

Indian Case Study of Bundling of Solar Steam Cooking projects to sell Gold standards Certified Emission Reduction (CER) and Voluntary Emission Reductions (VER)

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1 Abstract :

Experience of Bundling of Steam Cooking Project for Sale of CERs and VERs is shared.

2 Background :

Germany had hosted a global meet called Renewable 2004 in June in Bonn 2004. Around 3000 people were to participate and German Ministry of Environment and Nuclear Safety decided to make this Conference Carbon Neutral. They started looking for project from which they could buy Gold Standard CERs. They gave this task to its agency GTZ (Gesellschaft fuer Technische Zusammenarbeit= German Association of Technical Co-operation). The difference between normal CERs and Gold Standard CERs is that the CERs arising of Sustainable project and which meet the stringent norms set by NGOs are called Gold standard CERs and they fetch better price than CERs. Mr. Christof Sutter of M/s Factor is a friend of ours and has been associated with us right from beginning when we started our work on Solar Concentrators. At that time he visited India as Student Volunteer and was accompanying Mr. Wolfgang Scheffler. Later he finished his studies at ETH Zuerich and also did PhD there and joined Factor. In between he has earned reputation in field of CDM and is known as Indian Expert too.

When he learnt that GTZ was looking for Gold standard CERs convert the meeting they were organising to be Carbon Neutral he approached us to ask if we would be interested. In past too we had done a projects along with him and M/s Factor prepared Project Design Document (PDD) for a Bagasse based Co-generation Power Project for a company that was planning to put up the same in a Sugar Industry Power Generation. At that time it was for Dutch Agency which had brought out tender to identify projects for CDM.

Thus when Christof Sutter asked us we readily agreed to join hands with Factor and with their co-operation and inputs we prepared (Project Identificatin Note) PIN and submitted same to Factor who submitted it to GTZ. GTZ liked the project and gave us go ahead.

Project Design Document (PDD) :

Following was the Contents of the PDD

- A. General description of the small-scale project activity.
- B. Baseline methodology
- C. Duration of the project activity / Crediting period
- D. Monitoring methodology and plan
- E. Calculation of GHG emission reductions by sources
- F. Environmental impacts
- G. Stakeholders comments

Following Annexes were also submitted

- Annex 1: Information on participants in the project activity
- Annex 2: Information regarding public funding
- Annex 3: Sustainable development assessment
- Annex 4: Project eligibility
- Annex 5: Stakeholder consultation
- Annex 6: Letter confirming appropriate methodology/conservative baseline.

Project Description : The project activity includes the implementation and operation of solar community kitchens and similar solar steam applications (hereafter referred to as solar community kitchens) in various regions in India. The project uses solar energy to prepare food and warm drinks for a total of more than 28'000 people on a regular basis. Doing so, the project substitutes conventional fuel such as diesel and unsustainably harvested firewood. Note: Kerosene is used only in household cooking stoves and not used in larger community kitchens to produce steam and therefore not considered as alternative or baseline fuel.

The project has multiple direct contributions to sustainable development such as reduction of local air pollution, job creation, and improvement of working conditions.

Reduction of local air pollution: The used solar energy technology that substitutes the combustion of diesel and firewood is producing zero emissions and therefore contributes directly to the improvement of the local air quality. In addition, especially the substitution of fuelwood reduces in-door air pollution caused by poor combustion of fuelwood in the baseline case.

Job creation: The technology creates new job opportunities in two ways: i) the solar system is entirely manufactured in India using a labour intensive process; it was introduced in India through German-Indian technical cooperation and is thus the result of a technology transfer process; ii) the operation and maintenance of the solar system is more labour intensive than in the baseline case, which generates new additional jobs, mostly in rural India.

Improvement of working conditions: The system provides a smoke free working environment for the operators. This is a clear benefit for project locations where the baseline fuel is firewood. Burning firewood involves a more complicated fuel handling and often forces the operators/cooks to work in a smoky and unhealthy environment.

A more detailed sustainable development assessment, which follows the guidelines of the Gold Standard, is provided in annex 3.

