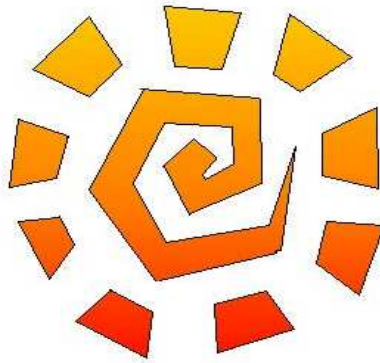


Salud del Sol, Inc.



The Solar Autoclave Joint Venture:
Abridged Business Plan*

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**This document is an abridged version of the complete business plan for Salud del Sol, Inc. from the 2008 Business Plan Competition at the University of Dayton. For the GlobalGiving Competition, we are directing funds received to furthering the research of the solar autoclave through prototyping and testing in Nicaragua during the summer 2009 (see pg. 8, section 3.4 Prototyping and Testing). We are happy to provide more information about our business operations, please send any questions to team@saluddelsol.org*

1. Executive Summary

To many people of the world, electricity is scarce and expensive. The head nurse in the rural clinic in Sabana Grande, Nicaragua does not have on-site access to a medical instrument sterilizer (autoclave). She is required to transport contaminated instruments to the nearby city of Ocotál, complete time-consuming paperwork, drop off the instruments, and then pick them up at another time. The transportation of the instruments involves a bus ride and a long walk from the bus to the hospital in Ocotál. The cost of the bus ride and the cost to sterilize the instruments are not covered by the current medical system. The time spent by the nurse to deliver and pick up the equipment is time that could have been used to meet the needs of patients. Even if the clinic had access to an electric sterilizer, they would not be able to pay for the cost of the electricity to run the sterilizer. At times, sterilization simply cannot happen. One fatal result is neonatal deaths, which stem from poor hygiene during delivery and the first critical hours after birth, accounting for a large proportion of child deaths in developing countries, including Nicaragua. To address these extreme circumstances, Salud del Sol, Inc. is researching a solar autoclave, an appropriate medical instrument sterilizer powered by solar power to enhance the ability of 1,000 rural clinics to provide better health care to Nicaragua's 5,487,000 residents.

Salud del Sol, Inc., meaning “health from the sun,” is an appropriate technology assistance company. The first venture of Salud del Sol, Inc. involves the collaborative research, development, testing, and implementation of a solar autoclave for the rural areas of Nicaragua. Salud del Sol, Inc. conducts the research and development of the product, acts as custodian for intellectual property, secures funding through donations and grants, performs market analysis and development, and provides other advice/assistance for long-term sustainability. The local community of Sabana Grande, Madriz, Nicaragua and Grupo Fenix, a renewable energy program at the National Engineering University in Managua, Nicaragua, is providing product requirements and market analysis for the autoclave. The University of Dayton's School of Engineering Design and Manufacturing Clinic is conducting further design and testing. Las Mujeres Solares (The Solar Women), a nonprofit women's group in the rural area of Totogalpa, Nicaragua, will produce the autoclave for small clinics throughout Nicaragua and eventually surrounding countries. Salud del Sol, Inc. will raise the funds needed through individual, corporate, and nongovernmental organization donations.

As advisors to Las Mujeres Solares, Salud del Sol, Inc. manages a website to promote the research of the solar autoclave, share the stories of Las Mujeres Solares, and in the future will receive donations to distribute solar autoclaves to rural clinics. Las Mujeres Solares will construct the solar autoclaves as they are ordered, and production will be overseen by the current directors of Grupo Fenix and Las Mujeres Solares, as well as by Salud del Sol, Inc.

The initial goal of the founders is to provide funding through sustainable philanthropy sources of individual donors, corporations, and non-governmental organizations. As the solar autoclave joint venture of Las Mujeres Solares expands to the private market, Salud del Sol, Inc. will support self-sustainability of the solar autoclave joint venture through efficient production and sales. This plan is written specifically for Nicaragua with an ultimate objective to reproduce the business in additional locations, scalable as expansion becomes possible once the solar autoclave business of Las Mujeres Solares becomes self-sufficient.

