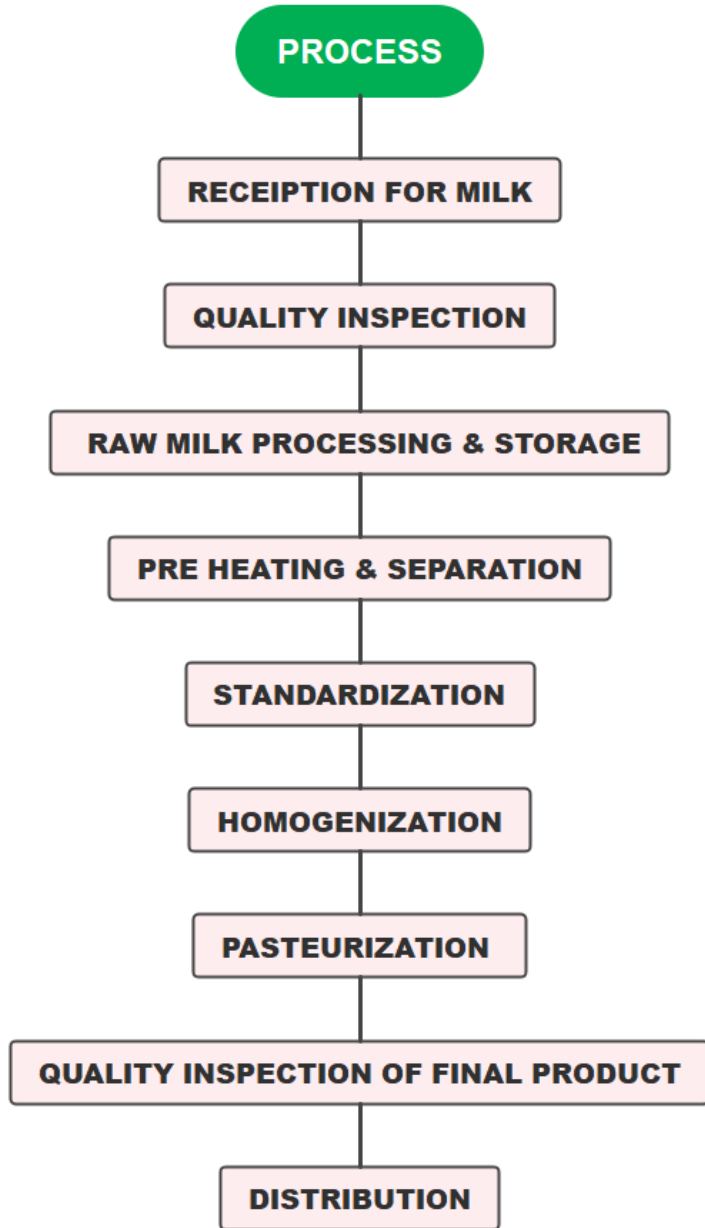


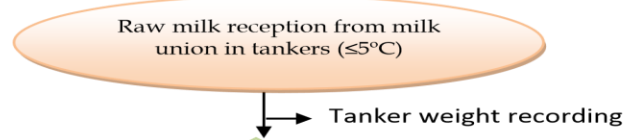
AMULFED DAIRY – PROFILE & PRODUCTS

- AmulFed Dairy Gandhinagar (AFD) was commissioned in September 1994 by L&T with Milk Handling capacity of 10 LLPD and currently it is 50 LLPD. It is the largest Dairy plant in Asia receiving such quantity of milk and converting into products.
- Our objectives are
 - Receive “Surplus Milk” from the Member Unions District Co-operative Dairies of Gujarat State and convert it into milk products after meeting the city liquid milk demand.
 - Supply milk round the year to meet liquid milk market demand of Ahmedabad and adjoining areas.
- Products at AmulFed Dairy: Pasteurized Milk in Poly-film sachet (Pouch), UHT & Aseptic Packaging in impervious laminate (TETRAPAK and SIG) and PET Bottle, Milk Powder, Ice-Cream, Ghee, Butter, Buttermilk, Lassi & Dahi, Probiotic beverages, milk based health beverages, Rabri, Pizza.

