



MESSE
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SOLAR LIGHTING UP THESE EIGHT SECTORS

Case Study

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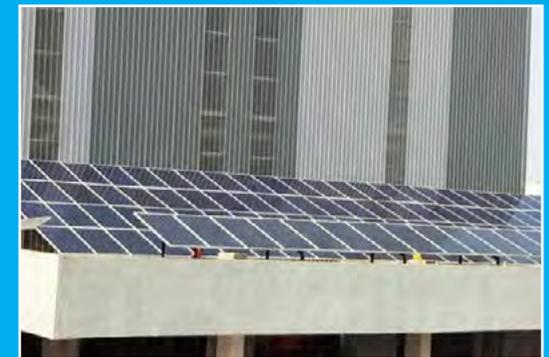
This is a series of 8 case studies developed for **Messe Munchen's** The Smarter E India/ Intersolar India 2022 by WriteCanvas, and designed by Crazy Pencilz.

CASE STUDY

1

Segment:
Dairy

Enterprise:
**Anand Milk Union Limited
- Amul**



The Dairy sector

Dairy is a sizeable, large segment that involves a supply chain from the start of milk production till the products reach the customers or the last mile. The entire process is an energy intensive value chain. This includes milk pooling points, collection centres, transportation to factories where milk goes through various processes. Recalling here, Minister of Power and New & Renewable Energy RK Singh's statement: "Extensive use of solar energy in dairy value chain can significantly reduce operational cost and ensure usage of clean energy."

India has a substantial number of milk producers in the country. It is estimated that there are more than fifteen million milk procurers that are connected to the large network of dairy cooperatives in the country. As per the government data, there are 1.65 lakh village level dairy cooperatives, 218 district/regional/Taluka unions and 24 State Dairy Federations/Apex Milk Unions.

Most of the dairy farms, and even the dairy factories, depend on grid energy for their power needs. With the introduction of smart machineries and increasing number of milk products innovation, the energy demand is increasing by the day.

The use of solar energy in the dairy segment was limited to hot water supply to boiler, hot water generator for processing of milk or for CIP cleaning. Large milk producers adopt these. It is yet to trickle down to retail milk producers who form the critical element of a cooperative milk society. But the scenario is gradually changing. Solar has found multiple applications in the dairy industry, gradually.

For instance, solar-energized refrigeration system for milk cooling, cold storages, packaging rooms etc. In addition, solar energy is utilised in the milk processing units to reduce not just energy cost, but also improve overall efficiency and productivity.

Among the many dairies in India, Amul, the largest cooperative in the segment, has pioneered many initiatives in the solar power adoption.



Amul's sustainability mission for 2030

35 per cent
Reduction in Specific
Carbon Emission

50 per cent
Reduction in Ground
Water Drawal

20 per cent
Reduction in Chemical
Consumption

**Carbon
sequestering**
through Forestry initiatives



Mr. Amit Vyas
MD - Amul

“We are prioritizing on renewable energy usage and have installed 1 MW solar rooftop PV system and renewable power contributes 2 per cent of total power consumption”

Solar shines through Amul Dairy

Amul, the largest dairy cooperative network not just in India, but globally, has embarked on an energy efficiency drive.

Amul is a brand of the Gujarat Cooperative Milk Marketing Federation, the leading federation of milk producers in the world.

The cooperative has drawn an impressive sustainability roadmap. This outline optimizing the use of natural, renewable resources to enable more than thirty-six million farmer members grouped into nearly 1,08,574 village-level dairy cooperative societies.

Being led from the top, the endeavour is spearheaded by Mr. Amit Vyas, MD; Mr. Vikramsinh Chavda, Head, Projects, and an entire team of engineers who work closely with the EPC partners.

“We are prioritising renewable energy usage and have installed the renewable power source which has seen reduction in power consumption by 21,00,000 kWh/annum,” said Mr. Amit Vyas, MD, Amul, who is presently spearheading the growth as well as the sustainability drive at the dairy.

For GCMFM Limited, the shift to go solar, albeit slowly, is perhaps a natural extension of the efforts it makes to stay at the forefront of the curve as a responsible corporate citizen.

In what could be termed as the first such large scale solar power project in the country, Zodiac Energy installed 1.4 MW captive power plant with

Highlights 2021-22

- Electricity saving of **21,00,000** kWh/annum
- Fuel saving **1,00,000** SCM/annum
- CO₂ emission reduction by **1800** MT/annum

co-generation facility at Amul Dairy on a Build, Own, Operate, and Transfer (BOOT) basis. Over the years EPCs such as Thermax, and Waaree Energy among others have enabled Amul to optimise solar power across applications.

For example, Thermax had in October 2016, installed a 560 m² parabolic trough collector field installed to allow for the feed-in of solar steam into the factory grid.

Waaree, on its part, used sophisticated tools and software to analyse the impact of the solar PVs and optimisation of the same across the federation's dairy partners, i.e., the dairy farmers. The company installed 320 Wp poly crystalline modules at the warehouse facility in Gandhinagar for captive consumption. The solar power has enabled the warehouse to run automated warehousing machines.

Mr. Vyas of Amul acknowledges,

“ Dairy is a perishable product. Hence the products must be transported under specified temperatures, or else they spoil. Additionally, dairies are launching multiple products to meet new market demands. This further puts pressure on the segment to scout for renewable energy like solar power to optimise cost. ”

Utilisation of solar power

Year	Technology	Total installed capacity (KWp)	Total generation (Million kwh)	Per cent Overall Electrical energy
2018-19	Solar rooftop	520	0.36	0.55
2019-20	Solar rooftop	1000	1.15	1.72
2020-21	Solar rooftop	1000	1.68	2.19
2021-22	Solar rooftop	1000	1.64	1.92
Total capacity at AmulFed Dairy	Solar rooftop	1000	1.64	1.92

Among other applications nationally, Amul has pioneered the use of solar energy in the following areas:

Hybrid thermal-solar collector for air conditioning at its modern trade store: The system is installed at the company's modern trade store named Amul Green Terrace, in Anand. The system (SunX) increases Delta T in the refrigeration cycle. This combined with the increased kinetic energy of the gas molecules, effectively increases the surface area of the condenser. Due to increase in molecular velocity and subsequent volume conversion within the condenser, finally this results in a reduced energy demand of compressor.

With this system, Amul reduced daily electrical unit consumption of VRF system without HSTC System from 202 Units to 134 Units, i.e., 33.66 per cent.

Hybrid thermal solar collector for -2 °C chiller operation at TFC, Mogar: The system is installed for -2 Degree Chiller

Operation. HTSC system for operation of -2 °C chiller at its chocolate plant. The system is installed between compressor and condenser, with solar energy pressure of refrigerant is increased and overall electrical load on the chills is reduced. The chilled water generated with this system is used for refiner and tempering machine in chocolate manufacturing plant.

The HTSC system is unique and patented technology. With this system, Amul has saved 5000-6000 units of electric energy. ROI of this system is 2.5 years, Mr Vyas says.

Hybrid thermal solar collector for 7 °C chiller application: The hybrid thermal solar collector for 7 °C chiller was installed in May 2022. The chilled water generated with this system is used for refiner and tempering machine in chocolate manufacturing plant.



Impact on energy consumption

FY 2019-20 59.7
kWh/KLFY

FY 2020-21 52.3
kWh/KLFY

FY 2021-22 53.4
kWh/KLFY