

SATES Project



El Montot Valencia - Spain

**Promoter and
Owner:**



**Engineering and
Architecture**





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Introduction



It all starts with a catastrophe:

On Wednesday, June 15, 2016, a fire broke out in Bolbaite, burning more than 1,500 hectares, according to estimates from the Generalitat's emergency service; affected seven municipalities, 3 in the Canal de Navarrés region.

The fire also devastated a lot of land in the municipalities of Anna and Chella (of Canal de Navarrés), Estubeny (la Costera) and Sumacàrcer, Sellent and Cotes (la Ribera Alta).



Due to its size, our property was seriously affected, destroying the fire with centuries-old crops, leaving the mature mass of forest vegetation decimated. The conjunction of the passage of time and the power of nature have worked the miracle, rising from its ashes in a literal sense, life returns again to the Montot, the vegetation recovers in a surprising way.

As our wise man of the word, Don Miguel de Cervantes, said: „Trust in time, which usually gives sweet solutions to many bitter difficulties.“ We have trusted in time without losing hope, that is why today we present our new project for Finca el Montot.

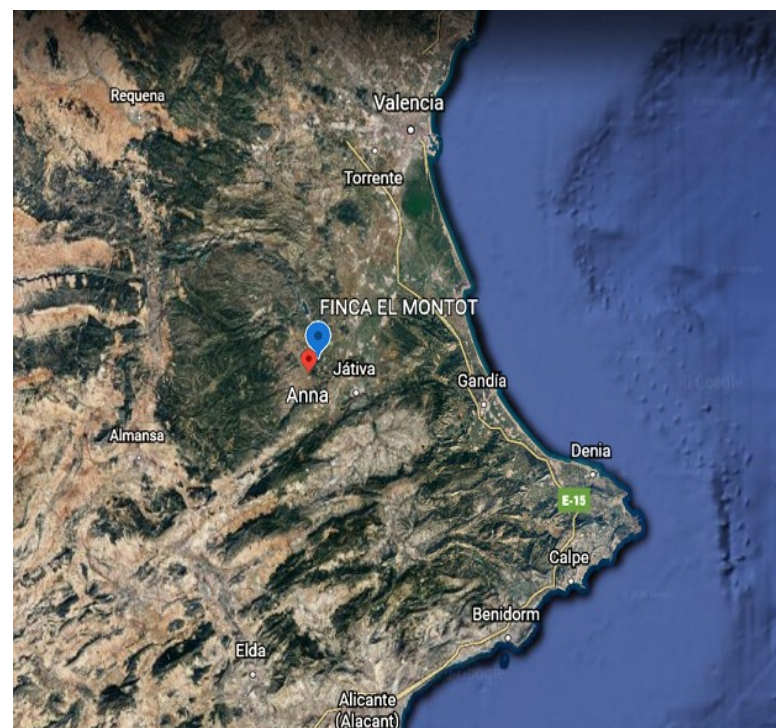
Location



Our property is located in the heart of the Canal de Navarrés region, dominating from its elevated position the entire environment of the Province of Valencia.

