THE GREEN MICRO NATION

Nowadays cities consume 80% of global energy and are responsible for 75% of carbon dioxide emissions. Global warming is a serious issue and man is more and more aware of his responsibilities. Planning a new city is a very important commitment. We as architects and men make choices that concern the future of our species as well as the future of our planet. Buckminster Fuller and Paolo Soleri taught us that we are on board a "spaceship we call earth", and since operating "spaceship Earth" is a very delicate task, we must do all possible efforts to try to offer an environment that suits best not only our species, but all of "Nature". A sort of "live and let live" widened to interspecies relationships. We don't consider man as the centre of the Universe anymore, so we believe that a new nation should arise with this principle in mind: all efforts should be made to offer a free environment for all species to prosper and progress in the wonderful flow of life that we have the extreme luck to be part of.

This is why we want our new city to float above the ground and at the same time to be as dense as brains cells. A place of connections and development. A place from where to look at a free world. To put it in Louis Wirth's words, a place with critical mass and human fuel; a place of tension and friction, but also a cradle of creativity and progress. "*Without the density there is not enough human contact; without the diversity and differences there is no chemistry; without the size it is not enough of everything.*"

DESIGN PRINCIPLES

DENSITY ≠ VERTICAL

Differently from what we are used to think, verticality is not the only solution when the matter regards a very dense city.
We have to re-interpretate the vertical concept, not limited to skyscrapers, but developed on a new model of vectorial city with completely different density standards, a "light landscraper".

DON'T MESS WITH THE GROUND

The relationship with the natural environment when we design tomorrow's cities should always take into consideration the huge respect that nature deserves. The soil preservation should be a priority, that's why we chose to have a light impact on the ground, keeping the land as wild as we could.

CAR-FREE ENVIRONMENT

All cities looking for symbiosis with Nature should aspire to a car-free environment. This means the development of a unified infrastructural system of public transport that gives the opportunity to move all around the city.

VISUAL PERMEABILITY

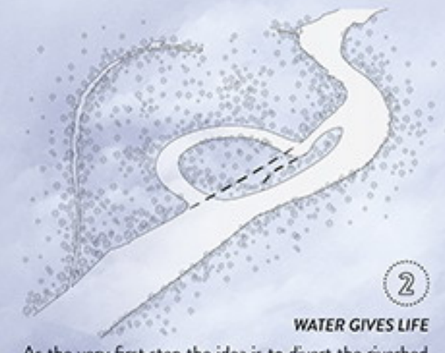
Having a light impact on the surrounding environment means to have a structure that doesn't block the view and allows the earth to breathe. A vector habitat appears to be the ideal formal choice for the city.

PROJECT STORYBOARD

1

THE WILD INITIAL STATUS

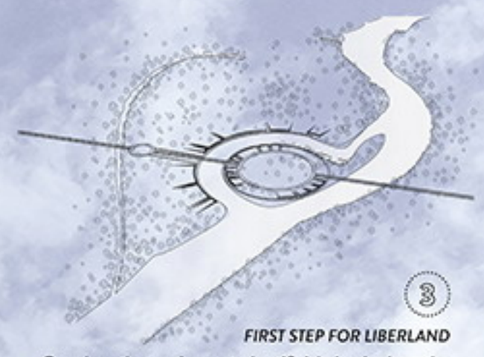
Liberland today comes as a green peninsula with a rigorous vegetation and a well-developed fauna, typical of the river environment bordering the Danube.



2

WATER GIVES LIFE

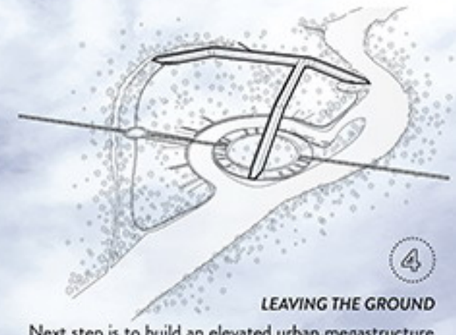
As the very first step the idea is to divert the riverbed into the site, creating an artificial circular cove to bring life within the peninsula and to separate it from the native island.



