

Gujarat lost 13 % (100 sq km)
of its forests in the last two!
years due to human activities.
2008 Forest Survey in India (FS)

Installation of the first 50 m² Scheffler Solar Crematorium

April 2008 by Alec Gagneux - www.fairCH.com

1. Summary:

1998 Wolfgang Scheffler started - together with Indian friends - to develop and construct equipments which shall realize the local idea of cremating dead bodies by solar energy. The first 50 m² Scheffler Reflector got installed 1999 on the ground of Himalaya Machinery Company in Baroda / Gujarat. Every year though, when Wolfgang visited Baroda to continue the work, he had to recognize, that many of the promised actions were not put into action during the time, he was absent. At the beginning of 2007 the chief engineer who was an important part of the project for several years, left Himalaya Company because he had a financially much better offer from an other company. This was the moment, Wolfgang decided to stop further activities around the solar crematorium. As more than 90 % of the work was fulfilled and many experiments showed positive results, I thought, that it is a great loss, to give up now. A friend of us, Deepak Gadhia from Valsad – board member of the Muni Seva Ashram in Goraj village – declared, that the administration of the ashram would be happy to install the Solar Crematorium in their village in order to prove the benefit of solar cremation. October 2007 practical team work started with the Muni Seva Engineer Ronak Choksi and the staff of the “Himalaya Company” in Baroda.

When I left for Switzerland after nearly 6 month of collaboration, the 50 m² reflector was properly installed in Goraj village (30 km east of Baroda). The receiver area had a diameter of ca. 300 mm (concentration ratio = 500) and we measured a temperature of 1050 degree Celsius without cleaning mirrors.

Now Eng. Ronak Choksi will coordinate further efforts. If the technical tests of the first solar crematorium will be successful, then people in that area can choose if they want to be cremated free of cost by solar energy or if they want to be cremated the traditional way with (ca. 300 kg) firewood and dried cow dung patties.

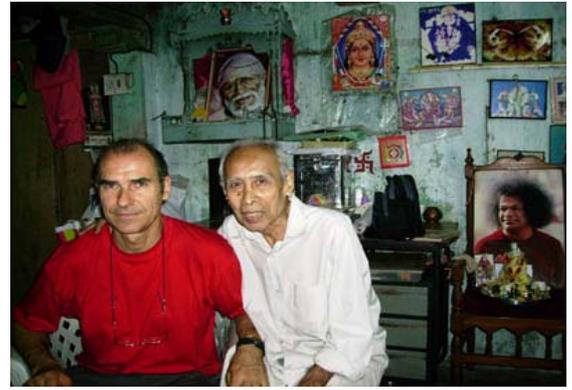
2. Activities from October 2007 until March 2008:

After my landing in Mumbai, I visited the man in Valsad/ Gujarat who had the idea of the Solar Crematorium. He explained me, what is important to know regarding cremation rituals in Hindu culture and he underlined, that the acceptance of this less harmful form of cremation is great, because Surya (the sun) is holy for Hindus. He underlined this statement telling me about his list with 80 names from people who are ready to be cremated with solar energy.

When I arrived in Baroda/ Gujarat, the Parabolic Dish was on the compound of Himalaya Company in a rusty (after monsoon) condition. Technicians, who worked together with Wolfgang Scheffler (Inventor) for several years, were happy to continue solar work. The chief mechanic (Mr. Kanti) was active in this project since 8 years. This was a great advantage. The first three months I was mainly working in Baroda because of the good infrastructure of Himalaya company and because the management and staff were very supportive for further

mechanical and electrical duties which had to be fulfilled. Most of the expenditures were offered in a very uncomplicated way from the Himalaya company.

As the main challenge is to have a very small focal area, the whole frame has to be adjustable for exact positioning during the different seasons of the year. 23 electrical DC motors with gear boxes had to be installed and tested for an



Daniel Philippen fixing a Gear- Box on East wing. Stand in lying position.



