

The largest solar carport in Pairi Daiza

by Nathalie LEBRUN / 2023-03-06 06:58:29 / Belgique / 106 / FR



Year of commitment : 2019

CO2 Impact : The production of renewable energy on this very large scale makes it possible to affirm that this project for phase 1 makes it possible to avoid the emission of 6800 tons of CO² in comparison with the conventional production of a turbine - gas - steam pla



1 €

Builder

Perpetum Energy & Préfabois

Manager / Dealer

Green4Power

GENERAL INFORMATION

This carport construction makes it possible to meet two needsThe largest solar carport in Pairi Daiza

The largest European solar carport was built in Pairi Daiza in 2020. The aim of the animal park was to produce its own electrical energy, while creating new shaded parking spaces.

Answer to a double need

In order to complete the planned developments of the Park, Pairi Daiza needed to move its parking areas.

At the same time, faithful to its environmental philosophy, Pairi Daiza expressed the desire to create its own energy to reduce its impact on the environment.

The proposal of Perpetum Energy, an innovative company in solar solutions, in association with Préfabois, manufacturer of wood solutions, and Green4Power, the

third-party investor, quickly found the support of the management of Pairi Daiza. This solution was the creation of a large-scale solar carport, including 62,750 solar panels, for an annual production of 20,000 MWh/year of green electricity. This carport construction makes it possible to meet two needs: the creation of numerous parking spaces for the public as well as the production of renewable energy that can be used directly in the park, over an area of 10 hectares.

Bio-sourced panel supports

Large-scale solar carports already exist around the world, but the supports are usually made of metal. In order to remain in perfect correlation with the environmental philosophy of Pairi Daiza, Perpetum Energy proposed to build this large infrastructure entirely in wood, which is a biosourced, renewable and natural material. It enlisted the skills of a local partner, Préfabois, to build the complete infrastructure in short circuits, and in record time.

Innovating also means optimizing and respecting the environment

Pairi Daiza's very demanding specifications in terms of sustainability and environmental protection led to in-depth reflection within the Perpetum Energy consortium and Préfabois, their "wood" partner who designed and built the carport.

Specific goals: use local wood, to optimize the wood material, reduce the loss of raw materials as much as possible, reduce the consumption of grey energy. This deep reflection carried out in eco-design, gave birth to two innovative processes, implemented specifically for the Pairi Daiza solar carport construction site.

Wood innovation: whole trunks

The first innovation introduced by Préfabois concerns the woods used. The woods are PEFC certified woods, mainly from local forests. The main structural timbers, both vertical and horizontal, were made from raw logs, which have not undergone any sawing transformation (and from local timber). The only mechanical operation undergone by the log is specific machining at the end, in order to obtain pre-fabrication for easy assembly on site.

This avoids all the usual operations usually carried out for structural beams, both in the 1st transformation of wood (sawmills: debarking, sawing) and in the second transformation of wood (planing, gluing, multiple machining). A large part of the grey energy of all these unrealised transformations is avoided.

From an ergonomic point of view, the complete trunks fit perfectly into the Pairi Daiza site, both by their natural side, reminiscent of their primary functions as "trees", and by their design side, bringing the spirit of nature absolute broadcast by the animal park.

Implementation innovation: a mobile factory

The second innovation saves energy and greenhouse gases related to transport. Indeed, on the wooden structure come the solar panels, which need to be assembled together and positioned optimally on the supporting structures.

In order to optimize transport and handling related to solar panels as much as possible, Préfabois has designed a mobile factory, which has been positioned in a temporary structure on the very site of construction of the future car park. In this mobile factory, all the solar panels were assembled on specially designed solid wood profiles, elements which were placed directly on the load-bearing structures in trunks.

A significant challenge, which made it possible to assemble all the solar panels on site, avoiding a lot of bulky transport, and guaranteeing an optimal quality of assembly (given the fragility of certain elements, the risk linked to transport no longer exists and the concern for material rationalization extends here to the non-reproduction of elements).

From innovation to the environment: well-being

These innovations and processes have allowed a beautiful integration of the solar carport in its immediate environment. On the one hand, by the visual integration of the structure in wooden logs, hyper natural. On the other hand, by the recovery of rainwater via a well-designed system, which makes it possible to redistribute this rainwater to areas that can accommodate a beautiful biodiversity, visible from the arrival of visitors even before entering the park. Finally, the creation of solar carports also has a shading function above the car parks, which makes it possible to limit the increase in temperature in the vehicles.