3

FIRST STEP FOR LIBERLAND

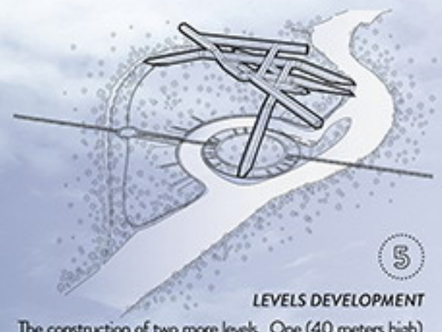
Based on the newly created artificial circular bay, the second step is the human settlement through the construction of the infrastructure linking Liberland to Croatia and Serbia.



4

LEAVING THE GROUND

Next step is to build an elevated urban megastructure with an hexagonal section that hovers some 120 meters above the ground.



5

LEVELS DEVELOPMENT

The construction of two more levels. One (40 meters high) stabilizes the structure, touching the ground in 2 points, the other (200m high) instead increases the population capacity and offers breathtaking views of the surrounding countryside.

6

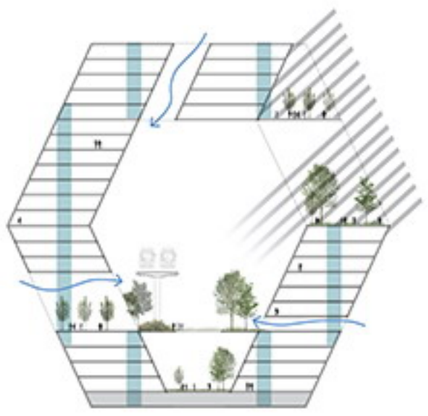
GO INTERNATIONAL

Last step is the construction of an airport on top of the highest level. This gives the possibility to people all around the world to visit Liberland and gives the city a completely new international dimension.

CROSS SECTIONS

Ⓐ

RESIDENTIAL
This standard section schematically shows how the hexagonal habitat would work in residential areas. You can see the vertical connections formed by 6 elevator blocks, the public pedestrian terraces where the openings are and the bottom plan dedicated to technical facilities.



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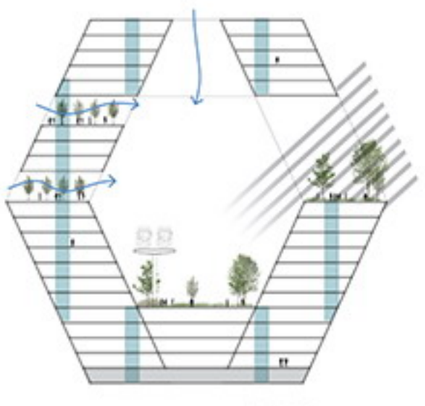
OFFICES & ADMINISTRATION
The openings which serve to increase the interior lighting of the city are crossed by vertical connecting elements, creating an interesting spatial complexity. The office areas are quite compact showing greater overall compactness.



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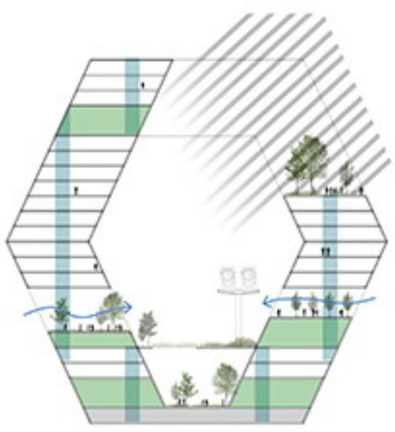
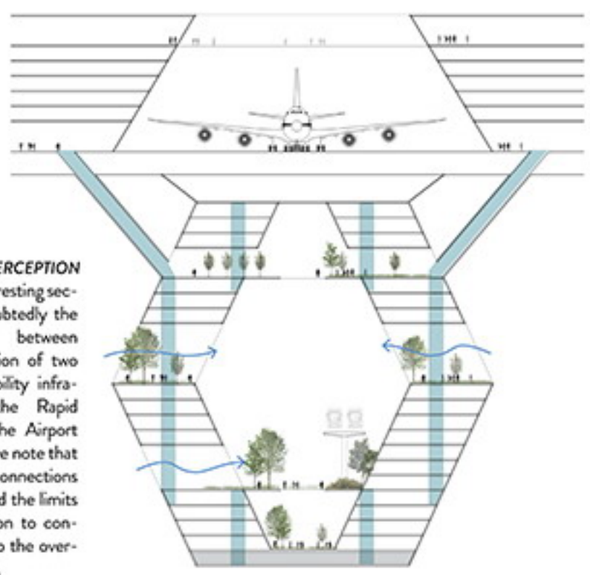
MIXED USE
The mixed-use areas are the most widespread in the mega-structure. They are characterized by large openings and the presence of shops and commercial and leisure activities at different vertical levels. Public spaces are composed by several pedestrian avenues and public terraces full of greenery.



