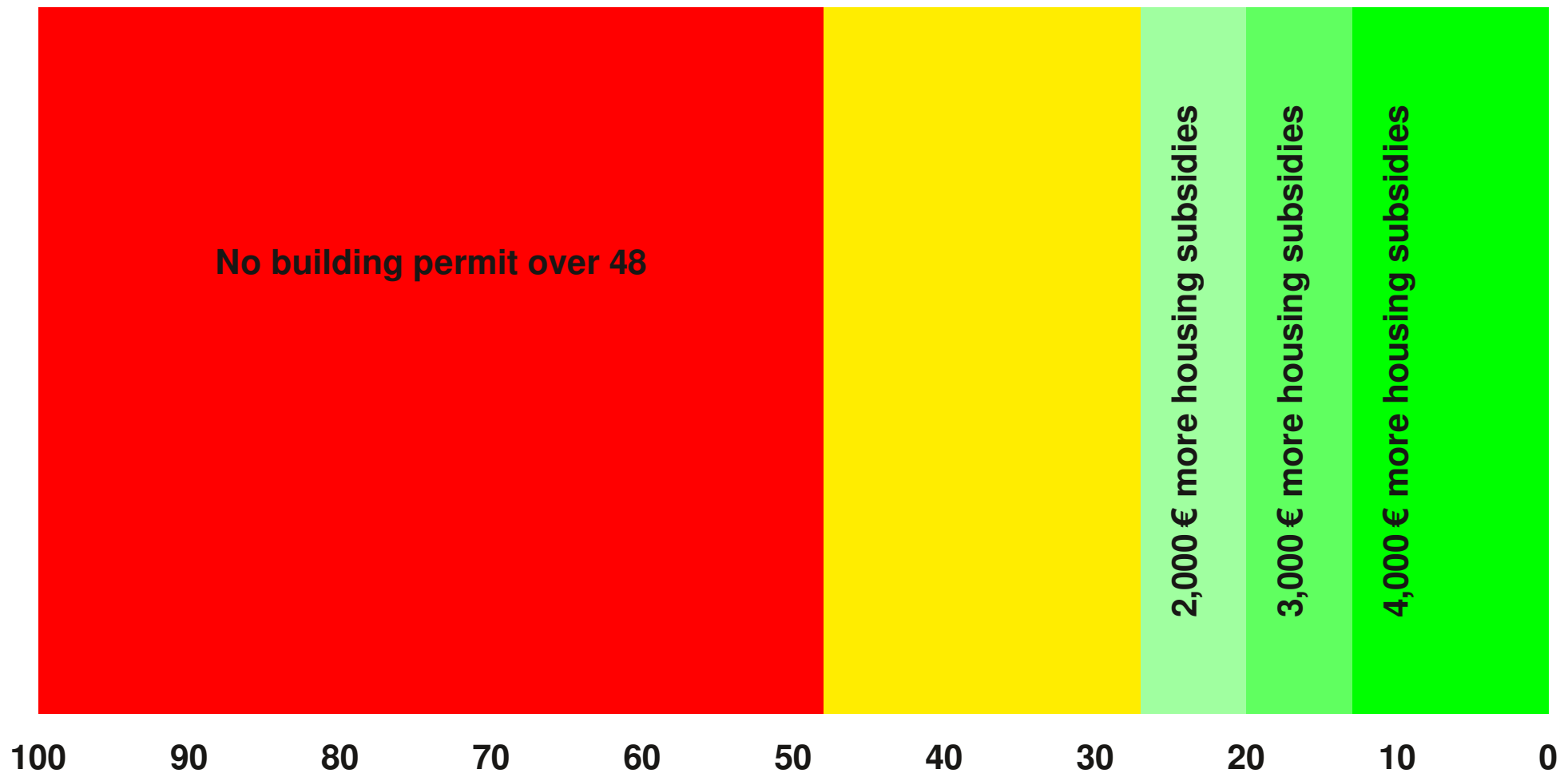


**Climate Protection Superiority House**

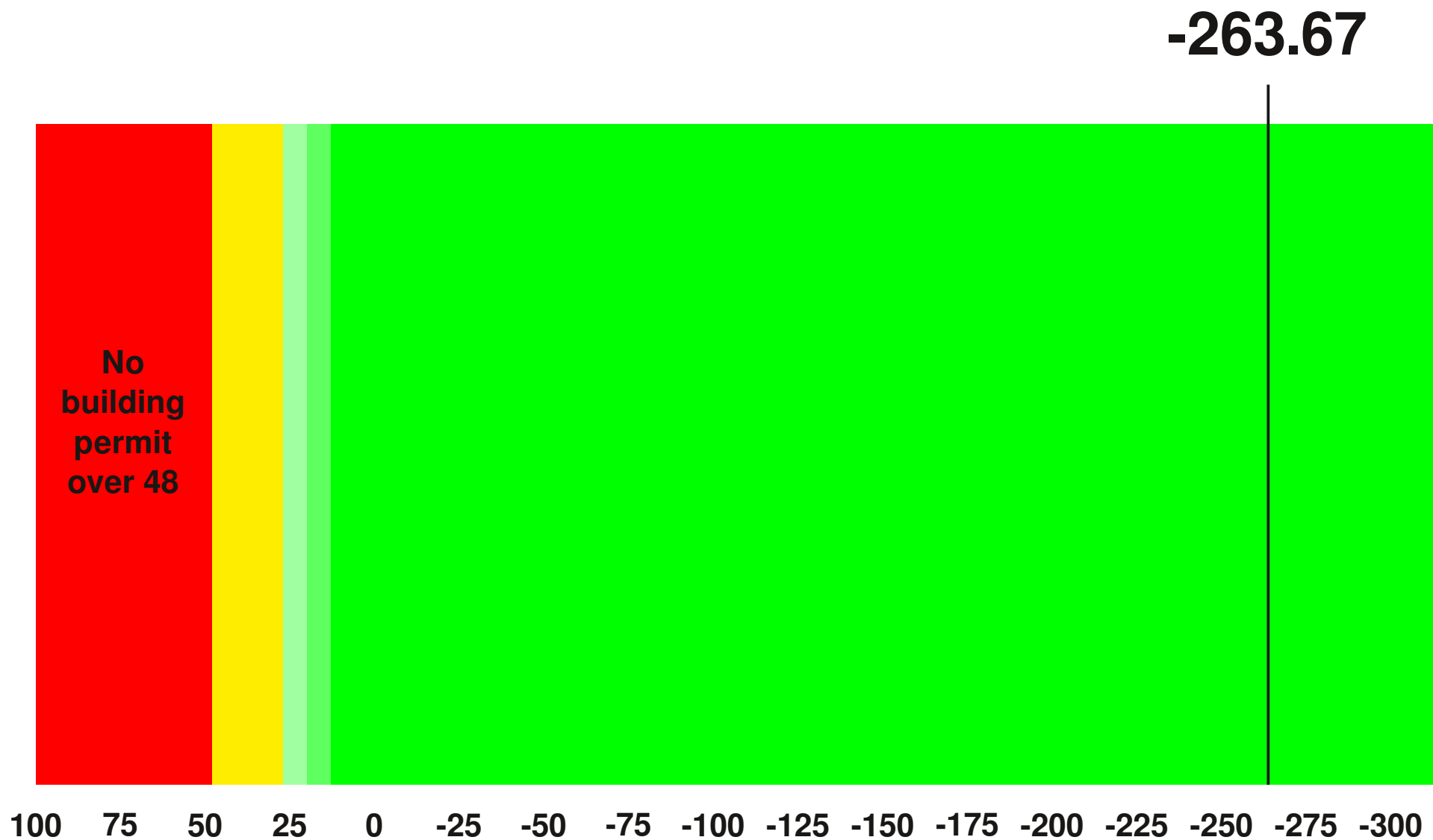
# Primary energy indicator (Pi value) for Salzburg

The 2016 Salzburg Building Technology Ordinance (S.BTV) in Salzburg also brought a new requirement value: primary energy indicator (Pi value).