1.2 Vision

To save lives and empower underserved communities.

1.3. Mission

Provide communities in Nicaragua with the opportunity to improve their own healthcare systems while supporting sustainable development that creates jobs for members of these communities.

1.4. Objectives

The objectives of Salud del Sol, Inc. during the first year of the Solar Autoclave business are:

1. To adapt Las Mujeres Solares's Solar Center for the manufacture of solar autoclaves;
2. To create, increase, and maintain a donor base at different levels of sponsorship;
3. To develop an outreach program for Salud del Sol, Inc.;
4. To develop and implement a marketing strategy for the solar autoclave;
5. To complete the product design and verify functionality through prototyping and clinical testing;
6. To release the product; and
7. To build the organizational capacities of Salud del Sol, Inc.

1.5. Keys to Success

1.5.1 Product Design

Salud del Sol, Inc. is developing a solution to a local problem with the solar autoclave. Existing autoclave designs are costly, difficult to produce, and are difficult to operate. The solar autoclave designed by Salud del Sol, Inc. emphasizes low cost, local production, and ease of usability. The product design is simple to produce, encouraging the knowledge transfer to similar environments. Also, the solar autoclave is simple to operate because the amount of user interaction with the sterilizer is minimal.

1.5.2 Salud del Sol, Inc. Website

Currently, the Salud del Sol, Inc. website publicizes the research of the solar autoclave and stories of Las Mujeres Solares. When the solar autoclave design is verified, an option will be made available on the website to donate directly to the production of solar autoclaves. The website will allow donors to see who they are donating to, and how their contributions are being used. After donating \$10,000 worth of solar autoclaves, donors will be able to advertise on the donor website and officially be part of the sustainable development ventures of Salud del Sol, Inc. The website will utilize PayPal TM to simplify the donation process.

1.5.3 Subsidized by Solar Box Cooker Sales

Las Mujeres Solares produce and sell solar box cookers within Nicaragua. The product design for the solar autoclave is based off of the design of the solar box cooker, decreasing the production training needed for Las Mujeres Solares. Because the solar box cookers can be sold in the private market, their sale will subsidize the cost of solar autoclaves to be donated to public rural clinics. Eventually, the private market purchases will completely subsidize the solar autoclaves, creating a sustainable business for Las Mujeres Solares.

2. Organization Summary

Salud del Sol, Inc. handles many of the logistics of the solar autoclave joint venture. Salud del Sol, Inc. provides technical assistance for economic development, conducts the research and development of the product, acts as custodian for intellectual property, secures funding through donations and grants, performs market analysis and development, and provides other advice/assistance for long-term sustainability. As shown below in Figure 1, Salud del Sol, Inc. has plans to implement and oversee multiple joint ventures, which are conducted by local community groups, with assistance from a supporting nonprofit organization in-region.

