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Raums: Hier investiert Europa in
die ländlichen Gebiete.



Zero Carbon Village

Energy Self-sufficiency, Modular Prefabrication
and Sustainable Building Materials

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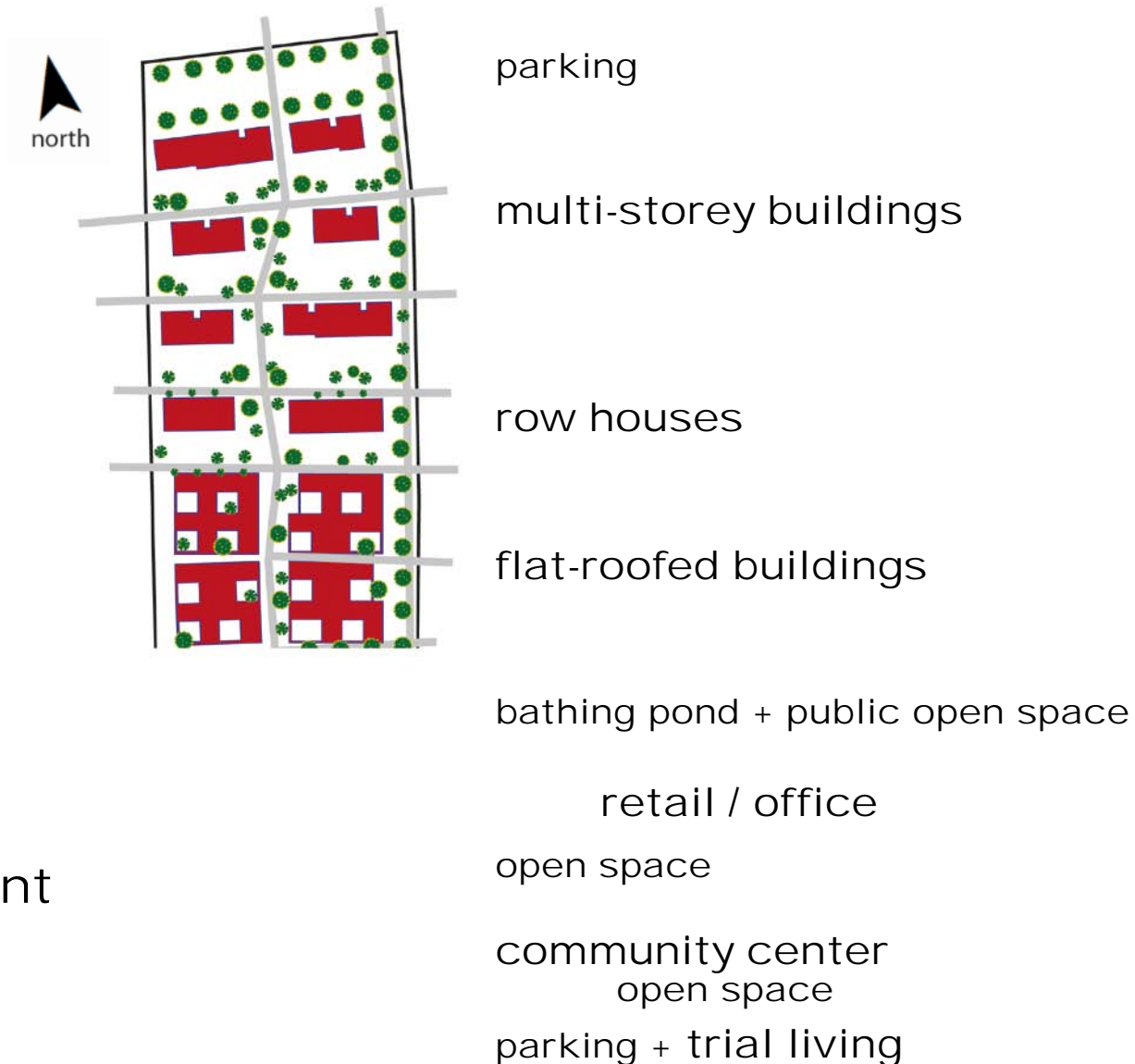
How to reach *Zero Carbon* in the building industry?

