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gecommitteerde: Ro Koster/Ad Kil
begeleiding MA+U: Jan Willem van Kuilenburg/Pieter Veenstra

SCALING DOWN THE VALLEY

The way we live is not efficient. We waste, we barely recycle and the facilities we use are wasteful. The reason is the large scale in which we facilitate ourselves. This also happens in and around Arnhem and Nijmegen.

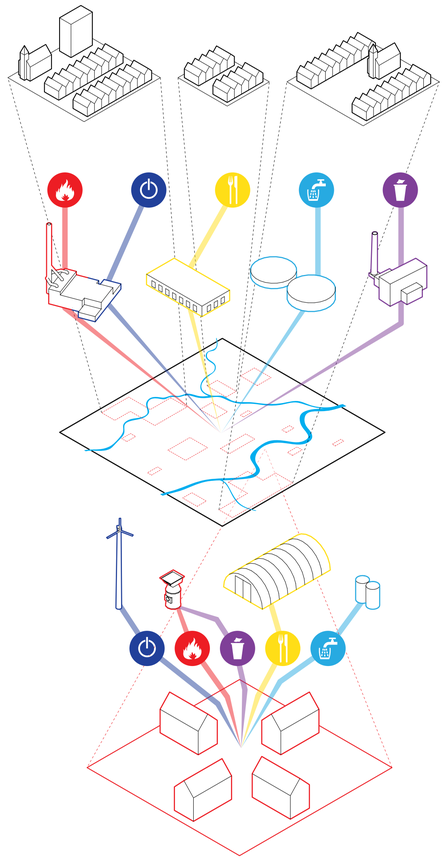
The way of living in the sphere between the rivers Waal and Rhine has to alter drastically. Only 1% of the water that flows through the rivers, is used by the area. Sever climate change in the next decades will result in the increase of the water-pressure. Waste is processed near the major cities in the area, most of the energy is supplied by a power plant or even imported from neighboring countries, and food arrives from farms and greenhouses all over the area.

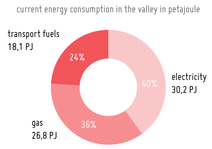
People are becoming more conscious about the way they produce their food or energy. They understand that energy is everywhere around us, and that they can no longer rely on fossil fuels.

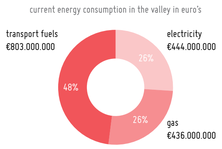
Self-sufficiency is the answer. People can provide for themselves in their basic needs on a much smaller scale. The valley has to be cut up into self-sufficient parts. We have to start thinking of what the user, the habitant of the valley, needs. The valley will practice a new kind of urbanism, that's built on the existing context, and will consist out of self-sufficient clusters. Social networks will connect the clusters together, so the valley becomes a grid of clusters.

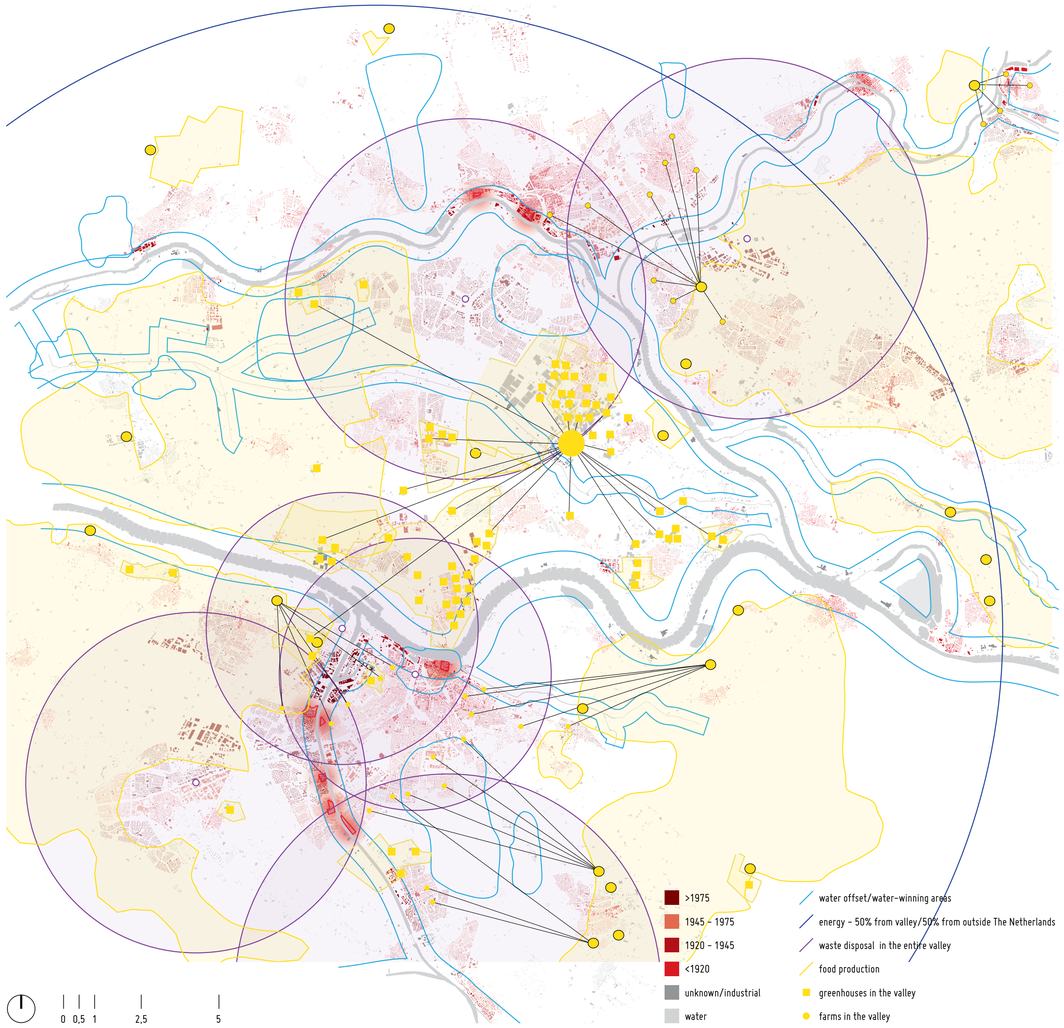
The self-sufficient clusters of the valley have to be in balance; it has to provide in all of it's own basic needs, therefore it cannot afford to spill. The valley is an ideal location for self-sufficient clusters, as it offers a divers landscape. It will be setting the example of how we should design with the large amount of water, the changing climate and new social structures.

