LE PRÉSAGE

Restaurant propulsé au soleil

Testing phase of the first solar restaurant of France (Europe)

Pierre-André Aubert

Association Rêves Germés – Restaurant Le Présage

http://restaurantlepresage.fr

contact@restaurantlepresage.fr

+33 (0)6 17 941 942

Abstract :

The solar restaurant project « Le Présage » aims at being the first solar powered restaurant of France, Europe, and thus at demonstrating the viability of solar cooking for catering business in a developed country like France.
Pierre-André Aubert, founder of this project, graduated first in aerospace engineering and then turned to become a cook, getting a professional certificate in 2010 and working as a cook since.
For the last 3 years, he developed the concept of a solar restaurant and build a new type of professional stove for French style cuisine which works as a receiver for a 8sqm Scheffler Reflector thanks to a new design of the secondary reflector. This stove is fitted with a cast iron cooking top that graduates in temperature from cool to hot across its span and it allows the cook to work with the sun just as he would on a normal gas stove in a professional kitchen.
The project raised last year enough money through a crowd-funding campaign to launch a testing phase in the form of a two months period open-air 25 seats restaurant in the South of France, running from the 7th of October 2016 to the 4th of December 2016.
This testing period, still ongoing, allows the project to gather valuable measurements on both the technical, economical and human resources model of the future restaurant.
This paper will present the stove, the set-up of the testing phase and its environment, the results of the testing phase (number of meals served, customer quality survey, economics of the restaurant, media coverage) and the perspectives it offers.
The author believes that a successful solar restaurant in France will definitively be a major help for the advancement of the Solar Cooking movement as it will open minds and offer new opportunities in countries that still not consider the potential of Solar Cooking.

Key words :

Solar restaurant, western style cooking, advocacy, gastronomy, Scheffler

LE PRÉSAGE

Restaurant propulsé au soleil

Testing phase of the first solar restaurant of France (Europe)

Pierre-André Aubert

Association Rêves Germés – Restaurant Le Présage

http://restaurantlepresage.fr

contact@restaurantlepresage.fr

+33 (0)6 17 941 942

1. Introduction

After being graduated in aerospace engineering and working in this field for 5 years in France and abroad, notably 2 years in India, the author decided in 2010 to give a new orientation to his career, starting over as a craftsman by getting a professional culinary degree and working as a cook since.

By learning the way cooks do cook in professional restaurants and thanks to a natural curiosity, the author looked at the already existing solar cooking systems but could not find what he was looking for as a cook. He therefore decided to build this new solar stove that would power his kitchen. And thus begin the solar restaurant project “Le Présage”.

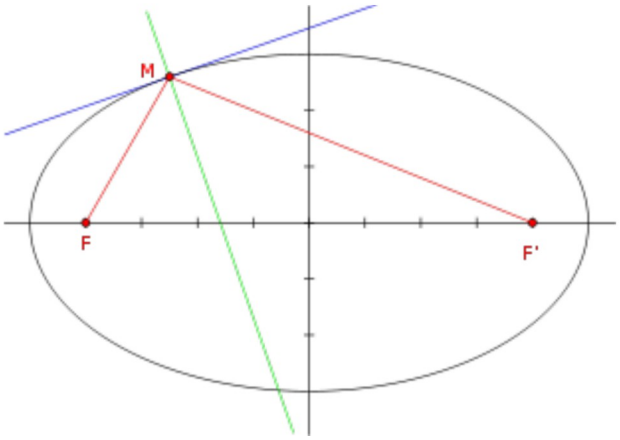
2. The stove

In order to represent a credible alternative, this new stove has to be designed in such a way that cooks would find back instantly their habits and ways of doing. In a professional kitchen running western style cooking, the central stove allows either to cook simultaneously several dishes at different temperatures or to move a pan from the hot spot to a lower temperature across the cast iron top.