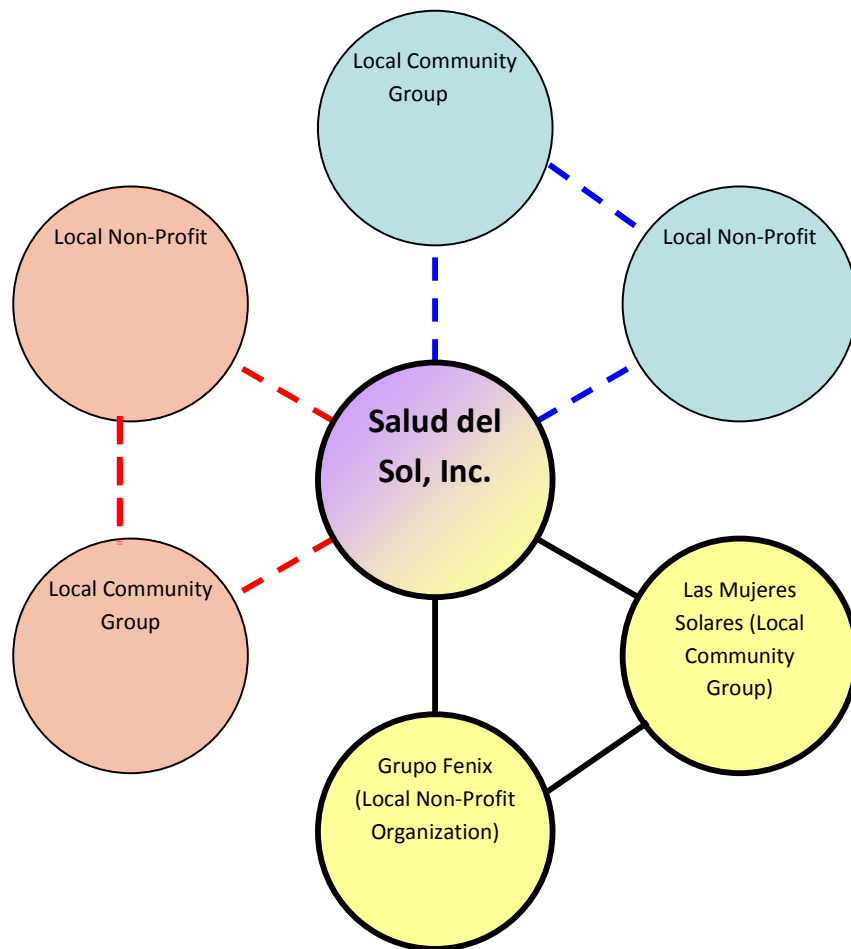


Figure 1. Organization chart.

In the solar autoclave joint venture, production will be run by Las Mujeres Solares (The Solar Women). Las Mujeres Solares is a community group in Sabana Grande, a community in the city of Totogalpa, Madriz, Nicaragua, shown below in Figure 2. It is an affiliate of Grupo Fenix, a program of the UNI (National Engineering University), which has been promoting renewable energy in rural Nicaragua for almost ten years. Grupo Fenix and the UNI are based out of Managua, Nicaragua's capital city. They work with many communities throughout Nicaragua, including Las Mujeres Solares.

Las Mujeres Solares provides encouragement and support to its members, which provides strength to the community as a whole. Among other projects, the women's group is a strong supporter of solar cooking. Most of the women own and use a solar cooker to cook their food, and they promote the use of solar cookers throughout Nicaragua. This is accomplished through simple conversations with other communities, as well as through attendance at countrywide renewable energy and science fairs.

Las Mujeres Solares have completed their largest project to-date with the production of the community building, the “Solar Center” in December 2007. The Solar Center is a solar cooker and autoclave construction workshop completely run on solar photovoltaic energy. The project will eventually include other buildings, such as an adobe pump house, and agricultural projects.



Figure 2. Map of Nicaragua

2.1. Legal Entity

Salud del Sol, Inc. will provide the technical and fiscal assistance to Las Mujeres Solares to produce the autoclaves locally, using locally available materials. They will distribute them to rural clinics throughout Nicaragua, courtesy of donor organizations. The cost to purchase an autoclave will be nominal due to the minimal production cost and by ensuring that the funds stay within the company, rather than going to an investor. Salud del Sol, Inc. is pending 501(c)(3) tax-exempt status which will enhance opportunities for raising funds via grants and charitable contributions

The solar autoclave design will be protected by a Creative Commons License. This license allows the design to be used for not-for-profit use, while preventing use of the design for commercial purposes. Specifically, Salud del Sol, Inc. will be applying the Attribution Non-Commercial Share Alike (by-nc-sa) Creative Commons License to its products. This license allows the design to be shared with others, and it allows others to build upon and improve the design if they attach the same Creative Commons license to their result and give recognition to Salud del Sol, Inc. It also prevents any and all designs, the original design and any alike designs, from being used for commercial purposes. It is recognized internationally and enforced in court. This type of protection aligns with the mission of Salud del Sol, Inc. A patent would not contribute to the mission of saving lives. This "some rights restricted" form of protection is suitable to all parties involved in the solar autoclave joint venture.