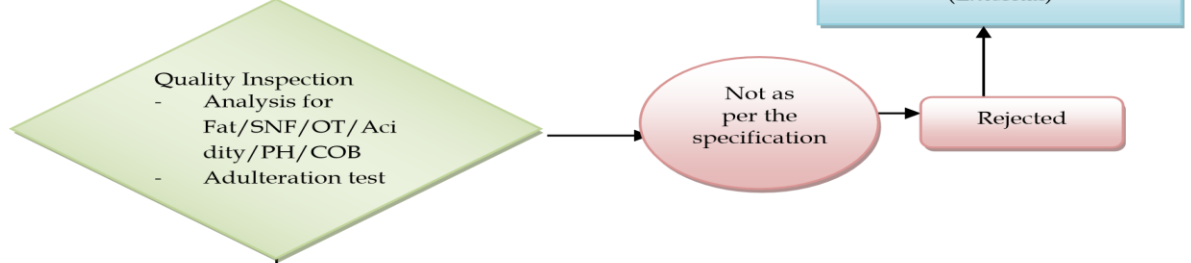
AMULFED DAIRY – MANUFACTURING PROCESS



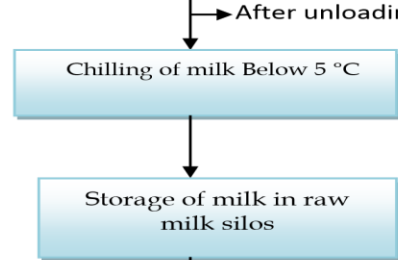
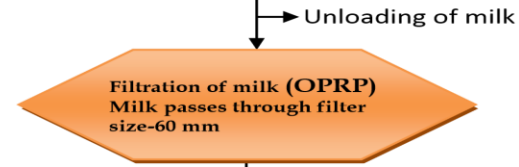
Step-1 Reception for Milk