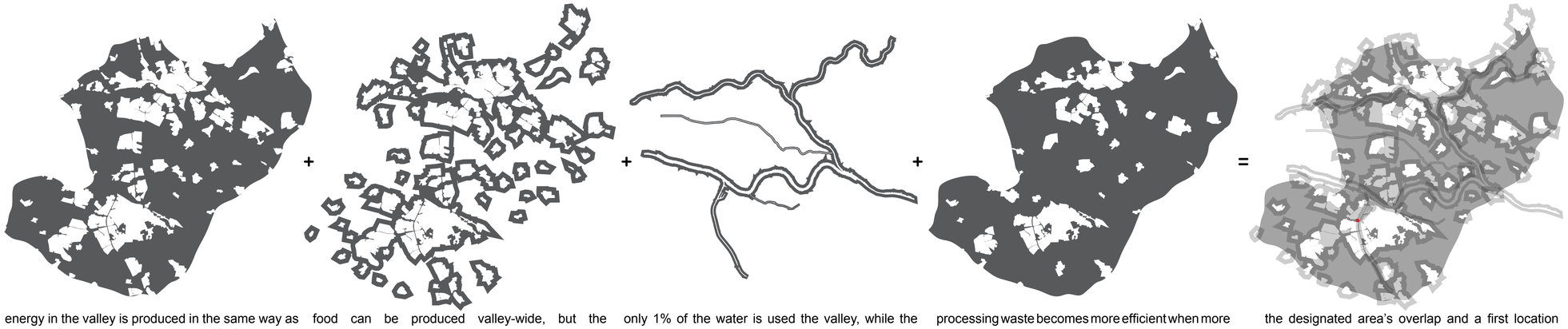
The clusters consists of up to 150 households. With these magnitudes, the clusters will form a balanced and efficient system, where each clusters grows it's own food, generates it's own energy, and clears it's own drinking water. Clusters can form within the existing cities or in the rural landscape. It can start with just one cluster, that has the existing structures of the city and the rural landscape as a foundation. Once the first clusters is built, other parts of the valley will follow until the valley turns to a collection of habitats.











energy in the valley is produced in the same way as the rest of the Netherlands, nearly 50% of the energy is produced in a power plant within the valley, the other 50% is produced outside the valley and can even come from outside the Netherlands
when we picture a world where we supply our own energy, and are no longer depend on a power plant 50 kilometers from where we live, we can do this as broad as the valley itself
technologic developments to supply in your own energy ensure that we are nog longer bound by place, but by sufficient space to supply in our own energy
other cycles in our lives can be tuned to the process of energy, like processing waste or food production

food can be produced valley-wide, but the transportation costs are very large; it costs a lot of energy and therefor money, and can be more efficient

when the food production is scaled down and the habitants of the valley become responsible for producing their own food, the borders of the existing context are fit for this, the transportation costs will shrink

only 1% of the water is used the valley, while the valley is characterized by the water and can use it's water for drinking water or grey water

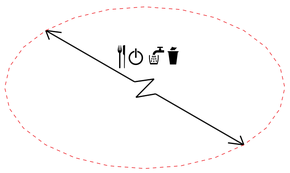
the current sewage systems in the Netherlands is out-dated and very inefficient, downscaling of the sewage system is the answer

processing waste becomes more efficient when more people live in a smaller area, costs in transportation will become less

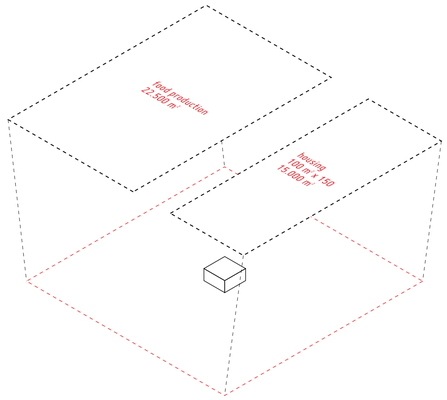
processing waste in the valley can be scaled down for the are's that are less populated, so it will become more efficient to process your own waste

the designated area's overlap and a first location can be chosen

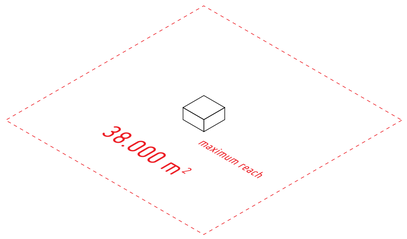
jvdv



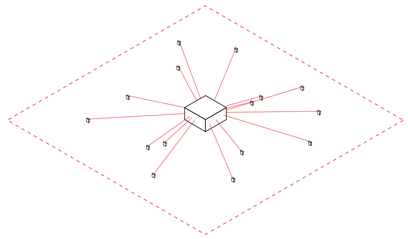
a community with adaptable scales in facilities



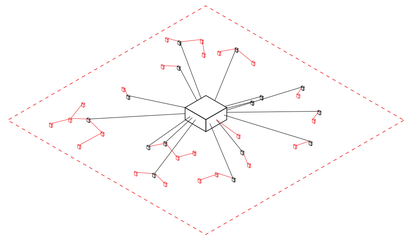
program in the community
placing a center in the community as start up for the dwellings



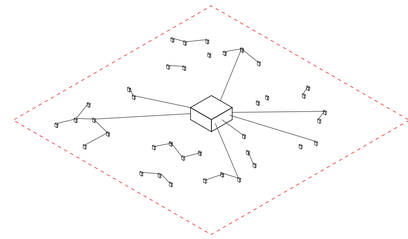
area of the community
the maximum reach depends on the location



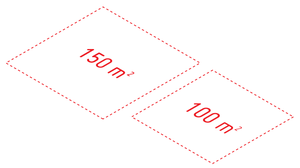
the machine and it's seeds; the dwellings



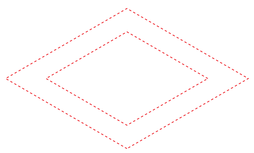
the dwelling interconnect



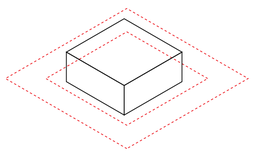
the dwellings transform and become more self-sufficient



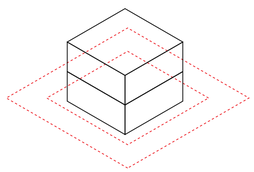
150 m² food production per 100 m² housing