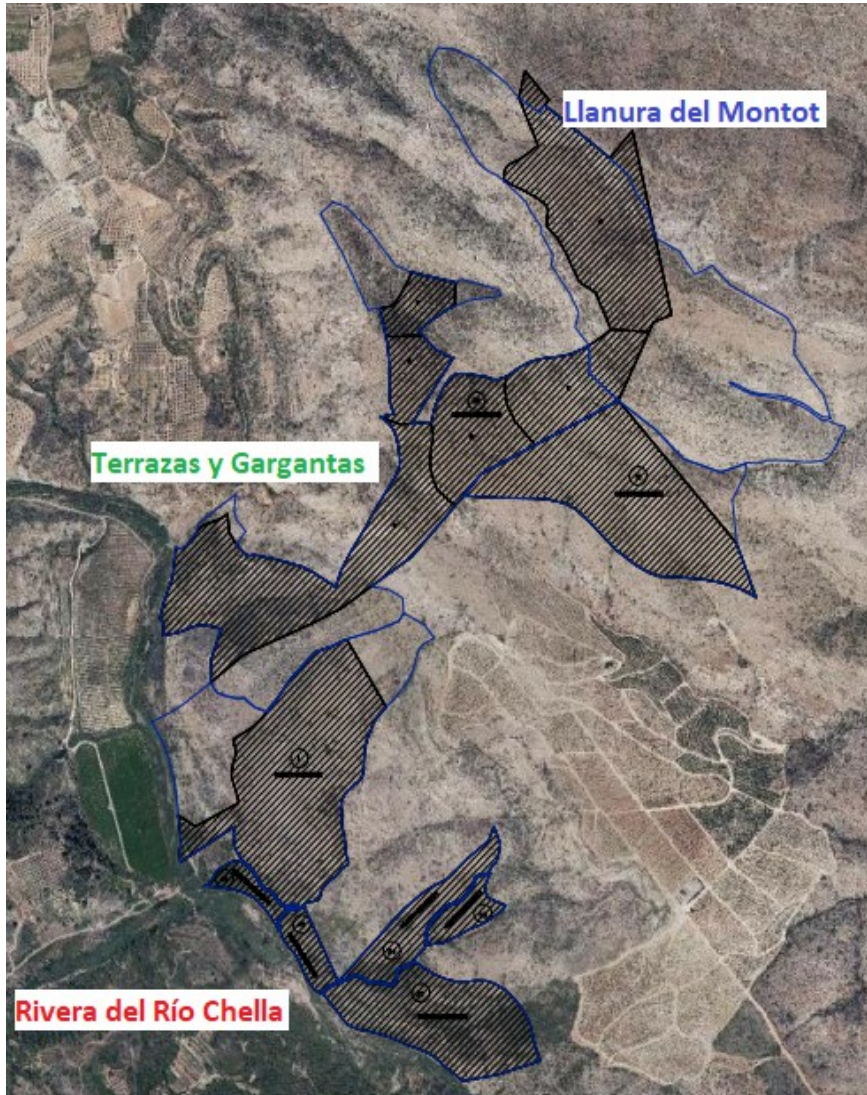
A few minutes from Valencia capital, with excellent road communications, with one of the most important ports in the country and with an equally dynamic airport.

The property limits with the 4 municipalities of the area given its dimensions, to the north with Chella, to the south with Estuveny, to the east with Sellent and Cotes, to the west with Anna and the Chella river..



Distances by highway	Valencia	Gandia	Denia	Javea	Alicante	Benidorm
Finca el MONTOT	57 km	53 km	75 km	85 km	101 km	106 km

The Property



The dimensions speak for themselves, we are facing one of the largest properties for private use in the Province of Valencia, with more than 1.3 million square meters in a unique natural environment.

Due to the orography of the land we can divide the farm into 3 zones: the banks of the Chella river, terraces and gorges towards Chella and Anna; and the Montot plain in the highest part of the estate (throughout the presentation we will make constant reference to these areas).

The Montot plain is the highest point in the area, which allows you to enjoy panoramic views of the entire province of Valencia, coming to see the sea to the East and the Sierra de Almansa in the province of Albacete to the West.

The project



Our company acquires the property in the year 2020, from the first minute we begin the work of analysis, evaluation, delimitation, demarcation, etc. Taking by proximity the model of our neighbors (an impressive agricultural estate, fully industrialized for the maximization of citrus production). We reach a clear conclusion, the high position of the farm allows early yields in relation to other areas (a clear advantage as we are the first to be able to obtain a harvest. Although, the similar works to be able to make our property equally productive are totally unfeasible, since an earthwork and leveling of such caliber would never be authorized due to its high environmental impact.

Therefore, we had to start with a concept from scratch, something different and at the same time profitable: Our project is based on 3 lines of action (ecological farming, tourism and energy) that start from a common denominator: technical feasibility, self-sufficiency, sustainability, integration with the environment, use of existing resources, zero footprint and compliance with the legal framework.



**Sustainable Tourism
Exploitation**



**Ecological Recovery
of the farm and crops**



Self-generation

Ecological Recovery



The first element of our Project is the ecological recovery of the Farm. Since 2016, the property has remained unchanged since the previous owners did not carry out any activity after the fire.

As we have already mentioned, since last year we have carried out many studies to see which may be the best option. Without a doubt, intensive formulas and massive products must be ruled out.

We must opt for the organic cultivation of products with higher added value and less impact on the environment.



For this reason, the cultivation areas will be recovered on terraces and stone terraces that have more than 600 years of history. Returning to the traditional cultivation of olive, almond and citrus trees of historical ecological varieties.

The main action area will be the area of terraces and gorges, also but to a lesser extent in the Montot plain, to combine it harmoniously with the areas of the tourist part of the complex.

Crop Recovery (I)



The farm has exceptional physical conditions of the land, the favorable thermal anomaly and the height of the location. Our neighbors, as we have been able to verify, obtain the fruits of their crops between 1 and 2 weeks before the rest of the producers in the area, since the farms are exempt from frost in the lower areas.

This translates into a huge competitive advantage and much higher profitability (selling the first has a price). But we cannot compete massively because we are not going to physically alter our terrain, we must win in quality.