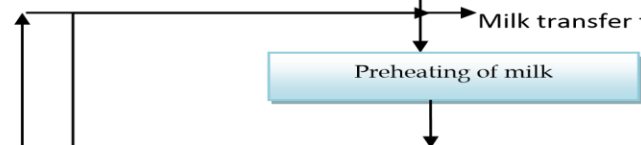
Step-2 Quality Inspection



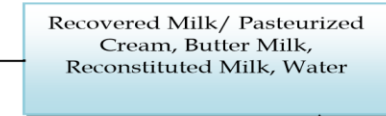
Step-3 Raw milk processing & Storage

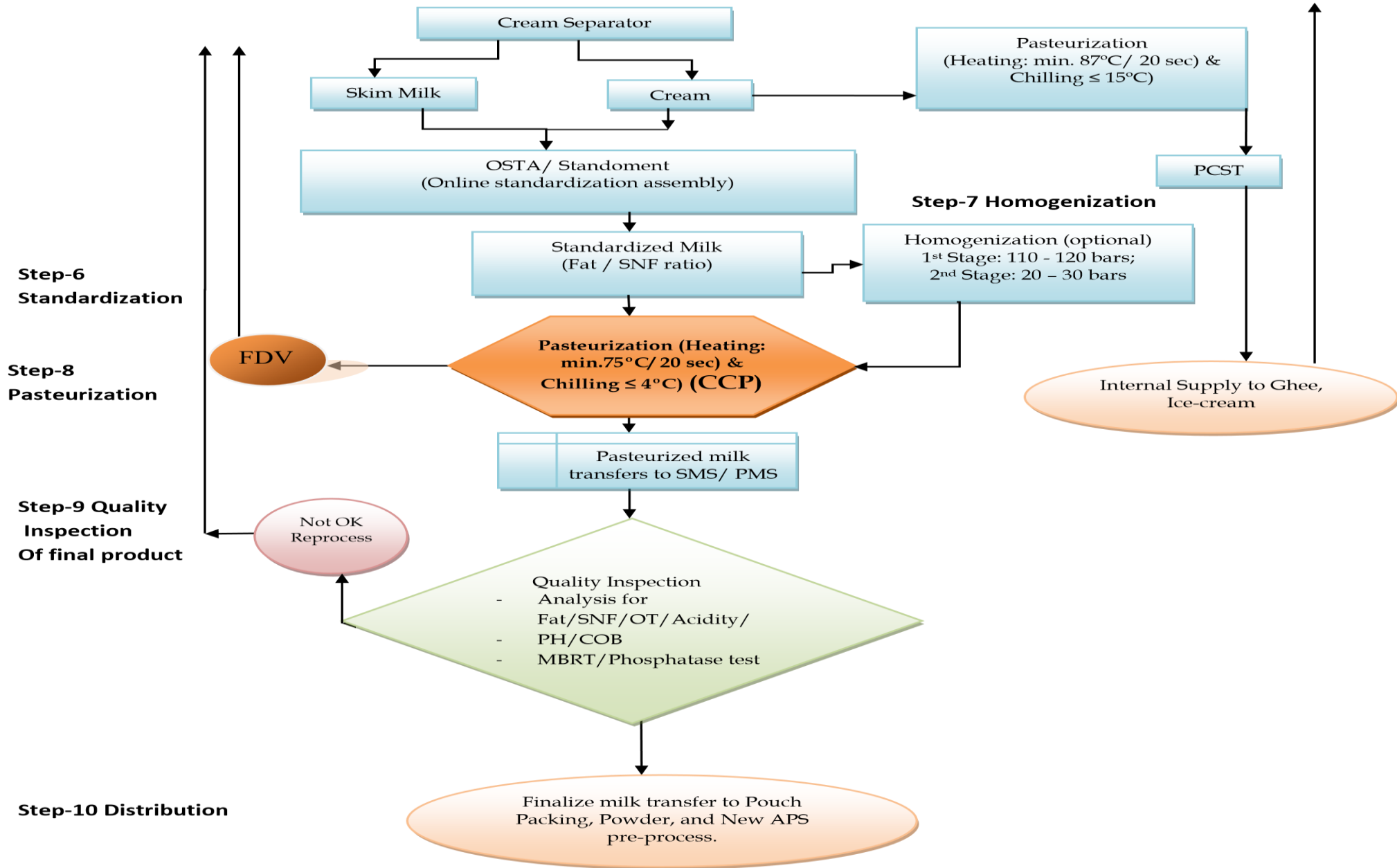


Step -5 Preheating & Separation



Step-4 CIP of empty milk tankers





IMPACT OF COVID 19

- We are in essential service. When all FMCG cut down their production Amul Family served the 3.6 million farmers and 60 crores Amul-loving consumers by its dedicated and committed team who attended duty everyday and also served specially the corona front-line warriors. This is recognized by Government of Gujarat, all State Governments and Government of India.
- Annual Production increased by 30%
- Specific Electrical Consumption (SEC) decreased by 12.5%
- Initiatives undertaken to improves capacity Utilization.
- Production planning rescheduled to improve the productivity.
- Energy Efficiency improvement measures undertaken
- Initiatives undertaken to improve energy performance of Utility areas.
- Shift schedules modifications to ensure minimum travel, less manpower at any location, less exposure to COVID-19 risk ensuring smooth continuous 24 hours 7 days a week, 365 days a year operation of the Dairy to process high inflow of milk and meeting higher demand from the market

SPECIFIC ENERGY CONSUMPTION

YEAR	ANNUAL ELECTRICAL CONSUMPTION	ANNUAL THERMAL CONSUMPTION	SPECIFIC ELECTRICAL ENERGY CONSUMPTION	SPECIFIC THERMAL ENERGY CONSUMPTION	PRODUCTION DATA	% IMPROVEMENT
	Million kWh	Million Kcal	kWh/ Ton of Production	Million Kcal /Ton of Production	KL	
2018-19	66	132740	55	0.10483	1300562	-
2019-20	67	124335	56	0.103940	1196210	0.15
2020-21	77	171953	49	0.110395	1557609	7

