

The Kyoto Twist Solar Cooking Society
A Summary and Explanation

By
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The Kyoto Twist Solar Cooker Society became a registered non profit society in Canada in 2005. Its goal was to support small projects in developing countries, so that as many families as possible could benefit from a sustainable alternative to their cooking fuel, which was typically wood or charcoal. In the eight years following we worked on twenty different projects with six partner organizations in five countries: Haiti, Bolivia, Mali, Tanzania, and Madagascar and reached a total of 639 families. This paper will summarize our experience. I am the founder of the organization and much of the organization's preliminary ideas and platform came from me, but I want to stress that this was a collaborative effort that spanned continents and involved many volunteer hours and the input of many other partners. So the credit goes to many people and my gratitude and deep appreciation goes out to all of them.

I will speak first about the projects, how they were organized and conducted, the guiding principles and the goals we were trying to achieve. One goal was to eliminate the necessity of travel to the projects from our base in Canada. This was keeping with our objective to save and reduce greenhouse gas emissions, to keep down the cost of supplying families with the cookers and demonstrate the cost efficiency of solar cooking in the context of carbon finance. We also intended to create some well paid employment for the trainers and interviewers who were working on the ground. The project leaders mostly volunteered their time and energy, though we encouraged them to make allowances for administration in their project budgets. They also set the wage scale for the rest of their project team. They created the projects from their own vision and expertise. They knew their community and what had worked in the past. They used the solar cookers that they had used and tested in their own circumstances already. The Kyoto Twist did not dictate the equipment, other than to strongly suggest the use of some form of retained heat cooking and education about water pasteurization and food safety. One project in northern Mali included an improved charcoal stove. The range of solar cookers in these projects was interesting and adds credibility to the idea that the solar cooker employed is not the most crucial factor. When we looked at the final results of all the projects and compared the useable life expectancy of the various models, the average amortised cost does not vary much. By our analysis it cost the average family \$15.41 to own and use a solar cooker (N.B. This includes the initial training and project overhead). Interestingly, the highest cost oven with a twenty year life expectancy cost \$9.98 per year and the least expensive cookers (Cookits) averaged about the same or a little higher due to their frequent replacement cost. This is not to say that a "better" cooker is not desirable. All but the highest cost oven mentioned above (the Global Sun Oven) were manufactured locally with available materials. We used a term called the "Family Solar Cooking Year" (FSCY) as one factor for our analysis of cost efficiency, because we needed to project forward ten years to get a comprehensive picture of the estimated fuel savings and to take into account the varying life expectancies of the cookers. A FSCY is the cost for a family to own and maintain a solar cooker for one year. The average cost

per participant in all the projects was \$195. This includes the equipment, the training and follow up administrative costs in the host community, the interviewing, data processing and overhead.

The projects all started with an application form, which has not changed from the first project to the most recent. It asks the applicant to describe their situation, their experience and a profile of the community where they want to do their first project. It asks for a description of existing cooking fuel practices and supply, the population and geography, barriers experienced in the past and other factors that contributed to an overall picture of the need for a new cooking technology and solar cookers in particular. It asks about health risks due to current practices and perceptions about deforestation and the rising cost of the conventional fuels. Then the application asks for a description of the project design with certain required fields such as participant selection practices, training program, follow up plan, data collection, equipment needed and where it would be procured, stored and transferred, the rationale for this particular choice of cookers and then a detailed budget for the project. The funding ceiling for first projects has been \$5000 USD.

The applications generally went back and forth between the applicants and our two program coordinators until we thought that they were complete enough to present to our board of directors for approval. Once that was done, with their input and sometimes more revisions and more consultation with our partners in the field, we would draft a contract based on the approved application which was then sent for their approval and signatures. The projects were usually designed in four phases, with disbursements made after the completion and documentation of the previous phase. Reports and files such as participant selection and follow up interviews, trainers' reports, and equipment purchases were all emailed to us. The first projects usually had thirty households. Subsequent projects sometimes had as many as 100 households participating.

Most of the funding for our projects came from our local community here in Canada and most of that was from our one annual fundraising campaign. In November we sent out a letter which talked about our current projects and goals for the coming year. It included a small gift card that had a picture of a family from one of our projects with their solar cooker. On the back of the card it said:

A gift has been made in your name to help a family cook with the power of the sun.

The gift provides a solar cooker and a program of training and support to a family dependent on wood for cooking fuel.

Solar Cooking provides a carbon neutral cooking alternative to the creation of greenhouse gases in Sun-rich developing areas of the world

Some people used these cards as Christmas gifts or for other occasions, which was their intended purpose. Others simply sent a donation. At the end of the year we knew how much money we had to put towards projects the following year.

When we started the Kyoto Twist it was one of our objectives to assist our partners to learn about the carbon market potential and to build their capacity to participate in this expanding opportunity if and when they ever wanted to. It was also our intention to promote carbon awareness in our own community and try to make the connection between reducing emissions at home and around the globe. The practice of offsetting our individual carbon footprints is still not widely understood. There was a short lived campaign in Canada called, “The One Tonne Challenge”. It encouraged Canadians to “Take action on Climate Change, use less energy, save money, improve air quality and protect our environment”. It offered many tips on ways to accomplish this and then it encouraged everyone to use the carbon calculator on the government’s website to compute their personal and household carbon footprints and try to save a tonne of emissions the following year. It was against this backdrop that we launched the Kyoto Twist. We wanted to ride this new wave of social and environmental awareness. We explained that a family using a solar cooker for even a third of their cooking would save between one and four tonnes of greenhouse gas emissions per year. If they supported our projects, the investment would not only go a long way to easing the burden of expensive or hard to get cooking fuel for the families, it would also offset their carbon footprint. We pledged to document the savings and follow the principles of the formal carbon market. We knew there was a very steep learning curve when it came to understanding the principles set forth in the Kyoto Protocol and that there was still a great deal of “Climate denial”. There is still a long way to go on this, but solar cooking is a useful educational tool for climate education and attacking poverty at its base.