Bet held

Pairi Daiza now welcomes its visitors in a car park equipped with a solar carport on 10 hectares. All the current electrical needs of the park are covered by these photovoltaic panels. The surplus electricity (approximately 20% in 2022) produced at Pairi Daiza is reinjected into the network.

Pursuing its objective of becoming a 100% green Park within 10 years, Pairi Daiza launched in 2022 the construction of the extension of its photovoltaic installation.

From the end of 2023, an additional 31,036 photovoltaic panels will be commissioned. Thanks to larger and more efficient panels, this photovoltaic extension will have a power of 20,500 kWp. The new installation will produce 19,800 MWh/year. This green energy will be used on the one hand to cover the energy needs of the new worlds under construction in Pairi Daiza and the balance will be reinjected into the network. Pairi Daiza will contribute even more significantly to the local production of green energy in Wallonia. By the end of 2023, the total installed power of the Pairi Daiza solar car park should reach 45 MWp, which should make it the most powerful solar car park in the world.

Progress Status

Delivered

Data Reliability

Self-declared

Funding Type

Private

Website Enterprise / Infrastructure

<https://www.perpetumenergy.com/project-pairi-daiza/>

Sustainable Development

Attractiveness :

One can consider users and stakeholders.

Among the users, consider the visitors of the animal park, the staff and the management of Pairi Daiza.

Visitors are the direct beneficiaries of the carport. The shaded parking function, which provides them with easy parking on the one hand and the comfort and well-being of the shade shelters on the other, is greatly appreciated. In addition, the natural appearance of the structures wins the support of visiting users, as do the charging terminals for electric cars arranged under this photovoltaic carport.

The management of Pairi Daiza has clearly expressed its desire to repeat the project in phase 2. Let us repeat below what Mr. Eric Domb, president and founder of Pairi-Daiza, declared in the press release on this subject: *"We are convinced of the need to mobilize for the planet. We also believe that everyone, at their level, can become an actor. We are already in favor of animals, those who are in danger in nature and those who live closer to us. We also want to act to limit the impact of our activities as much as possible and show that it is possible. The deployment of this solar car park is fully in line with our desire to be a 100% green Walloon Park and company in less than ten years."*

In addition to the satisfaction of their visitors, the animal park is delighted to have become a producer of green electrical energy, and to produce a surplus of 20% and to inject it into the public network.

The extension of the solar carport will on the one hand cover the energy needs of the new worlds under construction in Pairi Daiza and the balance will be reinjected into the network. Pairi Daiza will therefore contribute even more significantly to the local production of green energy in Wallonia.

Among the other stakeholders, two other companies: Perpetum Energy, which ensures the installation and operation of the solar carport, and Green4Power, an ethical investment vehicle 100% dedicated to the financing of projects in the field of renewable energies.

These two companies are proud to contribute to the environmental objectives of Pairi Daiza. This is totally in line with their missions to support industrialists and large consumers, to reduce the carbon footprint of their energy consumption as much as possible, by offering them third-party investor formulas.

Finally, the Préfabois company, which works for Perpetum Energy in the design and operational construction of the carport, is very proud to have provided innovative solutions such as the use of logs, made of biosourced materials, resource savings, sequestration of carbon or even the mobile factory for the assembly of the panels.

Well Being :

The well-being provided by this project is threefold.

The first is an element of comfort: the shade provided by the carport for visitors to the park. During high summer temperatures, this aspect is greatly appreciated.

The second well-being is aesthetic and linked to the very natural wood look of the carport, with in particular whole logs used, offers an atmosphere in line with one of the wishes of the animal park: to advocate harmony between living beings and their environment. .

The last element providing well-being is more subtle and linked to the production of green energy. The 20,000 MWh/year produced is as much energy produced naturally, without the greenhouse gases that would have been released for the same production via a turbine-gas-steam system. It is estimated that 6,800 tonnes of CO² emissions have been saved in this way. What is good for the atmosphere is good for our health, whatever the scale.

Social Cohesion :

Although infrastructure is more focused on services and the environment, it can be given two roles that strengthen social ties.

The first is related to visitors. After parking their vehicle under the carport, visitors are encouraged to go to the entrance to the animal park, following a clear and predefined route. This brings families, or groups, together as they move to the entrance and waiting area. Friendly exchanges often take place there.