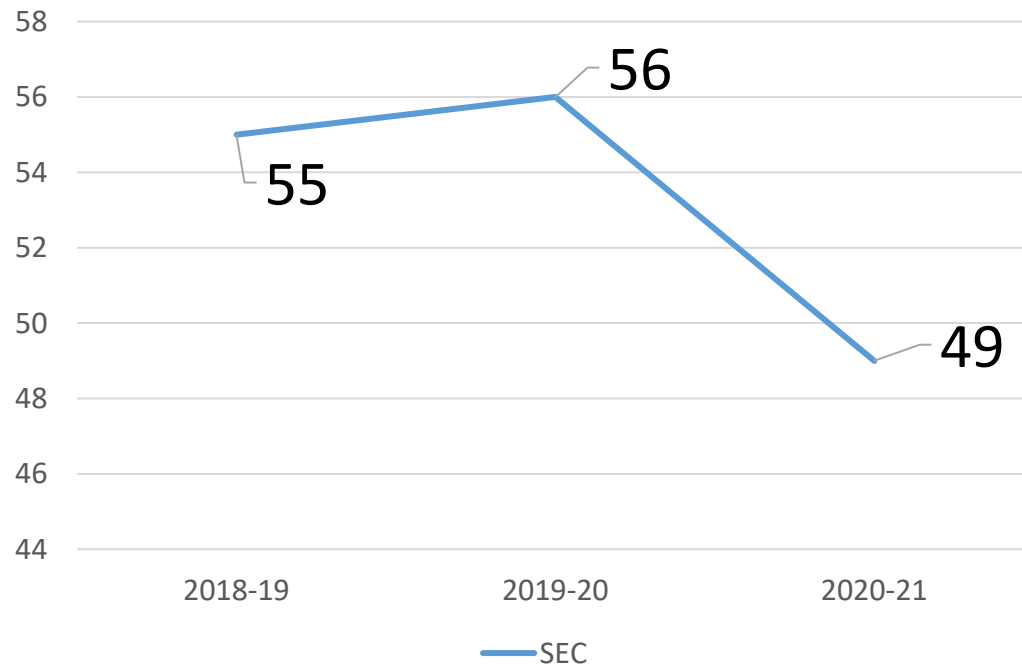
Specific Thermal Energy consumption of Powder production (29 SCM/KL) is 6 times higher than other products (5 SCM/KL). Powder production is 63% higher (47828 Ton to 77724 Ton) in 2020-2021 than in 2019-2020

SPECIFIC ENERGY CONSUMPTION-PRODUCT SPECIFIC

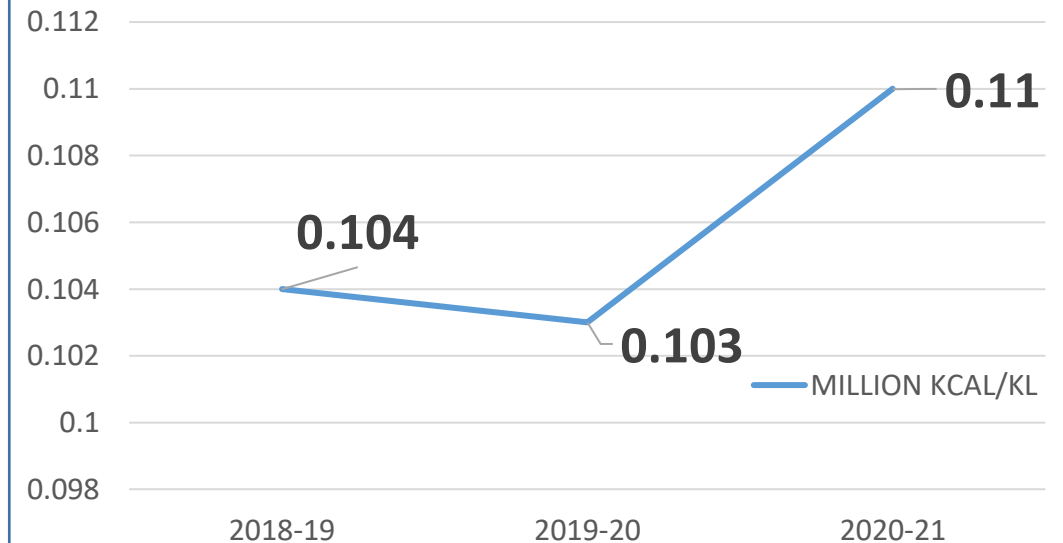
PRODUCTS	2018-19		2019-20		2020-21	
	SEC	SFC	SEC	SFC	SEC	SFC
SEC KWH/KL SFC SCM/KL						
Powder –KL INPUT MILK	67	37	70	35	60	29
Pouch- KL	22	1	26	1	27	1
UHT Tetrapak-KL	65	6	69	12	66	15
PET Bottling plant-KL	205	20	215	13	284	45
Ghee –KL	14	4	17	5	13	2
Butter Plant –MT	38	6	31	2	28	6
Ice Cream- KL	163	1	159	5	245	3
Pizza-KN	111	6	101	16	50	2