The project is a small-scale CDM project activity. The project type, as defined in UNFCCC's Appendix B of the simplified modalities and procedures for small-scale CDM project activities, is type 1.C: *Renewable energy projects; thermal energy for the user*.

Following the categorisation of the CDM Gold Standard, the renewable energy used can be specified as *solar thermal energy that generates heat*.

The project activity is implementing a steam based thermal solar energy technology. The technology has been developed over the past years by a cooperation between German physicists Wolfgang Scheffler and various Indian institutions. The heart of the technology are parabolic concentrators (Scheffler concentrators) that directly concentrate sunlight to a heat exchanger (receiver), where steam for cooking purposes and other thermal applications is generated.

Above the receiver is an insulated header pipe filled half with water. The cold water enters the receiver through an inner pipe, gets heated due to the high temperature of the concentrated solar rays and the heated water then moves back to the header pipe. The cold water again

enters through an inner pipe and the cycle continues till steam is generated. The steam gets stored in the upper half empty portion of the header pipe building up the working pressure. The steam is then sent to the kitchen through an insulated pipeline.

The used technology is environmentally safe and sound and is manufactured locally.

Our company Gadhia Solar is specialised in this technology and has manufactured and installed solar steam cooking system on turn-key basis - starting from system for 500 people per day (1,000 meals per day) to 15,000 persons per day (30,000 meals per day). For further details on the technology, please refer to <http://www.gadhiasolarenergy.org>

A.4.3. GHG emission reductions will be achieved by the substitution of diesel and fuelwood based steam generation through emission free steam generation by solar energy. At most project sites the project activity will substitute diesel while at other project sites diesel and unsustainably harvested fuelwood will be substituted. In absence of the proposed CDM project activity the community kitchens would install, or continue to use, steam generators fired by diesel or unsustainably harvested fuelwood.

The total anticipated GHG reductions during the first crediting period is 7820t CO₂e.

There are no national or sectoral regulations mandating that actors like the project participants have to use renewable energy technologies such as solar energy. In some cases, the Indian Ministry of Non-conventional Energy Sources (MNES) provides subsidies for the technology used in the project activity. While such subsidies substantially help the project developer to finance the solar installation, it is only in combination with revenues from carbon finance through the CDM that makes the project enough interesting for institutions to implement it.

The first crediting period is from October 1, 2005 to September 30, 2012. The table below presents anticipated GHG emission reductions during this period.

Table: Anticipated GHG emission reductions during the first crediting period.

Year	2005	2006	2007	2008	2009	2010	2011	2012	Total 1 st crediting period
GHG reductions in t CO₂e	270	1'120	1'120	1'120	1'120	1'120	1'120	830	7'820

No Official Development Assistance (ODA ie Foreign Aid Funds)is used for this project activity.

Non-ODA public funding from Germany is used to develop the project activity and to buy CERs. For details see annex II.

A more detailed, confidential finance plan is available for the DOE as asked by the Gold Standard.

The proposed project activity is not a debundled component of a larger project activity

The project activity uses the baseline methodology as defined in Appendix B of the simplified modalities and procedures for small-scale CDM project activities, category I.C.: "renewable energy projects, thermal energy for the user"

B.2 Project category applicable to the small-scale project activity:

The project activity is a small-scale CDM project activity for which the CDM Executive Board provided indicative simplified baseline and monitoring methodologies.

First, the project activity qualifies as a small-scale project activity as defined in Decision 17/CP.7 "Modalities and procedures for a clean development mechanism as defined in Article 12 of the Kyoto Protocol".

Second, the project activity comprises renewable energy technologies that supply users with thermal energy that displaces fossil fuel or non-renewable sources of biomass as asked for by Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

Mohan Reddy, Zenith Energy, affirmed as a internationally recognised, local CDM expert that an appropriate methodology has been used for this CDM project activity in combination with conservative parameters. See letter in Annex 6.

<p>B.3. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered <u>small-scale CDM project activity</u>:</p>

The additionality test below follows the tool for the demonstration and assessment of additionality as approved by the CDM Executive Board at its 16th meeting.