Our partner CEDESOL in Bolivia has been able to access funding through the formal carbon market. They did four projects with us, lead by David and Ruth Whitfield in order to practice the new methodologies and learn the Gold Standard system, which is another steep learning curve. They were soon able to enter into a partnership with the Swiss NGO called “myclimate”, and have successfully completed the first stages of a Gold Standard project for 52,000 households. It is a long road to that point and it is the same everywhere it has happened. myclimate has another Gold Standard project in Madagascar for 110,000 families which also took years of preparation and community development work. The systems are very complex and demanding and so they should be, in order to earn the confidence of investors and the public alike. I will not go into the details and complexities of carbon finance in this paper, but I want to say that we applied them wherever possible to the Kyoto Twist requirements and practices. Briefly for those of you who are familiar with the UNFCCC parameters, we examined “additionality”, double counting avoidance, non-renewable biomass analysis, sustainable development criteria, data collection of fuel types and usage, and any other ‘conventions’ that were appropriate to the given project and our estimations of greenhouse gas reductions.

We all know that it is rare for a family to adopt solar cooking in isolation. This is why peer support is so important and part of the reason that small scale projects can be more effective, especially in the beginning when the idea is taking hold and the capacity for scaling up is not yet mature. Sometimes these small projects are referred to as “incubators”. Solar cookers have been called a “push” technology, as compared to a “pull” technology such as cell phones, which had an instant consumer attraction around the world. Solar cookers have been somewhat snubbed in the technology world for the perceived barriers to their adoption, but this is a narrow view in my estimation. When conditions are right and proper supports are put in place, families will succeed and benefit greatly, as they did in our projects. The current push for improved biomass stoves does not address the ever increasing demand on the wood resource and the need we have to keep carbon in the ground and in trees. The carbon finance systems we see today, the so called regulated and volunteer markets all take into account the percentage of “non-renewable biomass”(NRB) and track its increase and decrease annually, because that is an important factor in the estimation of total emissions saved. This is not easy to measure, but it shows part of the complexity of verifying net emissions saved. When solar cookers and retained heat cookers are used there are no resulting emissions or pollution due to the use of appliance itself and NRB is not a factor. The potential of this to reduce the total emissions globally and enhance forest cover has been well documented.

Our fuel savings data and analysis is not nearly as rigorous as in the regulated and voluntary markets. The participants in all of the projects are carefully screened and one of the requirements is that they agree to attend monthly meetings with their peers. This gives them the opportunity to problem solve together, share recipes, report their fuel savings, learn a little bit about climate change and get a sense of connection with each other and the broader context. A paid trainer attends each meeting and records the data. We originally estimated that our projects would reduce carbon emissions for ten dollars a metric tonne. We now estimate that our projects, with all of their variability averaged closer to twelve dollars per tonne. Large projects such as the two myclimate projects, even with their greater complexity cost less per tonne because of the economy of scale and other factors. Currently the purchase price of carbon credits in the regulate markets is depressed due to a glut of credits on the market, but most experts expect it to rebound dramatically. In what is sometimes referred to as the “informal” market such as the Kyoto Twist, the value is more tied to the co-benefits such as improved living conditions, less deforestation and improved indoor air quality. There is growing evidence that the co-benefits are what attract consumers who want to offset their carbon footprint. The most recent issue (#62) of the journal *Boiling Point* cited studies supporting this trend.

The final interviews for all of our projects showed that 95% of families were happy with and using their solar cookers and retained heat cookers by the end of the first year. Annual fuel savings averaged around 35%. Annual expenditure for conventional fuel dropped the same percentage and in some countries was as much as \$100 per year. The highest greenhouse gas reductions were in the community of Mbeya in southern Tanzania, because the conventional cooking fuel there is kerosene and the average savings for those thirty families was 4 gallons/month.

The real success however is seen in the stories, not the numbers. One young girl in rural Bolivia said that she liked the solar cooker, because she felt safe using it while her parents were away working and it allowed her to study rather than collect wood all the time. Some of the women in Yirimadio, Mali, who are Muslim said they got an hour more sleep during Ramadan because they could cook the breakfast for their families the night before and keep the food warm overnight in their retained heat baskets. In most cases it was the money saved that was the most acknowledged benefit and the reported savings most often went to pay for basic needs, food, medicine and education. There were many reports of reduced lung and eye irritation due to the reduced indoor air pollution. Fewer bundles of wood were collected, fewer trees were cut. The children in these homes, the future generation, have tasted and enjoyed solar cooked meals. They will take that forward.

In conclusion I would like to say that there is much more room for solar cooking “incubators” and public education around climate change, carbon offsetting and the valuable role solar cookers can play. The total value of the carbon market today is estimated at four billion dollars annually and has been growing each year since it began. Accessing carbon financing is getting easier overall. In order for the dedicated leaders already in the field to do this, they need the opportunity to practice the procedures and methodologies. This is why incubators can play such a vital role.

The Kyoto Twist found that there are many individuals who care enough about climate change, the environment and poverty in the world, that they will contribute generously to projects like ours in order to reduce their carbon footprint and benefit families like these. This is the origin of our motto “*Save a Tonne / Save a Life*”.