Mr. Kanti is checking crossbars in Equinox, Summer and Winter position



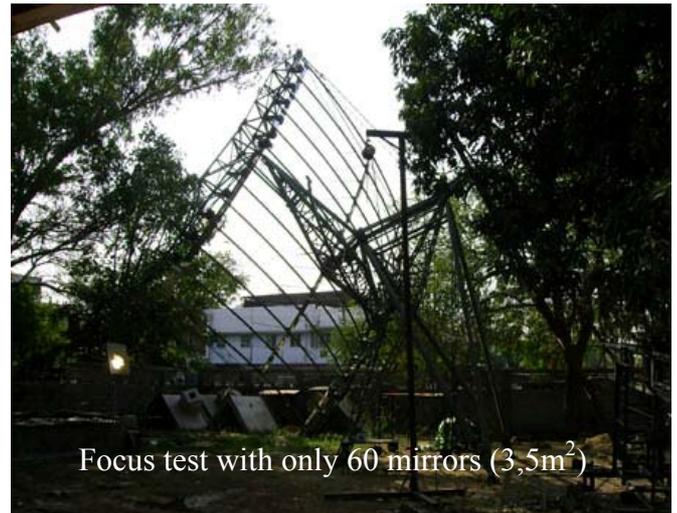
Measuring depth of crossbars for winter position (Delta = - 22.5 Degrees)

improved seasonal adjustment (± 23.5 Degree). All the parts had to become very precise in order to have minimum mistakes in the focal area. The test results of the crossbars (13 pieces) were very positive. Not more than ± 2 mm mistakes were measured compared with the calculated seasonal conditions ($+23.5$ / Equinox / -23.5 Degree). The 12 different mirror types between the 13 crossbars were already bent with the radius for correct focal distance in equinox position (compromise). The bending of mirrors got realized by gluing two 2mm mirrors together on a jig with the required radius. Each line between two crossbars holds 86 mirrors ($86 \times 12 = 1032$ mirrors totally; $A = 49 \text{ m}^2$; weight of all mirrors = ca. 500 kg).

During November Daniel Philippen from Switzerland supported our efforts. We also visited the Muni Seva Ashram. A wonderful place near a small river was chosen as place for the new crematorium. Together with Daniel the correct geographic North-South alignment got marked and so we were able to prepare the layout for the foundations on this piece of land belonging to Goraj village.

15. of January it became possible to test the structure with three lines of bended mirrors fixed between the crossbars (3.5 m^2). The focus had around 300 mm diameter but in morning and evening positions the frame was twisted which resulted in a bigger focus.

After these tests the moment was right to dismantle all and to make preparations for the shifting to Goraj



Focus test with only 60 mirrors ($3,5\text{m}^2$)



Stand and Rotating Support after sandblasting



Frame on Rotating Support on the ground



Foundation for stand: reinforced concrete

village (30 km East of Baroda). The Stand, the Rotating Support the wings of the Frame and small parts got sandblasted and primer was sprayed twice as anti-corrosion measure. Then the elements were transported to Goraj and the final painting was applied at the new place of erection (income generation in rural areas). From now on more and more activities took place in Goraj. Because of rocky land the space for the reinforced foundation had to be blasted. The frame parts were mounted to the rotating support on the ground. Mirror fixing and electrical wiring got started. As soon as the concrete was hardened, the stand and the back-crane of the stand (for lifting the stand up and down) got installed with the help of a mobile crane. The exact alignment of the stand (bearings parallel to polar axis) was adjusted together with staff of the Ashram. During the different phases of the project practical education was integrated in order to make the operators from Muni Seva Ashram able to use the system properly. After the mirrors were all mounted on the crossbars of the frame we needed again a crane to lift the finished frame with the rotating support into the bearings of the stand. Before lifting up the stand with its back crane, all electrical installations had to be tested. The seasonal adjustments were now regulated so that the frame had the correct paraboloid for the day of testing (16. March: $\Delta = -2$ degree).