1. Sustainable Building Materials
2. Modular Prefabrication
3. Energy Self-sufficiency

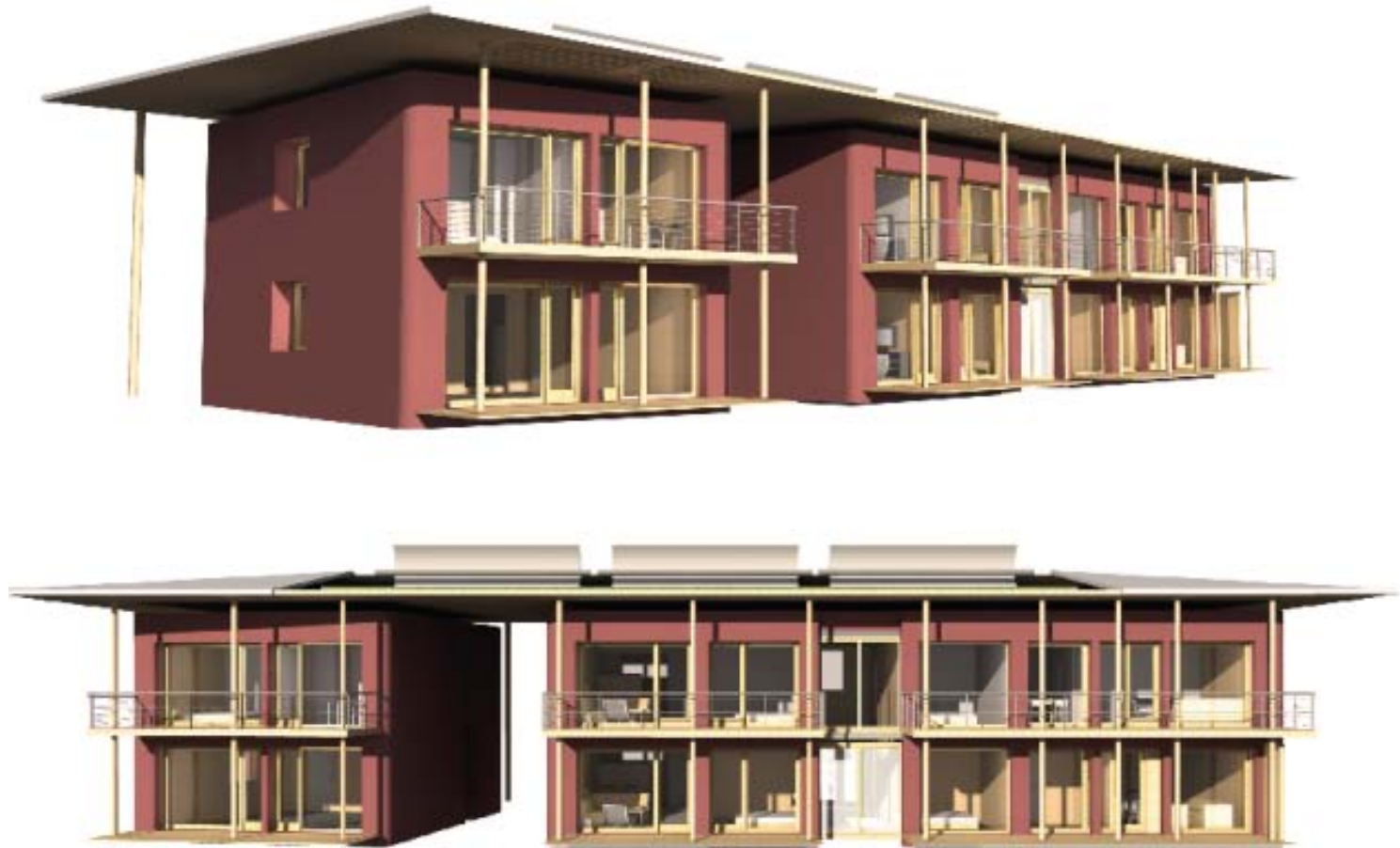
Project Overview

settlement with
high density



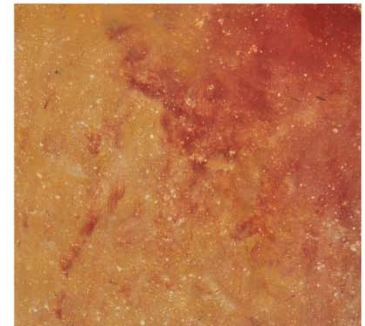
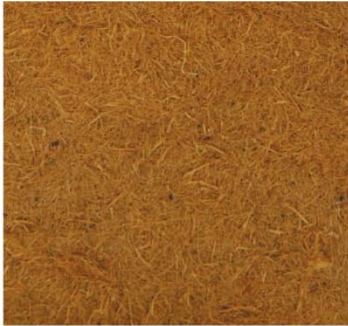