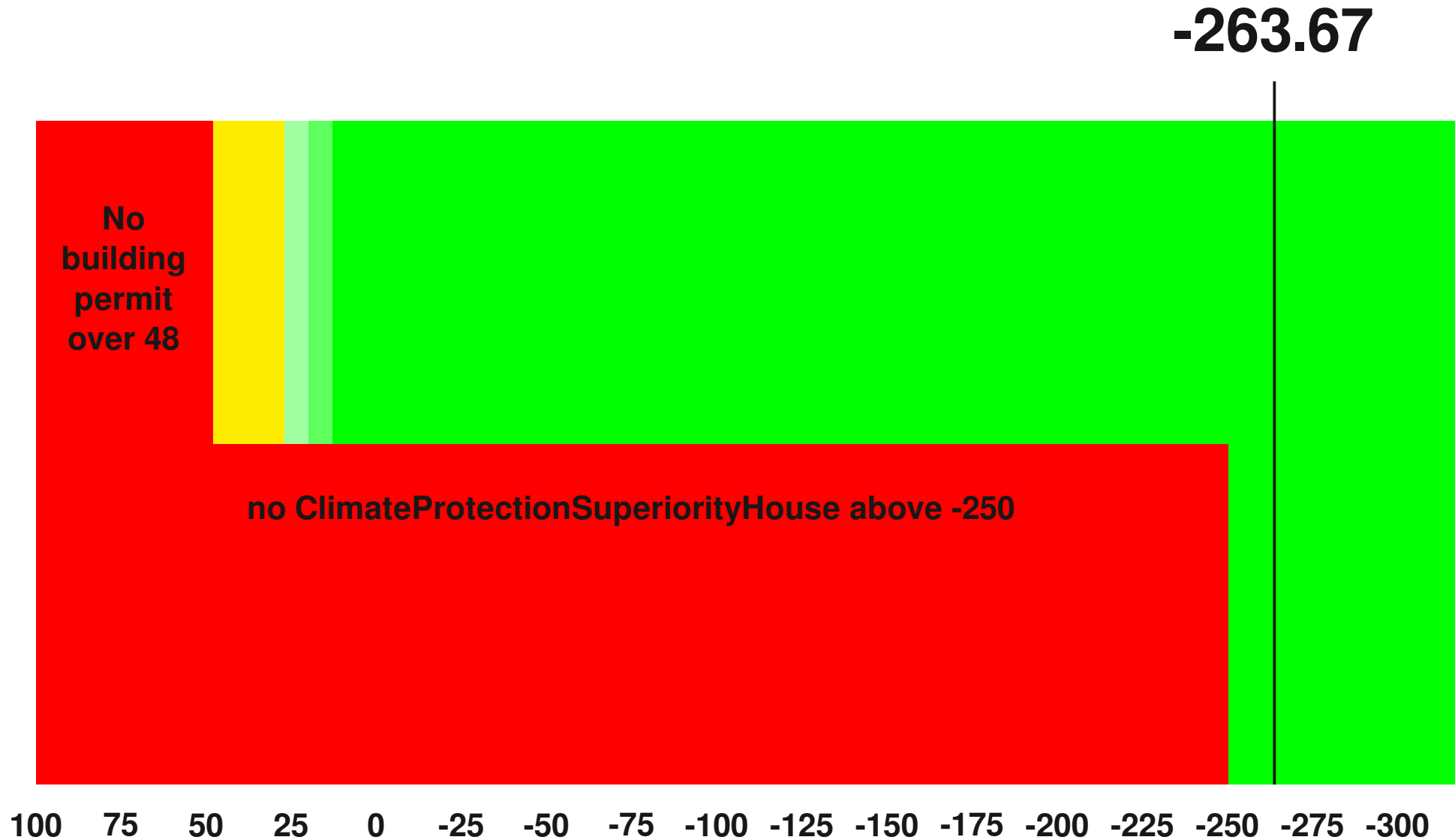
The primary energy indicator - a dimensionless value - is considered the overall energy efficiency indicator in Salzburg.



# GEMINI next generation house preliminary energy certificate September 2019:



**According to the 2020 version, it is a  
ClimateProtectionSuperiorHouse  
if a PI value  $< -250$  is achieved:**



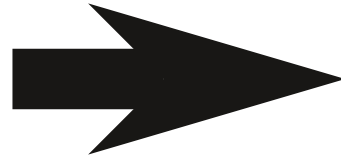
**Evaluation for the  
production of building  
materials**

**Domestic electricity**

**DHW domestic hot water**

**Room heat**

**Form factor of the house**



**PI-value**  
**The primary energy indicator**  
**- a dimensionless value**

# Evaluation for the production of building materials

**PENRT:** 2.893 kWh / (m<sup>2</sup> ref. area<sub>OI</sub>)

**PENRE:** 2.583 kWh / (m<sup>2</sup> ref. area<sub>OI</sub>)

**PENRM:** 310 kWh / (m<sup>2</sup> ref. area<sub>OI</sub>)

**PERT:** 2.027 kWh / (m<sup>2</sup> ref. area<sub>OI</sub>)

**PERE:** 410 kWh / (m<sup>2</sup> ref. area<sub>OI</sub>)

**PERM:** 1.617 kWh / (m<sup>2</sup> ref. area<sub>OI</sub>)

**GWPT:** 361 kg CO<sub>2</sub> equ. / (m<sup>2</sup> ref. area<sub>OI</sub>)

**GWPF:** 629 kg CO<sub>2</sub> equ. / (m<sup>2</sup> ref. area<sub>OI</sub>)

**GWPB:** -268 kg CO<sub>2</sub> equ. / (m<sup>2</sup> ref. area<sub>OI</sub>)

**AP:** 2,44 kg SO<sub>2</sub> equ. / (m<sup>2</sup> ref. area<sub>OI</sub>)

**EP:** 1,05 kg PO<sub>4</sub><sup>3-</sup> / (m<sup>2</sup> ref. area<sub>OI</sub>)

**POCP:** 2,48 kg C<sub>2</sub>H<sub>4</sub> / (m<sup>2</sup> ref. area<sub>OI</sub>)

**ODP:** 5,06 · 10<sup>-5</sup> kg CFC-11 / (m<sup>2</sup> ref. area<sub>OI</sub>)

**This is far too long-winded!**

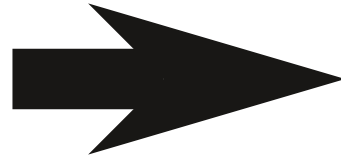
~~Evaluation for the  
production of building  
materials~~