It is not an easy task, but we are willing to achieve an even more ambitious goal, trying to involve the UPV and in particular the Higher Technical School of Agricultural Engineering and the Natural Environment of Valencia, to use our farm and crops as a place of trial of new techniques, and recovery of indigenous varieties lost due to commercial pressure.



In the same way, we consider very important and with the same objective the collaboration with the Conselleria d'Agricultura, Desenvolupament Rural, Climate Emergency and Ecological Transition.



With the experience, knowledge of our technicians, the involvement and talent of UPV teachers and students, we are convinced of success.

Crop Recovery (II)

The commitment to quality, what is truly natural is not a fad or a whim, the Ministry of Agriculture highlights the growth of the organic sector in Spain. Similarly, each year in Europe the sale of these products increases.

Nowadays, terms such as “eco”, “bio”, “organic”, “natural” sound familiar in many supermarkets. Consumers are becoming more demanding every day, they are better informed, they are more sensitive and responsible in their consumption. Hence, producing foods of differential quality is a guaranteed success, even with lower productions. The price differential is huge.

Due to its size, our farm has enormous potential in the medium term once the new crops are established.



On the other hand, the constructions linked to ecological farming will be of high quality, just like the rest of the constructions in the project, always seeking integration with the landscape and taking advantage of the natural unevenness of the terrain.

The planned constructions include: warehouse, workshop and offices; They will have an area of around 350m² in independent construction units to minimize the visual impact.

Physical approach of the cultivation areas and facilities



Sustainable Tourism



The second axis of our project is the creation of a small rural ecotourism complex.

Given the peculiarities of our property (as we have seen in the recovery of crops), it would be very difficult to assume an investment such as the one required, counting only on organic farming activity.

It is essential for the technical viability of the project to have a second source of income that at the same time serves as a structural mortgage guarantee for the necessary investment.



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The property's land and future constructions must be capable of supporting a financial burden, if applicable, of more than 8 million euros.

Aware of the nature of the property, we propose an intelligent and respectful action; based on the criteria of sustainability, integration with the environment and low environmental impact. For this reason, we consider that the best figure of development is the recreation of a small village, with low-volume buildings scattered among them.

The ideal area for the performance is the Montot plain. 11

Village Recreation (I)



The recreation of a small village will fulfill a fundamental task within the project and the other two parts (cultivation and generation).

The configuration of a network mesh system is arranged, that is, the interconnection of each construction element, with this the aim is (as we will see later) a function of electricity generation, recovery of rainwater and recycling of gray water for its use in crop irrigation.

There will be some constructions that we can define as nuclei that will house common elements of the complex (of greater volume) and others that will be satellites that will be used as independent accommodation units.

The main composition of the village would be around 40 accommodation units (satellites), with an individual area of around 65m²; and 2 main buildings (nuclei) for common use with a larger area of around 400m².

The core buildings will house the common elements of the complex: (1) reception, bar, restaurant, offices and general services; (2) Multipurpose hall and leisure areas, library, business center, fitness and wellness.



Village Recreation (II)

Independent Accommodation Units (satellites)

The 40 accommodation units will be distributed in groups of 20 around one of the two main buildings (common areas) of the complex, thus seeking the greatest dispersion of a unit with respect to the closest one.

In this way we achieve two objectives: minimize the visual impact within the property as a whole and more specifically in the Llana del Montot; and achieve great privacy for the clients, who will be able to enjoy their little house within the village.

The constructions will be ground floor with a solarium or terrace area in the main elevation, exposed stone walls and hidden roofs (solar generation area) by the façade walls.

The paths between units will serve to create a new network of ditches and improve the use of rainwater, flowing into the ponds, artificial lake and hydroelectric generation circuit.



Village Recreation (III)



Common areas and services (nucleus)



The 4 buildings of general common areas will serve to satisfy the needs of a maximum of 100 people staying, as well as to be able to modulate the spaces for holding events, company conventions and small congresses. An upper-middle class client will be sought.

The first of the buildings will house the general reception of the complex, a bar, shop, and general service areas.

The general restaurant and modular buffet area for customers.

The second construction will be a multipurpose building, and leisure for customers, with a library, business center, fitness area (with a small gym and wellness center for the healthy balance and general well-being of our customers.

The planned area of these areas will not exceed 800m², which added to the 40 accommodation units would mean a combined area of around 3,400m².



Village Recreation (IV)

Improving access and interior roads

The interior roads of the farm and its trails will be improved, making the circulation of machines and people easier and safer. Most of them will be gravel and paved stone, avoiding paved areas.