Development
plan



Design of multi-storey buildings: Arch. Scheicher

1. Sustainable Building Materials



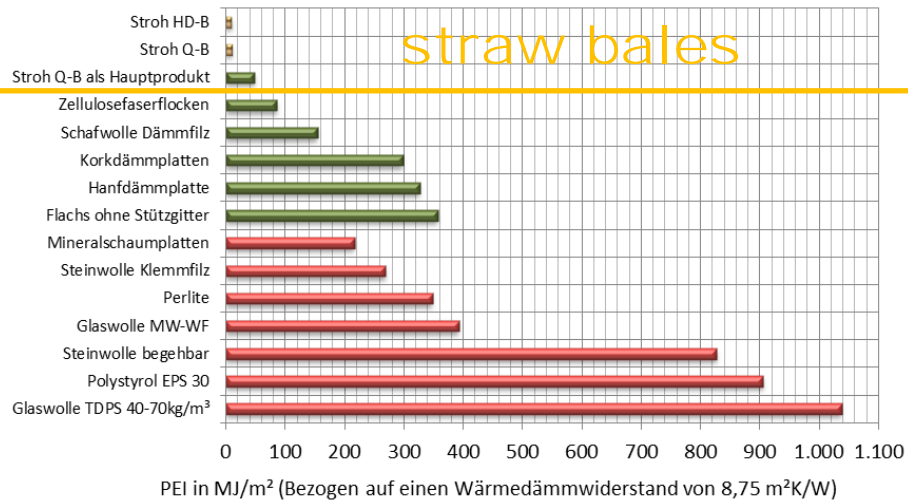
insulation Materials

walls

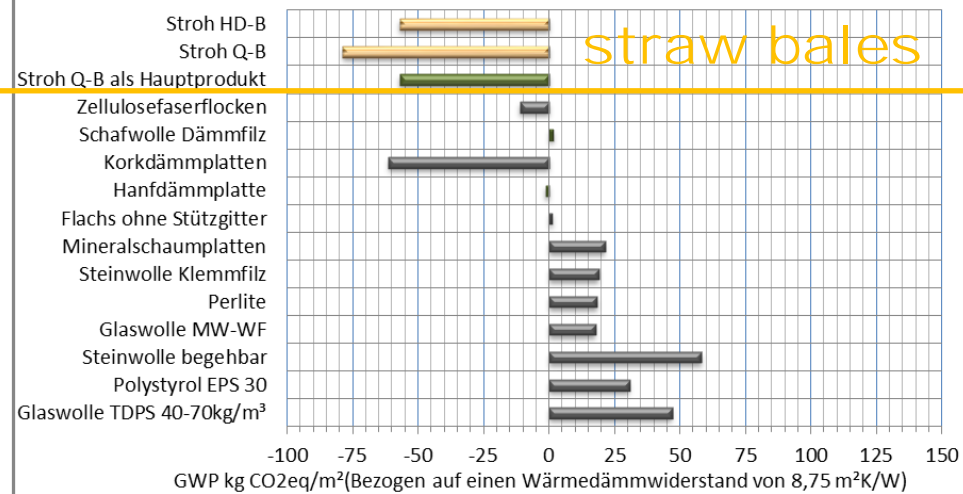
surface

Primary energy input + global warming potential

PEI - Primärenergieinhalte, nicht erneuerbar

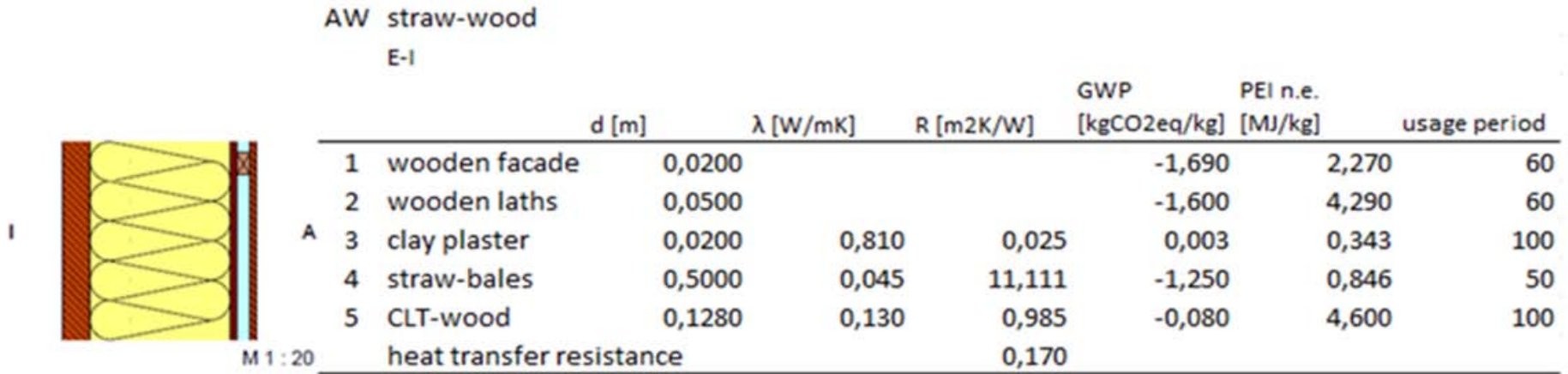


GWP - Treibhauspotential



PEI in MJ/m² + GWP in CO2eq/m²
related to thermal insulation resistance of 8,75 m²K/W

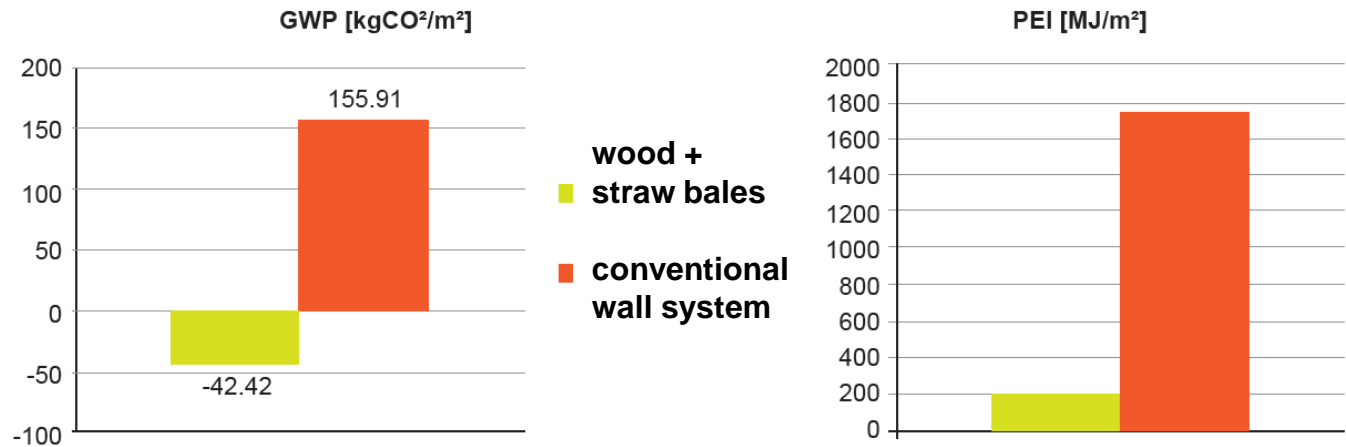
Wall construction, wood and straw	Useful life	Composting	Product recycling	Material recycling	Thermal utilization	Disposal	Additives	Regional
CLT wood	100	no	re-use	further use -> e.g. chipboards	yes - 18 MJ/kg	possible after thermal pre-treatment	very small proportion of binder materials (PUR adhesive)	yes
straw bales	50	yes (after opening)	re-use (if necessary cutting/tying -> insulation material)	further use (opening, if necessary baling) -> straw bales, fertilizer, bedding	yes - 17,5 MJ/kg	possible after thermal pre-treatment	thread (hemp, sisal, PP)	yes
clay plaster	100	yes (if only natural additives)	re-use (moistening with water, cleaning -> clay plaster)	further use (moistening with water) -> new clay products	not possible	disposal category 3 possible (but usually composting)	hemp, flax etc. possible	yes
wooden laths (timber, planed, tech. dried)	60	yes	re-use	further use -> e.g. chipboards	yes - 18 MJ/kg	possible after thermal pre-treatment	-	yes
wooden facade (timber, rough, air dry)	60	yes	re-use	further use -> e.g. chipboards	yes -18 MJ/kg	possible after thermal pre-treatment	-	yes