SPECIFIC ENERGY CONSUMPTION

SPECIFIC ELECTRICAL ENERGY CONSUMPTION
KWH/KL



SPECIFIC THERMAL ENERGY CONSUMPTION
MILLION KCAL/KL



Specific Thermal Energy consumption of Powder production is higher than other products. Powder production is 63% higher (47828 Ton to 77724 Ton)in 2020-2021 than in 2019-2020

MAJOR ENCON PROJECT PLANNED -2021-22

PROJECTS	Investment (Rs in Million)	COMMENTS
Bio-Digester	50	UASB (Up flow anaerobic sludge blanket)
Time matched Regeneration	0.3	Cooling heating cycle
CCGT	200	COGENERATION
LNG Station	100	LNG as a transport fuel for our vehicle
Wind Solar Hybrid	300	OPEX Model

ENERGY SAVING PROJECTS

YEAR	NO OF ENERGY SAVING PROJECTS	INVESTMENTS	ELECTRICAL SAVINGS	THERMAL SAVINGS	SAVINGS	IMPACT ON SEC (ELECTRICAL, THERMAL)	
						INR Million	kWh
2018-19	6	10.5	937000	3465	19.65	0.78	0.0030
2019-20	3	7.3	305000	117	2.78	0.255	-
2020-21	9	145.8	2367000	1788	26.18	1.52	0.0011