The road accesses must also be improved, being essential the construction of a new road in the northern part of the farm that connects it with the Chella highway from the north.



Heliport Construction

Given the characteristics of the farm, it is essential to have fast and safe air access to it. For this reason, the provision of a helicopter landing strip has been planned in the area of the Montot plain.

Parking area

No parking areas have been arranged on the surface due to its impact, all needs have been concentrated in a general semi-underground car park (taking advantage of the contour lines of the Montot plain) to make its integration easier; and with capacity for 50 vehicles.

Village Graphic Representation



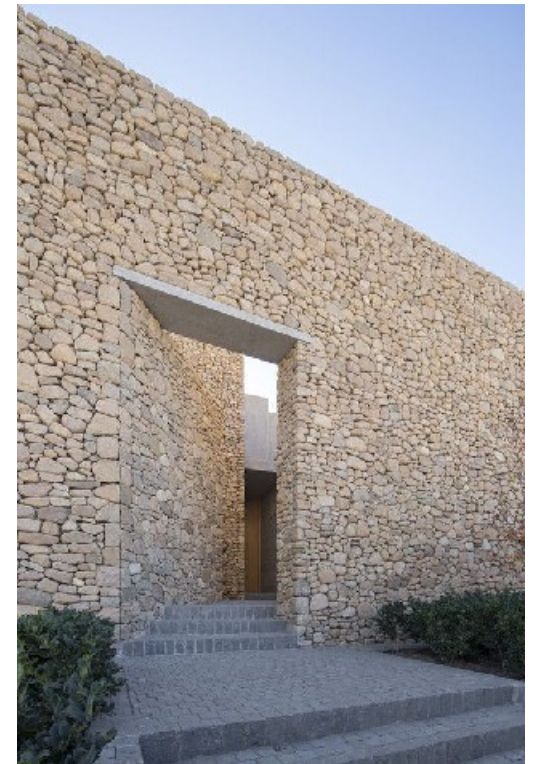
Architecture and design



Our intention is for the SATES Project to be an international benchmark, therefore, the commitment to quality architecture is total. Clean, simple lines, practical and unsophisticated concepts.

The urbanization would be totally integrated into the landscape, using the materials of the area: stone in the air and natural elements as constants of the construction, betting on a modern and efficient design. Eliminating expensive heating and cooling systems in favor of very low energy consumption, applying the concepts of the Passivhaus (passive house) and integrating them with the Self-generation system that our project contemplates.

The volume of total buildings around 4,000 square meters above ground represents 0.30% of the total area.



The dispersion of the village in its different areas and the materials guarantee a minimum impact.

Self-generation



This part of the project undoubtedly makes it something unique, no one to date proposed a combined concept (with the two parts already described) or a similar energy mix for self-generation.

Based on the national supply model itself, aware that an energy mix is the only realistic possibility if you want to do without accumulators and macro-batteries (expensive and highly polluting), we have designed a strategy based on 3 abundant resources: water, sun and wind.

Combining the 3 sources, a circular energy generation cycle can be obtained, without peaks or valleys; taking advantage of all surpluses, even exporting energy to the grid.

The base of the system is the production through solar energy taking advantage of all the roofs of the available building units of the complex, reaching an installed power of 1 Megawatt.

The base of the system will be complemented by generation through Mini Wind Power with an installed power of 0.250 Megawatts and hydroelectric power with an installed power of 1 Megawatt.



Thermal by Biomass.

Last resort support as a thermal generator through the combustion of pruning residues and chips (Austrian model) for critical phases and system maintenance.

Solar Generation (I)



Each housing unit with an approximate cover of 65m² will have a three-phase hybrid kit for an installed power of +10 Kilowatts and each core of the complex's common areas will have 75 Kilowatts.

Our concept allows concentrating on the roofs the equivalent of more than 4 hectares of a solar farm.

Exploitation with solar panels

The visual impact of the so-called "solar farms" is terrible from our point of view, therefore, we renounced that model, and developed a new one.

We take advantage of the hidden roofs of all the buildings in the complex to create an electrification mesh. As we have already mentioned, the interior of the roofs will only be visible from a superior aerial view, therefore the presence of the solar panels will not be perceived from any angle on the ground.

Each roof will serve first of all as a primary energy source for the construction itself (powering all the building's consumption), deriving surplus production to the electrification grid for distribution in the energy mix. The surplus not consumed during the day is used to pump water. And thus be able to generate hydroelectric power during the night.