We should also underline the social link that has been created through the companies working on this project. A real emulation took place, allowing to work together, in a transversal way. The different entities worked in good coordination with the Park and all the companies involved, and more particularly Perpetum Energy and its partner Préfabois, and exchanged regularly, at different levels. Even if it joins the economic pole, one cannot deny the social links which were created and made it possible to reach this high quality.

Preservation / Environmental Improvement :

The car parks and solar carports have been set up on Pairi Daiza land directly adjoining the enclosure of the animal park.

The access roads and car traffic have been planned in bitumen, in order to guarantee a long life (and therefore avoid repeated works, which is in itself also ecological), this implies a partial waterproofing of the project areas. The other areas and infrastructures have therefore been designed to take into account and compensate for this aspect and to respect biodiversity as much as possible.

First of all, all the parking areas were made with stones, in order to allow rainwater to percolate naturally into the ground. Indeed, the carport structures supporting the solar panels are not designed to be waterproof, they however present a partial shelter for the rain in addition to their shading function.

The tree logs, present on two sides of the parking areas, have been specifically preserved for biodiversity and for the natural shade they provide. In addition, plants on the ground or in large planters have been scattered around the carports, so as to create greenery and refuge areas for insects and other small animals.

Resilience :

Two principles have been taken into account for climate change.

The first is to limit overheating by improving user comfort, thanks to the shade structures inherent in the project. Shading is a direct induction of solar carports, and the first effect visible to users. Returning to your vehicle at the end of the summer day, when the sun has been at its zenith, is much more pleasant if it has been located in a shady place.

The second principle concerns heavy rains and the evacuation of water to avoid flooding. Indeed, solar panels and roads, even if they are not designed to retain rain, involuntarily form a water retention surface. To take this point into account, drains have been installed along the roads and car park access roads, in order to collect rainwater and direct it towards valleys and rainwater retention basins. These storm basins make it possible to drain the car parks in the event of heavy rain and to avoid the risk of flooding in this area or around the park.

Responsible use of resources :

Pairi Daiza's requirements in terms of sustainability and environmental protection led to in-depth reflection within the Perpetum Energy consortium and Préfabois, their "wood" partner who designed and built the carport.

Specific goals: to use local wood, to optimize the wood material, to reduce the loss of raw materials as much as possible, to reduce the consumption of embodied energies. This in-depth reflection on eco-design has given rise to two innovative processes, designed and implemented by Préfabois specifically for the construction of the Pairi Daiza solar carport.

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Eco-designs that have made it possible to optimize and minimize resources, while offering the possibility of producing green energy on a large scale.

Testimony / Feedback

Luc Leenknecht, CEO-founder of Perpetum Energy: "We are proud to contribute to the environmental objectives of Pairi Daiza. This project is totally in line with Perpetum Energy's mission: to help manufacturers and large consumers reduce the carbon footprint of their consumption as much as possible, by offering them, as a third-party investor (off-balance), an optimized mix of multi-technology solutions such as photovoltaic, wind, energy storage, ... "

See video presented below, also explaining the project

Video testimony from ORES.

Eric Domb, president and founder of Pairi Daiza: "We are convinced of the need to mobilize for the planet. We also believe that everyone, at their level, can become an actor. We are already in favor of animals, those who are in danger in nature and those who live closer to us. We also want to act to limit the impact of our activities as much as possible and show that it is possible. The deployment of this solar car park is fully in line with our desire to be a 100% green Walloon Park and company in less than ten years".

Jean-Benoît Sepulchre, operational manager of Green4Power: "The financing of the extension of the Pairi Daiza solar power plant illustrates the winning formula that Green4Power is putting in place with its partners: enabling Pairi Daiza to fully assume its environmental responsibility by preserving its capital and other resources for the development of its core business; while Green4Power ensures the financing and operation of the solar power plant in the long term thanks to the resources and skills at its disposal. This second Solar Car Park joins its eldest in the fast-growing Green4Power portfolio".

Laurent Riche and Patrick Moutschen, CEO-founders of Préfabois: "The design of the Pairi Daiza solar carport is an environmental and philosophical achievement. Our goal was to use local wood, minimizing waste, maximizing material. The use of logs made it possible to avoid 50% loss of material, while retaining its power to sequester carbon. The project, carried out in very short circuits, going as far as installing the solar panel assembly plant in the parking lot itself, is an edifying response to the rationalization of transport and resources. We are very proud to have brought these solutions to Parc Pairi Daiza. »

Governance

Pairi Daiza

Holder Type : Private Company

Perpetum Energy & Préfabois

Builder Type : Construction Industry

Green4Power

Manager / Dealer Type : Private

Since 2018, Pairi Daiza has set itself the goal of being 100% green by 2030 - 2032. A first step was taken in 2019 with the commissioning, by Perpetum Energy, of a gigantic photovoltaic installation in the car parks of the Park.