Domestic electricity

DHW domestic hot water

Room heat

Form factor of the house



**PI-value**  
The primary energy indicator  
- a dimensionless value

**PENRE:** 2.893 kWh / (m<sup>2</sup> ref. area<sub>OI</sub>)

**PENRE:** 2.585 kWh / (m<sup>2</sup> ref. area<sub>OI</sub>)

**PENRM:** 310 kWh / (m<sup>2</sup> ref. area<sub>OI</sub>)

**PERT:** 2.027 kWh / (m<sup>2</sup> ref. area<sub>OI</sub>)

**PERE:** 410 kWh / (m<sup>2</sup> ref. area<sub>OI</sub>)

**PERM:** 1.617 kWh / (m<sup>2</sup> ref. area<sub>OI</sub>)

**GWPT:** 361 kg CO<sub>2</sub> equ. / (m<sup>2</sup> ref. area<sub>OI</sub>)

**GWPF:** 629 kg CO<sub>2</sub> equ. / (m<sup>2</sup> ref. area<sub>OI</sub>)

**GWPB:** -269 kg CO<sub>2</sub> equ. / (m<sup>2</sup> ref. area<sub>OI</sub>)

**AP:** 2,44 kg SO<sub>2</sub> equ. / (m<sup>2</sup> ref. area<sub>OI</sub>)

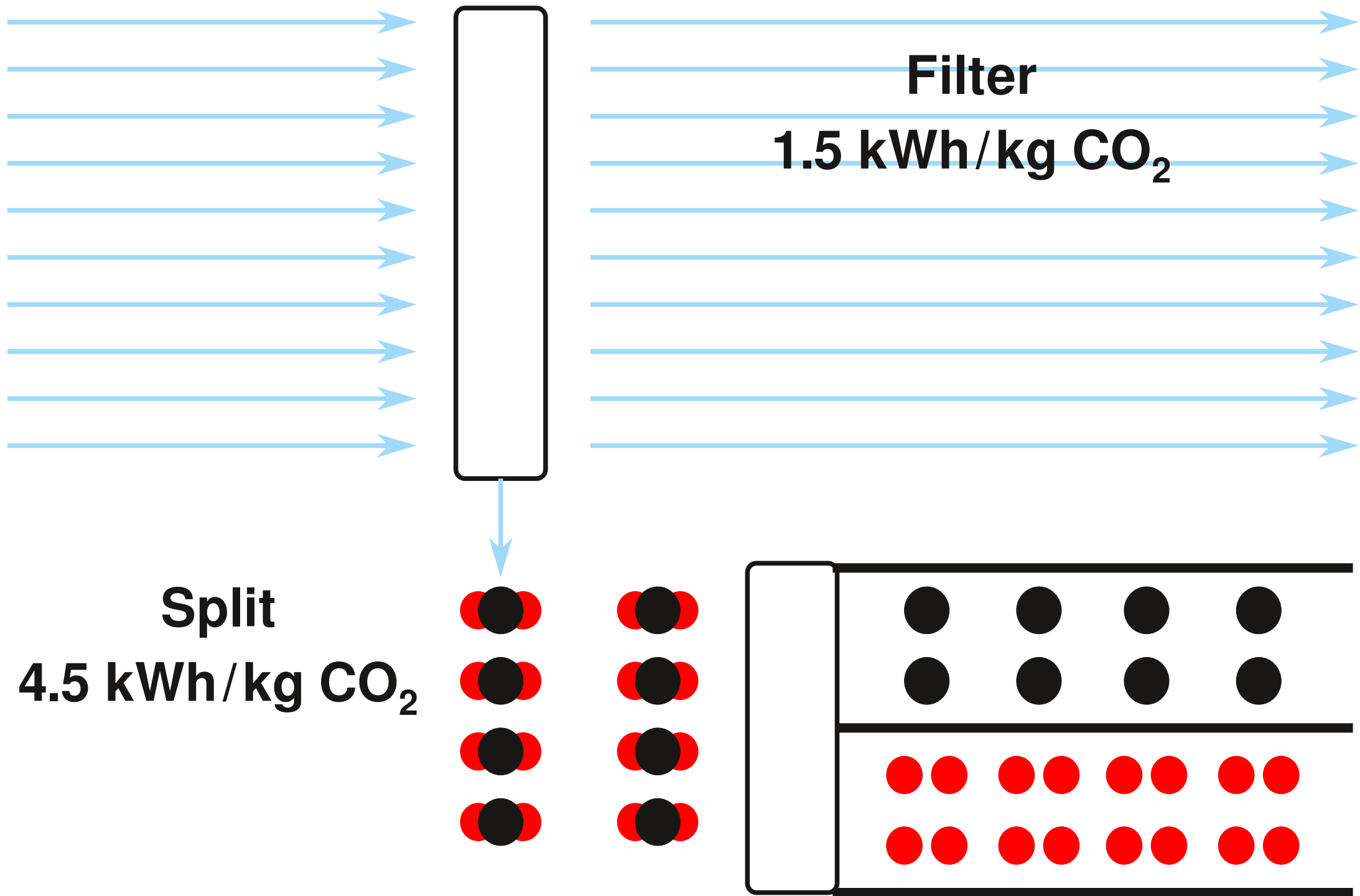
**EP:** 1,25 kg PO<sub>4</sub><sup>3-</sup> / (m<sup>2</sup> ref. area<sub>OI</sub>)

**POCP:** 2,48 kg C<sub>2</sub>H<sub>4</sub> / (m<sup>2</sup> ref. area<sub>OI</sub>)

**ODP:** 5,06 · 10<sup>-5</sup> kg CFC-11 / (m<sup>2</sup> ref. area<sub>OI</sub>)

**kWh<sub>el</sub> as a uniform standard**





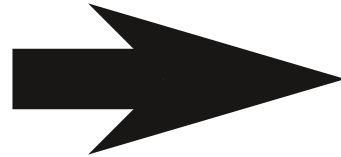
~~Evaluation for the  
production of building  
materials~~