INNOVATIVE PROJECT

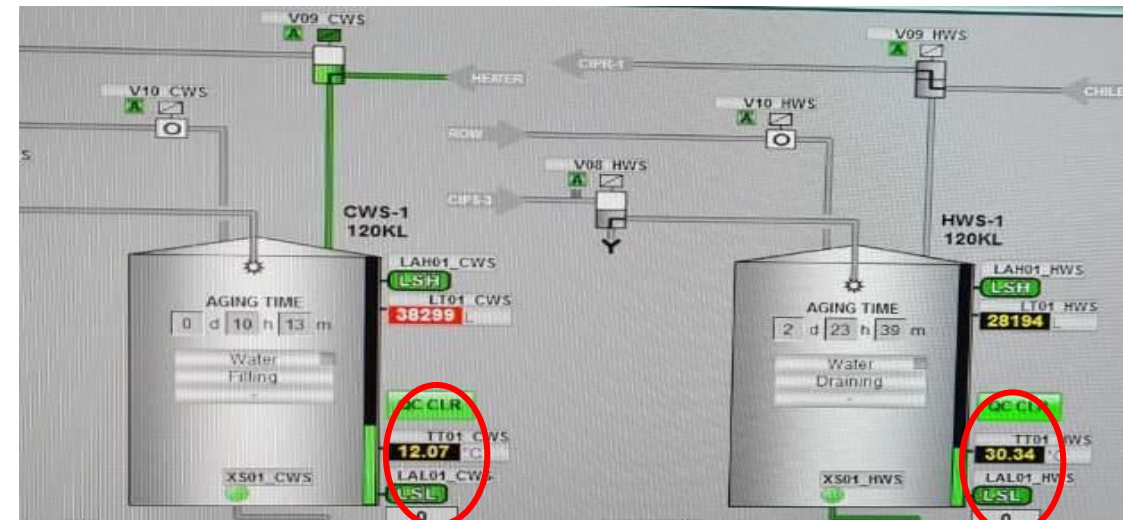
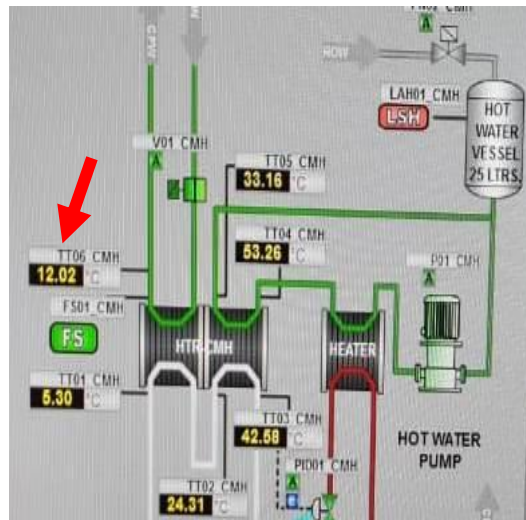
- Time matched Regeneration and hot cold segregation
Water is cooled while heating chilled milk for dahi production and the cold water is used while cooling the butter milk
Pasteurizer has simultaneous regeneration. In butter milk production there is 4 hours time lag for Dahi incubation. So cold water is stored and used during chilling process
- All Dairies Manufacturing Butter Milk can replicate this concept.
- Entire Project is conceptualized and designed by plant Team.

INNOVATIVE PROJECT

YEAR	CAPACITY	ANNUAL ELECTRICAL SAVING-KWH	ANNUAL ELECTRICAL COST SAVING-(Rs.Million)	ANNUAL THERMAL SAVING-SCM	ANNUAL THERMAL COST SAVING (Rs. Million)	TOTAL ANNUAL SAVINGS (Rs. Million)
2020-21	120 KL	352000	2.81	135000	4.185	6.99

REAL TIME DATA OF HEATER WHICH HEAT THE MILK & COOL THE WATER & CHILLER WHICH COOL THE CURD & HEAT THE WATER

REAL TIME DATA OF COLD & HOT WATER SILO



UTILISATION OF RENEWABLE ENERGY SOURCES

YEAR	TECHNOLOGY (ELECTRICAL)	TYPE OF ENERGY	ONSITE/ OFFSITE	INSTALLAED CAPACITY	GENERATION	CUMULATIVE GENERATION	% OF OVERALL ELECTRICAL ENERGY	INVESTMENT
SOLAR ROOF TOP PV SYSTEM				KWp	Million kwh	Million kwh	%	Million
2018-19	SOLAR ROOF TOP PV	SOLAR	ONSITE	520	0.728	0.728	1.11	20.6
2019-20	SOLAR ROOF TOP PV	SOLAR	ONSITE	492	0.688	1.416	2.15	24.2
2020-21	SOLAR ROOF TOP PV	SOLAR	ONSITE	150	0.210	1.626	2.16	5.55
TOTAL CAPACITY AT AMULFED DAIRY				1162	1.63		2.28	
2018-19	BIOMASS POWER	BIOMASS	OFFSITE	1200	10.62	0	16.00	
2019-20	BIOMASS POWER	BIOMASS	OFFSITE	3300	20.86	0	27.72	