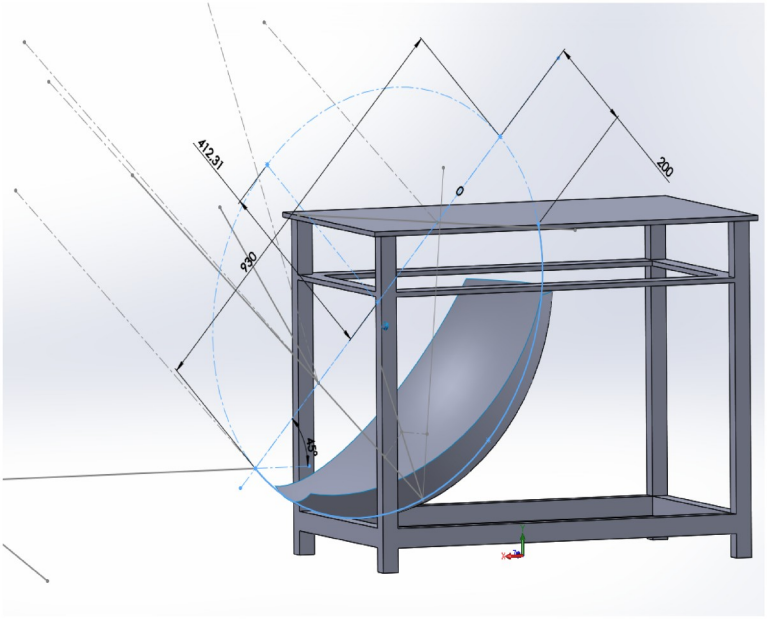
The cast iron top generally measures 100 cm by 60 cm and the hot spot diameter is about 35 cm and would reach up to 500°C for a professional gas stove.

While researching solar concentrating system, the author came across the “Scheffler” parabolic design and its unique balance between power and usability. The fix focus feature allows to build a static stove and to work inside a building (the kitchen). Moreover the needs of power calculated by the author matched the performance of a 8 sqm reflector.

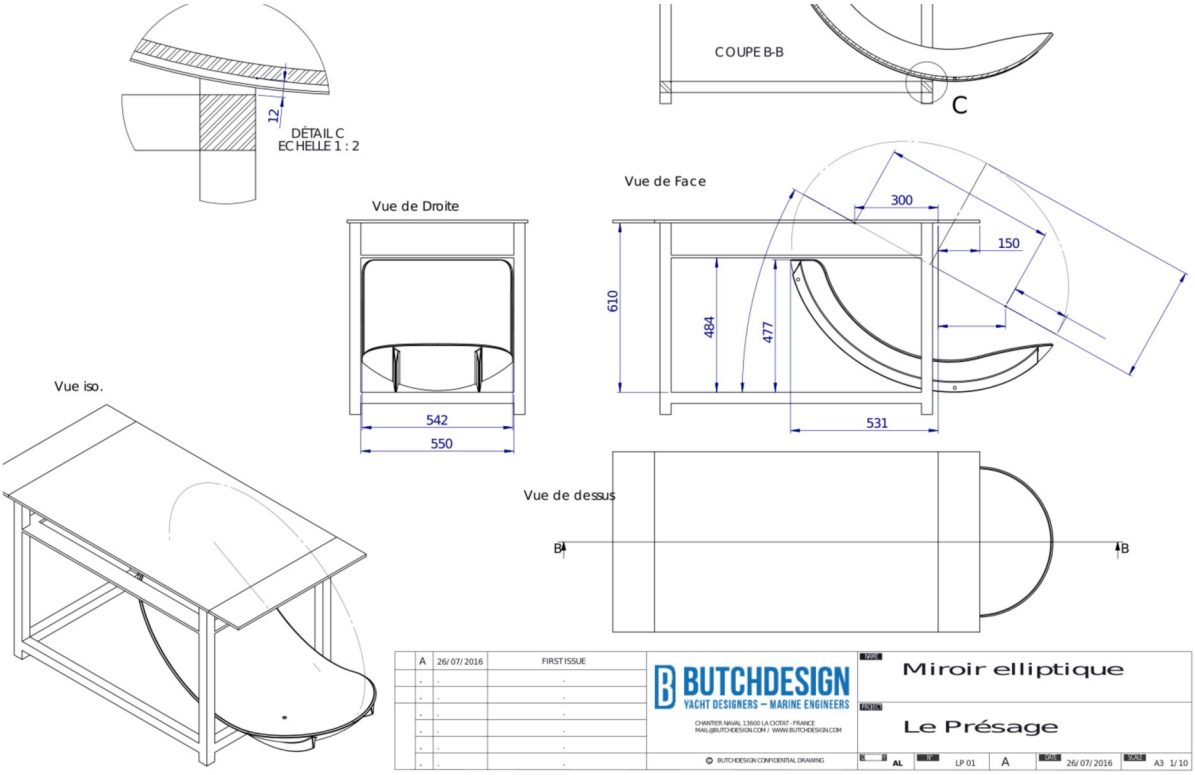
Working in partnership with Dr. W. Scheffler and H. Hoedt from Simply Solar, an old reflector was refurbished and brought back to France to start building the new receiver.
As the goal of this receiver is to heat a cast iron plate as high as possible (around 500°C), a new design of the secondary reflector was needed in order to keep the focus as small as possible.