Solar Generation (II)



The resulting generation mesh would be the following:

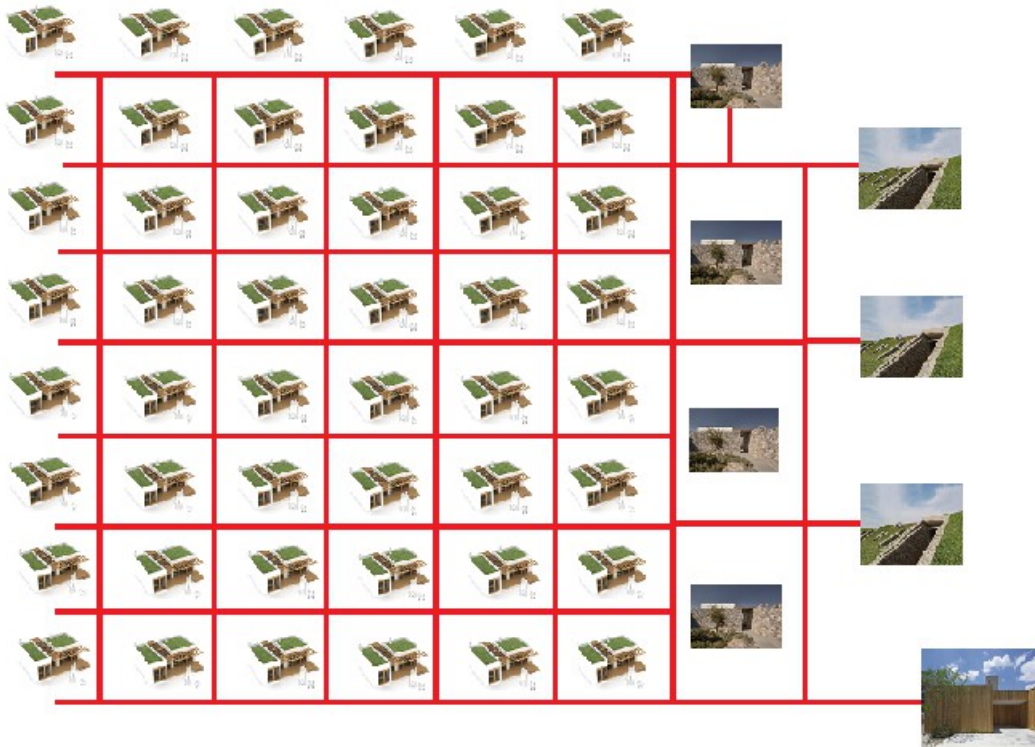
-40 housing units of 15Kilowatts/und. of installed power = 600 Kilowatts. composed of around 1,350 solar panels of 400W at 24V Monocrystalline PERC.

-2 cores of the buildings of 100Kilowatts/und. = 200 Kilowatts.

composed of around 750 solar panels of 400W at 24V Monocrystalline PERC.

- Installation buildings (agricultural part and generation) in total = 200 Kilowatts.

composed of around 750 solar panels of 400W at 24V Monocrystalline PERC.



The total installed power would reach the surprising figure of 1 Megawatt.

The production capacity for every 10 Kilowatts would be a total of energy captured in one day: 31,200 Wh/day in winter and 72,800 Wh/day in summer.

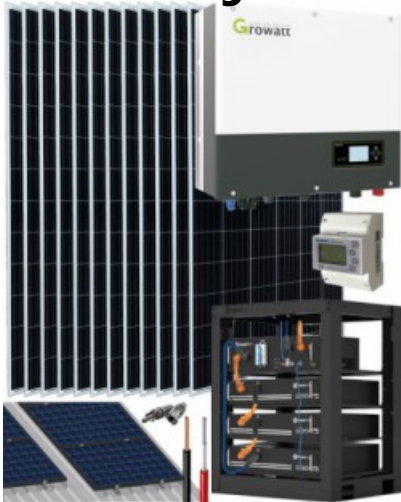
For the production estimate, the average Spanish peninsular radiation has been taken into account, including a percentage of system losses and a capture with a minimum of 3 hours of peak sun for winter, while in summer, 7 hours of sun have been taken. , which is equivalent to 52000Whday x 100 units, we would obtain 5.2 MWhday.

The maximum power generated would be enough to supply more than 500 homes.