Ⓓ

AIRPORT INTERCEPTION
The most interesting sections is undoubtedly the intersections between the interception of two different mobility infrastructures: the Rapid Transit and the Airport Lanes. Here we note that the vertical connections extend beyond the limits of the hexagon to connect people to the overlying terminal.



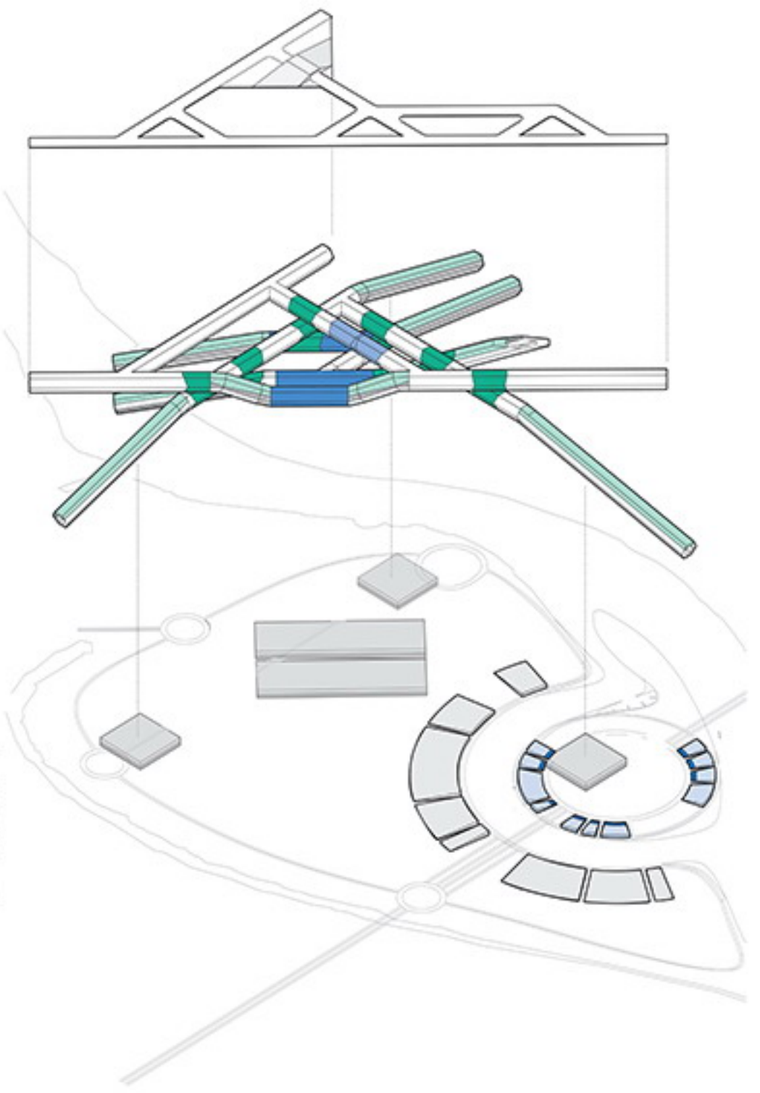
TECHNICAL FACILITIES
COMMERCIAL
ELEVATORS

ISOMETRIC FUNCTIONS

We considered the following areas to guarantee a comfortable life to the future inhabitants of the city:

-RESIDENTIAL: 25m² /hb
-PUBLIC SPACES: 9m² /hb
- EDUCATION & RESEARCH: 4,5m² /hb
- PARKINGS: 0,85m² /hb

From these views we can see all the different functions placed in the city of Liberland. Starting beneath the ground we find parking lots and power plants where the foundation slabs are. At ground level there are the industrial areas, the vehicular infrastructure, linking the city with Croatia and Serbia and surrounding the National Wild Park, and lastly the leisure/touristic activities such as shops, restaurants, cafes and hotels. Climbing the mega-structure we can see the sloping elements characterized by agricultural terraces, with hydroponics and aeroponics cultivations. On lower levels there are areas destined to education and research, schools and university. The main public spaces and elevated pedestrian terraces are located in all the interceptions among vertical layers, while in the central parts, we located offices and administration sections. Lastly the most logic solution for the airport and the hospital was to place them in the only one interception that catches all three vertical layers, the more easily accessible area from anywhere in the flying city of Liberland.



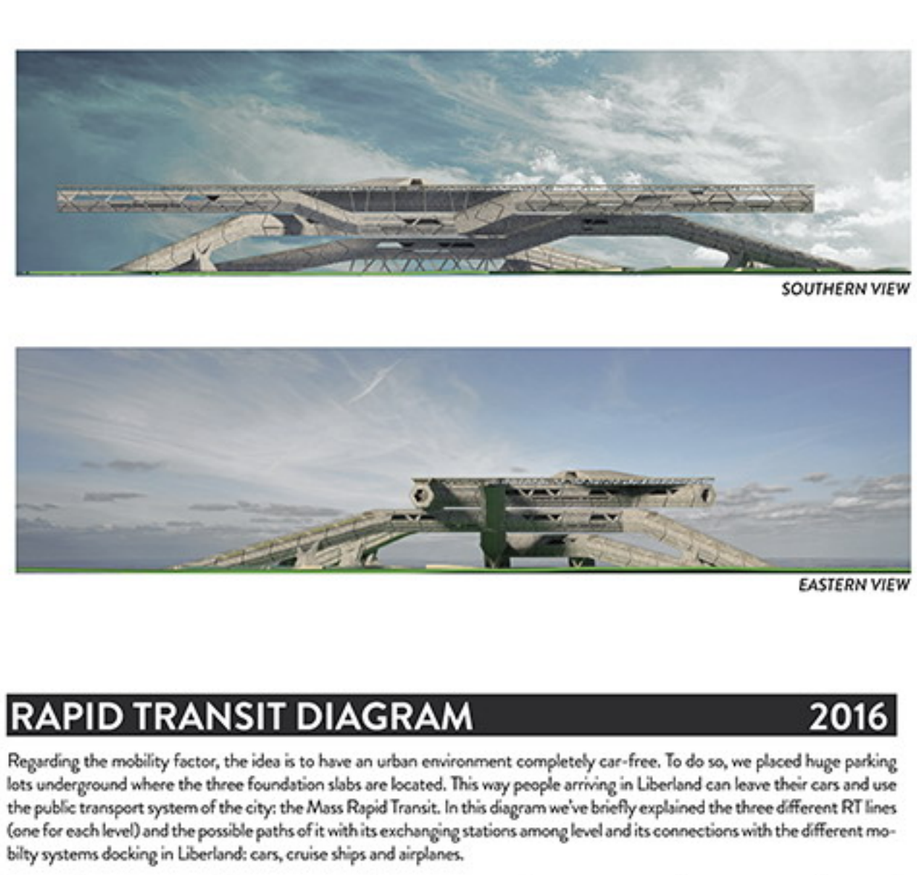
HOTEL & RESTAURANT
HOSPITAL
OFFICES
COMMERCIAL
INDUSTRIAL HARBOUR
EDUCATION & RESEARCH
PARKING LOTS
TECHNICAL FACILITIES
RESIDENTIAL
AGRICOLTURAL TERRACES
PUBLIC SPACES
ELEVATED AIRPORT

