



# ▶▶▶ Abridged Basics for Career Development

MODULE 01

# PROJECT MANAGEMENT

## Real World Examples



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## CASE STUDY 02

# LESSONS LEARNED DESIGNING AND BUILDING THE SOLAR STEAM COOKING SYSTEM AT TIRUPATI TEMPLE

## BACKGROUND

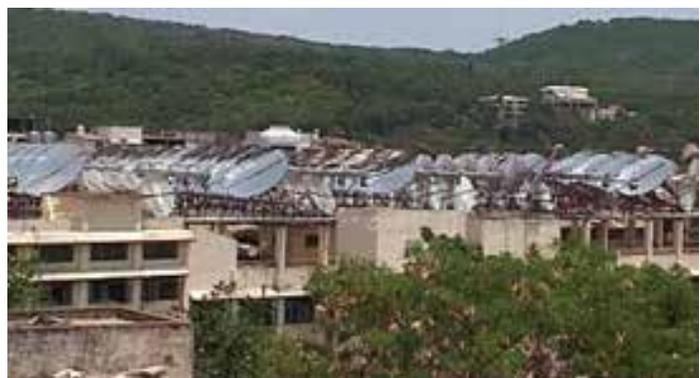
The journey of Gadhia Solar started when rural women in India pointed out the importance of the forest and their desire to limit deforestation for cooking purposes. However, there was no alternative cooking methods available, as they had no reliable source of electricity, LPG, or kerosene.

The first solar cooker proposed, a solar-box cooker, was too fragile and slow, and did not allow for frying.

Thus the idea to offer a better solar solution/product, led to the formation of Gadhia Solar. Both promoters of Gadhia Solar, Dr. Shirin Gadhia and Deepak Gadhia, had studied and worked in Germany and reached out to their contacts and friends to seek a solution. Dr. Dieter Seifert, inventor of the Parabolic Solar Cooker SK 10/SK 14, offered his technology and support free of cost to get “Gadhia Solar” off the ground.

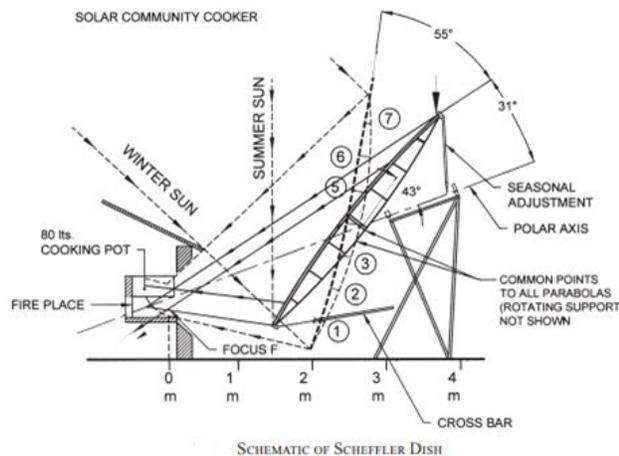
Through conversations with potential customers, it was often pointed out that they would prefer to cook indoors rather than out in the sun. Based on this feedback Gadhia Solar met with Wolfgang Scheffler, a physicist who had developed technology that allowed solar cooking within the comfort of the kitchen. Gadhia Solar was fortunate to get this technology and successfully commercialized the Community Solar Cooking System in India using the Scheffler Concentrator, which reflected the sun rays into the kitchen.

Gadhia Solar was a company that came out of the NGO, Eco Center ICNEER (International Center for Networking Ecology, Education and Re-integration), as a social enterprise to support and finance Eco Center ICNEER’s work to promote sustainability.





## DEVELOPMENT OF INDIA'S (AND WORLD'S) FIRST SOLAR STEAM COOKING SYSTEM:



The Gadhia's were approached by a spiritual NGO, who was looking for a solar cooking system to cook for 1200 people. Since bringing sun rays into the kitchen with concentrators was not possible at this site, the Gadhia's approached M/s HTT GmbH a leading German company, expert in Thermal Engineering, in which Deepak Gadhia had worked earlier.

GATE (German Appropriate Technology Exchange) an arm of GTZ (German Technology Co-operation-a German Aid Agency) was approached and offered to fund the prototype.