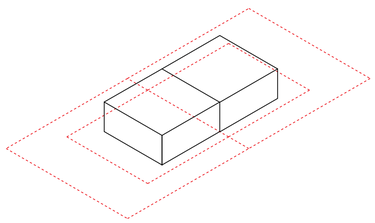
family's get an area



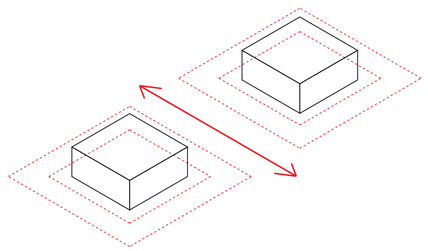
they built their own dwelling



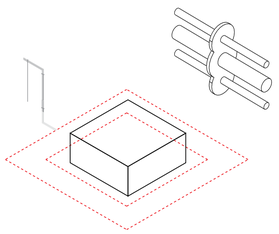
the dwelling becomes more self-sufficient



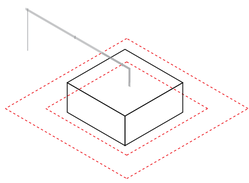
the units can be placed together



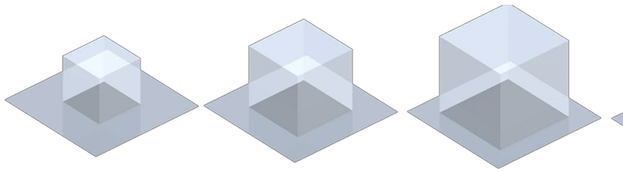
during the organic growth of the community, roads will form between the dwellings



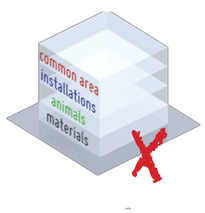
the dwelling connects with the machine



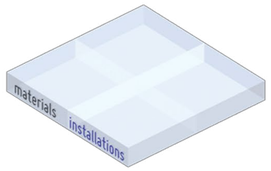
the dwelling connects with the machine



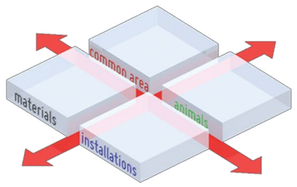
the machine needs to grow, as the community grows



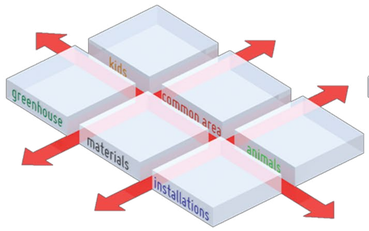
stacking the program isn't adustable to the growing of the community



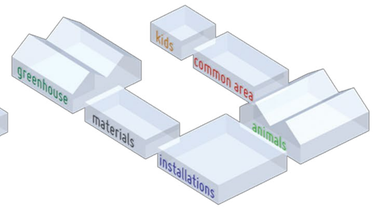
placing the program next to each other, allows the machine to grow



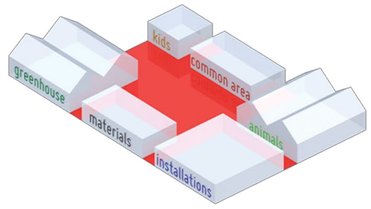
creating space between the programs, where new functions can arise



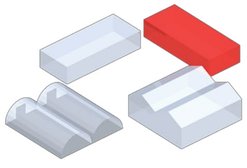
the lay out of the machine can adopt new functions, and can grow along with the community



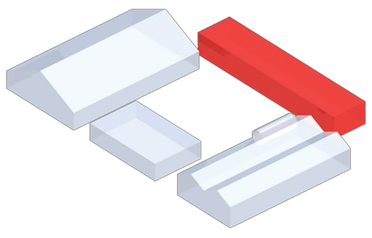
functions can shape into their most efficient form



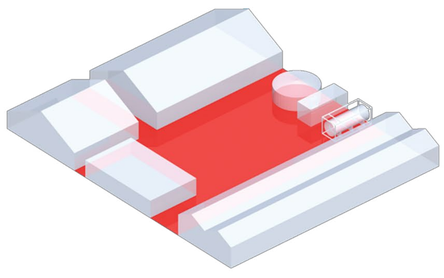
functions can shape into their most efficient form



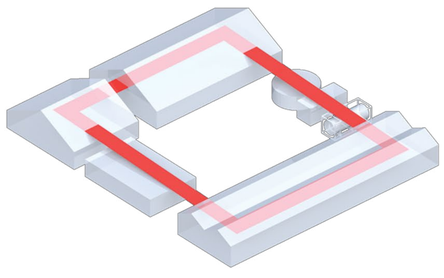
phase 01: the basics to start up, the people in the commnuity can affort minor installations and create space with recycled materials



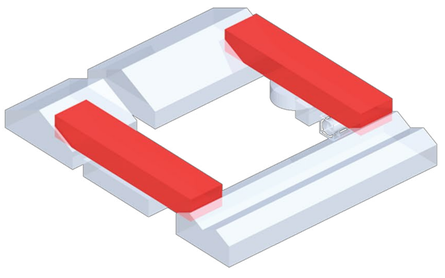
phase 02: the community grows, and so does the main buidling



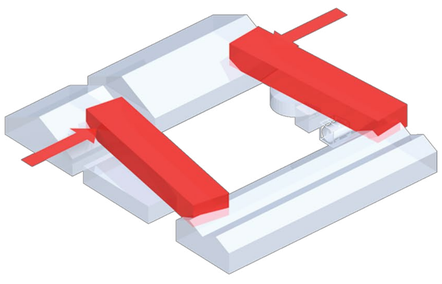
pahse 3: the area between in installations is a market place in the middle of the community



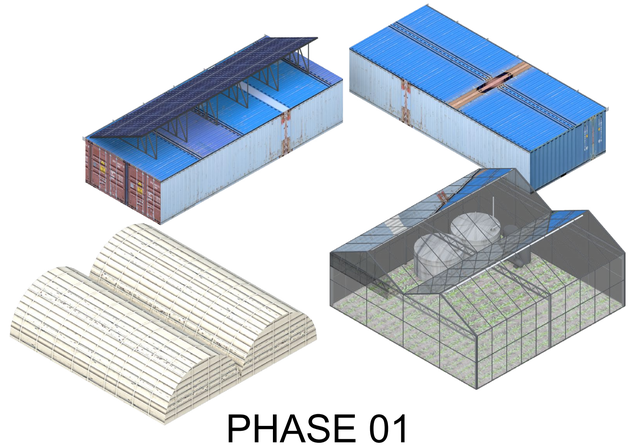
the different functions - all needed - need to find a connection with each other, bessides the market place



the common area becomes the main route trough the different functions



the common area's can be placed to create more space and allow the users to get trough the entire building



PHASE 01

20 family's
5 one person family's
2 senior one person family's
4 two person family's
2 senior two person family's
2 family's with one child
4 familiy's with two children