Domestic electricity

DHW domestic hot water

Room heat

~~Form factor of the house~~



**PI-value**  
The primary energy indicator  
- a dimensionless value

**Electricity for the production of building materials and 6 kWh per kg CO<sub>2</sub>**

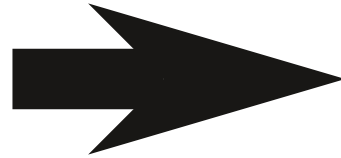
**Domestic electricity**

**DHW domestic hot water**

**Room heating and cooling**

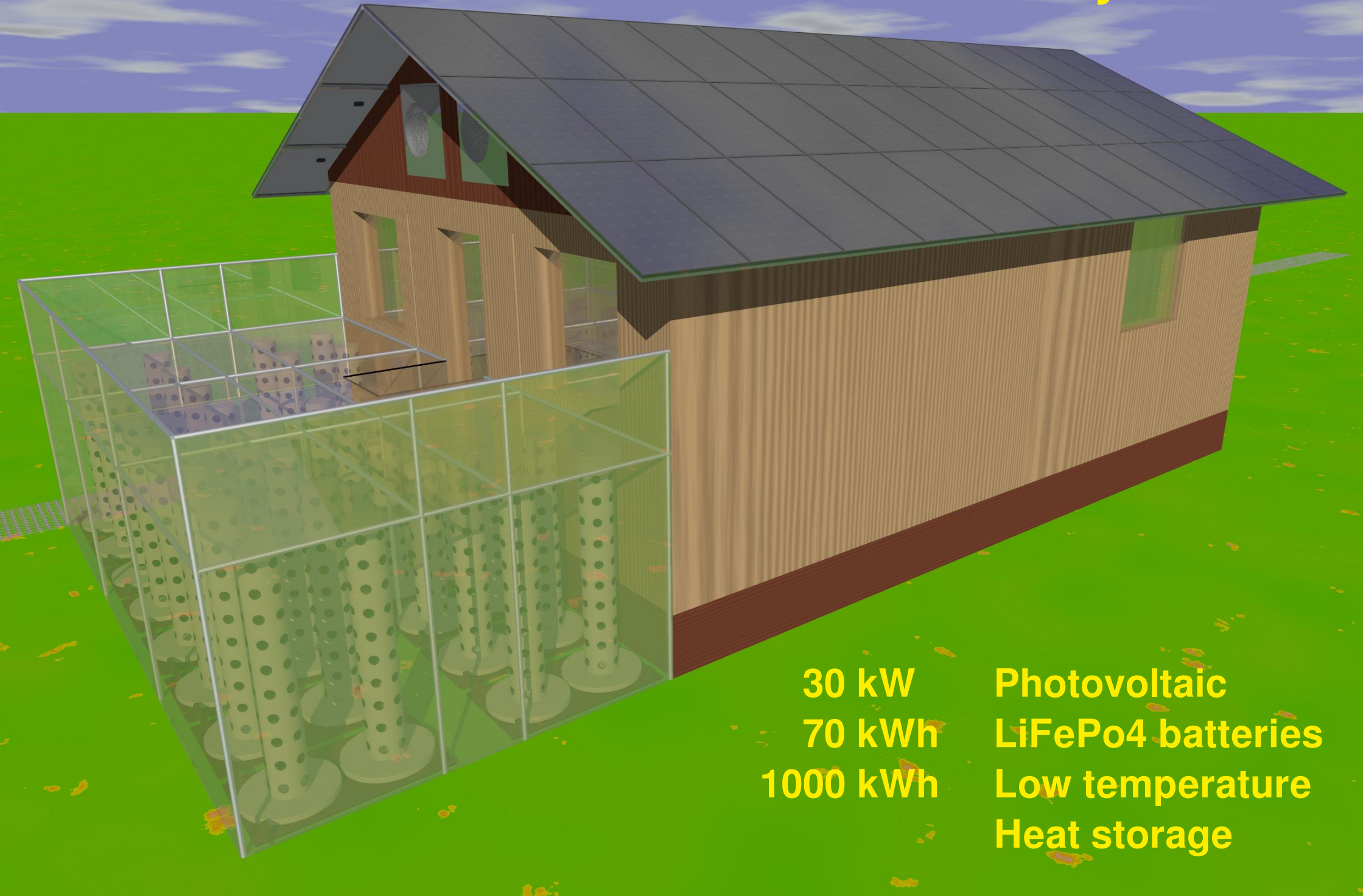
**Mobility**

**Exchange electricity 6:1**



**Replication factor**

# Summer / winter balance electricity



**30 kW**      **Photovoltaic**  
**70 kWh**     **LiFePo4 batteries**  
**1000 kWh**   **Low temperature**  
                  **Heat storage**



vs



Material	CO2 emission through chemical reaction	Evaluation	GEMINI next
1,000 kg concrete	The chemical reaction to produce 200 kg of cement emits 140 kg of CO2	840 kWh	concrete-free
1,000 kg steel	Reduction with carbon 1,750 kg CO2, not applicable for reduction with hydrogen	10,500 kWh	25,200 kWh

### Monthly balance GEMINI next Generation 66 m<sup>2</sup>, 30 kW peak photovoltaic, 70 kWh battery

	January	Feb.	March	April	May	June	July	August	Sept.	October	Nov.	Dec.	Total
Electricity balance													
Oslo	-989	-443	869	2,012	2,956	3,376	2,969	2,196	1,222	73	-697	-1,036	12,510
Berlin	-575	66	1,281	2,478	3,108	3,327	3,184	2,657	1,747	716	-254	-676	17,060
Vienna	-341	326	1,701	2,873	3,410	3,508	3,593	3,017	2,051	998	-23	-435	20,678
Rome	586	1,130	2,317	3,204	4,003	4,171	4,533	3,959	2,714	1,790	801	488	29,695
Athens	933	1,313	2,738	3,692	4,390	4,619	4,941	4,480	3,223	2,087	1,147	697	34,259
Tel Aviv	1,491	1,800	3,073	3,657	4,369	4,624	4,684	4,254	3,412	2,606	1,726	1,353	37,049
Cairo	2,099	2,313	3,557	4,024	4,578	4,723	4,799	4,410	3,679	2,995	2,154	1,906	41,237

### Deterioration of the monthly balance due to 6:1 exchange rule

	January	Feb.	March	April	May	June	July	August	Sept.	October	Nov.	Dec.	Total
Exchange 6:1													
Oslo	-5,934	-2,657	869	2,012	2,956	3,376	2,969	2,196	1,222	73	-4,182	-6,214	-3,313
Berlin	-3,450	66	1,281	2,478	3,108	3,327	3,184	2,657	1,747	716	-1,521	-4,056	9,538
Vienna	-2,045	326	1,701	2,873	3,410	3,508	3,593	3,017	2,051	998	-138	-2,608	16,687
Rome	586	1,130	2,317	3,204	4,003	4,171	4,533	3,959	2,714	1,790	801	488	29,695
Athens	933	1,313	2,738	3,692	4,390	4,619	4,941	4,480	3,223	2,087	1,147	697	34,259
Tel Aviv	1,491	1,800	3,073	3,657	4,369	4,624	4,684	4,254	3,412	2,606	1,726	1,353	37,049
Cairo	2,099	2,313	3,557	4,024	4,578	4,723	4,799	4,410	3,679	2,995	2,154	1,906	41,237

**Calculation with heating degree days, the whole annual consumption is calculated with a simple multiplication heat demand \* heating degree days.**

**Always heat to 20°,  
you never need to cool.  
Humidity remains unconsidered.**

**Simple devices with simple settings, storage and storage strategy is something completely unknown.**

~~Calculation with heating degree days, the whole annual consumption is calculated with a simple multiplication heat demand \* heating degree days.~~

Simulation with sampled weather data about direct and diffuse irradiation, wind, temperature and humidity and precipitation.

