



Title: Solar *Roti* making machine for home based livelihoods

Case study No.:

Initiated in:

Key terms:

The solar powered roti (Indian bread) rolling machine is a clean energy solution for a common home-based livelihood in North Karnataka. Jowar is a commonly grown crop in Northern Karnataka and the jowar roti is a dietary staple across the region. It is eaten almost daily at homes and local hotels, commonly known as dhabas or khanawaalis. Traditionally Roti rolling was done by hand, but roti rolling machines are increasingly replacing this. However, frequent power cuts during working hours are impeding productivity and income.

#### IDENTIFICATION

Sumangala Patil was identified through a partner organization called Best Practices Foundation. Sumangala Patil attended their market oriented livelihood training program and it was discovered that she had additional market, which she could not cater to, due to power cuts.

The entrepreneur, Sumangala Patil, makes jowar roti in her house and supplies them to neighboring families and petty shops. She was making around 150 rotis per day with power available for only 3 hours during the day. The clean energy intervention has given her additional hours of work and enabled her to meet the market demand.

#### PROBLEM ASSESSMENT

In order to develop a sustainable solution, it was essential to look at the financials of the business. In this regard, multiple visits were made to the entrepreneur to understand her business in detail including, financials, operations and market. Being an informal home-based entrepreneur, she did not have actual recorded data and was only able to provide estimates. Detailed assessments needed to be done to ensure that we were able to come to an average set of figures to use for the financial model.

The Roti machine she was using was old and had an inefficient motor. Solar powering the existing machine would have increased the size of the solar system and thereby the cost. The option therefore was to replace the existing motor with an energy efficient motor, which could reduce the cost of solution and increase the efficiency of the machine.

**IMPACT:** Post a month of installation, the entrepreneur was very happy with the solution and felt that the machine was just as effective if not faster. By this time, we had ascertained that on an average she was making 150 Rotis earlier and now with this machine, she was able to increase that number to 400 - 450 Rotis a day.

#### PROJECT NUANCES

Considering that the entrepreneur was depending on this machine for her livelihood we could not risk tampering her existing machine. Further, considering that the market she catered to was on a daily basis, even one day of loss would mean that someone else would capture her market. As a result, it was decided to take the risk and invest in a separate Roti-rolling machine to innovate upon.

Post intervention, it was clear through the financials, that the entrepreneur would be able to bear about 30% of the total project cost. The entrepreneur needed financial support for the project and hence we decided to approach the local branch of Syndicate Bank for a loan for her.

Looking at the demand for rotis in North Karnataka, the machine proves its viability. Unlike other livelihood applications, the roti rolling machine has limited applicability on other locations.

After regular follow-up with the bank she was able to avail of a MUDRA loan for small and micro enterprises. The loan was Rs. 30,000 for a period of 3 years at an interest rate of 9.7% and an EMI of Rs. 963.

## TECHNICAL SPECS

S. No.	Particulars	Capacity	Quantity
1	Solar Module	150 wp /24 V	1
2	Solar Tubular Battery	110 Ah/12 V	2
3	Hybrid Charger	300 Wp, 12V/24V	1
4	DC Motor	150W, 24V	1
5	LED Light	3.6 W	2
6	Roti Roller Machine		1
<b>Total System Cost = Rs 84,115/-</b>			
<b>R&amp;D Grant = Rs 54,115/-</b>			
<b>Bank Loan = Rs 30,000/- for 3 years at 9.7% interest</b>			



## FINANCIALS

Pre intervention : 200 Rotis/ day(Profits/Month)	Rs 10,170
Post intervention: 400 Rotis/ day(Profits/Month)	Rs 20,340
Increase in Profits/Month	Rs 10,170
Bank EMI	Rs 963
<b>Additional Income in hand</b>	<b>Rs 9,207</b>



Post this intervention, this model has been further refined from a technical angle thus reducing the price further. The current system design is illustrated as follows:

### 1000 Rotis per day

No.	Particulars	Specification	Qty
1	Solar modules	150 Wp	1
2	Battery	80 Ah	1
3	Hybrid Solar Charge controller	10 A	1
System cost		<b>Rs.71,000/-</b>	

\*This includes cost of a Roti machine – Rs 22,000

### 500 Rotis per day

No.	Particulars	Specifications	Qty
1	Solar modules	40 Wp	1
2	Battery	60 Ah	1
3	Hybrid Solar Charge controller	10 A	1
System cost		<b>Rs.64,000/-</b>	

\*This includes cost of a Roti machine – Rs 22,000