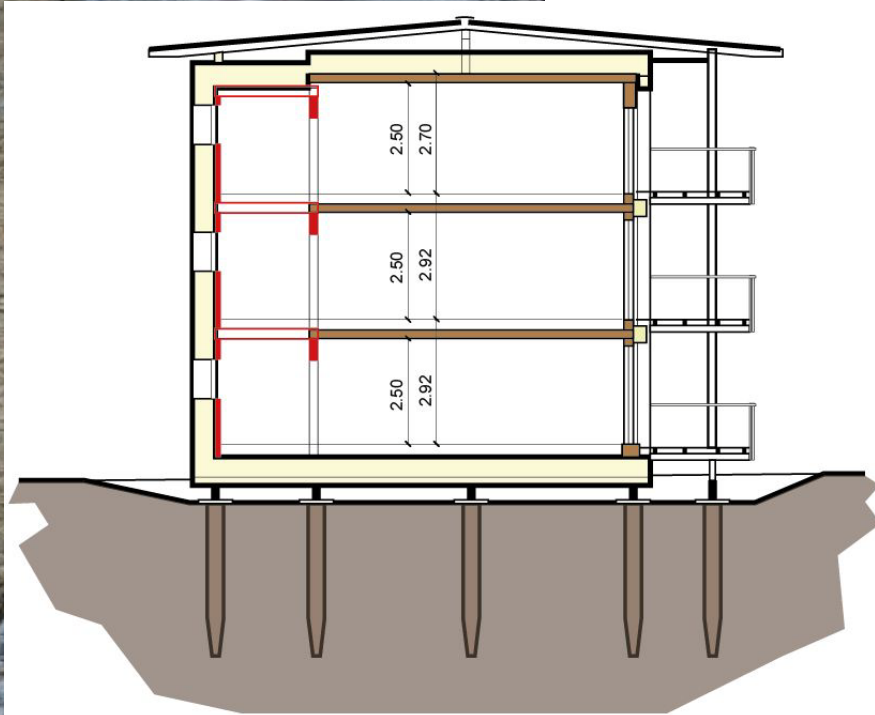


Wall construction

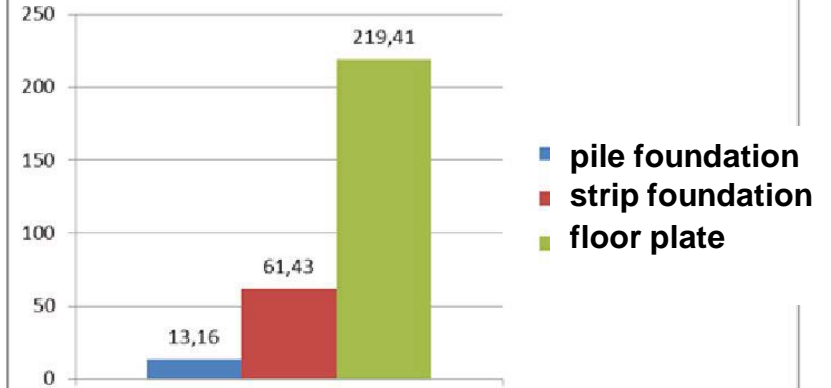
			GWP	PEI n.e.	
	0,7180	RT =	12,291	[kgCO ₂ eq/m ²]	[MJ/m ²]
	U =		0,081	-96,49	390,16
					74

Comparison to
conventional
wall system

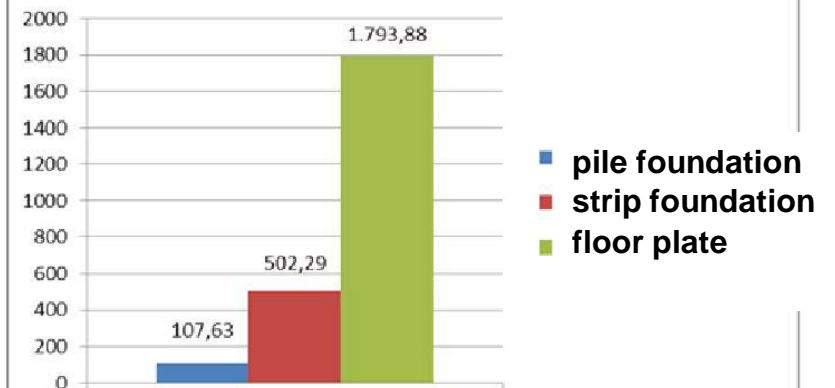




GWP – ferroconcrete foundations [kgCO₂/m²]



PEI – ferroconcrete foundations [MJ/m²]