SOUTHERN VIEW

EASTERN VIEW

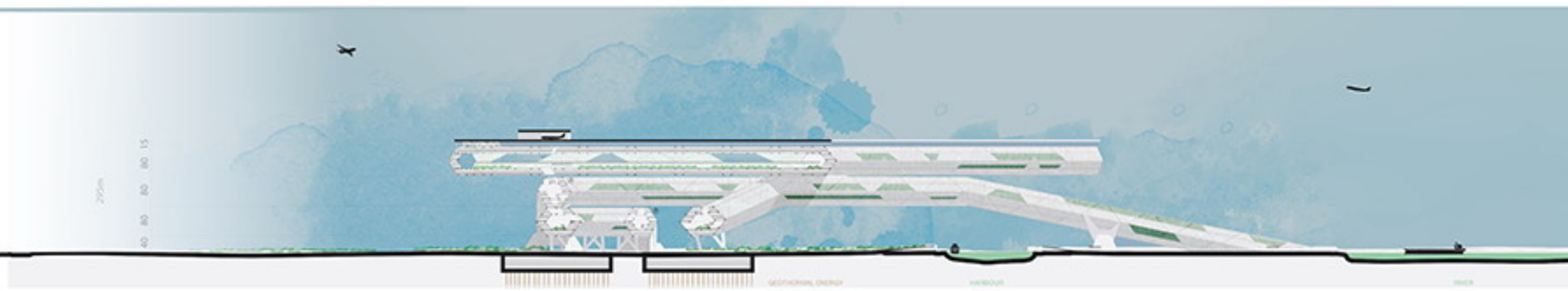
RAPID TRANSIT DIAGRAM 2016

Regarding the mobility factor, the idea is to have an urban environment completely car-free. To do so, we placed huge parking lots underground where the three foundation slabs are located. This way people arriving in Liberland can leave their cars and use the public transport system of the city: the Mass Rapid Transit. In this diagram we've briefly explained the three different RT lines (one for each level) and the possible paths of it with its exchanging stations among level and its connections with the different mobilty systems docking in Liberland: cars, cruise ships and airplanes.



OVERALL SECTION

From the overall section we can see the visual permeability of the megastructure, despite its huge dimensions. It's a dynamic composition developed in three different levels, respectively at 40 mt, 120 mt and 200 mt of height.
As we've seen from the cross sections here we can observe how the vertical distribution could work, where the technical facilities are located and how our hexagonal city could be opened to the outside world. Moreover the relationship between the city and the terrain is visible. Where the structure touches the ground, foundations are used to produce energy through geothermal power plants.



CITY PLANS

GROUND LEVEL *FIRST LEVEL* *SECOND LEVEL* *THIRD LEVEL* *TOP LEVEL*

ENERGETIC SOLUTIONS

Cities occupy only 2% of the Earth's surface, but they significantly contribute to pollution emissions responsible for climate change, especially for the massive consumption of fossil fuels. The energy used for the production of electricity, for transport, for the industry and for housing is the main source of carbon dioxide in urban areas. In terms of its impact on climate change, it leaves a deep imprint.

Choosing a dense and compact urban prototype as the one we propose for Liberland, we speed up and facilitate the implementation of innovative technologies for mobility, such as rapid transit, or for the production of sustainable energy . Below there's a diagram of the energetic organism operating in Liberland.

EXTIMATED SENSIBLE HEAT AND THERMAL LOAD OF THE CITY:
1400 MWt (calculated on an extimated volume of 28.000.000 m³)