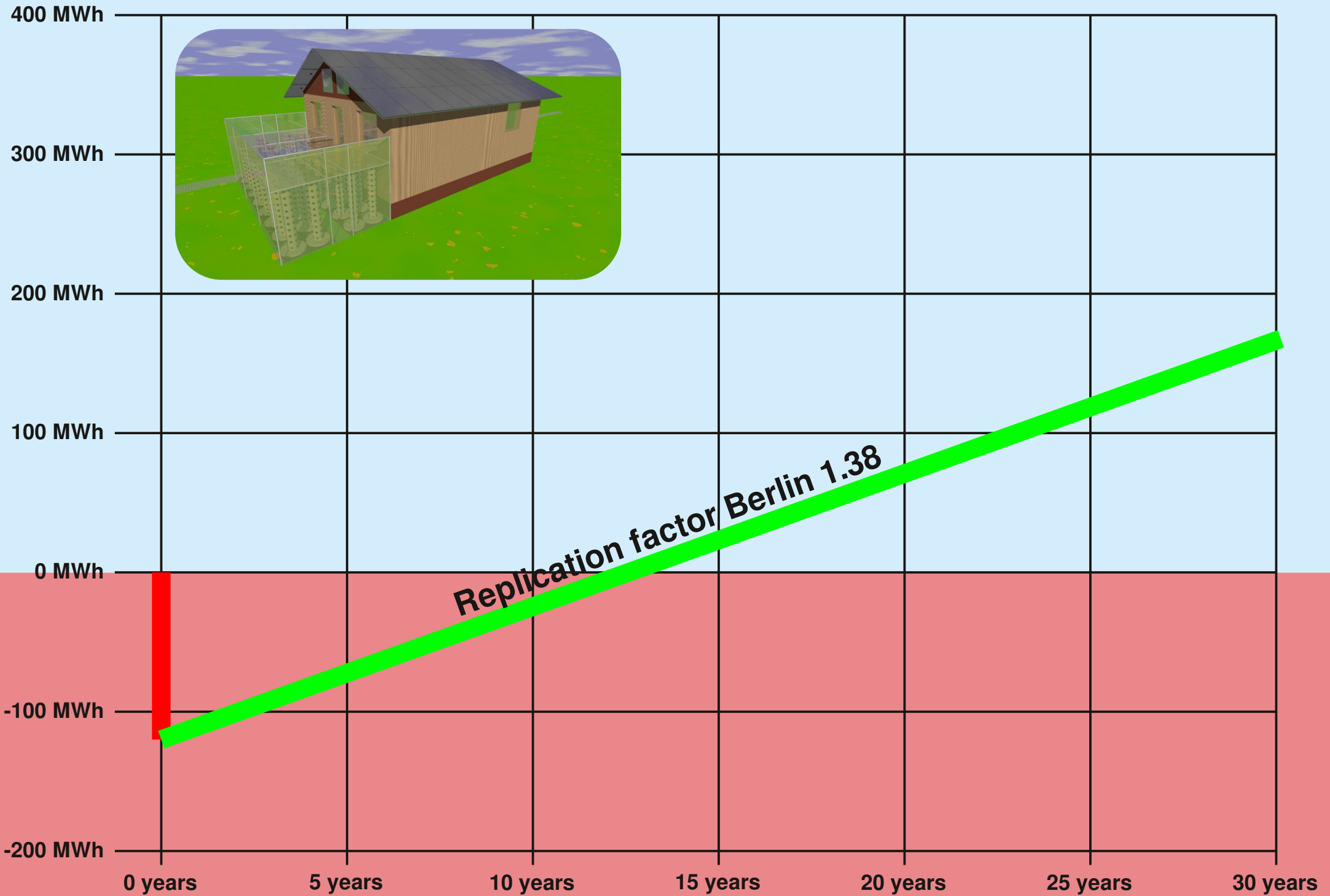
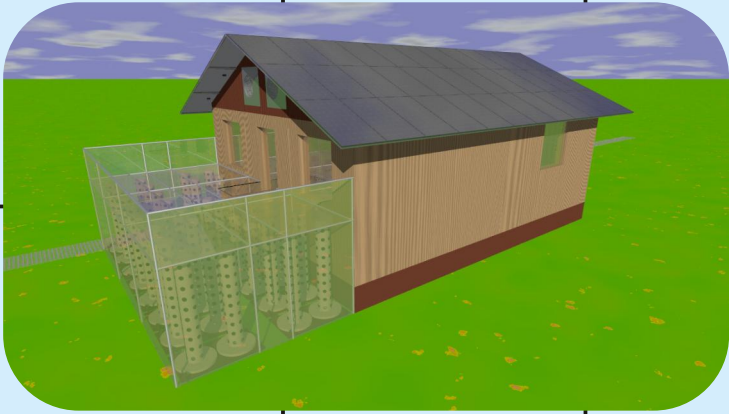
~~Always heat to 20°, you never need to cool. Humidity remains unconsidered.~~

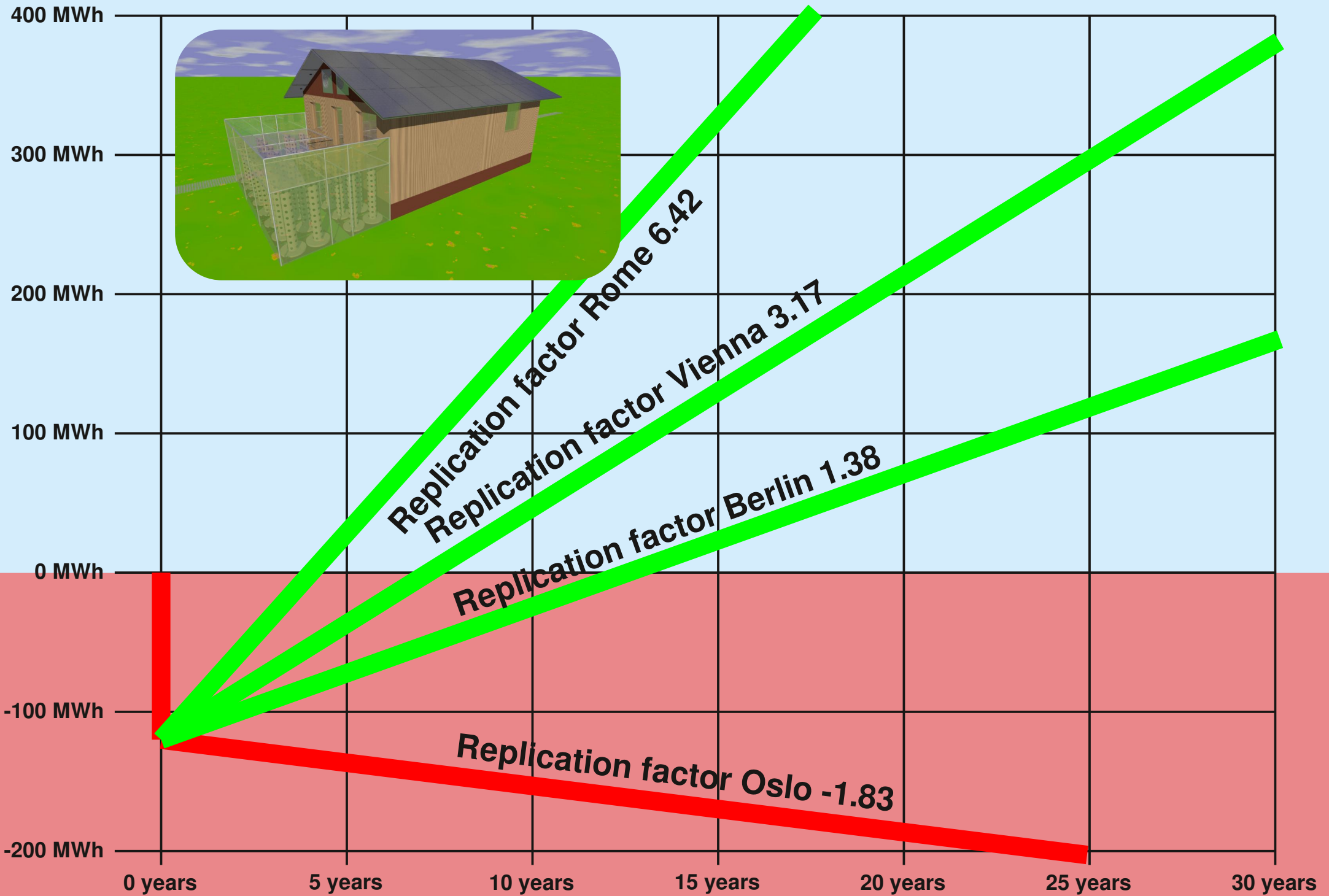
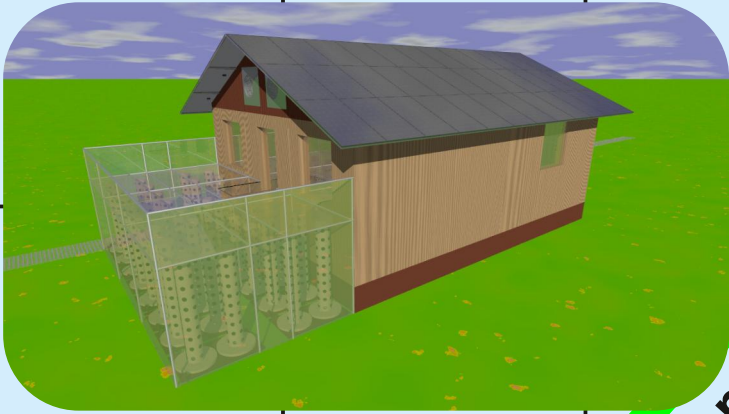
Tolerance band  
21° to 25° room temperature,  
40 % to 60 % humidity.