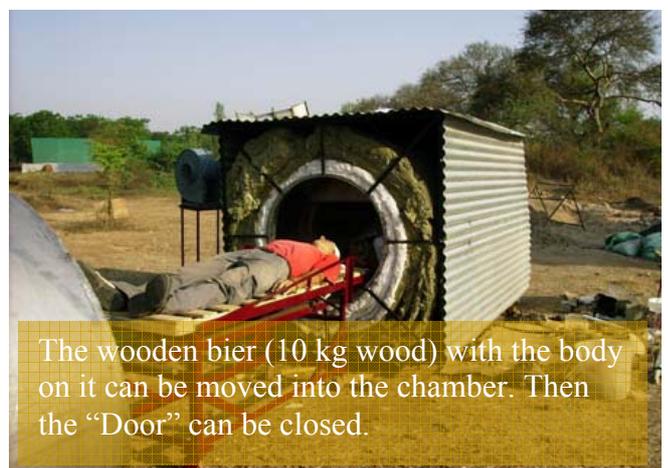
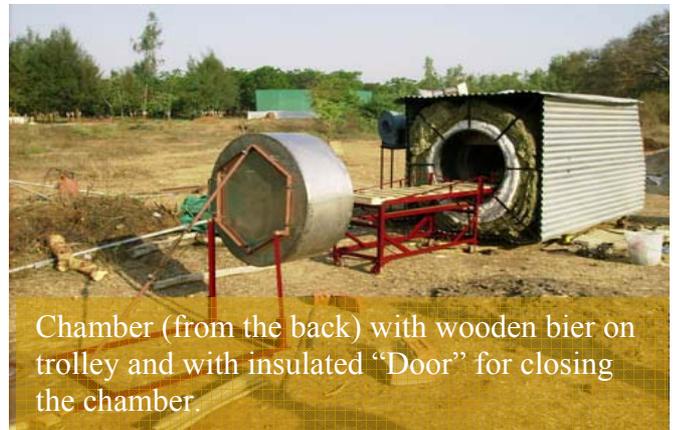
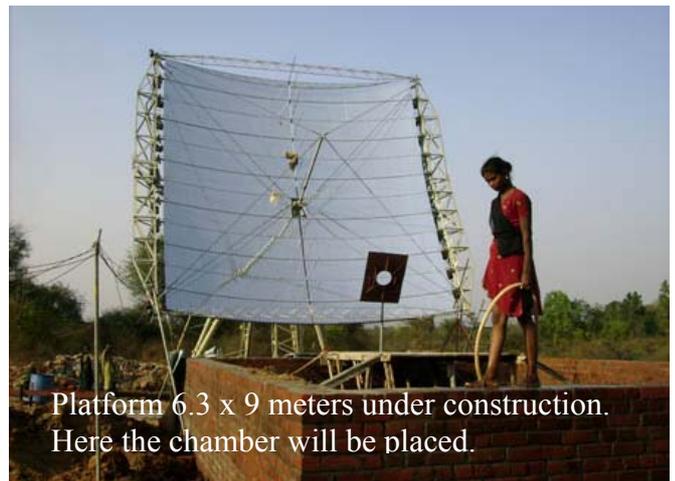


On the right height and in the correct distance we prepared a provisorily stage for measuring the focal area because the platform for the chamber was not ready then. As mentioned in the Summary, the focal area has a diameter of 300 mm. In order to correct the twisting in the morning and the evening position, 8 instead of 4 wire ropes are connected to the 4 edges of the frame with an elastic telescope column in the middle of the frame.

As soon as the platform is ready, the chamber can be tested. If the temperature inside the chamber is reaching ca. 900 degree Celsius, then small animals like e.g. dead dogs can be cremated in order to see, if the system can start to benefit human families soon.

3. Further Steps

- Finishing platform
- Putting the chamber in correct position (Focus)
- Testing temperature in chamber. How much time is needed to heat the chamber? What is the maximal temperature? Is it needed to expand the opening of the chamber from 240 mm to 260 mm diameter? Testing combustion with dead animals like e.g. dogs. What is the optimal quantity of air per hour for a good combustion? Etc.
- Stronger motor for Truss 13
- Mounting and testing Automatic tracking system
- Making all motors movable from central control panel. All the positions of the moving parts must be readable on the digital control boards from the control panel.



- Calibration for all seasons [Delta minus 23.5 (December 25.) until plus 23.5 degree (June 21.)]: The frame will be adjusted according to the excel sheets in mm-values. With help of the measurement tapes within the structure all mm- values must correspond with the measured values on the control board.
- If the system is ready for cremation, a similar list like in Valsad can be prepared for the Goraj - area.
- Universities can be contacted in order to benefit students who want to work with solar energy developments.
- Painting all before next monsoon
- Rain protection for chamber and other equipment like blower, control panels (reflector; chamber) etc.
- Correcting glass mirrors which are not in correct position between crossbars
- Caring, that the environment around the solar crematorium is respected (waste management; no cars or trucks if not necessary; not allowing to pollute the ground or the river)
- Organizing back up system, for reliable crematorium procedure (unstable weather)
- Maintaining the system
- Etc.
- As suggested by Ronak Choksy reporting about the system once a month is expected
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Coordinator from Muni Seva Ashram Mr. Ronak Choksi (L) with operator Mr. Salim (R). Development, Maintenance and operation is in their hands now.