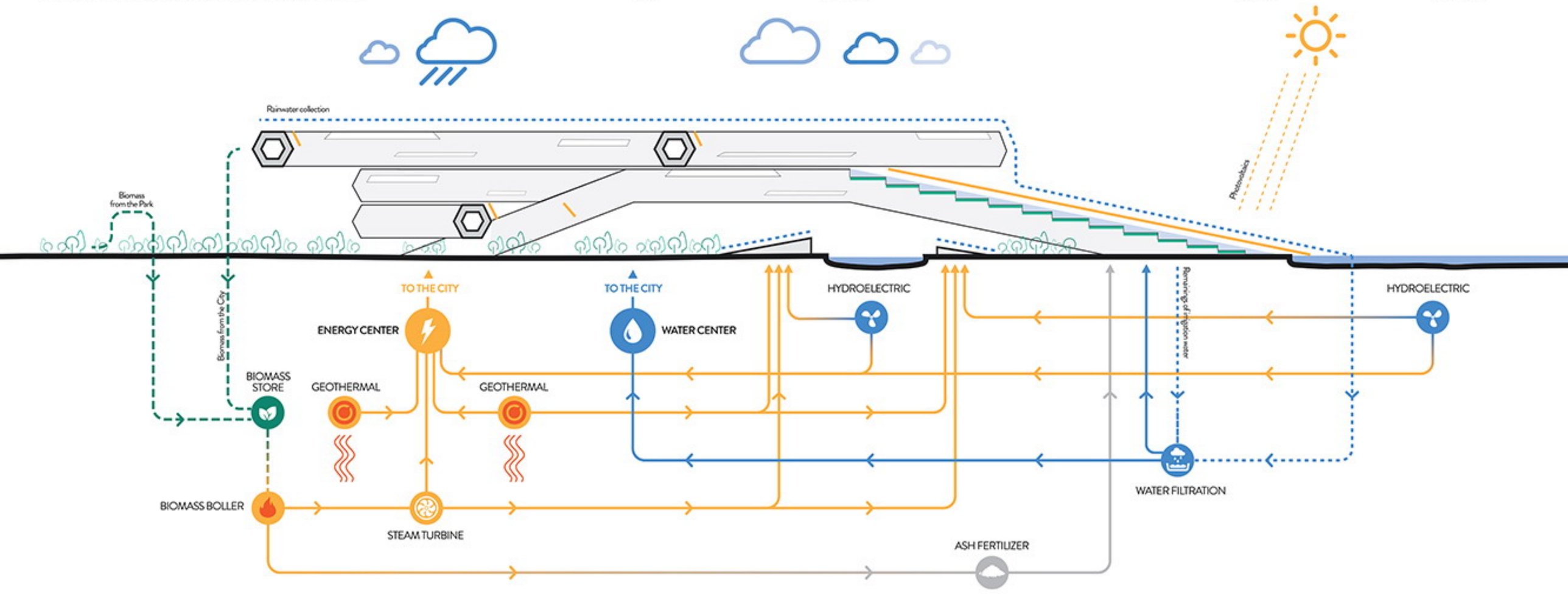
PHOTOVOLTAIC
The photovoltaic system consists of several district power plants, for a total of about 27.34 MPPT, using the energy produced by about 175,000 square meters of photovoltaic panels, spread all around the Liberland's facades.

GEOTHERMAL
Ther are 12,386 (50 mt deep) geothermal probes within the foundations, spaced 9 mt from each other, ensuring proper heat exchange with the ground without altering the bearing capacity of foundation pilings. There are going to be six geothermal power plants for a total of 41 MWt.

BIOMASS
The implementation of thermal systems to convert biomass into energy. The basic outputs of combustion are separated until there's availability of oxygen and conversion temperature to produce fertilizers for the agricultural terraces of Liberland.

HYDROELECTRIC
The tidal energy converter system that extracts energy from Danube's waterflow. A system featuring a helical design that employs shrouded vertical axis turbines that form an array in fluvial conditions. Starting with a 1MW plant the idea is that it can expand during the years.

DISTRICT HEATING
The cogeneration plants producing hot water and electricity. A distribution network composed by a complex of substations (one per user or user group). A thermal pollution of cooling water of conventional power stations (river water) is minimized because the heat is transferred to the users.