3. The Solar Autoclave Summary

3.1 The Problem

Clinics in Nicaragua are not able to sterilize surgical instruments easily because they have no electricity. Workers must travel to the large hospital centers in cities in order to sterilize their instruments, which requires transportation and money, both of which the clinics lack. The solar autoclave solves the problem by utilizing the solar power of radiation from the sun, allowing the surgical utensils to be sterilized relatively quickly, easily, and on an as-needed basis.

3.2 Product Design

The design of the Autoclave will use the solar box cooker, which is very common throughout Nicaragua today. Local community members, including Las Mujeres Solares, currently manufacture the cookers and use them to cook food, roast beans, and boil water. The autoclave will utilize the reflective panels of the cooker (note that there are no solar photovoltaic panels) to reach desired temperatures for sterilization of the instruments.

The design is a pressure vessel design that must sustain a temperature of 121 deg C at 15psi for 15 minutes in order for the instruments to be sterile. It is made using locally available materials, and is simple and inexpensive enough such that the solar autoclave can be constructed by the women of Las Mujeres Solares. The instruments lie inside a metallic cylinder, which is sealed with two “end caps” on either end of the cylinder. The end caps are connected together with four threaded rods, forming a tight seal against the cylinder when tightened. Sterilization will be confirmed using a proprietary sterilization indicator that will be shipped with every solar autoclave.

3.3 Challenges

Creating a product for use in a developing country requires us to include local community members in the research and design to ensure that we are creating a product that is culturally acceptable. Fortunately, solar box cookers are common through out Central America, and most of the developing world, so community members are familiar with the basic technology of the solar autoclave. It is imperative for the product design of the solar autoclave to be culturally appropriate for the local users.

Another challenge is the availability of materials. Las Mujeres Solares can purchase materials from Managua, as well as import materials from out-of-country. The device was designed to minimize the use of these options, as importing is costly.

The third obstacle of the solar autoclave is identifying an alternative source of power when there is no sun to provide thermal energy. In Central America, the rainy season lasts approximately 6 months out of the year, but the downpours themselves only last a portion of the day, leaving the rest of the day sunny. It takes only 15 minutes to sterilize surgical instruments in the solar autoclave (half an hour is reserved for warm-up time to ensure that the temperature is steady). Thus, rainy season is a challenge, but the short time period needed for sterilization bypasses this concern.

3.4 Prototyping and Testing

During the summer of 2009, the solar autoclave prototype will be tested and pilot studies will be run in Nicaragua by a field team of three engineering students and a business student from the University of Dayton and local community members from Nicaragua. Daniel Hensel, Salud del Sol, Inc. Director of Product Research, will lead the research in Nicaragua. Pending testing results from the field, the next step will be clinical testing with a local doctor to prove that the instruments have in fact been sterilized. If successful, the field team will then initiate production, beginning with training the women of the community how to construct solar autoclaves. If the testing is not successful, the field team will pool resources to attempt to achieve a working system by altering the design as needed. The ETHOS field team also plans to provide other services throughout the summer of 2009, such as continuing computer and internet courses for the locals of Sabana Grande, instructing the schools on how to use DAQboard systems for testing, and assisting in various community projects.

3.5 Proprietary/COTS

The solar box cooker itself is proprietary; it is constructed by Grupo Fenix and its cooperating community groups (including Las Mujeres Solares) in Nicaragua. Many of the solar autoclave parts, however, are Commercial-Off-The-Shelf (COTS). This allows production to become quicker, easier to produce, and easier to imitate (all key success factors of the design). Also, the COTS characteristic of the autoclave allows it to be easily adjusted for use in different solar box cookers. Because the box cooker is proprietary, the design of the solar cookers usually varies from region-to-region, but the solar autoclave parts should become relatively standard.