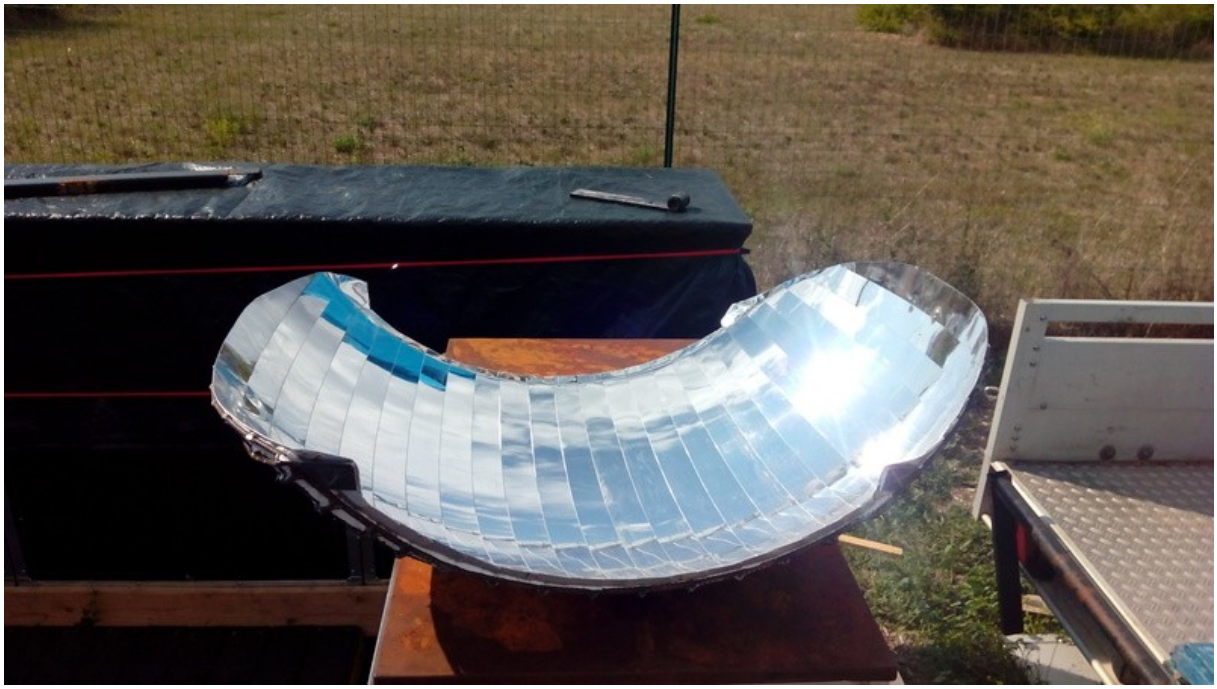


As per our setup, the secondary mirror had to be an ellipsoid according to the peculiar reflexive property of an ellipse. Indeed, any ray of light that would pass through one focus will reflects off the inner surface through the other focus.



The secondary reflector has to be installed in order to get the second focal point in the middle of the plate on its width and in one third on its length so that the range of temperature is optimal.