AEROPONICS AND HYDROPONICS

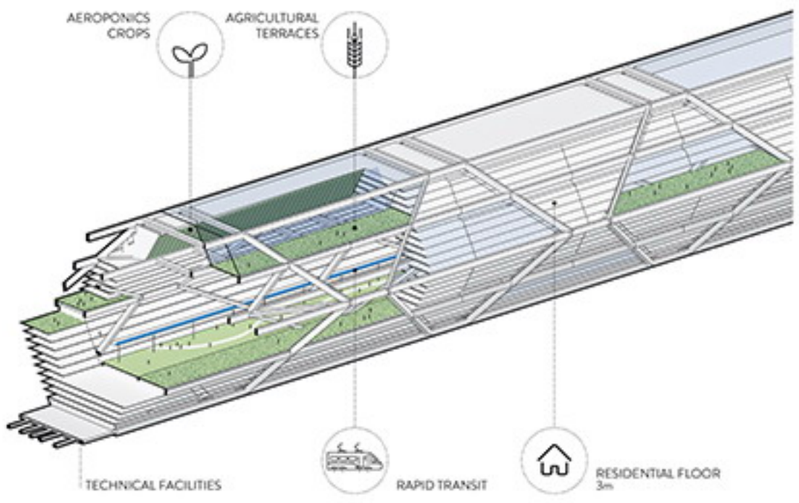
According to the studies carried out by the UN about the future growth of the world population, it is estimated that by 2050 the world population will reach 9 billion inhabitants. From the nutritional point of view, the problem lies in the fact that about 80% of the areas available for agriculture have already been used, and it is evident that the remaining 20% will not be sufficient. This promotes the idea to re-introduce within Liberland that part of production that was once an essential component of cities, and which has undergone a gradual process of exile, agriculture in modern urban planning seems to be completely excluded. For the purpose of sustainable development it is necessary to adopt production and consumption systems that are more localized and the creation of circuits of local resources.

The choice of including agricultural terraces of hydroponic and aeroponic type presents the following benefits:
- Water saving of around 80%
- Fertilizers Savings of approximately 50%
- Pesticides saving of around 80%
- No co2 emissions

According to our design, estimating a total area of 215'543 square meters intended for agricultural purposes, with a volume of 4'461'032 cubic meters, we can meet the food needs of about 70,000 people, accounting for 1/5 of the potential population of Liberland. You can also introduce environments for livestock farms with small animals inside the city, increasing the level of food self-sufficiency of the micronation.

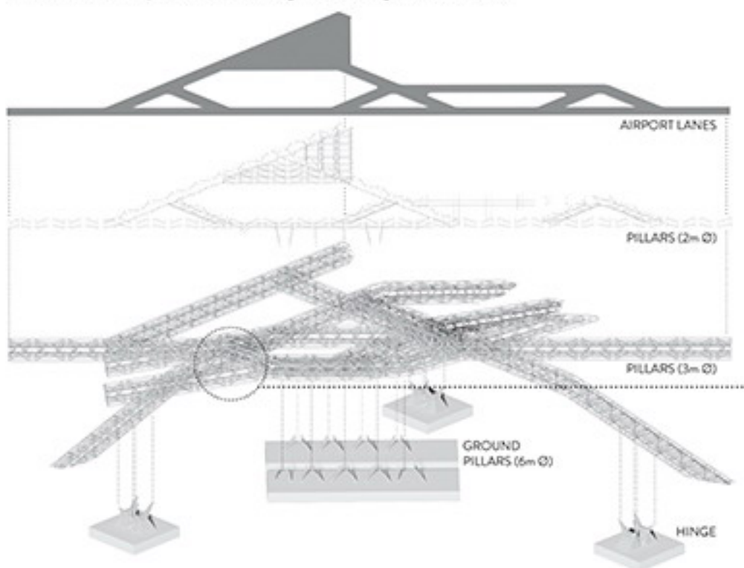
INSIDE THE HEXAGONAL VECTOR

Looking closer at the vector and opening it on an isometric view, we can see how the terraces could work together with the different levels of the hexagonal urban habitat. At the lower level are located the technical facilities such as pneumatic waste collection or hydric and power systems. The central cavity houses the main public spaces where the Rapid Transit passes by. Lastly from this view the scale of the megastructure is clearer with its 24 vertical and liveable floors.