42 people
10 children
26 mature people
6 senior people

homes
3.000 squared meter used for housing
with the heart of the community in the center
common area's as greenhouse, kitchen and a
playroom voor children

10 cows
52 square meter stable
523 square meter meadow
1.045 kilograms meat per year
76.285 liter milk per year
314 cubic meter manure per year

21 pigs
21 square meter stable
146 square meter meadow
1.254 kilograms meat per year
105 cubic meter manure per year

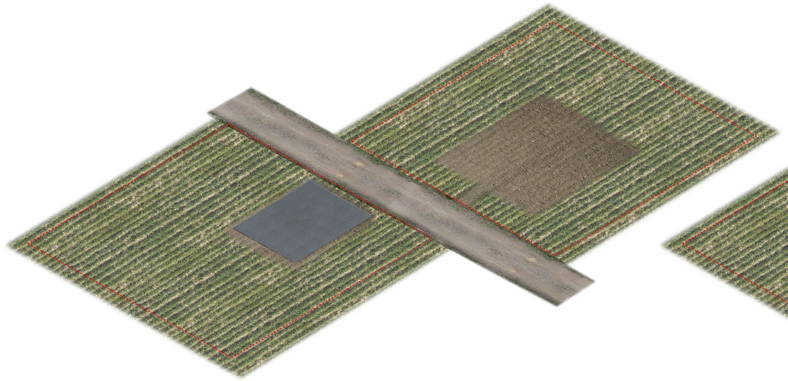
125 chickens
13 square meter stable
13 square meter meadow
34.485 eggs per year
502 kilograms meat per year

gas
6.740 cubic meter gas usage
1 gastank containing 1.600 liter
filled by a third party

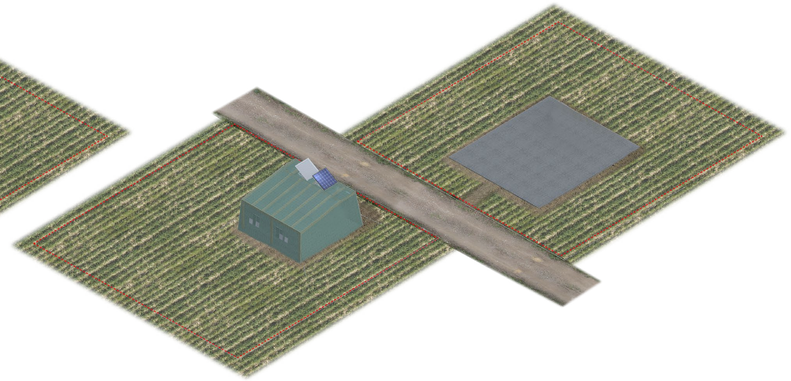
electricity
6 family's depand on common electricity
18.000 kilowatthour electricity
150 squared meter of solar panels

water
152.570 liter water needed
30.514 liter drinking water needed
pre-filtered by the pond as wetland
heated by a heat pump and solar collectors
warm water stored in a buffer vessel

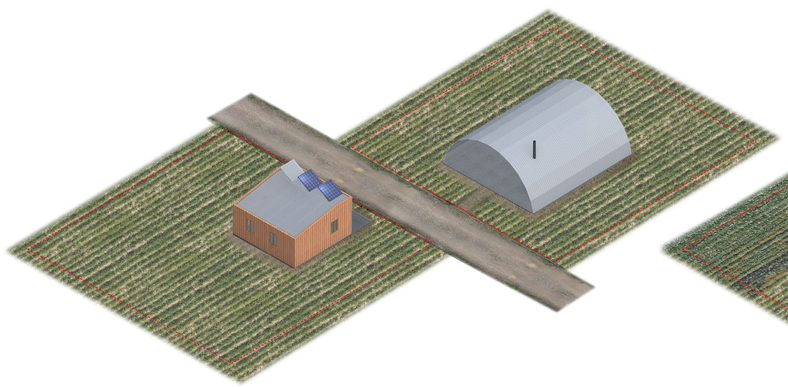
vegetables and fruit
4.180 kilograms of vegetables and fruit
3.135 square meter of vegetables and fruit



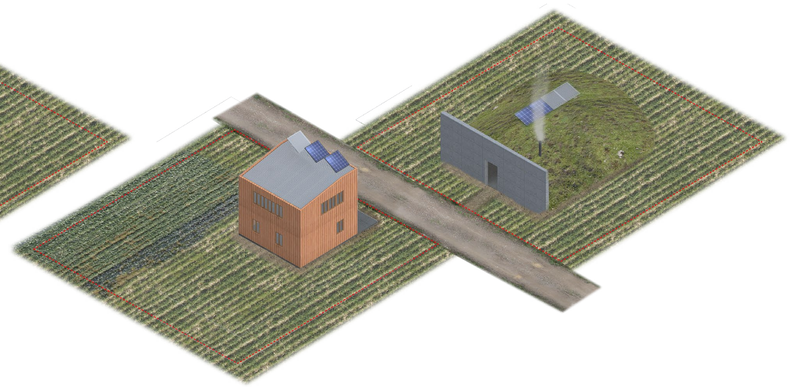
the dwelling is situated between the food production



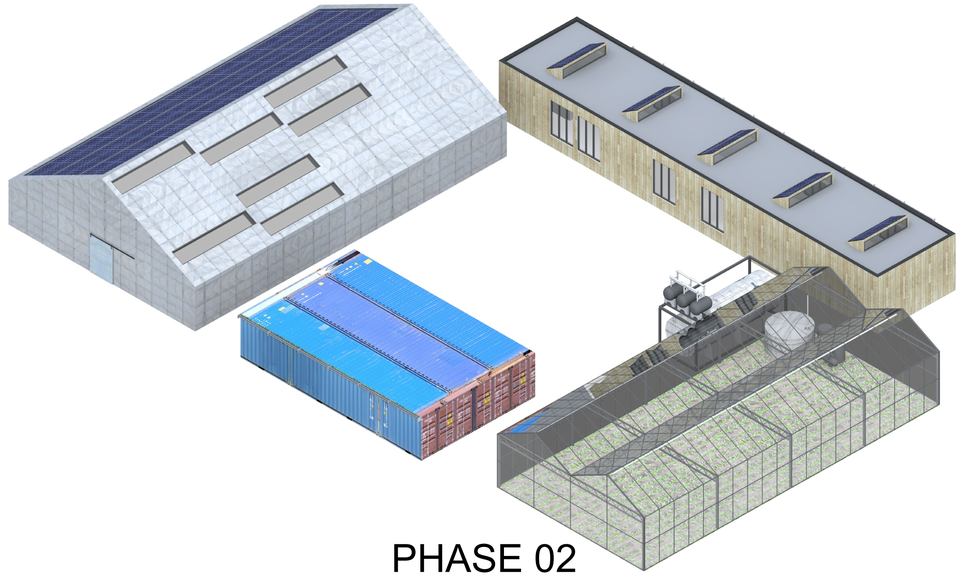
the dwelling connect with the macihne, while they develop their homes



while the dwelling use recycled materiales, they become more self-sufficient



the dwellings keep on developing



PHASE 02

50 family's
13 one person family's
6 senior one person family's
11 two person family's
5 senior two person family's
6 family's with one child
9 familiy's with two children