Wind Generation



Installation in the buildings

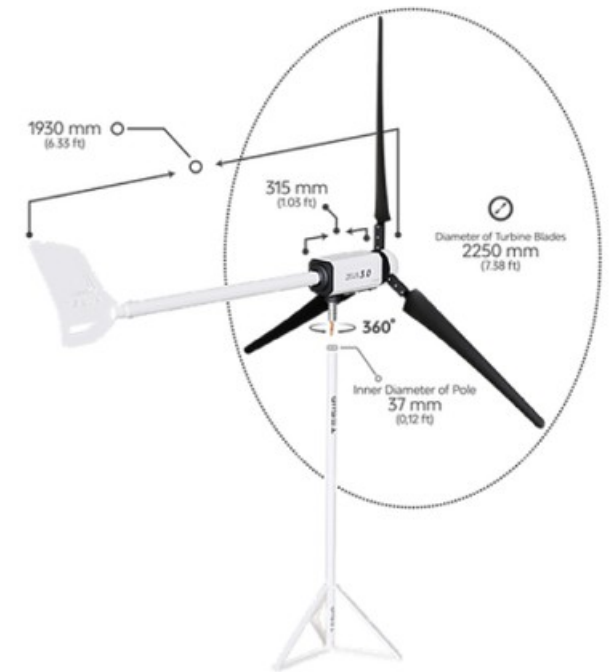


The wind part within the general generation system represents a small percentage, taking into account that the installed power through 3000W mini wind turbine equipment would reach up to 0.25 Megawatts.

These are widely used equipment, especially in northern Europe, and a little more unknown in Spain, since all the installed power is concentrated in super structures of huge machines.

With the forecast of installed power, a generation of more than 200 Kilowatts could be reached at its peak (with winds of more than 10m/s, although starting from assumptions of lower wind load we would be in a normal ratio of more than 100 Kilowatts with 6m/s and generation already at 48V, with a minimum start-up of 2m/s and a production of 20 Kilowatts at 3.7m/s.

With this approach with small equipment, low maintenance, resistant and with minimal visual impact, we manage to provide our self-management grid with sufficient resources along with hydroelectric production, when the sun stops contributing to the energy mix.



**Dimensions of 3000W
mini wind turbine**

Hydroelectric Generation (I)

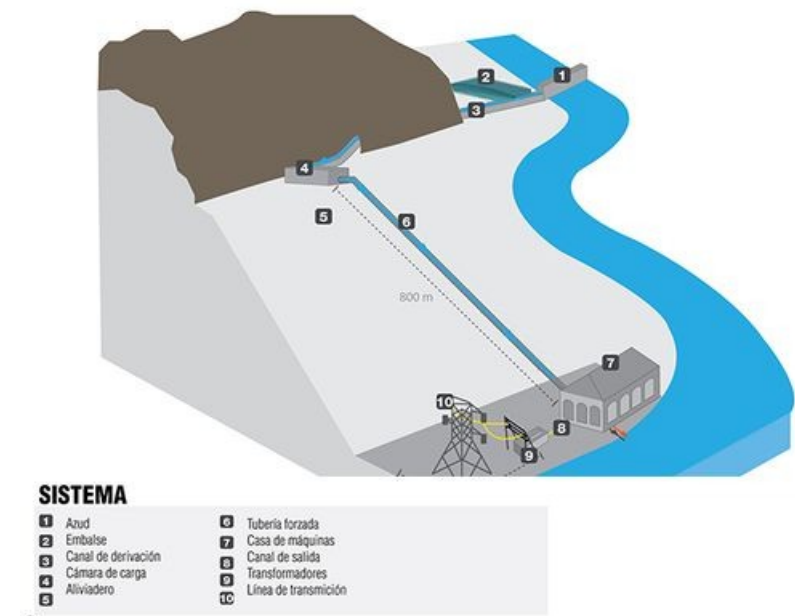


Within our energy mix, the hydroelectric contribution of scale is fundamental, it allows us to compensate for the needs of the complex when solar generation is not possible.

To integrate a Hydroelectric installation (in such a way that it is not perceived) the ideal formula is the arrangement of ponds and small artificial lagoons, which serve as collectors for the entire network of ditches and canals of the complex itself. The planned installed power would be 1 Megawatt. Our land by the natural fall of the Montot plain is ideal for this purpose, it would allow us to connect 3 rainwater supply ponds and a final pond from where the gravity tubes would depart towards the lower part of the property next to the Chella river (with a jump of more than 300 meters high and a penstock of more than 500 meters).



Natural ponds to create the water storage network at various levels until the last one before the jump to the Chella River, but without connection to the river, always in a closed circuit.



Hydroelectric Generation (II)



Aware that we cannot propose large structures, which would imply a huge environmental impact, we have developed a concept that we could define as a mini reversible power plant:

A reversible hydroelectric power plant is a hydroelectric power plant that, in addition to being able to transform the potential energy of water into electricity, has the ability to do it the other way around, that is, increase the potential energy of water by raising it to the planned tanks, consuming energy for this. electricity (generated during the day with the solar installation). In this way it can be used as a method of energy storage (a kind of giant battery). It is designed to meet energy demand during peak hours and store energy during off-peak hours. Its main operation would be during the hours when there is no sun. The installed power would be 1 Megawatt.