Truss 13



Stand Automatic tracking

4. **Technical explanations:**

4.1. **The Reflector:**

The square frame is a stiff construction having two wings (East and West) – each having a movable hinge in the middle. The Wings are connected with trusses working like turn buckles forcing the 13 crossbars between the wings to bend elastically correct for reaching the required precise parabolic form for each season. The geometric

conditions can be measured with installed wires touching measurement tapes: At the middle of each Crossbar the depth can be measured. The two Wings (East and West) have also a wire between the Bolt of Crossbar 1 and the Bolt of Crossbar 13. The two stiff wings can be moved around a hinge in the middle so that the measurement between the bolt of the middle Crossbar (7) and the wire has the required distance. All the other adjustable distances between the bolts of Crossbar 2 – 6 / 8 – 12 and the wire can also be measured. All what must be adjustable requires a motor, a gearbox and an electric resistance to allow the operator to change the paraboloid according the season (-23.5 degree until +23.5 degree). The operator can move and control all the 23 motors from a central control board. The angle between the polar axis and the frame can be changed manually by a chain for correct seasonal angle.

The (day -) tracking system which compensates the rotation of the earth is automatically: a light sensor moves a motor which is connected with the chain. The chain moves the rotating support around the polar axis 15 degree per hour. The chain can also be moved manually. All the day- and seasonal adjustments of the Scheffler Reflector can be moved either manually or by 12 Volt motors which get energy from a 12 Volt Accumulator charged by a solar panel (PV).

Further information about Scheffler fix focus reflectors: http://solare-bruecke.org/English/scheffler_e-Dateien/scheffler_e.htm; document from 2006: http://www.solare-bruecke.org/infoartikel/Papers_%20from_SCI_Conference_2006/22_wolfgang_scheffler.pdf

4.2. The Chamber:

First the chamber will be heated without air blower. When the temperature of the chamber reaches ca. 900 degree Celsius, then the body can be moved into the cremation chamber and the well insulated "Door" can be closed. The air blower (maximum 0.75 kW / 220 Volt AC) needed for optimal combustion, can be regulated. Ca. 150 kg of air is calculated per hour. The air passes first through 15 heat exchanger tubes (above the body) from the back to the front of the chamber. Then it enters preheated into the chamber through many small holes. The hot flue gases leave the chamber through the focal area which results in a secondary combustion and like that no smoke should be in the exhaust gases. The calculated time for cremating a 60 kg body, is ca. one to two hours.

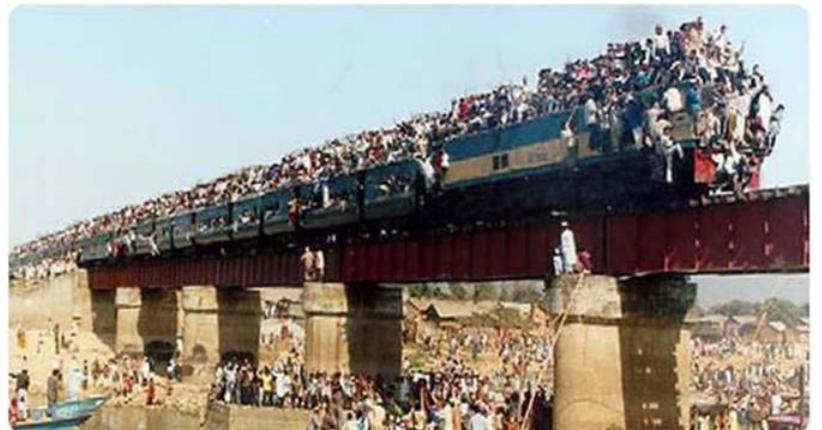
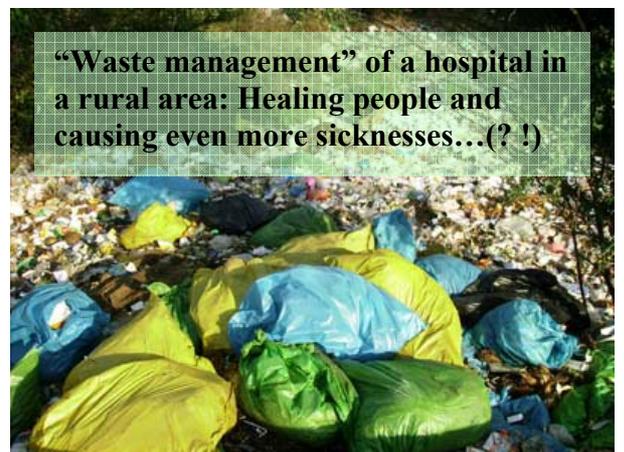
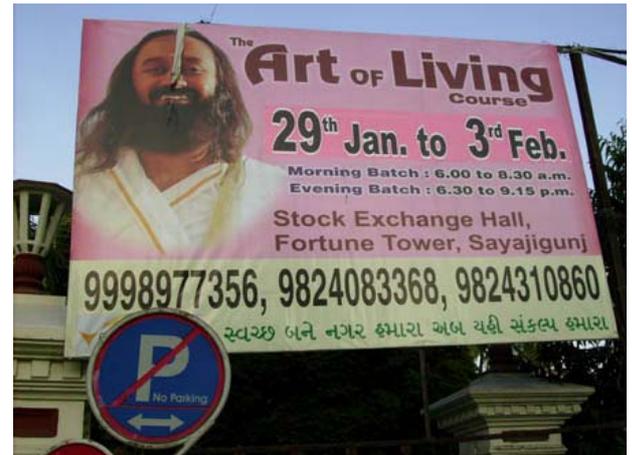
5. Solar Energy in the context of sustainable development