105 people
24 children
65 mature people
16 senior people

homes
7.500 squared meter used for housing
with the heart of the community in the center
common area's as greenhouse, kitchen and a
playroom voor children

26 cows
131 square meter stable
1.306 square meter meadow
2.613 kilograms meat per year
190.713 liter milk per year
784 cubic meter manure per year

52 pigs
131 square meter stable
1.306 square meter meadow
2.613 kilograms meat per year
261 cubic meter manure per year

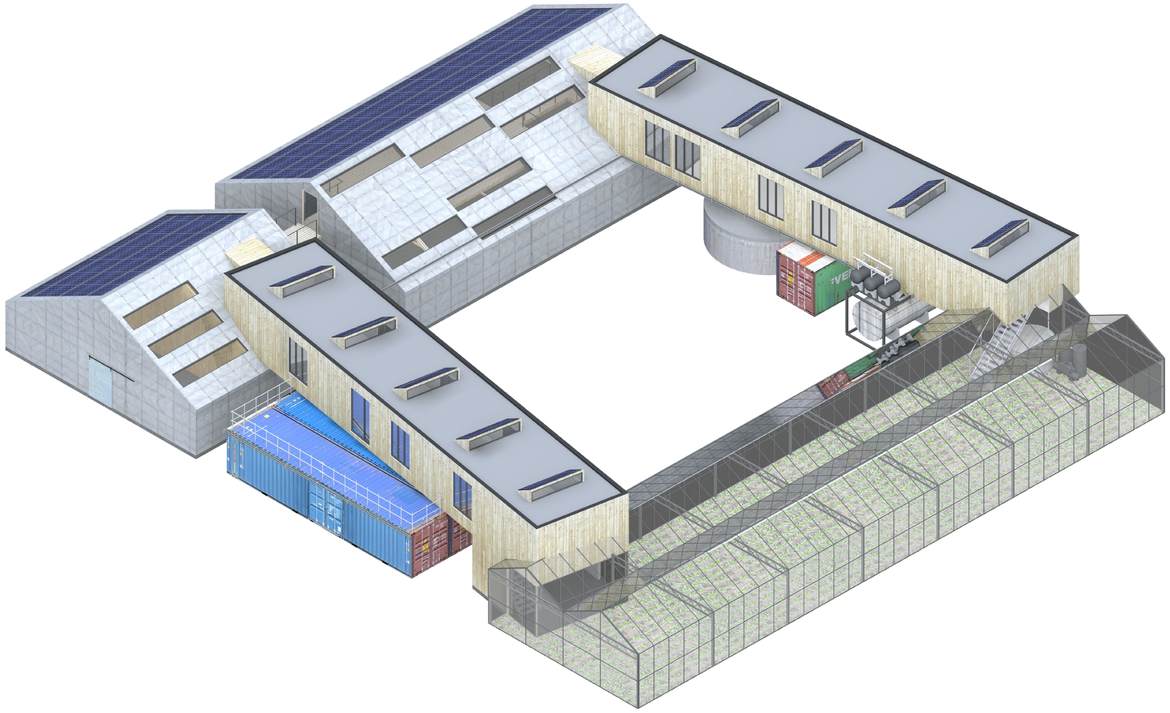
314 chickens
31 square meter stable
31 square meter meadow
86.213 eggs per year
1.254 kilograms meat per year

gas
16.850 cubic meter gas usage
2 gastanks containing 1.600 liter
filled by a third party

electricity
15 family's depand on common electricity
45.000 kilowatthour electricity
300 squared meter of solar panels

water
381.425 liter water needed
76.285 liter drinking water needed
pre-filtered by the pond as wetland
heated by a heat pump and solar collectors
warm water stored in a buffer vessel

vegetables and fruit
10.450 kilograms of vegetables and fruit
7.838 square meter of vegetables and fruit



PHASE 03

100 family's
25 one person family's
12 senior one person family's
22 two person family's
10 senior two person family's
12 family's with one child
18 familiy's with two children

52 cows
261 square meter stable
2.613 square meter meadow
5.255 kilograms meat per year
1.525.700 liter milk per year
1.568 cubic meter manure per year

gas
33.700 cubic meter gas usage
micro-digester with wkk
turns the manure from the animals into
38.000 cubic meter gas
64.000 kilowatthour electricity

water
762.850 liter water needed
152.570 liter drinking water needed
pre-filtered by the pond as wetland
heated by a heat pump and solar collectors
warm water stored in a buffer vessel

209 people
48 children
129 mature people
32 senior people

105 pigs
105 square meter stable
732 square meter meadow
6.270 kilograms meat per year
523 cubic meter manure per year

electricity
30 family's depand on common electricity
90.000 kilowatthour electricity
300 squared meter of solar panels (gas)

