

# Almanac of the Future

A STORY OF SUCCESS

Motivational Experience No. 46



**SUN BURNS  
FREE**

## **AN INTERNSHIP WITH A CONSEQUENCE**

*In the highlands, north of the Mexican capital, there is sun all day long, more than three hundred days a year. When Gregorio came from Germany to do a social year in the diocese of Tula, he only knew the climate of his homeland. It became a lifelong challenge for the young man to discover and further develop ways to use the energy provided by nature. He managed to locally manufacture a solar heater, a pioneering model in its time that can still be found on the roofs of many hotels and residences in the area.*

*Since then, inventions have become the guiding thread of Gregorio's life, a self-taught man with a long life. With his company Trinysol, he remains true to his motto: "Concentrated solar power for everyone and everywhere", with unique approaches.*

During his last year of school in Xanten, a town on the Rhine River in Germany, Gregorio had already told his parents that he did not plan to do his military service but to dedicate this time to a year of social service. What he had not told them was that he wanted to do this social service in Mexico, since the Diocese of Münster in Germany was offering places for this type of volunteer work in its sister diocese of Tula in Mexico. It was only when the young man received the news that he had been accepted to travel and begin his social service in Mexico that he spoke to his parents. After an initial shock, they accepted the idea that the youngest of their children would be away from home for a year. Gregorio, quite friendly, remembers his youth: *"The preservation of creation and the care of the environment were my themes"*.

His first job as a volunteer in Mexico was to accompany the construction of energy-efficient ovens for farming families.

These ovens, in addition to saving firewood as an energy source, avoid the slow smoke intoxication of peasant women during the cooking of meals. The costs for the construction of these ovens were covered by the parish priest with donations from Germany. Gregorio got used to the work so quickly that he was already thinking about two things. On the one hand, he questioned the fact that donations were covering what the beneficiary families, appreciating this type of oven, were willing to assume, at least in part. This issue, after long discussions with the parish priest, Gregorio's fellow countryman, was put into practice; showing that Gregorio's hypothesis was well founded since there were families who benefited, who assumed the costs one hundred percent. The other question that the young volunteer asked himself was, what if there was a way to take advantage of the radiant sunshine every day to cook? For Gregorio it was a fact that "sun burns free".

By looking around, Gregorio found a viable formula: a solar stove with reflectors. Through other volunteers in

the diocese, Gregorio had learned about the metalworking shop run by German missionary brothers in Cardonal, another parish in the diocese. Gregorio recalls: *"With a sketch I had drawn, I went to the workshop in Cardonal. The idea was to order the complete construction of the solar stove or at least the metal parts to assemble the stove."* Months passed, but nothing. The workshop had not paid much attention to the volunteer boy's idea of a solar stove. Finally, Gregorio himself, with the help of the people at the workshop, began to manufacture the parts for the solar stove. The reflector plates were brought by Gregorio's parents from Germany when they came to visit. In no time the boy put together the small parabolic dish with the reflector plates, which reflect the sun's rays concentrating them to a single point in the center of the dish. The experiment worked, cooking with the solar stove. But Gregorio and the other people involved found several disadvantages to this trial: there is only room for one pot, the entire cooking time is exposed to the sun, and the taste of the food prepared in the solar

stove is somewhat different than usual because of the penetration of the energy to the entire pot and not just the base as in the case of a stove or oven. Standing in the sun outside the house is not customary in Mexico, especially for cooking, and the reflector had to be adjusted every 15 minutes towards the sun. The social year in 1999 ended quickly for Gregorio: *"I was very intrigued to build a solar heater during this first phase of my stay in Mexico, but time was not enough. What I did have time for was to support the creation of a women's cooperative, which processes ixtle, the agave fiber used for bath sponges. This cooperative is still going strong today"*.