4. Market Analysis Summary

The market segmentation for the solar autoclave and solar box cooker sales requires two approaches: the donor market and the private market. The market segmentation for donation seeking will include small, medium, and large donors to fund the distribution of solar autoclaves to the rural clinics of Nicaragua. While the main objective of Salud del Sol, Inc. is to fulfill the need of medical instrument sterilization in rural clinics, there is an opportunity for growth in private sales. The segmentation of the private sector will include individuals, government, and private hospitals with a budget that allows for the purchase of the autoclave or a solar box cooker.

5. Strategy and Implementation Summary

The solar autoclave joint venture will focus on the production and distribution of solar autoclaves within rural clinics of Nicaragua, courtesy of individual donors, nongovernmental organizations, and corporate sponsors. These will be subsidized by sales in the private market. The private market includes individuals who want a solar cooker to cook food or sterilize water, local governments who want to improve local health and curb deforestation, and private health care providers who want a solar autoclave for backup or emergency situations. Eventually, these private sales will completely subsidize the solar autoclaves donated to the public, socialized health clinics, making the business self-sufficient.

6. Marketing Strategy

Salud del Sol, Inc. will reach its potential market through several methods. One is the website, through which donor organizations can purchase solar autoclaves and donate them to rural clinics throughout Nicaragua. This will be updated on a bi-daily basis, and Salud del Sol, Inc. will continuously work to increase traffic to the site by linking with others and increasing press. Other ways to reach the donor market include presenting the solar autoclaves at national and international symposiums and giving guest presentations at universities and other cultural gatherings. Yet another way to reach the market is through advertisement in periodicals and sending mailings to donor organizations.

The strategy for private market sales varies depending on the segment. For individuals and local governments, the best advertisement is word of mouth. Already, popularity of solar cookers has grown. In-country science and technology fairs also provide advertising opportunities to these segments. To increase solar autoclave sales to private health care facilities, in-country travel and presentations, by Salud del Sol members and by Las Mujeres Solares, are necessary.

7.Management Summary

The Directors of Salud del Sol, Inc.

Lori Hanna, Executive Director

Daniel Hensel, Director of Product Research

Anna Young, Director of Development

Lauren Dokes, Director of Finance

The solar autoclave joint venture will be locally managed by Grupo Fenix and Las Mujeres Solares members:

Susan Kinne, Director of Grupo Fenix and liaison

Mayra Azucena López , President Las Mujeres Solares

Nimia López, Coordinator, Solar Cooker Construction Team, Las Mujeres Solares

Salud del Sol, Inc. Board of Trustees

Gloria Crowe, CFE, Internal Audit Manager for BAC/Credomatic, one of the leading banks in Nicaragua.

Brad Eldridge, CPA, Accountant for Salud del Sol, currently assisting with filing for tax-exempt status within the state of Ohio.

David Ganszarto, CEO of Alternate Solutions Homecare, southwest Ohio's leading provider of home healthcare services. Mentored Salud del Sol during the 2007-2008 University of Dayton Business Plan Competition.

Richard Komp, Ph.D, CEO of Skyheat Associates and physicist within the field of renewable energy. Inventor of the solar autoclave design and guest lecturer for Grupo Fenix, partner organization of Salud del Sol.

Margaret Pinnell, Ph.D, Director of ETHOS program at the University of Dayton and Assistant Professor, Department of Mechanical and Aerospace Engineering at the University of Dayton. Sponsor of the Design Clinic research of the solar autoclave and has traveled to Nicaragua with students.

James Ryan, J.D., Attorney at Bailey Cavalieri, LLC practicing in the areas of commercial lending, retail law compliance and corporate and securities law. Lawyer for Salud del Sol, currently assisting with filing for incorporation and tax-exempt status within the state of Ohio.

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