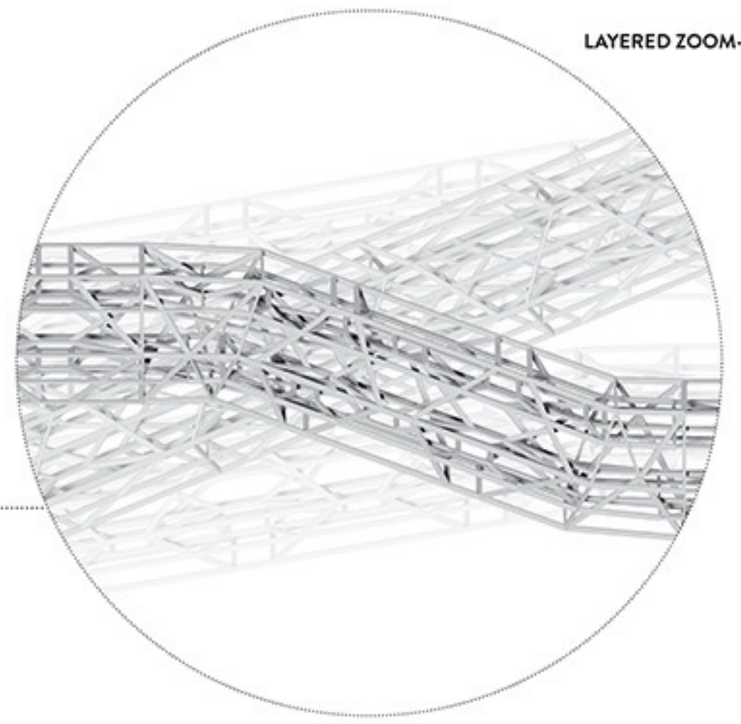


STRUCTURAL FEASIBILITY

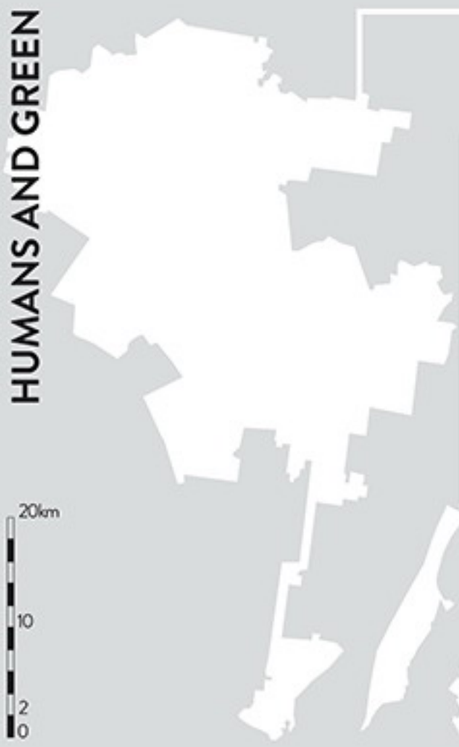
From a structural point of view the principle used to build up the city is the truss. In fact the skeleton of each element consists of two intercepting hexagonal truss networks. This structure is designed to transmit to the ground a weight of approximately 51'300'00 tons. Since we have a total of 518'400 square meters of foundation slabs, we estimate to have a pressure of about 100t/m2. So the foundation piles (1m Ø) are organized on a grid 3 mt x 3 mt.



LAYERED ZOOM-IN



HUMANS AND GREEN



LOS ANGELES *USA*
POPULATION 3'928'864 hb
AREA 1'290,5 km²
DENSITY 2D 3'044,45 hb/km²

MANHATTAN *USA*
POPULATION 1'636'268 hb
AREA 87 km²
DENSITY 2D 18'807,68 hb/km²

NOVI SAD *SERBIA*
POPULATION 388'490 hb
AREA 129,4 km²
DENSITY 2D 3'002,24 hb/km²

FLORENCE *ITALY*
POPULATION 382'471 hb
AREA 102,3 km²
DENSITY 2D 3'737,99 hb/km²

LIBERLAND CITY *LIBERLAND*
POPULATION 340'000 hb
AREA 7 km²
DENSITY 2D 48'571,42 hb/km²

MONTECARLO *MONACO*
POPULATION 35'881 hb
AREA 2,02 km²
DENSITY 2D 17'973 hb/km²