Step 0. Preliminary screening based on the starting date of the project activity

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a. Define alternatives to the project activity:

The following alternatives to the project activity have been identified:

- Alternative 1: The proposed project activity not undertaken as a CDM project activity;
- Alternative 2: The proposed project activity undertaken without Indian subsidies and not undertaken as a CDM project activity;
- Alternative 3: Continuation of the current situation (no project activity or other alternatives undertaken).

Sub-step 1b. Enforcement of applicable laws and regulations:

Step 2. Investment analysis

Sub-step 2a. Determine appropriate analysis method

The appropriate analysis method is an investment comparison analysis (sub-step 2b, Option II). Apart from generating CERs, the project activity produces steam, which is used for thermal purposes, which excludes the use of option I.

Sub-step 2b. – Option II. Apply investment comparison analysis

The Net Present Value (NPV) for generating the steam requirements during the project lifetime (15 years) has been identified as sensible financial indicator. It is an indicator for the costs of steam production that the institution has to bear and can easily be used for comparing the different alternatives.

Please note that the main product (steam)) is not sold but used by the institutions. As the steam output is the same for the project activity as well as for all alternatives presented, it is not needed to attribute a (fictitious) price to the steam generated. However, this results in negative Net Present Value (NPVs) in all cases.

Sub-step 2c. Calculation and comparison of financial indicators

In the following, costs for steam generation during the whole project lifetime are calculated for the CDM project activity as well as for the three alternatives identified above in sub-step 1a. The calculations are only considering the part of the steam generation that is altered by the project activity. Fossil fuel consumption that remains the same in all cases is not considered (e.g. heat demand during monsoon).

The NPV of the project activity was calculated by carrying out a financial analysis of a representative solar community kitchen that belongs to the project bundle of the CDM project.

If it is a already existing kitchen that can easily integrate the old kitchen installations into the new solar system. Other institutions have to invest a higher percentage of costs into adaptation of the old system or have to build totally a new kitchen infrastructure. The system also occupies lot of space either in terrace or on the open ground near by. The same has not been calculated in economics. Hence, the choice of this installation to conduct a financial analysis is a conservative choice.

The technology used is relatively new in the Indian market with only a few running examples at the moment. Especially the long term performance of the technology (performance of mirrors over time) is a large risk factor. Hence, the installation of such a solar thermal system is perceived by the project proponents as a high risk project. The NPV analysis is run with a risk-adjusted discount rate. The table below shows estimates for risk classes the investing institutions apply. The solar thermal installation would fall under class IV. But to ensure a conservative additionality check, the lower risk-adjusted discount rate of class III is applied (14%).

It can be seen that the technology used by the CDM project (with and without subsidies) is not the economically most attractive option and therefore not the baseline. Therefore, actors following economic rationality do currently not install this solar energy technology without the CDM. The financially most attractive option without the CDM is to generate steam for thermal purposes with fossil fuels such as diesel. The current practice in India (using diesel oil for heat requirements in community kitchens) is reflecting this fact as well. Also if one considers the cost of land/ space requirement to install system it becomes unviable. Also the fact that mirrors/ reflectors would be needed to be changed every five years is not taken into calculations. Thus it is CDM incentive and the Green image that comes with it that has induced the buyer to go for Solar Steam System

Sub-step 2d. Sensitivity analysis

The sensitivity analysis (see table below) shows that the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions.

Table: Sensitivity analysis of financial analysis: NPVs of different alternatives are calculated and compared. Single key parameters have been altered +/- 20% at a time.

The sensitivity analysis shows that alternative 3 (baseline) remains always financially more attractive than alternative 1 (project without CER revenues) when each of the key parameters gets changed by +/- 20%. Therefore, alternative 3 can be considered as a robust baseline.

Step 4. Common practice analysis**Sub-step 4a. Analyze other activities similar to the proposed project activity**

The technology implemented by the project activity is clearly not a common practice. Most of the steam (>95%) in India is generated by means of fossil fuels or unsustainable biomass. There are a few pilot project in various regions in India that have implemented the technology during the last years.