Pile foundations

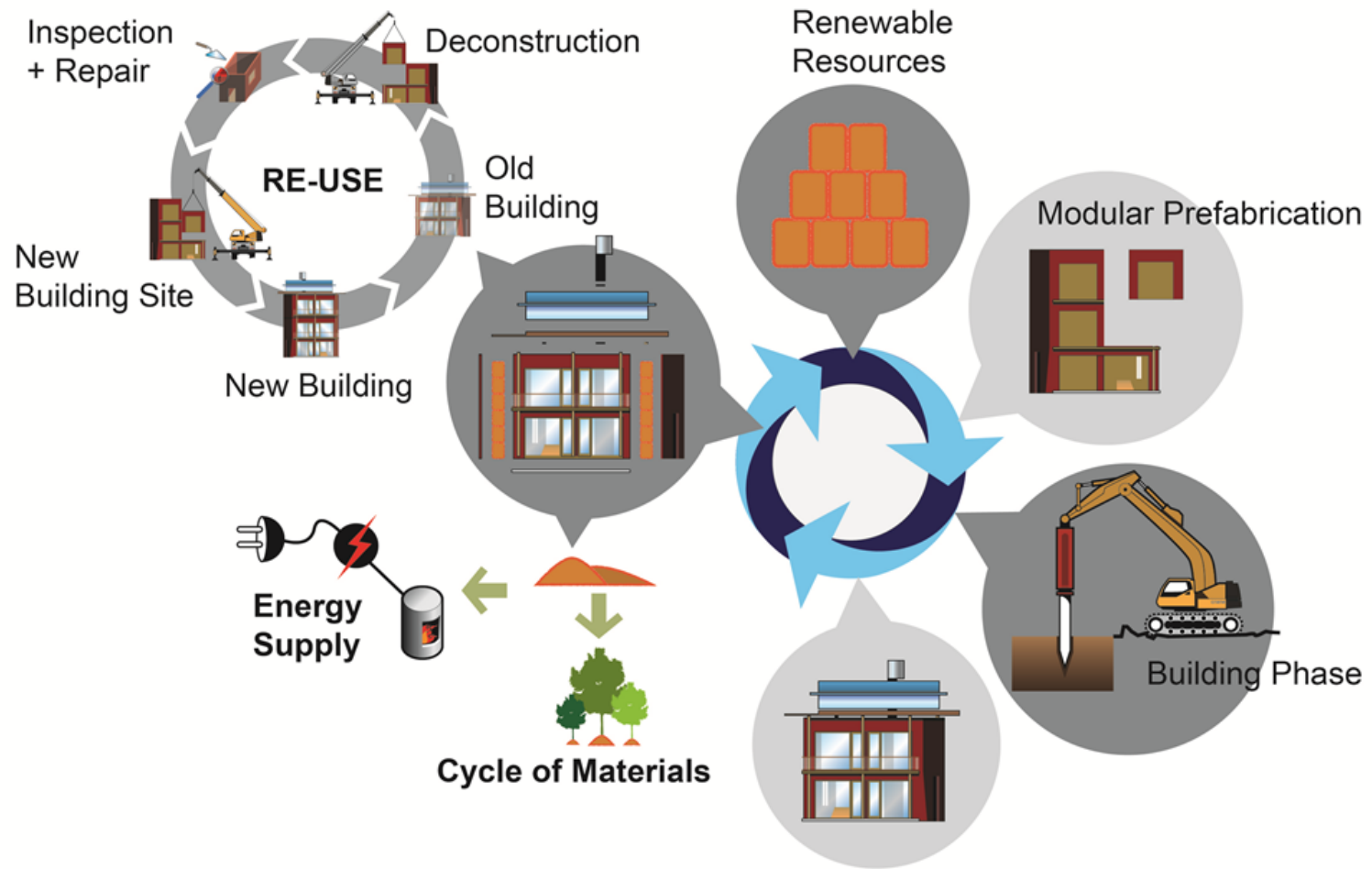
2. Modular Prefabrication

- collaboration of SME enterprises
- passive house standard
- simple deconstruction opportunities
- high / low grade of prefabrication



/





Life cycle of building materials and components

Prototype production
including insulation ex factory
produced by project partner *Ökohaush Systembau*