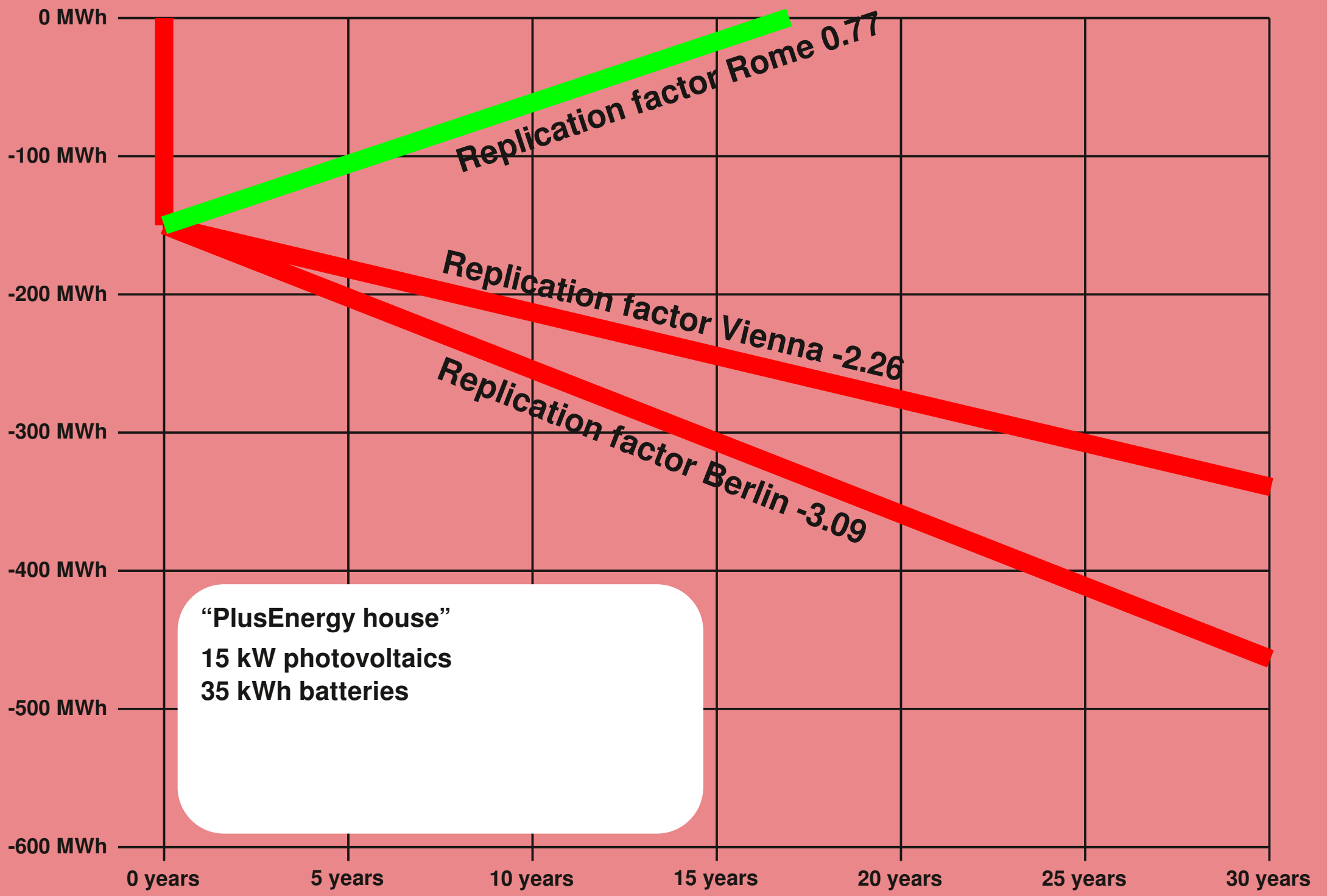
~~Simple devices with simple settings, storage and storage strategy is something completely unknown.~~

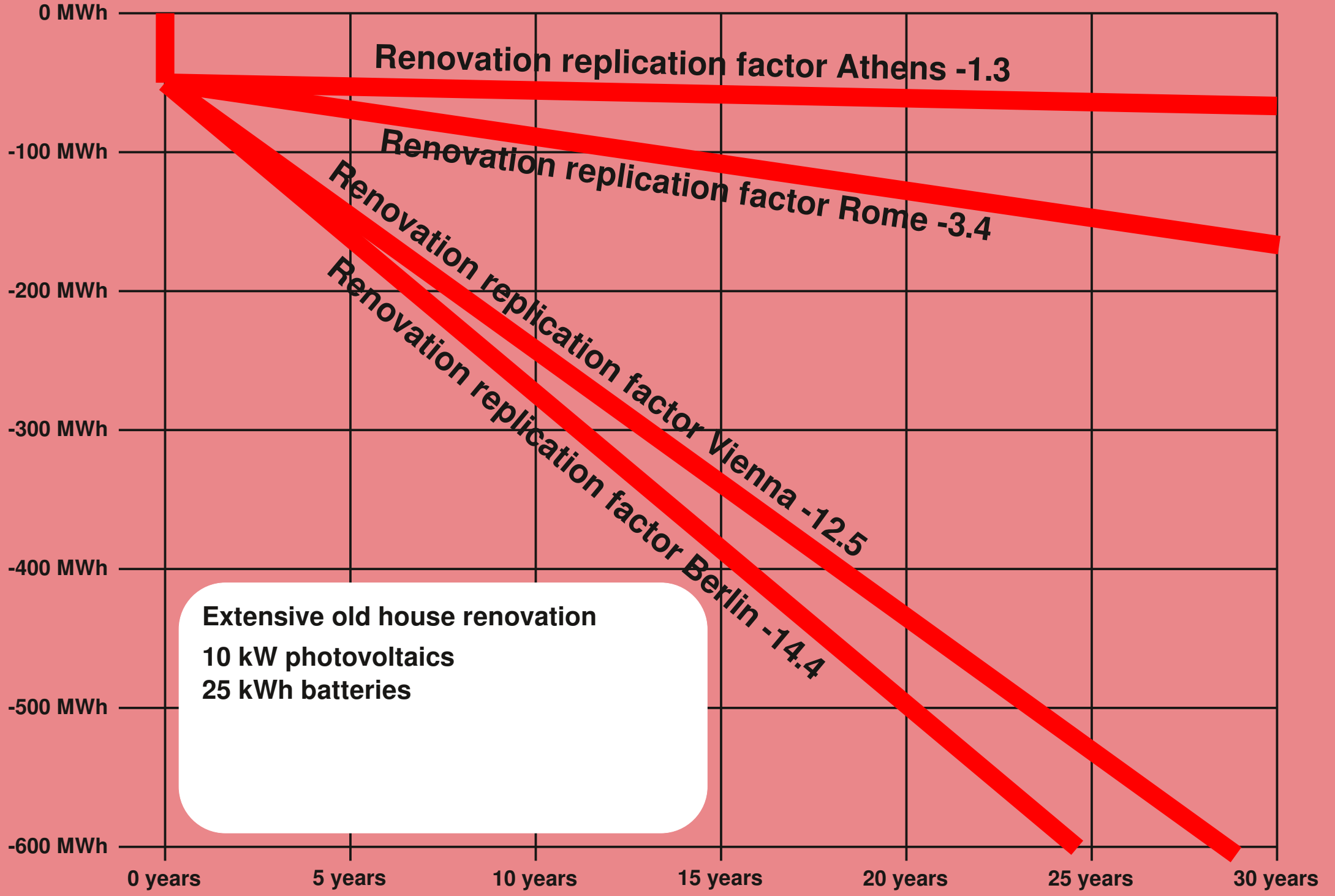
The home control software is involved in the simulation and must make decisions about the optimal use of all systems.