Sub-step 4b. Discuss any similar options that are occurring:

The very few similar activities identified in India do not call into question the claim that the proposed project activity is financially unattractive. These few pioneering institutions accepted the financial disadvantage of the technology in order to implement an environmental sound and innovative technology. In some cases (e.g. the Brahma Kumaris solar community kitchen in Abu Road, Rajasthan) Overseas Development Assistance (ODA) money was involved, which made the implementation possible.

Step 5. Impact of CDM registration

Thanks to the high contribution to sustainable development it was possible to negotiate an Emission Reduction Purchase Agreement ERPA that allows to sell Certified Emission Reductions (CERs) from this CDM project activity at a much higher price than currently seen in the carbon market. These high CER revenues provide a significant financial incentive for the institutions implementing the solar steam technology. As shown in step 2, these additional CER cash flows can make the project financially more attractive compared to the baseline case. However, the sensitivity analysis in step 3 cannot substantiate for all cases that the project activity with CER revenues becomes financially much more attractive than the baseline case. In some cases even the project activity with CER revenues tend to be financially less attractive than the baseline option. But in any case the additional CER revenues help to reduce the non-profitability of the project and therefore the CDM can be seen as a clear incentive that helps the project to get implemented.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the small-scale project activity:

As defined by the used small-scale methodology: The physical, geographical site of the renewable energy generation delineates the project boundary.

Figure: Project boundary for the project activity

Water treatment, back-up steam generator and use of steam are outside of the system boundary as these elements remain the same irrespective by which technology the steam is generated.

Specify the baseline for the proposed project activity using a methodology specified in the applicable project category for small-scale CDM project activities contained in appendix B of the simplified M&P for small-scale CDM project activities:

The project activity uses the baseline Type 1.C.as described in Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

For installations that displace technologies using fossil fuels, the simplified baseline is the fuel consumption of the technologies that would have been used in the absence of the project activity times an emission coefficient for the fossil fuel displaced. IPCC default values for emission coefficients are used.

For installations that displace non-renewable sources of biomass, the simplified baseline is the non-renewable sources of biomass consumption of the technologies times an emission

coefficient for the non-renewable sources of biomass displaced. IPCC default values for emission coefficients used.

According to the methodology used leakage has only to be considered if the energy generating equipment is transferred from another activity or if the existing equipment is transferred to another activity. This is not the case . Therefore no leakage has to be considered.

SECTION D. Application of a monitoring methodology and plan:

D.1. Name and reference of approved monitoring methodology applied to the small-scale project activity:

The project uses the methodology as defined in Appendix B of the simplified modalities and procedures for small-scale CDM project activities, category I.C.: “renewable energy projects, thermal energy for the user”.

D.2. Justification of the choice of the methodology and why it is applicable to the small-scale project activity:

The selected small-scale methodology 1.C mentioned above (for justification see section B.2) foresees three options for monitoring. The option 9 (a) is used for this project activity: *Metering the energy produced by a sample of the systems where the simplified baseline is based on the energy produced multiplied by an emission coefficient.*

Rationale: The two other options given are not applicable. The project activity is neither a co-generation project nor are the emission reductions per system less than 5 tonnes of CO₂ per year.

Since all systems in the project activity will be metered no sample needs to be defined. Or in other words: the sample is 100% of all systems.

D.3 Data to be monitored:

All data have to be monitored by each installation in the bundled project activity. The table below shows the monitoring requirements for a single installation.

Comment on ID number: X = number of installation.

The bundling organisation collects annually the data monitored from the various locations where the installations are operating. Hence the total number of parameters to be monitored is $n * 4$, with n = number of installations in the bundle.

ID number	Data type	Data variable	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/paper)	For how long is archived data to be kept?	Comments
X_1	Feedwater input solar steam generator	WS	litre	M	monthly	All	electronic	10 years +2	Feedwater input serves a proxy for steam generated. The operators have to assure that steam losses during steam generation are minimal.
X_2	Feedwater input backup steam generator	WB	litre	m	monthly	All	electronic	10 years +2	Feedwater input serves a proxy for steam generated. The operators have to assure that steam losses during steam generation are minimal.
X_3	Fuel consumption by backup steam generator	F (used)	litre or kg	M	monthly	All	electronic	10 years +2	Data unit depends on fuel used.
X_4	Direct employment generated by the project	E	man month	M	annually	All	electronic	10 years +2	Indicator to monitor sustainable development.