Our model would be a pure high pressure pumping plant, in which the upper reservoir is replaced by the set of ponds of the model (as a reservoir) whose only contribution of water is that which is pumped to the lower receiving pond, next to the river. Chella, but without coming into contact with the river.



Hydroelectric Generation (III)



The planned high head model corresponds to power plants with a drop of more than 200 m, equipped with Pelton turbines. In our case the drop is 300 meters and the tube could be 500m.

A Pelton turbine is one of the most efficient types of hydraulic turbine. It is a motor, tangential flow (transverse), partial admission and action turbomachine. It consists of a wheel (impeller or rotor) equipped with spoons on its periphery, which are specially made to convert the energy of a jet of water that falls on the spoons.

Pelton turbines are designed to exploit large low-flow hydraulic jumps (as is our case). Most hydroelectric plants equipped with this type of turbine have a long pipe called a pressure gallery to transport the fluid from great heights.

The Pelton turbine is a type of impulse turbine, and it is the most efficient in applications where there is a high head of water and a low flow of water, the Pelton turbine has a single wheel, unlike the turbines that They operate with compressible fluids. Our model is one of the smallest turbines on the market, the 1 Megawatt Neromylos, in such a way that its integration is simple.



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The constructions planned for the model would add around 250m² (in isolated units), for greater integration the tubes and the reception center where the Pelton Turbine is located will be buried.

All constructions will follow the same aesthetic criteria known so far in the project.

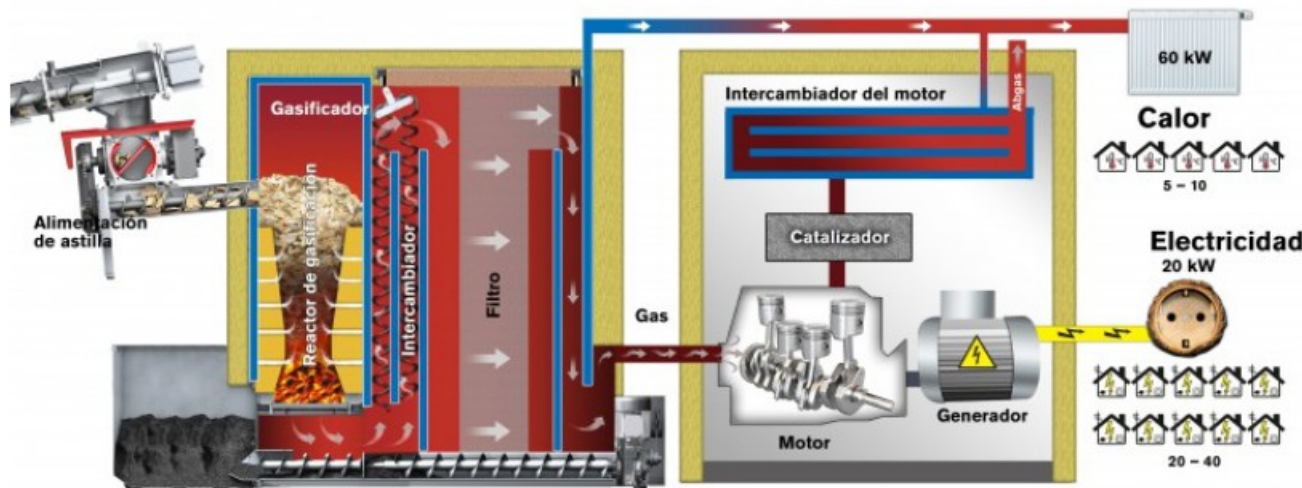


Thermal Generation

In this part of the Self-generation project, we could have opted for diesel generator sets, but it would not make sense with the philosophy of the SATES Project or with the objective of zero footprint.

For this reason, our last resort generation system (for emergencies or system maintenance) is based on Biomass. The concept we are committed to is the Hargassner, a compact and, above all, efficient system. It consists of two modules: one in which the firewood (chips or pruning waste) is gasified and the gas generated is filtered, and the other is the cogeneration itself: on the one hand it generates 20 electrical kW and on the other 60 thermal kW. heat generated in the gasification unit, in the cogeneration engine and in the electric generator. In this way the energy use is very high. In addition, both units are covered by a soundproof casing, which allows a very silent operation (unlike of any generator set).