**Extensive old house renovation**  
**10 kW photovoltaics**  
**25 kWh batteries**

# Farewell to completely inadequate objectives

		<b>GEMINI next Generation</b>			<b>„Plus energy House“</b>			<b>Big renovation</b>		
		Create	Balance	Rep. F	Create	Balance	Rep. F	Create	Balance	Rep. F
107										
109	Oslo	120,000	-3,313	-1.83	150,000	-20,814	-5.16	50,000	-34,334	-21.60
110	Berlin	120,000	9,538	1.38	150,000	-10,427	-3.09	50,000	-22,318	-14.39
111	Vienna	120,000	16,687	3.17	150,000	-6,283	-2.26	50,000	-19,198	-12.52
112	Rome	120,000	29,695	6.42	150,000	8,851	0.77	50,000	-3,895	-3.34
113	Athens	120,000	34,259	7.56	150,000	12,292	1.46	50,000	-564	-1.34
114	Tel Aviv	120,000	37,049	8.26	150,000	13,404	1.68	50,000	3,455	1.07
115	Cairo	120,000	41,237	9.31	150,000	15,419	2.08	50,000	5,612	2.37

**“We tried a little bit” is just an alibi for losers**

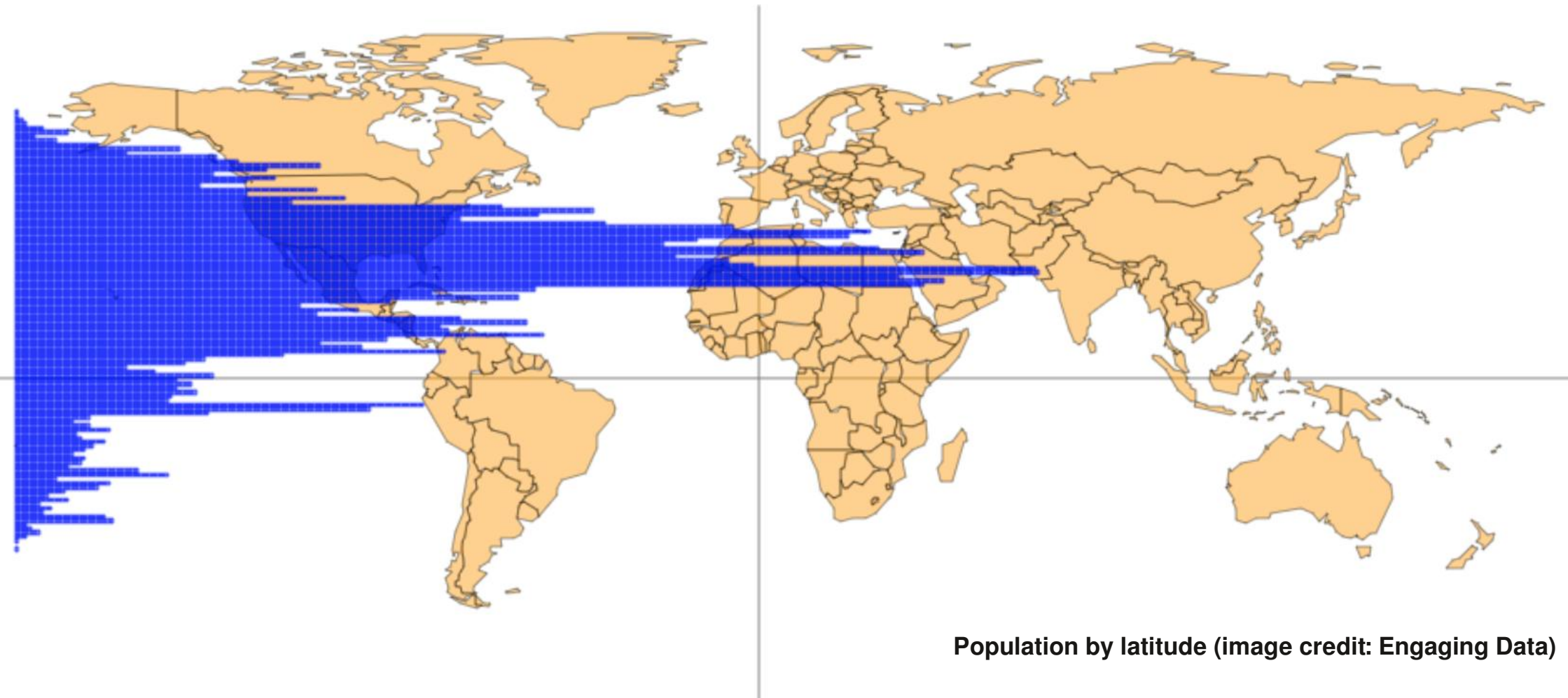
**Current world production of electricity**

**100% renewable energy simple**

**CO2 DAC for various applications**

**Suitable  
for the  
require-  
ments of  
planetary  
renovation**

**Suitable for over 90% of human settlements  
without additional qualifications,  
whether in Brandenburg or Kuwait**



# Off-grid properties

	January	Feb.	March	April	May	June	July	August	Sept.	October	Nov.	Dec.
119 Off-Grid limitations												
120 Oslo	-989	-443	869	2,012	2,956	3,376	2,969	2,196	1,222	73	-697	-1,036
121 Berlin	-575	66	1,281	2,478	3,108	3,327	3,184	2,657	1,747	716	-254	-676
122 Vienna	-341	326	1,701	2,873	3,410	3,508	3,593	3,017	2,051	998	-23	-435
123 Rome	586	1,130	2,317	3,204	4,003	4,171	4,533	3,959	2,714	1,790	801	488
124 Athens	933	1,313	2,738	3,692	4,390	4,619	4,941	4,480	3,223	2,087	1,147	697
125 Tel Aviv	1,491	1,800	3,073	3,657	4,369	4,624	4,684	4,254	3,412	2,606	1,726	1,353
126 Cairo	2,099	2,313	3,557	4,024	4,578	4,723	4,799	4,410	3,679	2,995	2,154	1,906