## **BETTING ON THE SOLAR HEATER**

Gregorio's university career in Germany included an internship overseas and after six semesters of university in Cologne, Gregorio returned to Mexico and Cardonal. He had used his last years in Germany to gain more technical knowledge. Instead of working as a



waiter, he worked as a plumber's assistant during university vacations and learned how to weld; he also learned a lot about solar heaters and became interested in solar reflectors, reviewing the literature of the expert in this field, Wolfgang Scheffler. During Gregorio's internship – by the way, it is a life-long internship since Gregorio has been living in Cardonal for almost twenty years – the metal-mechanic workshop in Cardonal became the epicenter of the young man's activities. Gregorio's talent as an inventor and engineer-builder became evident very quickly. He won the bet with the missionary, in whose parish he had lent his social year as he succeeded in manufacturing the first solar heater in all of Mexico. The Trinysol own-brand model is in the local and regional market to this day. The first example was installed, true to the bet, on the roof of the missionary priest's house. Despite the good performance of the model, there was no demand due to the very low price of gas at that time and only when gas went up in price, the solar heater became attractive. Trinysol began to sell a good number of copies until models produced in China, which cost



half the price, began to flood the markets in Mexico. *"The important thing, at the end of the day, is that people have access to clean energy,"* says Gregorio.

The sun, related to the energy theme, is definitely the common thread of the inventions, adaptations and progress that Gregorio has achieved in his career. In 2006 Trinysol was born, Gre-

gorio's own workshop, dedicating the name of this enterprise to his wife Trinidad. *Trinysol - Energy - the sun burns - use it* is the company's slogan, from the very beginning. *"In the beginning, we had to build doors and windows, often improvising the work with the little machinery we had,"* recalls Gregorio. They moved around a lot in the region to promote their solar heater prototype, which gradually began to be in demand.

## **SOLAR REFLECTORS AND THERMAL ENERGY**

Trinysol's brochure expresses what Gregorio's mental map is in terms of sun and energy: to take advantage of the 300 plus days of sun per year in Mexico, generating his own energy, daily and directly on site. The idea is to supply energy from solar reflectors, thus obtaining energy independence, zero emissions in the generation process, achieving a return on investment in only 3 to 4 years, with a useful life of more than

25 years. For Gregorio it has been key from the beginning to be able to demonstrate the functionality in real time in a pilot plant of solar reflectors. Making extraordinary efforts, both technically and economically, Gregorio first installed 8 solar reflectors with a surface of 16 square meters each, and then another 12 reflectors, whose installation has not yet been completed. Everything is located on his property, Finca Castel de Oro in El Sauz, municipality of Cardonal, in the heart of the Mezquital Valley. The design, construction and installation of the plant amazed not only the leading expert, Wolfgang Scheffler, but also a multitude of mechanical and energy engineers.



The solar reflectors work for 8 to 10 hours, taking advantage of the sun's rays, and are moved by sensors according to the course of the sun. The parabolic shape allows a concentrated reflection of the sun's rays at a point where they easily reach a temperature of 1,000 degrees Celsius. This temperature causes the immediate vaporization of the water, inside a closed system, allowing the generation of a pressure of more than 10 bars in the closed circuit, storing this pressure in a reservoir tank. The tank has in this solar-thermal energy system the function of a battery, allowing the storage of energy for a few days.

With this energy, Gregorio guarantees the operation of an industrial still with a capacity of 600 liters, producing distillates of fine pulque, fermented from maguey mead as well as from prickly pears of a nopal cactus, a variety of cactus typical of the region. For the production of sweet mead in industrial pots as well as for the baking oven, the energy produced by the system of reflectors and solar concentration is

also used. *"The range of productive branches for a solar reflector system is very attractive, it includes the food and bakery sector, dairy products, textiles, distillates, among others"*, Gregorio explains and continues: *"you can also opt for a modular installation, expandable according to the energy needs of the business"*.

## **THE BEGINNING IS ALWAYS DIFFICULT**

So far there have not been many solar reflector plants that Trinysol has been able to design and install, but Gregorio feels a great certainty that this will change soon, having the pilot solar park in El Sauz one hundred percent operational. In fact, there are many advantages for choosing to substitute the energy source in the processing and production phases, migrating from gas, diesel or electric current to thermal energy, generated by solar reflectors: environmentally friendly, energy savings and zero emissions, low cost and easy return on investment. Despite