cutting of components: composite lumber and OSB



assembling components; de-airing pugmill

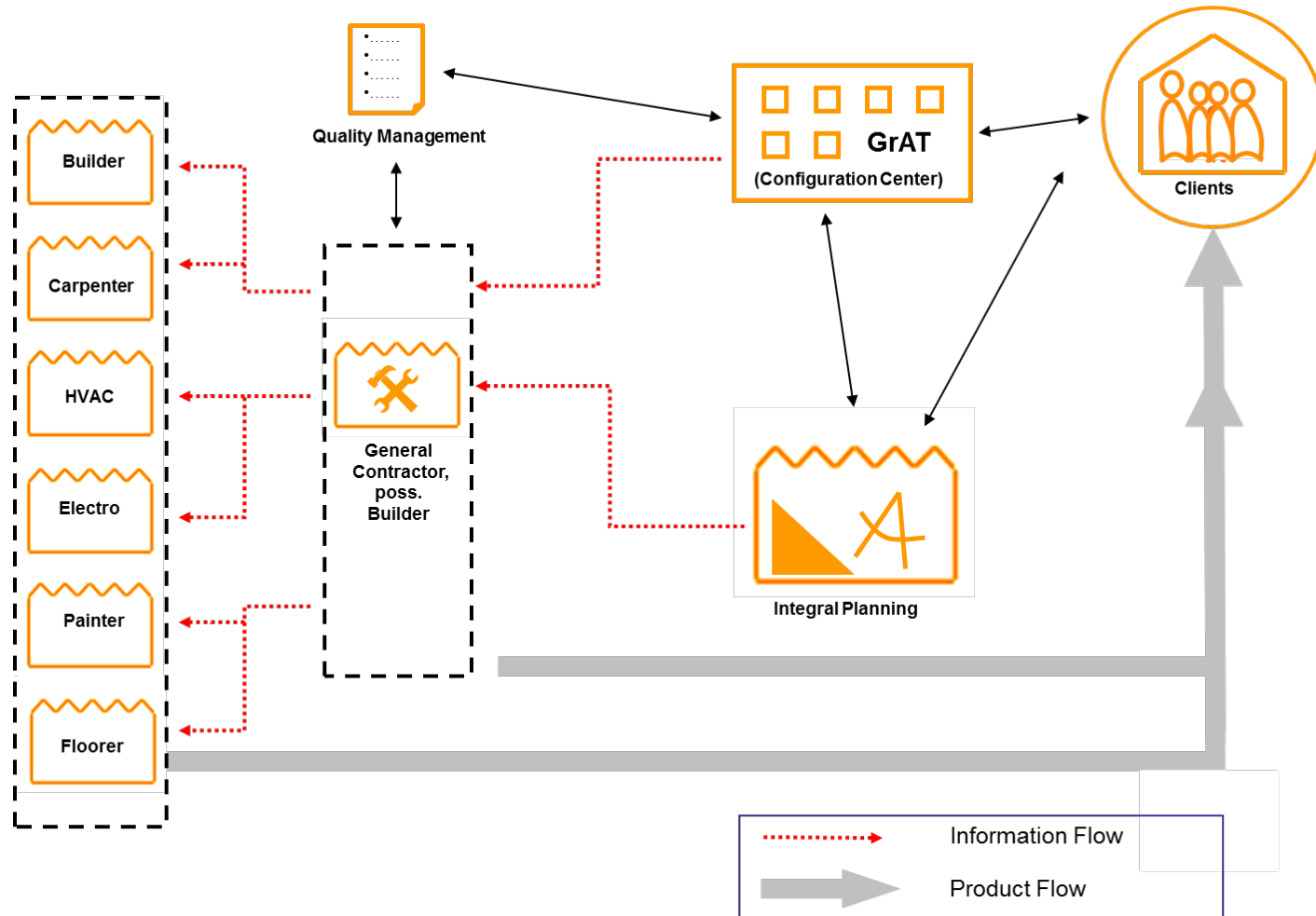


inserting straw bales

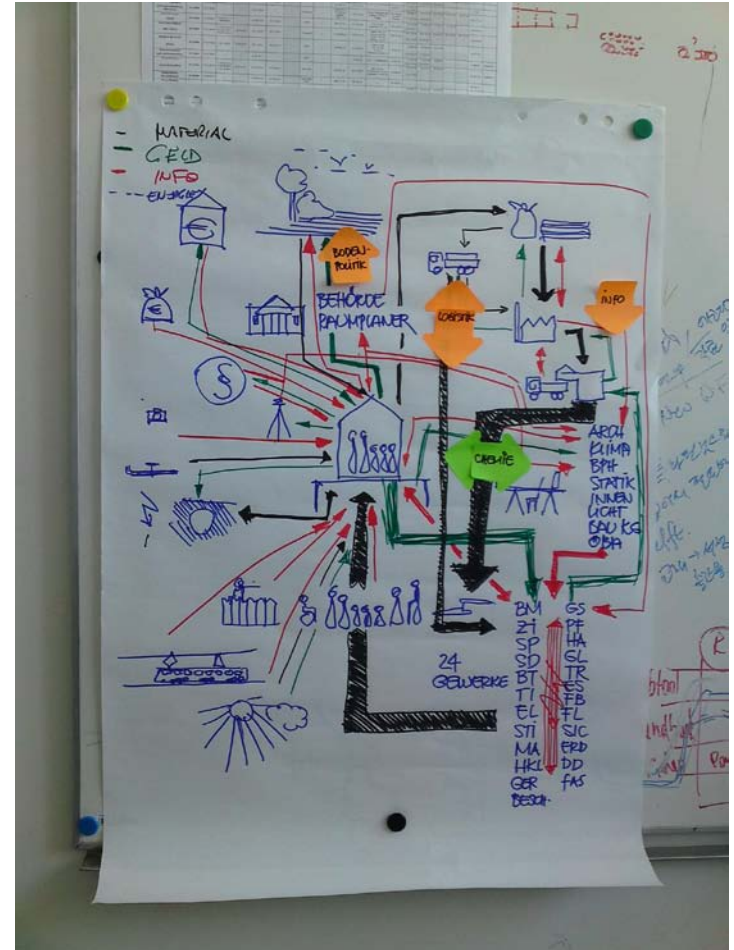