It is a new model and would be the first to be installed in Spain.



The entire process is automated and is constantly fed with processed wood chips or pruning waste.

It does not require a large area for installation and it does not generate toxic waste of any kind since the ashes can be used for other uses.

Representation Autogeneration



Resource Recovery

The proposed energy mix would have an installed power of more than 2 Megawatts, it is a self-sufficient energy model that dispenses with batteries, since we understand that it is an element as polluting as fossil fuels themselves.

The potential of the Project is enormous, since the location and physical conditions of the land are ideal. The hours of sunshine are guaranteed, as well as the wind. Although water, although present, is a scarce commodity, for this reason one of the main design axes of the project will be the recovery of the maximum amount of rainwater.

Through the roofs of the different buildings, by direct contribution to the ponds and by conduction of the entire network of ditches and canalized paths at the different levels of the estate.

In this way, water can be recovered from the occasional but heavy rainfall in the area. Our rainwater recovery network must act like a sponge, recovering every last valuable drop of water.

The plan will create an even more beautiful landscape with the richness that the new strategically distributed bodies of water will bring. An improved ecosystem with vegetation and life where there was only ashes.



Zero Footprint

Energy self-sufficiency through renewable energies applied in the project immediately implies the absence of a carbon footprint in our model.

But we wanted to go further by thinking about the use of traditional materials such as stone and wood for construction, using the air stone techniques used in centuries-old constructions (and which are still preserved).

Likewise, understanding that the correct use of water is fundamental, for this reason we will seek maximum efficiency in the recovery of rainwater.



The hydraulic generation installation will be a closed water circuit, which will be supplied by rain, without the need for another source.

The greater efficiency will seek the recovery of gray water through the construction of ecological treatment ponds, with which this water (previously lost) can be used for other purposes such as irrigation and maintenance of green areas.

Maximum respect for the use of water, materials and self-sufficiency of 100% renewable energy.



Circular Economy



The European Commission presented in March 2020, within the framework of the European Green Deal and as part of the proposed new industrial strategy, a new Action Plan for the Circular Economy that includes proposals on the design of more sustainable products, the reduction of waste , energy management and the empowerment of citizens.

The circular economy is a model of production and consumption that involves sharing, renting, reusing, repairing, renewing and recycling existing materials and products as many times as possible to create added value.

In practice, it means reducing waste to a minimum. When a product reaches the end of its life, its materials are kept within the economy whenever possible. These can be productively used over and over again, thus creating additional value.

Our project contrasts with the traditional linear economic model, based mainly on the "use and throw away" concept, which requires large amounts of materials and energy.

Benefits for the Region



We can analyze the benefits for the Shire by:

Direct profit:

- Investment of more than 6 million euros in the Project.
- Creation of +300 jobs in the construction phase.
- Creation of around +50 jobs for the exploitation phase (ecological farming, tourism and generation).
- Ecological recovery of the area and landscape improvement.
- Improvement of existing water resources.
- Possibility of supplying electrical surpluses.
- Prestige and impact of having a unique project.
- Zero carbon footprint.

Indirect Benefit:

- Stimulation of the general economy of municipalities.
- Betting on the local network of external services.
- Promotion of Regional and Provincial Tourism.
- New high-income visitors.
- Ecological and energy reference.
- Export of the luxury rural tourism model.
- Recovery of lost crops.
- Possibility of collaboration with the UPV.
- Innovation and new technologies for the area.
- Architectural appeal.



Conclusions

We are facing a very special project, unique for its general ambition and especially for its respect for the natural environment. Noteworthy:

Uniqueness of the farm for its location, climate and exceptional orientation, with an area of more than 1.3 million square meters.

Value of the recovery of crops and plant mass in an ecological way, as well as the creation of new wetlands for fauna and flora.

Potential for the development of cooperative luxury, alternative, sustainable and quality tourism, with 40 new accommodation units and services.

Opportunity to achieve energy and water self-sufficiency, with an installed capacity of more than 2 Megawatts. Development of new exploitation and cultivation techniques, which will make it a national benchmark.

Commitment to the quality of construction, design, efficiency and integration with the environment.



Creation of an important added value for the Navarrés Canal Region and the Province.

Responsibility to make good use of an element of incalculable value such as land and water, this is SATES.



The project is a reality thanks to VIRAUN's spirit and social commitment to a better world. And here, our modest but no less important contribution to it: new ideas, new designs and projects that are less hostile to Earth, Water and the Sun.

SATES - Spiritus Aqua Terra et Solum



Project Designed by:
Luis Antonio Ernenwein Vierna
Executive and Technical Director of VIRAUN