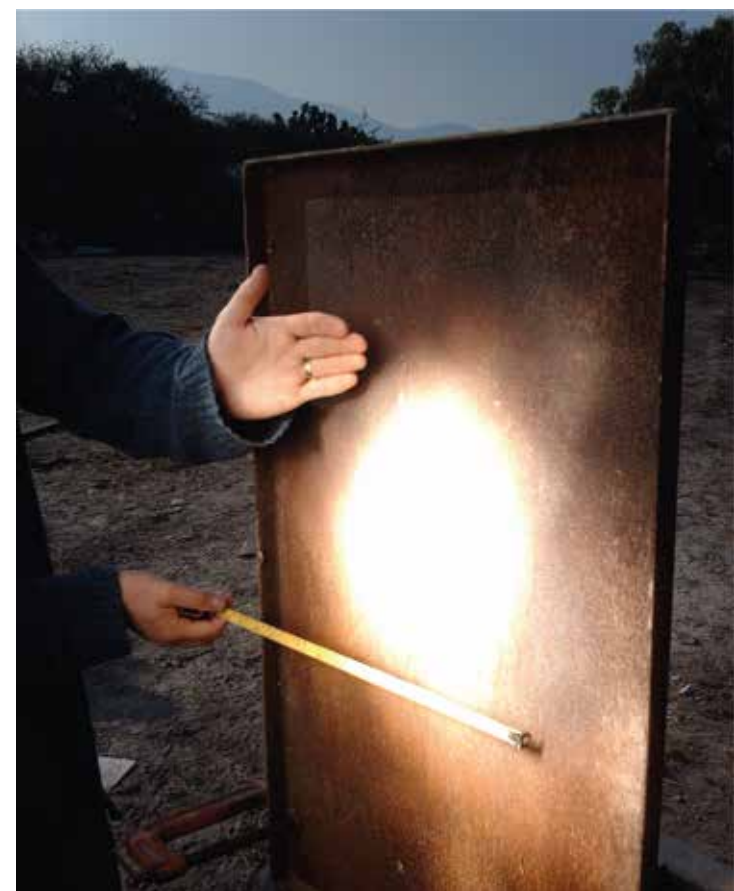
the current start-up phase - Gregorio has taken over the metalworking shop in Cardonal on loan from the dioceses of Tula and Münster - it is clear what Gregorio is looking for: "My aim with the shop and Trinysol is not just to guarantee jobs, but to develop energy technology that is adapted to the context, the environment and the culture of the people in the region. In my opinion, solar reflectors help rural people to guarantee their livelihoods, based on ancestral knowledge and complemented by techno-energy innovations".

Juan Trejo is Gregorio's running mate; between the two of them they started the Trinysol workshop and shared the design and installation of the solar reflectors for the Castel de Oro farm. "So far our workshop is in demand for agricultural machinery, but I share Gregorio's opinion that we need to focus more on the mass production of solar reflectors; this would help to lower costs and be able to respond to larger orders". Gregorio adds with a knowing smile: "We have not yet made more advertising for

the reflectors because it is not easy to have a larger stock of raw materials to produce several reflectors in parallel. But that's exactly where we are now".

## DISCLOSURES

At the Castel de Oro farm, where Gregorio lives with his family - the motivational experience no. 44 'Menthi Goyo' of the Almanac of the Future talks about this in greater detail - the facts speak for themselves. Thanks to the energy source of solar reflectors, the mead from the maguey is processed into a delicious sweet, which can even be consumed even by people suffering from diabetes. The distillates of pulque from maguey and prickly pear cactus have just won silver and gold medals in 2022 at a world festival of distillates, which takes place annually in Brussels. The production costs for both honey and distillates would be different if traditional energy sources were to continue to be used: financial costs due to con-



ventional energy prices, environmental costs due to the depredation of woody material to obtain firewood, and socio-cultural costs due to abandoning millenary ancestral agriculture, adapted to the eco-region and guaranteeing a friendly and resilient use of a semi-desert eco-cultural landscape.

For Gregorio, technology and innovation should strengthen culture, identity and territory, welcoming modernity instead of declaring modernity as Noah's ark even when there is no direction.



## MESSAGES TO THE FUTURE

The critical path for any technology, energetic or not, must be adapted to the context, the environment and the culture of the people and not the other way around.

The preservation of creation and the care of the environment guarantee the sustenance of lives, valuing ancestry and complementing it by techno-energy innovations.

Technology and innovation should strengthen culture, identity and territory by welcoming modernity instead of declaring modernity as Noah's ark even when there is no direction.

# Almanac of the Future

The text was elaborated, based on conversations in situ by Jorge Krekeler (coordinator of the Almanac of the Future - Misereor facilitator on behalf of Agiamondo) in January 2023. A big thank you goes to Gregor Schäpers and María Trinidad Cruz Paredes, with Daniel, Clarissa and David from the Finca Castel de Oro in El Sauz, municipality Cardonal, Valle del Mezquital, Hidalgo - Mexico, for the family welcome and the unlimited sharing.

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