prototype element with cover panel, pressed in vacuo

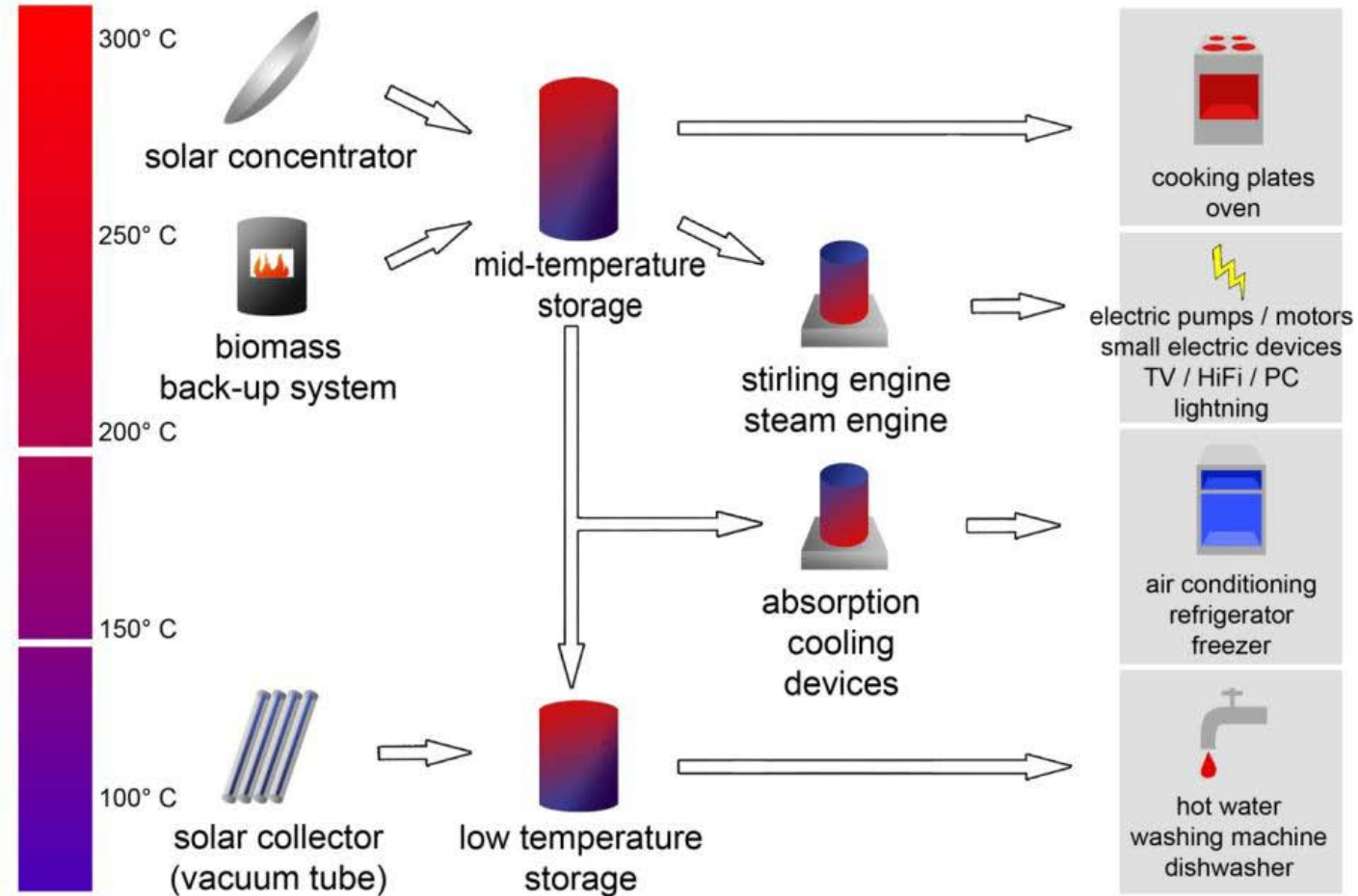
Collaboration of SME enterprises



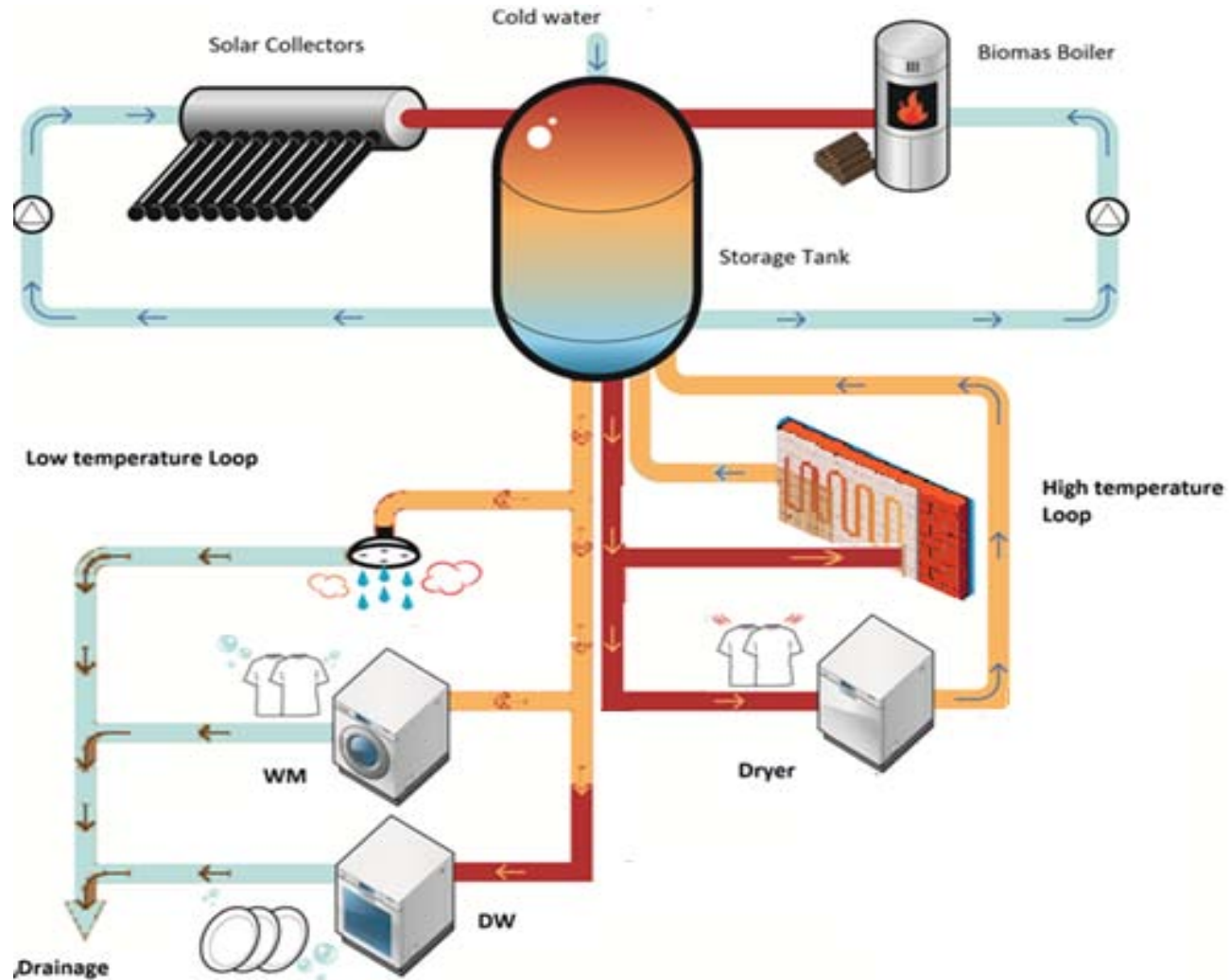
Workshops with local SMEs and project partners IG Passivhaus and ÖGUT