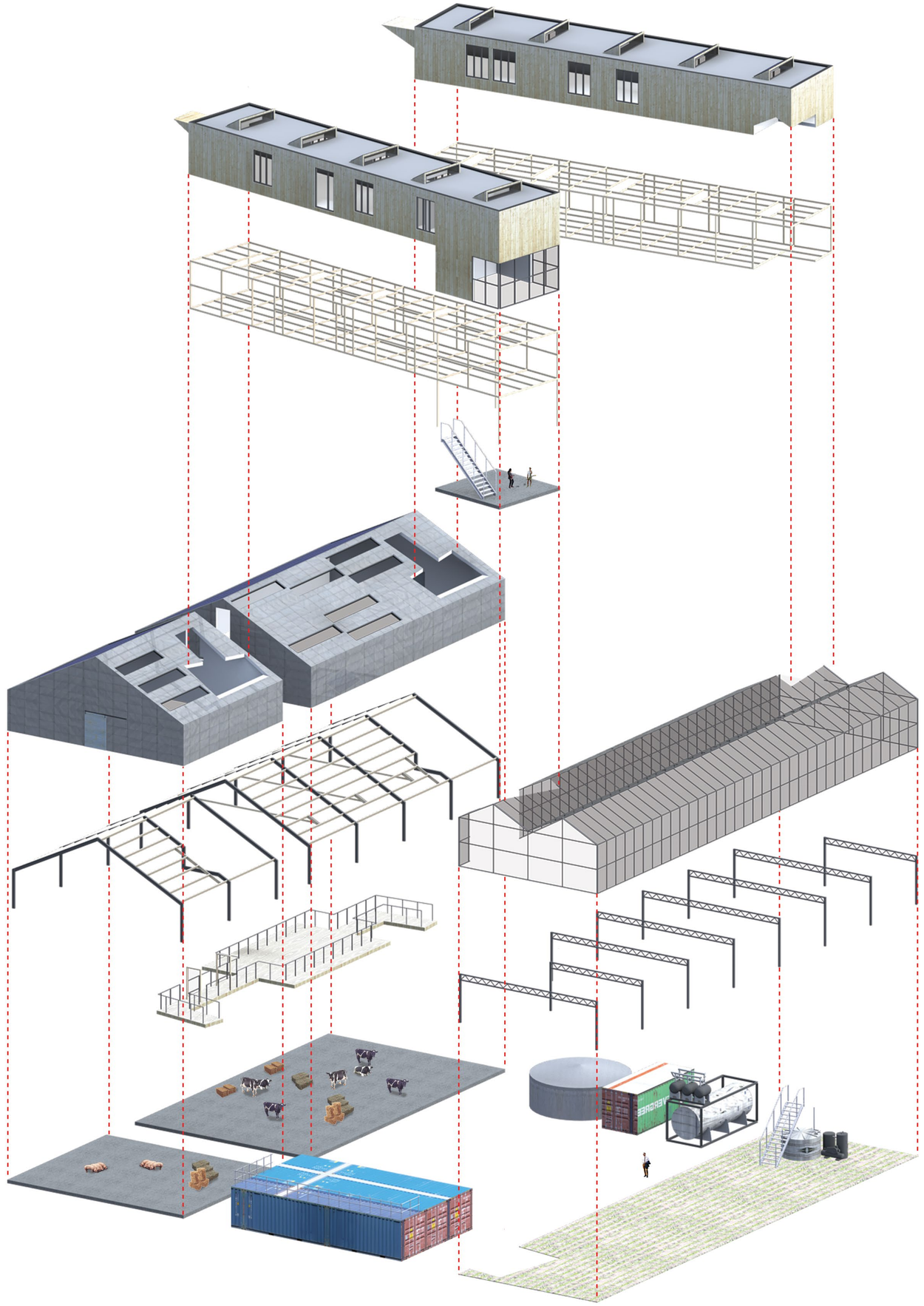
vegetables and fruit
20.900 kilograms of vegetables and fruit
15.675 square meter of vegetables and fruit

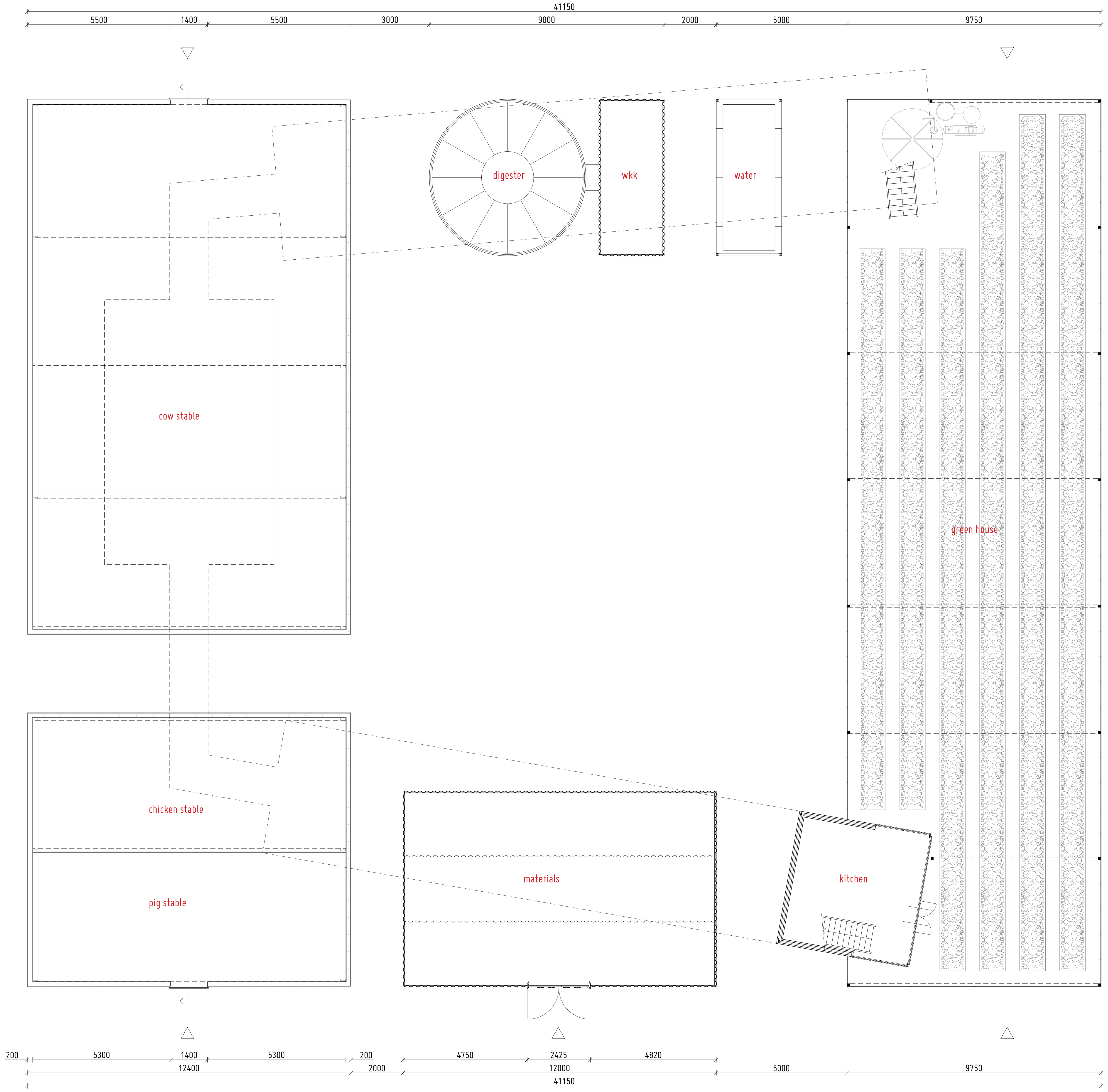
homes
15.000 squared meter used for housing
with the heart of the community in the center
common area's as greenhouse, kitchen and a
playroom voor children