D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures are undertaken:

See section D.5. below.

D.5. Please describe briefly the operational and management structure that the project participant(s) will implement in order to monitor emission reductions and any leakage effects generated by the project activity:

The responsible person / operator at each project location is known to the bundling organisation. Pls see list of Institutions and Contact address and tel nrs etc. (Attached)

The bundling organisation is also responsible for the initial workshop and training of the project operators to create awareness about the processes and requirements. Before handing over the operators are trained in its operation and maintenance and in a Workshop is organised where the operators would be invited to learn the methodology of collecting data as given above and also trained who to fill the log sheet so that saving achieved due to use of solar is easily calculable. E.g. Measurement and documentation of water used and thus steam generated by Solar Steam System

The bundling organisation (In this case our Company Gadhia Solar) provided each project operator with an operation and project manual where a necessary maintenance and monitoring processes are defined. The necessary data will be collected daily by the respective operator and stored in a logbook.

Quarterly, the collected data will be summarized by the project engineers / bundling organisation in a report and sent to the Indian Government. Regular project reviews are to be defined with the CER buyer as requested.

As the bundling organisation we prepared the yearly monitoring report for the verification by the Designated Operational Entity.

SECTION E.: Estimation of GHG emissions by sources:

E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary:

No emissions are occurring from the project activity as it comprises only the solar energy system.

$$E(\text{project activity}) = 0$$

Where:

$$E(\text{project activity}) = \text{GHG emissions due to project activity}$$

E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities

According to appendix B, no leakage estimation is needed for this project activity.
Leakage = 0

E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the small-scale project activity emissions:

Project activity emissions = 0

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHGs in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities:

To calculate the baseline emissions $E(\text{baseline})$, the amount of additional fuel that would have been used in the baseline case (compared to the project activity) is multiplied by the respective emission factor.

$$E(\text{baseline}) = F(\text{additional}) * EF$$

Because only $F(\text{used})$ can be monitored, we determine $F(\text{additional})$ by estimating how much diesel would have been required to generate the amount of steam that was generated in the solar system. The feedwater input into the solar system as well as into the back-up system are serving as proxies for the amount of steam generated. Hence, we can divide the amount of steam generated in the solar system by the average evaporation ratio of the back-up system to get $F(\text{additional})$:

$$F(\text{additional}) = WS / ER$$

$$\text{with } ER = WB / F(\text{used})$$

Hence, the total formula for baseline emissions is:

$$E(\text{baseline}) = F(\text{used}) * (WS / WB) * EF$$

Where:

$E(\text{baseline})$	=	GHG emissions due to baseline; [t CO ₂ e]
WS	=	Feedwater input solar steam generator (= proxy for steam generated by solar generator); [l]
WB	=	Feedwater input back-up steam generator (= proxy for steam generated by back-up generator); [l]
ER	=	Average evaporation ratio; in case of liquid fuel: [l/l]
EF	=	CO ₂ emission factor fuel (IPCC default); in case of liquid fuel: [t CO ₂ e /l]
$F(\text{additional})$	=	Additional fuel used in the baseline case (compared to the project activity); in case of liquid fuel: [l]
$F(\text{used})$	=	Fuel used (fossil fuel or unsustainably harvested biomass); in case of liquid fuel: [l]

E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:

$$\text{Emission reductions} = F(\text{used}) * (WS / WB) * EF$$

E.2 Table providing values obtained when applying formulae above:

See table in section A.4.3.1

SECTION G. Stakeholders' comments:**G.1. Brief description of how comments by local stakeholders have been invited and compiled:**

The stakeholder consultation process comprised two rounds of consultations and was characterised by the following key elements:

Initial stakeholder consultation:

- Stakeholders (see Annex for a detailed list) were invited by fax or email to comment on the initial project idea on 18/04/2005.
- The documentation of the initial stakeholder consultation comprised an environmental and social impacts checklist, and a non-technical summary of the draft PDD. These documents were published in English, one of the official languages in India. These documents were sent to the invited stakeholders and were made publicly available at <http://www.gadhiasolar.net>.
- The results of the initial stakeholder consultation were sent to all invited stakeholders and were made publicly available on 04/05/2005.