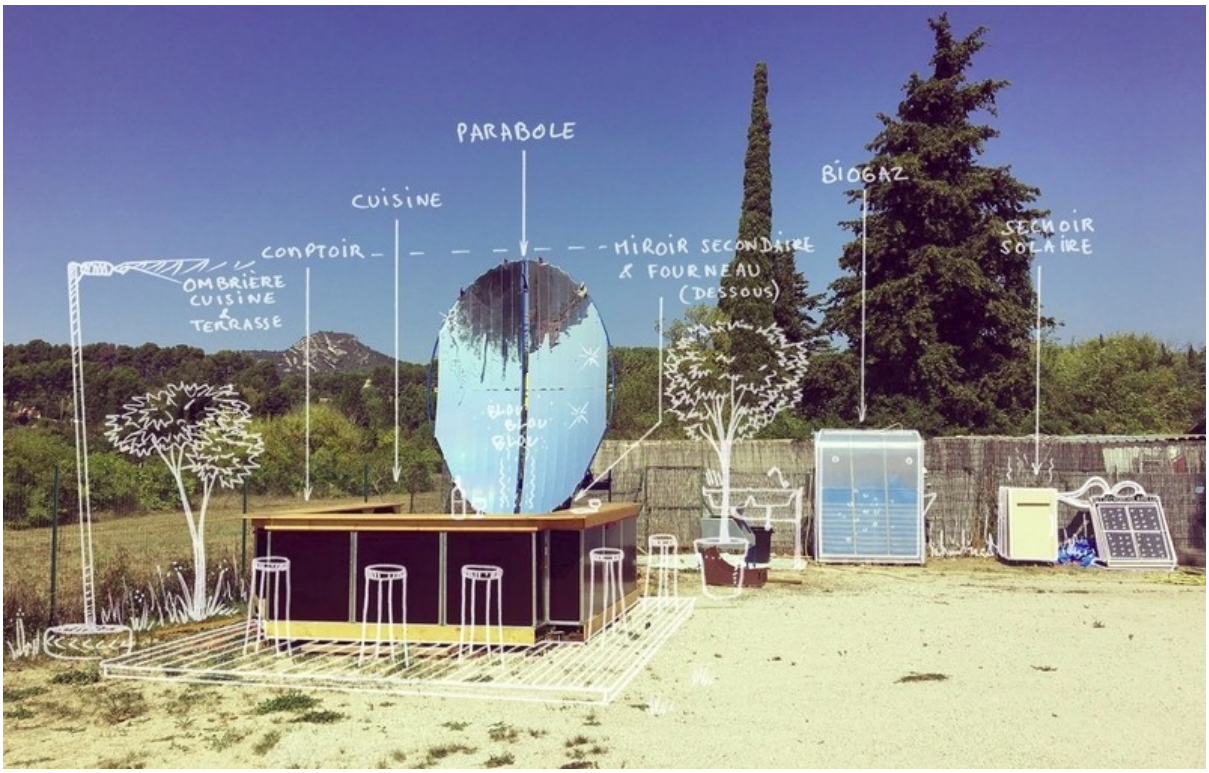
The secondary reflector made of aluminum sheets and fitted into the stove.

Performances of the stove :

After a warm-up of 35 minutes, the cast iron plate get to a temperature of 450°C on its hottest spot decreasing to 125°C on one end and 80°C on the other end.
It allows the chef to manage several dishes at one time as well as to keep warm or roast and thus to prepare a sophisticated meal for at most 25 people.

3. The global setup

The testing phase of the project took place in Aubagne, a small town near Marseille, in the sunniest region of France on the Mediterranean coast.



The test field is located on a fairly busy road which makes it easy to found but adds disturbances while the surroundings around are beautiful green fields.

The test kitchen itself is not really handy. For example there is no water in the kitchen ; the nearest water is in the dish-washing room, some 50 meters away from the kitchen. There is no shelter above the kitchen and the open-air dinning room so the team has to cover the kitchen to protect it from rain and dew at night. The tables and chairs also need to be stored inside.

The result of this testing phase will be analyzed with respect of this difficult conditions of work, especially regarding the wage cost.

4. Results

Throughout the experimentation, data were gathered in order to plan the future restaurant.

On a technical side, the stove reacted as expected, for temperature and capacity. Some improvements need to be done like to add an oven, to make it more practical and easier to clean or to build in a warming drawer.

The testing phase ran from October 7th to December 4th and the restaurant was open every sunny day, that is 32 days of opening.

In order to run the kitchen, one cook and a volunteer is needed every day.