**No restrictions**

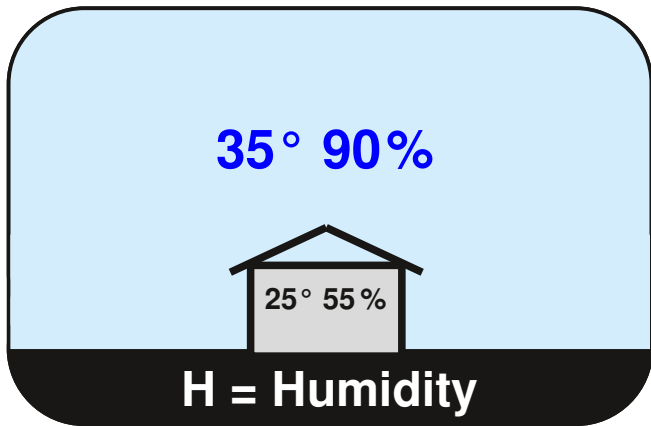
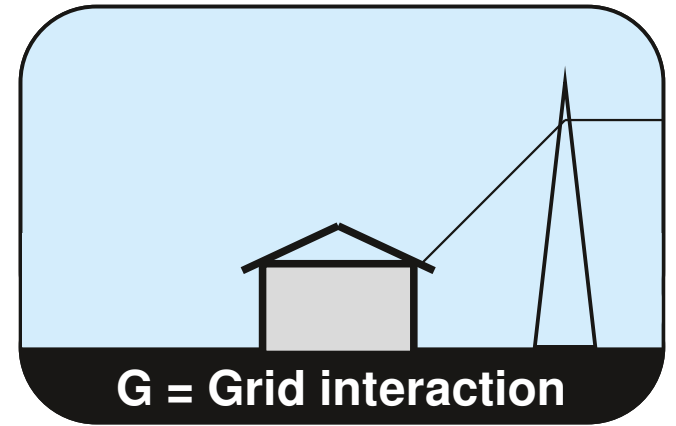
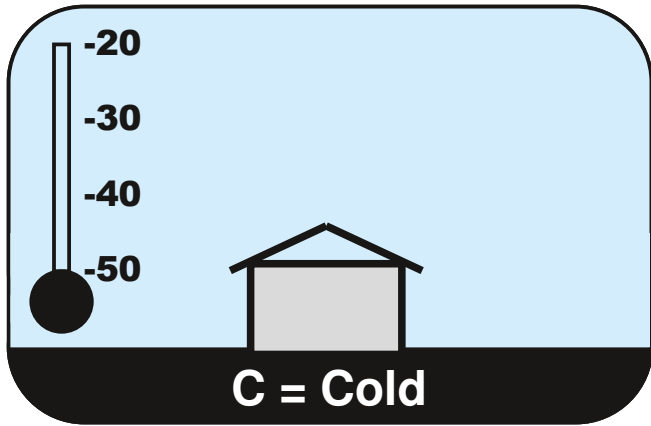
**Charging of electric cars limited to impossible**

**Moderate restrictions on household electricity, hot water and room heating**

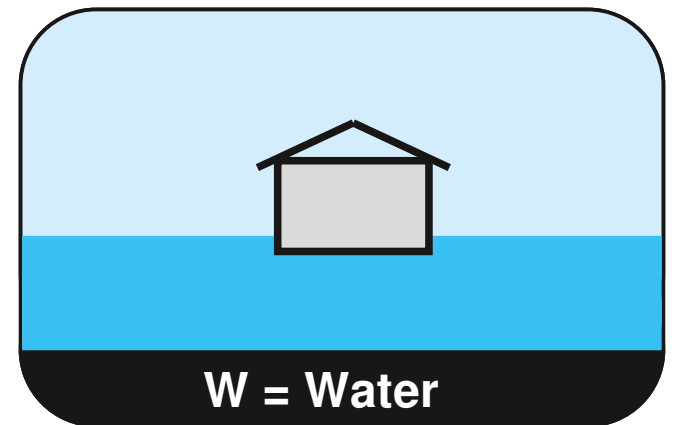
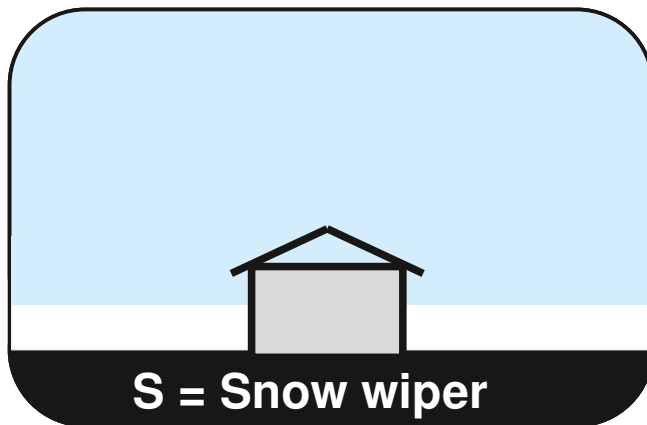
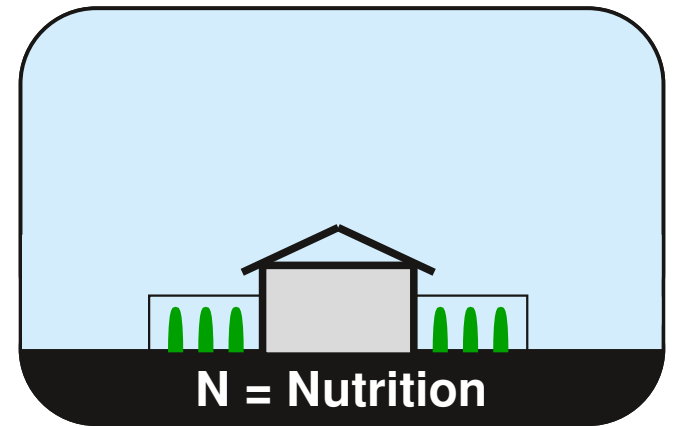
**Severe restrictions on household electricity, hot water and room heating**

**Notebook and smartphone charging possible, water pipes do not freeze**



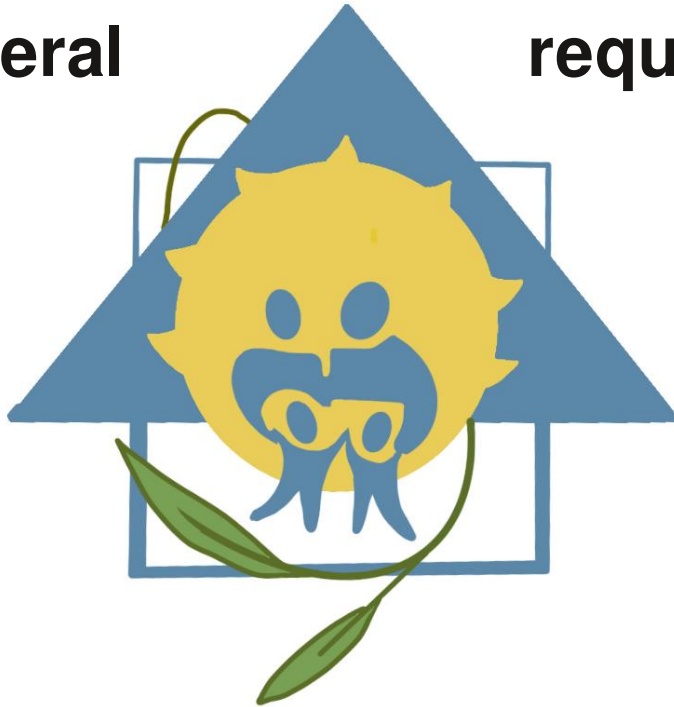


## Additional Qualifications



**General**

**requirements**



**Climate Protection Superiority House**