Thanks to the solar carport project proposed by Perpetum Energy, and its version in biosourced materials optimized by Préfabois, the project not only brings a good energy result, but has taken up the challenge of building it with strong environmental solutions.

This installation of 62,750 panels spread over just over 104,000 square meters produces 20,000 MWh of green electricity per year. The Park is therefore self-sufficient in net worth. And the excess energy (about 20% in 2022) produced by Pairi Daiza is reinjected into the network.

The investment is financed by Green4Power, an investment vehicle owned 70% by Perpetum Energy and 30% by Socofe. This ethical investment vehicle is 100% dedicated to financing projects in the field of renewable energies.

Green4Energy also manages the operation of the solar power plant.

Business Model :

Pairi Daiza is the driving force behind the project, owner of the land and the car park. It benefits from the green energy produced for all its infrastructures, with a declared self-sufficiency.

Perpetum Energy is the designer, builder (with its partner Préfabois), operator of the photovoltaic installation, for which it also provides monitoring and maintenance after commissioning. He subcontracted the wood design, the installation of the local wood carport and the installation of the solar panels thanks to the mobile factory to the wood builder Préfabois.

Green4Power is the third-party investor, which finances the operation, manages the operation of the solar power plant and in doing so allows Pairi Daiza to optimize the energy produced by its own infrastructures, while returning the surplus to the network.

Sustainable Solutions

Solar carport in local and optimized wood

Description :

A wooden solar carport structure, using notched logs, in order to optimize the raw materials and limit the production of embodied energies as much as possible. For large-scale projects, a mobile factory is set up for the on-site assembly of solar panels. The solution to couple the production of green energy with the advantage of wood to store carbon, for a greener planet.

- Parking management
- Renewable energies
- Low-carbon materials/ infrastructure



Company (es) Website :

- Parking management
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Photo credit

Perpetum Energy - Préfabois - Pairi Daiza

Reasons for participating in the competition(s)

Présenter le carport solaire de Pairi Daiza aux Green Solutions Awards était une évidence. L'essence même du projet est une démarche positive et innovante pour l'environnement.

Tout d'abord, la fonction même de l'infrastructure est la production d'énergie renouvelable à grande échelle, afin de rendre le parc animalier autonome en énergies. L'aboutissement du projet est un succès, puisque les 20.000 MWh/an produits dépassent de 20 % les besoins énergétiques du parc, ce qui permet d'alimenter le réseau public en énergie verte locale.

Mais ce projet va plus loin puisqu'il s'intègre dans la stratégie globale de Pairi Daiza en matière de développement durable. Il fallait trouver des solutions pour minimiser son impact environnemental dans la construction de son infrastructure. Pour ce faire, Pairi Daiza s'est adjoint les compétences d'entreprises locales (gestion solaire : Perpetum Energy et son partenaire Préfabois : entreprise de construction bois) afin de travailler le plus possible en circuits-courts.

Des solutions innovantes, amenée par l'entreprise locale Préfabois, ont permis de rationaliser les quantités de matières utilisées, les consommations en énergies grises, sur deux niveaux.

Le premier niveau exploité est l'éco-conception de la structure portante du carport, qui a été réalisée en bois, matériau biosourcé, renouvelable et recyclable. La fin de vie a été anticipée car elle est entièrement démontable, ré-utilisable et recyclable. L'éco-conception s'applique à l'utilisation des matériaux bruts, de grumes, afin d'éviter les usinages (qui consomment de l'énergie grise), de diminuer les déchets, et d'économiser la matière première. Enfin, l'éco-conception s'est fixée sur un approvisionnement des bois en circuits-courts, avec des productions situées à moins de 200 km du chantier.

Le second niveau exploité par l'éco-conception du carport est l'usine mobile. L'assemblage des panneaux solaires est réalisé sur site. Plutôt que de multiplier les transports, avec de grands ensembles de panneaux, et les risques qui y sont liés, c'est l'usine qui est venue au chantier. De nombreux charrois ont été épargnés, et autant de gaz à effet de serre qui y auraient été liés.

Le carport solaire de Pairi Daiza, c'est une réussite d'infrastructures énergétiques autonomes, c'est aussi un symbole des innovations environnementales simples et performantes réalisées par des entreprises locales.