328 paid meals were served for a turnover of 6116€ and 5360€ of prime cost. This prime cost includes the cook's wages but not the volunteer. The extra load of work carried out by the volunteer comes from the peculiar conditions of the experimentation and could be avoided by improving the test kitchen and making it more practical.

The economic results of the experimentation shows a slightly lower ratio than the one expected for the catering business but this can be explained by the significant amount of gifted meals to guests and staff linked to the context of the experimentation. This ratio could also be improved by a better sourcing of raw materials.

A quality survey has also been conducted during the experimentation. Out of the 328, 142 people filled a questionnaire regarding their acceptance of the concept, the time they have to eat or the amount of money they were ready to give for such a meal in the future restaurant.
The results are very encouraging as the guest were all pleased with their experience, the tasteful cuisine and the conviviality they felt.

It also shows that people would like to see this concept becoming a real restaurant and would agree with spending more money for the same service they experienced.

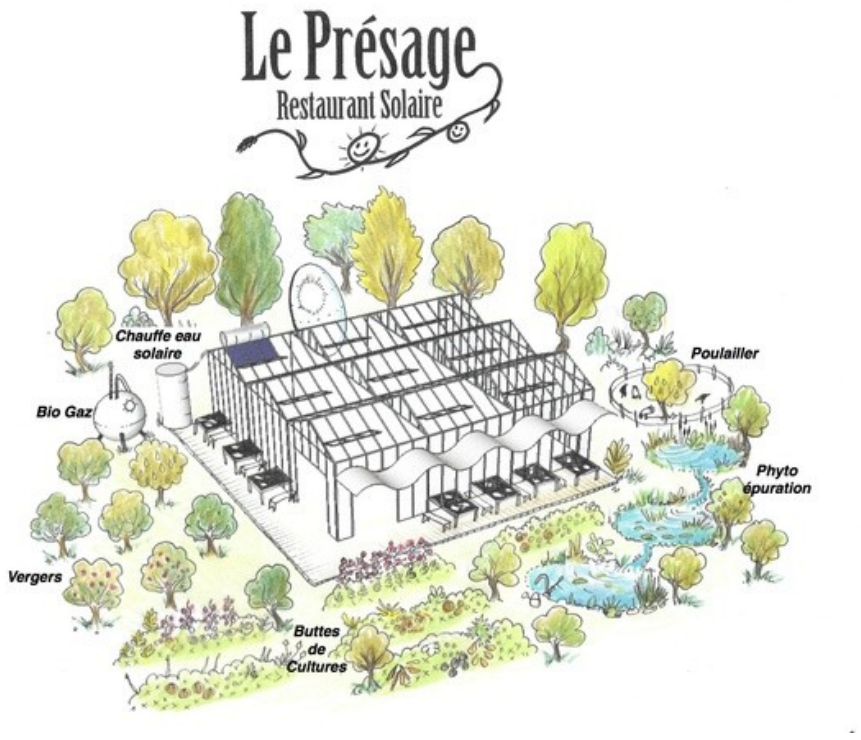
All of this give some confidence on the economic model of the future restaurant. In any case restaurants business is difficult, the profit margins are small so a special attention should be paid to the economic model.

The media coverage has also been outstanding, TVs and newspaper gave good report on the project, reaching a wide audience of nearly 10 millions French people while presenting Solar cooking in a fun, innovative and meaningful way.

Regarding the social media, around 45 000 direct views has been counted since the beginning of the experimentation.

5. Perspectives

This experimentation showed that the technology developed for this project works great, that the economic model has to be refined but is viable and that people in France are hungry for such a restaurant.



This project aims not only at running a restaurant with solar energy but also at integrating a restaurant in a living ecosystem with gardening and integrated waste management (biogas digester, phyto-epuration…) as well as other technologies like solar drying or solar cooling.

The next step is to found the place and the funding to implement this vision. 5000 sqm land is needed and 200 000 € is a minimum to build the restaurant as per the requirements. Thanks to the testing phase, discussions are already ongoing and a second improved test phase is planned for the second trimester of 2017.

Once the first solar restaurant is up and running, it will clearly be possible to duplicate it.

The author believes that the opening of a delightful and successful solar restaurant in France will definitively be a major help for the advancement of the Solar Cooking movement as it will open minds, raise awareness about Solar Cooking and offer new opportunities in countries that still not consider the potential of Solar Cooking.