

## Success Story on Hybrid Renewable Energy Systems in a Rural Agro-processing Industry (M/s. Upahar Foods)

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### Introduction

Agro industries in India are growing at a greater extent and play a vital role; efforts are being made to make it cleaner and sustainable. The role of renewable energy in industries is of paramount importance to meet a part of their energy demand and make them more environmental friendly by reducing the emissions. As the population is growing day by day, the agricultural processing techniques available today will not be sufficient to achieve the targeted food production. According to World Bank estimates, food inflation threatens to push at least 100 million people into poverty. In order to meet the food crisis throughout the year, it is crucial to process agro products properly.

One such industry named M/s. Upahar Foods is using renewable energy for processing the agro products is located in rural farm at Upahar Thottam, Kuppanur, Thondamuthur Block, Coimbatore district with food processing capacity of 400 kg per day. The rural firm is producing 35 varieties of millets, herbals and other organic fruits and vegetable-based food products. The main products are various types of vadagam, masala mix, herbal liquid and pickle. Initially the electricity are mainly used for carrying out all processing activities such as cleaning, grinding/milling, boiling, masala mixing and packing. The industry also houses a cold storage unit for storing herbal liquids. Now, this industry had integrated renewable energy technologies for electrical energy generation through solar PV, drying through solar dryers and also for hot water generation through solar water heaters.

### Solar tunnel dryer

The industry uses 5 numbers of solar tunnel dryer (21 x 3.75 x 2 m) with drying capacity of 250 kg/day of vadagam products. The dryer temperature reached 68°C during summer season. This has upgraded the produce as dust free, uniformly dried and high-quality product. Mr. N Janakiraman proudly says that the drying time was reduced up to 50% as compared to traditional methods. Additionally the product is handled under hygienic environment and requires less labour.



**Solar Tunnel Dryer**



**Products of M/s. Upahar Foods**

**Solar water heater**

Solar water heating system (SWHS) is a device which supplies hot water from 60°C close to 100°C using only solar thermal energy without any other fuel. In the case of smaller systems (100 – 2000 litres per day), the hot water reaches the user end, by natural (thermo – siphon) circulation for which the storage tank is located above the collectors. Solar water heating system (Evacuated Tube Collector) of 200 LPD was installed for supply of feed water to pre-heating of processing of various food products. Mr. Janakiraman says this water was found to be sufficient for pre-heating of various food products which minimizes the LPG usage.



**Solar water Heater**

### **Solar Photovoltaic – on grid system**

Based on the power consumption, a 5.5 kWe solar photovoltaic system with net metering was installed under PPP mode through ICAR-CRP scheme by the Department of Bioenergy, AEC&RI, Tamil Nadu Agricultural University, Coimbatore. Electricity and LPG fuel are mainly used for carrying out all processing activities such as cleaning, grinding/milling, boiling, masala mixing and packing. Industry also houses a cold storage unit (10 x 10 x 10 feet) for storing herbal liquids @ 12°C.



**Installation of 5.5kWe solar photovoltaic and net metering system**



### Connected load in the industry

S. No.	Type of machine	Connected kW
1.	Oven	2
2.	Wagar	6
3.	Grinder	2.25
4.	Mixer	0.5
5.	Pulping machine –Chilli	0.745
6.	Pulping machine – Tamarind	1.5
7.	Vegetable cutter	3
8.	Roasted machine	2
9.	Pulverizer	2.6
10.	Chekki	2.25
11.	Milling machine	9.5
12.	Papad making machine	2.25
13.	Cookie making machine (Vadagam)	6.33
14.	Cold storage	10
15.	Water pump	1.5
16.	Lights – Tube lights	3
17.	Lights – CFL	
18.	Fan	



### Machinery used in the industry

#### Power consumption of the industry

Average Daily consumption (working day) : 29 units

Average Consumption charges/day : Rs. 190 (Approximately)

Solar power plant installed capacity : 5.5 kWe

Daily electricity generation (Avg) : 27.5 kWh

### Extension Activities:

The renewable energy technologies installed at M/s. Upahar Foods, Kuppanur have been demonstrated to all the participants of various trainings organized by Department of Bioenergy, TNAU, Coimbatore for practical exposure and created awareness about the integration of sustainable energy system in food/agro-processing in rural industry.



**ICAR-DDG (Agri. Engg.) Visit**



**CRP-Project coordinator visit**



**SAMETI TRAINING PARTICIPANTS  
VISIT**



**GoI-BDTC turnkey workers visit**



**GoI-BDTC Biogas user's training participant visit**

**ICAR-DDG, CRP-Project coordinator and participants of various trainings conducted at Dept. of Bioenergy, AEC&RI, TNAU**

**Conclusion-**

M/s Upahar foods stands as a role model to replace the conventional sources of energy with renewable energy. He found very satisfied with vadagam dried from solar tunnel drier than the traditional methods in quality and production cost. The LPG is used to heat the water for preprocessing of food products; now with the solar water heater he is able to overcome the problem of getting LPG cylinders completely. The industry had overcome loss due to frequent power cut in day time by installing solar PV power plant to power all the processing machineries and cold storage system. The renewable energy technologies installed at M/s. Upahar Foods, Kuppanur have been demonstrated to all the participants of various trainings organized by Department of Bioenergy, TNAU, Coimbatore for practical exposure and created awareness about the integration of sustainable energy system in food/agro-processing in rural industry.