During my stay in India I had many contacts with different people from industry, ashrams, hospitals, government, schools, with neighbours and many other people.

Especially with decision makers, the possibilities for a better quality of life (Art of Living) got discussed. Many good ideas are around. Many solar equipments are installed. Very often the maintenance is a big problem. An even bigger issue was the observation, that the potential to reduce energy through good management (motivation and control mechanism) was very poor. So for example one of the hospitals was doubling the Air-Conditioning (AC) capacity in the time I was in India. The solar energy steam generator for 1/8 of the total AC capacity was discussed since several years but not installed. Around 1 ton! of firewood got burned per day just to cool with 1/4 of the AC capacity. So even if the solar installations are working, the growth of comfort is destroying more nature than before!

Focusing on causes:

In probably all cultures of this planet people say, that **prevention is better than healing**... unfortunately capitalistic economy is making most of us to do exactly the opposite. So it was not surprising, that in a very sophisticated hospital not even condoms were available for people. But if population growth and forced economic growth is not tackled in a wise way, all other efforts will be destroyed by violence!



Suggestions discussed with decision makers:

- Family planning is a human right – so information and means (minimum condoms) must be easily and dignified available for people (see http://fairch.ch/DeclarationPreventionSwitcher_2_.doc)
- The book “Where there is no doctor” form David Werner can be available for all the people in the local language: Let’s install it in waiting sections of Stations, Hospitals, in Schools, near Temples ...
- To invest in e.g. solar energy is nice – but if more harmful energy is consumed because of luxury- growth or because of weak maintenance- and motivation-mechanisms, then we cheat ourselves and we cheat even more our children.
- People like to play with small dogs – but if no sterilization program is organized dogs are suffering too much.
- If hospitals are investing more in treatment than in prevention, then the long term effects are more harmful than good.
- The Gadhia Solar advertisement suggests: Reduce, Reuse, Recycle. Lets do it also e.g. with hospital waste to reduce dumping of land in rural area. Separation of different waste categories is an old skill of India. Let’s use these skills.



6. Dedication and Thanks

This work is dedicated to all the people, animals and plants. The efforts shall improve the quality of life also in the long term.

Thanks to Wolfgang, Heike, Ronnie, Jabiz, Rashmi, Vikram, Kanti, Daniel, Rajis, Jakir, Rakesh, Ronak, Nevil, Ramesh, Deepak, Shirin, George, Suresh, Salim, André, Veronica, Vita, Maddy and so many more people who were/ are engaged for the reduction of harm.



7. Useful Information

- Sustainable Development with holistic approaches: www.fairCH.ch
- Solar Fix Focus Reflectors; Projects; Technical explanations: www.solare-bruecke.org;
- What is wrong with our economical system: http://www.fairch.ch/Menue/EXPONENTIAL_GROWTH.doc
- How to integrate the Human Right of Reproductive Health into every program: http://www.fairch.ch/Menue/DeclarationPreventionSwitcher_2_.doc
- How to organize Books “Where there is no Doctor” in local language: [http://www.hesperian.org/publications_translation_detail.php?\\$selecteLanguage=Hindi](http://www.hesperian.org/publications_translation_detail.php?$selecteLanguage=Hindi)
- Contact of the Muni Seva Ashram (MSA) which hosts the Crematorium. Coordinator: Mr. ronak_choksi@hotmail.com (0091 999 86 222 66); Phone of MSA: 0091 2668 268 004
- Contact for detailed technical information about Scheffler Technology in India: Mr. B.K. Jayasimha bkjsimha@yahoo.co.uk (0091 9422315088)
- Contact of the most active Ashram regarding renewable energies: Mr. Golo Pilz: golobhai@gmx.net; www.solar.bkwsu.de
- Solar projects in Bihar: www.solar-alternatives.com
- Solar projects in Gujarat: <http://www.gadhiasolar.net/>

Interested in more self-reliance and Peace? This is possible, if ---
--- we plant more trees than we ‘consume’
--- use solar energy
--- plan family
--- reduce harm