627 chickens
63 square meter stable
63 square meter meadow
172.425 eggs per year
2.508 kilograms meat per year

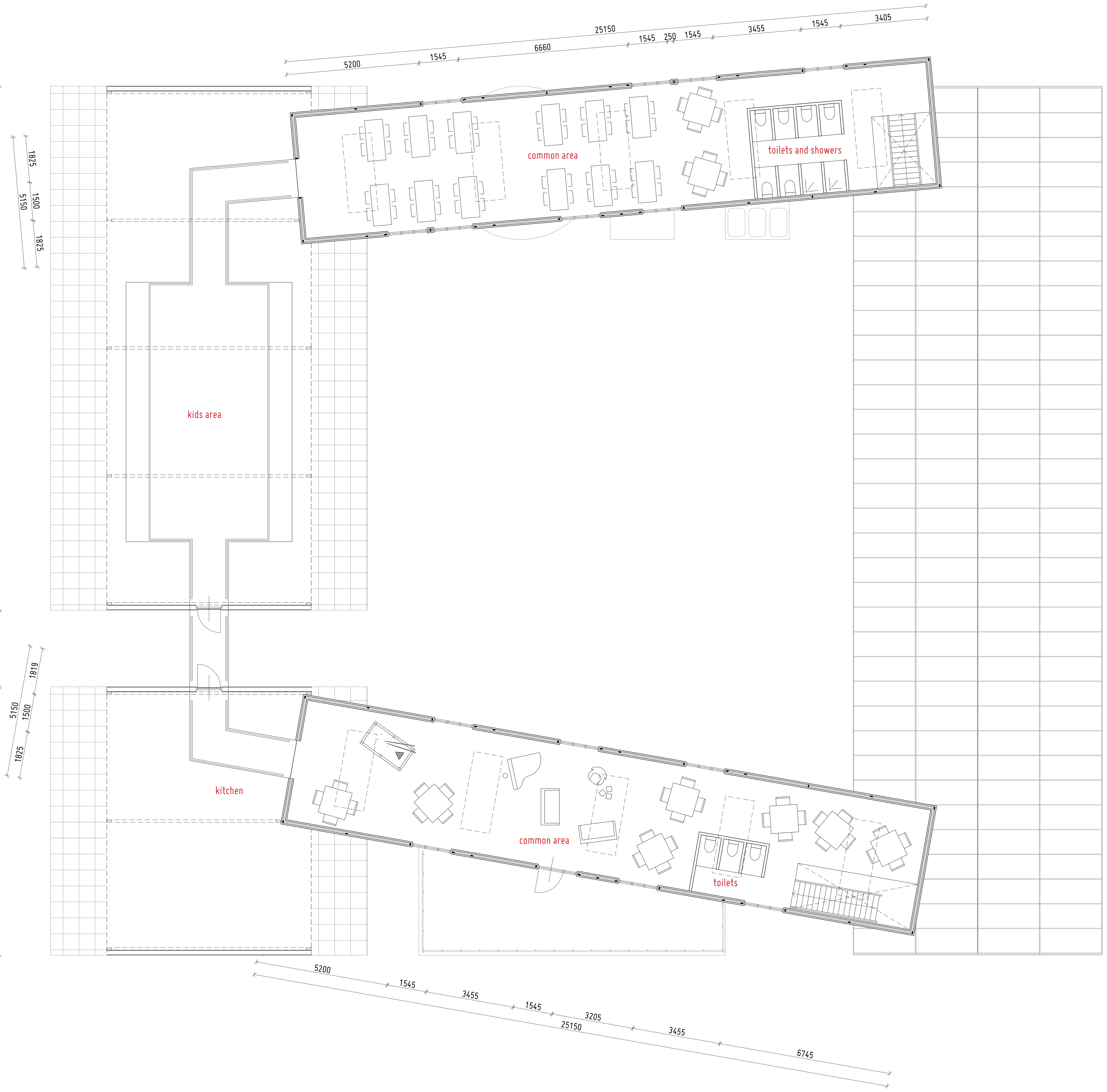
efficiently dealing with utilities

the valley

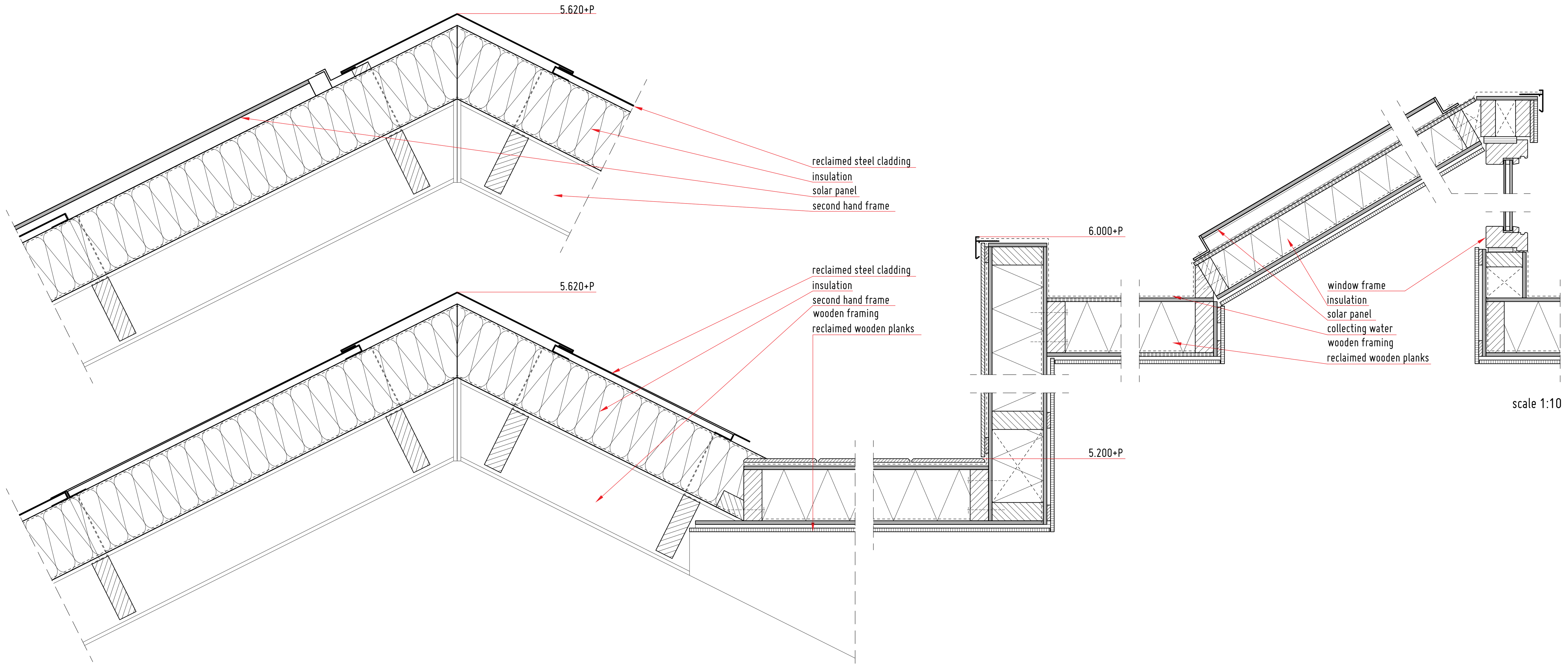




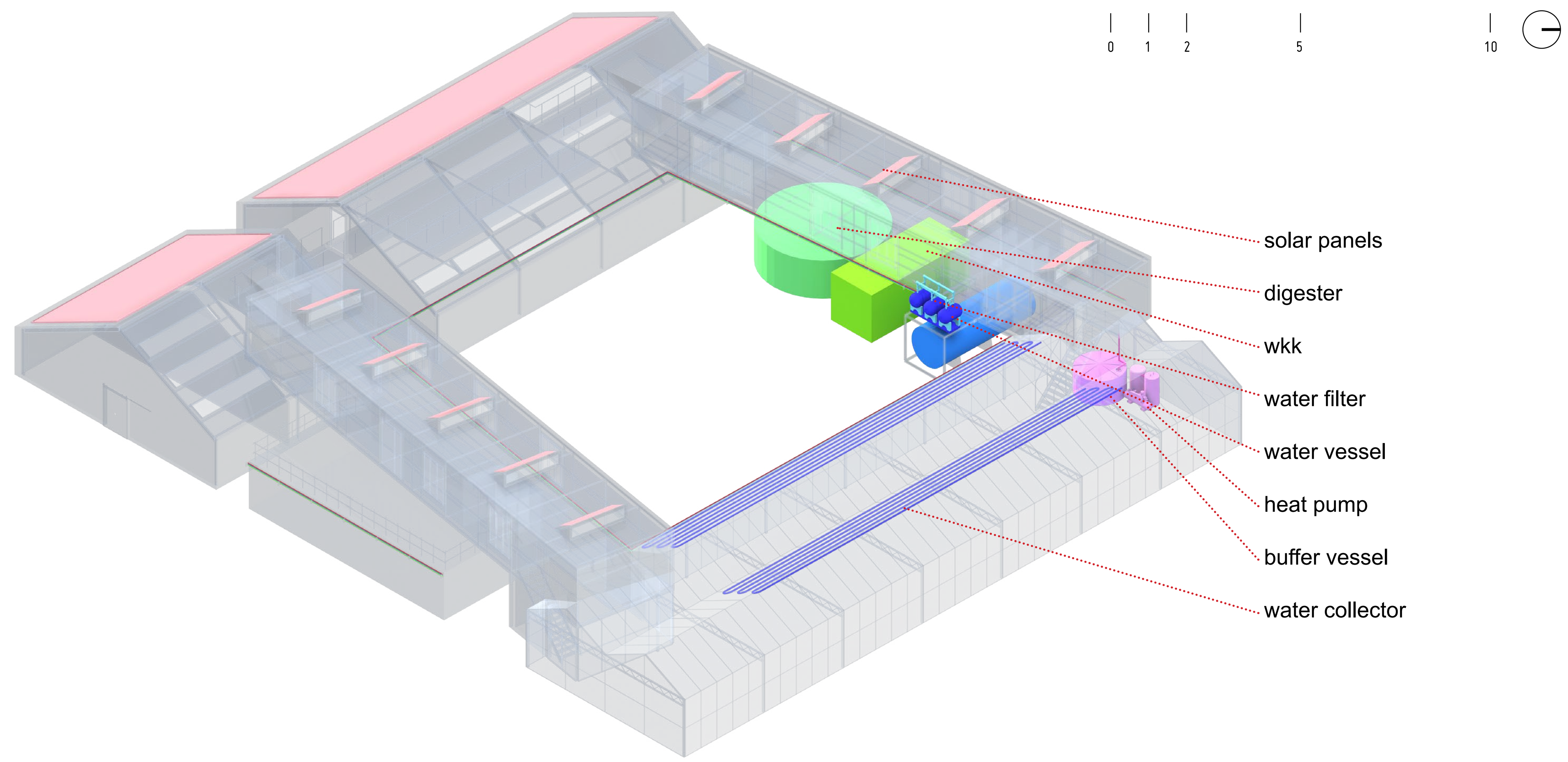
41150
digester
wkk
water
cow stable
green house
chicken stable
pig stable
materials
kitchen



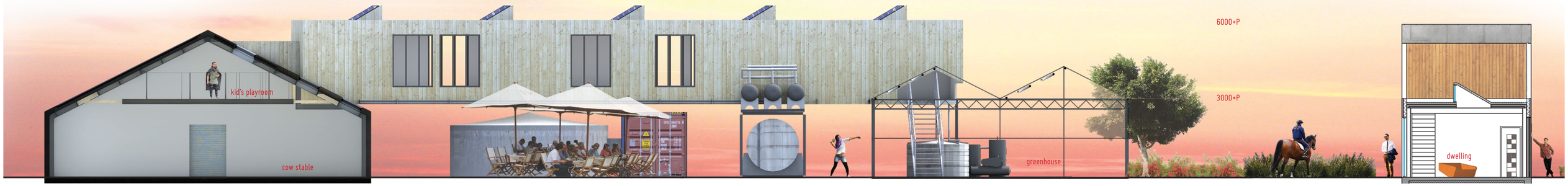
25150
common area
toilets and showers
kids area
kitchen
common area
toilets



5.620+P
reclaimed steel cladding
insulation
solar panel
second hand frame
5.620+P
reclaimed steel cladding
insulation
second hand frame
wooden framing
reclaimed wooden planks
6.000+P
5.200+P
window frame
insulation
solar panel
collecting water
wooden framing
reclaimed wooden planks
scale 1:10



0
1
2
5
10
solar panels
digester
wkk
water filter
water vessel
heat pump
buffer vessel
water collector


kid's playroom
cow stable
6000+P
3000+P
greenhouse
dwelling


6000+P
common area
3000+P
6000+P
common area
3000+P


Flyttlåda
Mellan
VOX