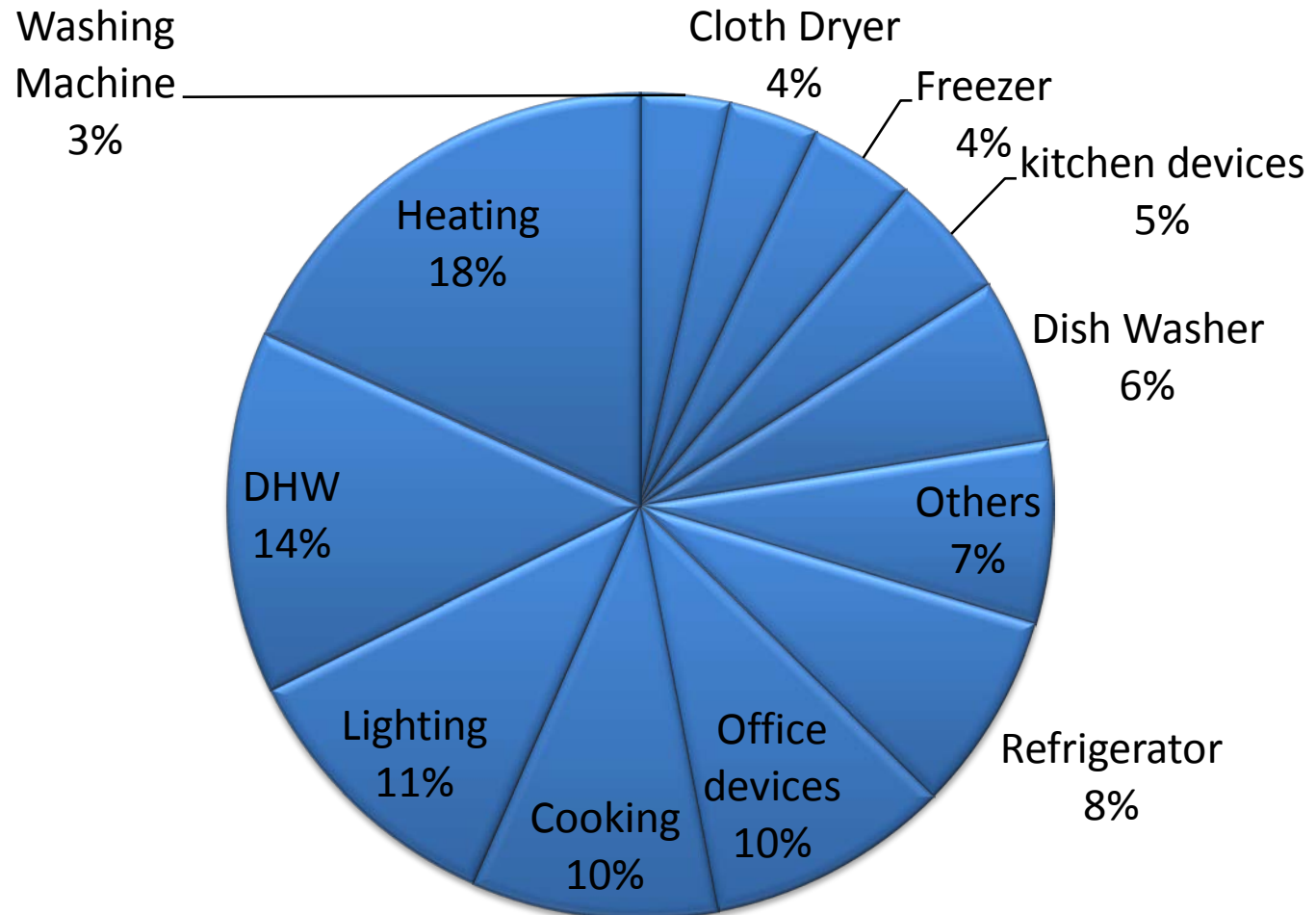
Energy concept of *Zero Carbon Village*



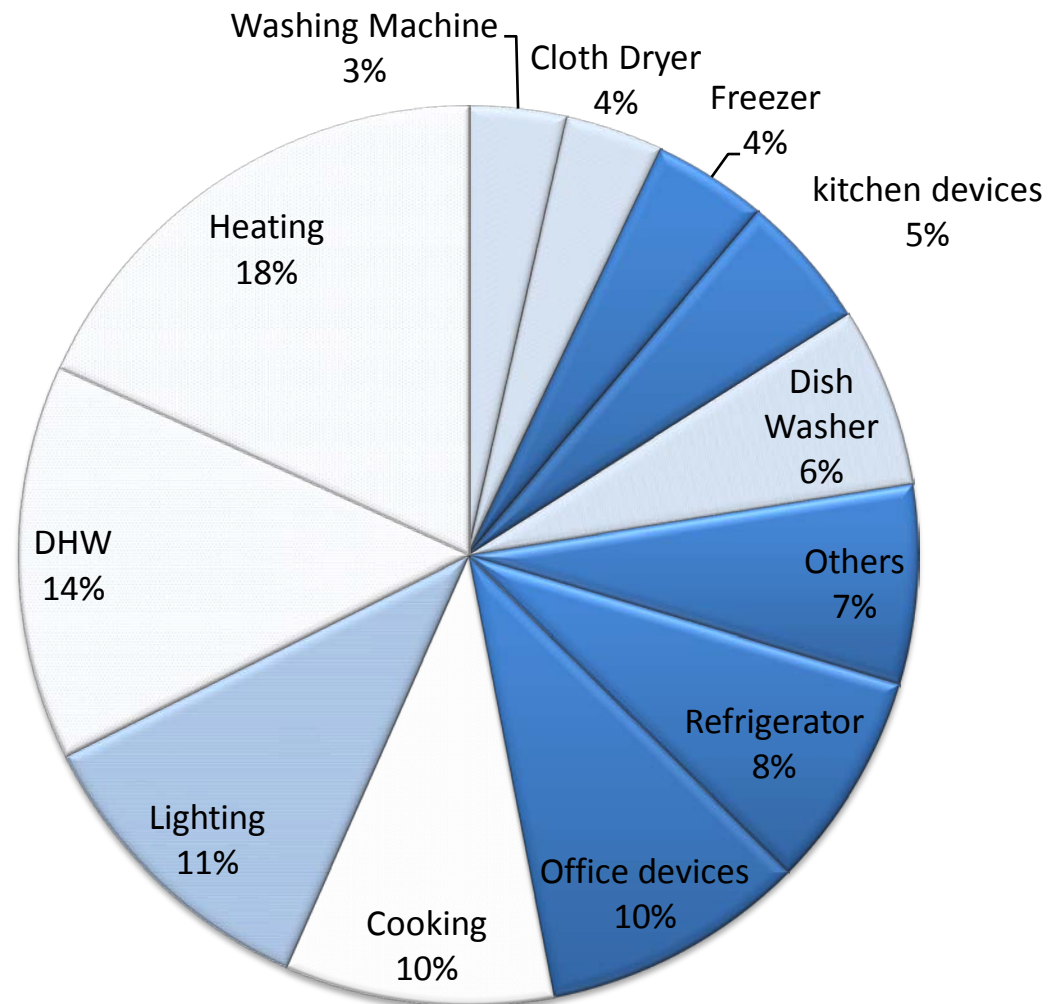
Thermal energy system layout



Electricity demand of Austrian households 2012 (cf. Statistik Austria)



Saving potential of electricity demand in ZCV



Energy consumption and saving potential in Austrian households through ZCV energy concept

Electrical Demand	Normal H.H.	ZCV	Reduced
	kWh/a	kWh/a	
DHW	576	49	91%
Room Heating	736	60	90%
Cooking	405	0	100%
Dish Washer	262	160	39%
Cloth Dryer	143	40	72%
Washing machine	142	64	55%
Lighting	446	223	50%
Other Groups	1475	1475	0%
Summation	4187 kWh	2071kWh	50%

Energy demand of the village:

Thermal: 198 MWh

Electrical: 166 (100) MWh

Solar Radiation in Lower Austria:

Global Radiation : 1559 kWh/m²

>> Supply with:

250 m² PV + 800 m² Thermal Solar collectors

Back-up: Biomass + Heat Pump

Preview:

- realisation of the settlement, step by step
 - further development of prefabricated modules, especially efficiency of production processes
 - further development of a transferable autonomous energy system that integrates zero emission appliances
- ready for the market in 2020



Further information: http://www.grat.at/projekte_e.htm



Zero Carbon Village

Development and demonstration of a totally CO₂ neutral and energy self sufficient residential area, produced in prefabricated straw bale constructions. The focus of the research is put on industrialized modular mass production of "Zero Carbon Houses", energy self sufficiency and the use of energy efficient and sustainable materials like straw.

[>> more](#)



Leader Study Lewari

This pre-study analyses the potentials and feasibility of implementing the energy-autonomous settlement "Zero Carbon Village" at a specific site ("Lewari") in the region of Traismauer, Lower Austria. The carbon neutral settlement is planned to be built with materials from renewable resources and to be supplied with renewable energy sources.

The study is available in German as PDF through the following link:

[>> Download study Lewari](#)