## PROJECT MANAGEMENT OF THE WORLD'S LARGEST SOLAR STEAM COOKING SYSTEM (AT THAT TIME):

The first task was to understand the cooking requirement and design the system accordingly.

The site where system would be installed had to be surveyed, and it was found that there was not enough space to put a system that would meet the cooking requirements.

Calculations were done to see how many Scheffler Concentrators could be accommodated in the space and as a result a system that cooks 30,000 meals per day was offered.

Another issue encountered, was that the terrace on which the system had to be installed had two levels. Therefore, a platform structure was installed so that the system could be placed on the same level.

Load calculations were undertaken to calculate the weight of the system and understand the loading structure, so that the loads are properly transferred to the columns and beams.

Based on the engineering calculations, a bill of materials (BOM) was prepared to estimate cost for the offer submission.

## LESSONS LEARNED FROM THE PROJECT ACCEPTANCE:

After the offer was accepted, Gadhia Solar realized that there were a lot of things that should have been clarified and included in the offer. Gradually a mismatch in expectations emerged. Fortunately, due to trust between the two parties, the issues could be clarified. However, the most important lessons for project management were:

- a) Proper costing when submitting
- b) Milestones specified for release of payments
- c) Clarity regarding where inspections should take place
- d) Specify who undertakes the inspection (In-house or third-party)
- e) Qualifications of suppliers specified in the offer so that there is no dispute of scope and approach.
- f) Specify taxes and duties to be paid and at what rate
- g) Terms of payment should be very specific
- h) Warranties and guarantees should be very specific

## LESSONS LEARNED DURING PROJECT EXECUTION:

On receiving the Purchase Order (PO) Gadhia Solar was excited until it became clear that the normal practice for the customer was that payment was made after the project was completed. Being a small company and start-up and undertaking this large project, it was not possible for Gadhia Solar to fund the project. Gadhia Solar approached the customer for advance payment, which they finally agreed to arrange after some difficulty.

Once the system was designed it was observed that it made no sense to make the components in the factory and assemble them on site due to the large distance and type of voluminous structures involved. Thus, very voluminous components were constructed on-site, but for that additional jigs and fixtures had to be sent to complete the on-site fabrications.

On talking to Tirupati Temple they agreed to allow Gadhia Solar Team access to the terrace site but refused access to power for welding due to the cost and required permissions from officials.

Also, Gadhia Solar was asked to pay for the rooms where their workers stayed and for their meals.

Thus the lesson during project execution was that proper forethought of potential problems related to site work, such as the logistics of room and board for the team and provision for light and power at the site, are discussed and agreed to beforehand. Additionally, it is important to have the proper safety and emergency provisions planned out ahead of time.

Also, it is recommended to have the appropriate insurance so that company and its workers are protected legally and financially.

### LESSONS LEARNED FROM PROJECT COMPLETION:

After completing the project, when handing over the project to the client, it is expected that there will be arguments and hesitation by the customer.

It is best to involve a few local people, and if possible a representative of the customer, right from the beginning of project. These representatives should be trained so that they know every aspect of the project and are confident to continue after the installation team is withdrawn.

Final recommendations are to document as much as possible, and have log books so that the system is properly monitored and data measured.



### BIOGRAPHY

Deepak Gadhia, Founder of Gadhia Solar is a Process and Environmental Engineer and participated in PG in Energy Conservation and Energy Management course conducted by and at T U Berlin in collaboration with MIT of USA.

After his return from Germany he started his company “Gadhia Solar” to offer Solar Thermal Solutions and the company has manufactured and supplied many Unique projects including world’s largest solar steam cooking system to Shirdi Temple that cooks 50,000 meals/ day and India’s first Solar Thermal Air-conditioning system of 100 Tonne Refrigeration.

In 2010 he sold his company Gadhia Solar after 25 years pioneering work in Solar Thermal and shifted to NGO Muni Seva Ashram ([www.greenashram.org](http://www.greenashram.org)) and now is Director in Section 25 company MSA Renewtech Foundations offering Solar and Sustainability Solutions and the profit of the company goes to support social cause.

Mr. Gadhia is Mentor to many start-ups and travels extensively worldwide to give lectures and share his work and vision.

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