Main stakeholder consultation:

- Stakeholders (see Annex for a detailed list) were invited by fax or email to participate in the main stakeholder meeting and to comment on the draft PDD 09/05/2005.
- The documentation of the main stakeholder consultation comprised the results of the initial stakeholder consultation, invitation to the stakeholder meeting, draft PDD, and a non-technical summary of the draft PDD. These documents were published in English, one of the official languages in India. All documents were made publicly available at <http://www.gadhiasolar.net>.
- A press release pointing to the stakeholder meeting was sent to the local media. The press release as well as an example for press coverage can be seen in Annex 5. (Interest people can download the PDD from UNFCCC website)
- The public stakeholder consultation meeting was held in conjunction with an independent representative of the local community (Mr Srirama Raju, Executive Director of Society for Energy and Environmental Development (SEED), a NGO based in Hyderabad) on 10/06/2005 in Valsad, Gujarat. 16 stakeholders participated in the meeting. The stakeholders discussed the opportunities of the Kyoto Protocol and the CDM in general and highlighted that bundling of projects is paramount for small projects to participate in the benefits of the CDM in order to reach the rural population with technologies which were needed by them but not affordable. The idea of the CDM Gold Standard was received very well. No concerns regarding the concrete project were mentioned.

The detailed outcome of the initial stakeholder consultation was made publicly available at <http://www.gadhiasolar.net>.

Next Steps : The PDD was submitted to GTZ for approval and they in turn got expert opinion and also inputs from TUV a agency in Germany which Validates the project. There were some minor changes suggested which were incorporated.

After that the PDD was published on the Site of UNFCC for public to give comments.

Then TUV requested their Office in India to come and visit the Sites to make their assessment which was done.

In future too TUV would every year visit the site to monitor the system and evaluate the system performance every year and based on their study of logsheet and their assessment would establish how much Tons of CERs were saved and based on that issue CERs which our Users will hand over to us and we would in turn handover same to GTZ. A price of Euro 12 per ton of Co2 has been agreed between us and GTZ. We would pass on the same to our Users after deducting a nominal fee to cover our expenses and efforts.

Conclusion

(Voluntary Emission Reduction / Verified Emission Reductions) VERs :

As seen above to generate CERs is a very complicated and lengthy process even if done under Small Scale Project Norms. The Cost is also high as every agency involved charges its fee starting from PDD to Validation to Monitoring and thus they say that thumb rule is that Process of CER sales become viable only if more than 10,000 Tons are considered. They can be either from one project or bundled as in our case.

In case that is not the case (and often for small projects it is never the case) one can go for sale of VERs which are simpler.

We have been fortunate to have gained experience in same too.

Recently we were approached by M/s Factor again to ask if we have VERs for sale from Projects that we not submitted for CERs. As in earlier project they wanted Gold Standard CERs only those project which were to come up and not already installed could be submitted and thus they had not got CERs and thus eligible for VERs. We had already committed the 10 upcoming projects CERs to GTZ so we offered to bundle our past projects which had not received the CERs for VERs.

The buyer is a Company in Swiss who wants to acquire VERs to get green image and is doing not to meet CER obligations.

The Swiss Company (buyer of VERs) agreed but with condition that only 20 % of the amount of sale of VERs should go to seller of VERs and the rest 80 % should go into a Fund Created out of which sustainable and good projects are undertaken.

We have recently done a project of Smoke Free village where whole cooks with 26 SK 14 Domestic Solar cookers and 23 biogas plant. The same was possible due to financial support from a NGO Intersol. School Children of Salzburg and St Johann are collecting money and giving it to Intersol to send it to India so that rural and needy poor of India who needs the cookers but cannot afford them can use them. Thus for us it was appropriate as now more and more villages are coming forward to become smoke-free. We find it also appropriate as the users of big solar cookers (Institutions) are thus contributing to smaller users making it Win-Win Situation for all the people, the technology and of all the ENVIRONMENT.