UTILISATION OF RENEWABLE ENERGY SOURCES

YEAR	RPO OBLIGATION-% SOLAR	REQUIRED REC	ACHIVED
2018-19	4.25	131	138
2019-20	5.5	1418	1154
2020-21	6.75	3246	1686

YEAR	TECHNOLOGY (THERMAL)	TYPE OF ENERGY	ONSITE/ OFFSITE	INSTALLAED CAPACITY (Million Kcal)	GENERATION	CUMULATIVE GENERATION	% OF OVERALL THERMAL ENERGY	INVESTMENT
SOLAR BOILER					Million Kcal	Million Kcal	%	Million
2018-19	SOLAR BOILER	SOLAR	ONSITE	0.19	141.2	141.2	0.11	12.4
2019-20	SOLAR BOILER	SOLAR	ONSITE	0.19	111.94	253.14	0.09	
2020-21	SOLAR BOILER	SOLAR	ONSITE	0.19	120.31	373.44	0.07	

WASTE UTILISATION & MANAGEMENT

SR NO.	TYPE OF WASTE GENERATED	QUANTITY OF WASTE GENERATED(MT/YEAR)			DISPOSAL METHOD
		2018-19	2019-20	2020-21	
1	SOLID-PLASTIC (MLP)	1.2	1.3	1.3	Co-processing in Cement Plant
2	SOLID-DRY SLUDGE(BIOLOGICAL)	6.5	6.8	6.7	Garden soil conditioner
3	LIQUID-WASTE WATER –KL	610220	634647	672295	1) Re use in Plant 2) Use for Gardening within plant.

2018-19				2019-20				2020-21			
TYPE OF WASTE GENERATED	QTY. LAC M3/ YEAR	GCV	WASTE AS % OF TOTAL FUEL	TYPE OF WASTE GENERATED	QTY. MT/ YEAR	GCV	WASTE AS % OF TOTAL FUEL	TYPE OF WASTE GENERATED	QTY. MT/ YEAR	GCV	WASTE AS % OF TOTAL FUEL
BIOGAS	15.3	6000	6.91	BIOGAS	15.23	6000	7.34	BIOGAS	15.34	6000	5.35

BIO GAS USED IN BOILER AS A FUEL AND ALSO USED IN COOKING PURPOSE AT CANTEEN AND QUARTER.

GHG INVENTORISATION

YEAR	Kg Co2/TON OF FINAL PRODUCT
2018-19	68
2018-19	66
2019-20	62

TYPE OF SYSTEM INSTALLED	SUPPLIER	INVESTMENT (RS IN MILLION)	OPERATING COST (RS IN MILLION)
Low Nox Burner (6 Numbers)	WEISHAAPT	27	1.5
Use Of Natural Gas For Zero Sox	SABARMATI GAS	100	1
Cyclone Plus Bag Filter In Milk Dryer For Low SPM Air Quality	GEA	250	2.5

INITIATIVES TAKEN:

- Use of Natural Gas for thermal Energy and release of flue gas <60 C using condensing economizer resulting reduction in thermal pollution and huge energy conservation.
- Utilized 80% of chemical energy of NG through CCHP co-generation.
- 2% of electricity consumed is generated through rooftop grid-connected SPV generator.

GREEN SUPPLY CHAIN MANAGEMENT

1. Rail Milk Transport CO₂ Reduction 0.01 kg CO₂/ T-Km = 1 T CO₂/ RMT Delhi Route = 2080 T CO₂/annum, 2.5 T CO₂ Kolkata Route = 1825 T CO₂/annum, 0.5 T CO₂ Mumbai Route = 200 T CO₂ /annum = Total CO₂ Reduction per annum 4105 MT
2. All milk Bulk Coolers, Refrigerated transport vehicles and HVAC systems are with CFC-free refrigerants
3. Industrial refrigeration is totally ammonia system having zero ODP (Ozone depletion potential, zero GHG effect
4. Entire Cow to Consumer (C to C) supply chain management is periodically reviewed for availing opportunities of low carbon technologies
5. All AMC gardens are maintained by Amul with lush green lawns and MIYA WAKI (Japanese Concept) dense plantations
6. All the 90 production plants have adopted MIYA WAKI dense plantations and maintain lush green lawns
7. LNG fuelled transport will have huge impact on CO₂ reduction
8. Solar Wind Hybrid (SWH) renewable energy will have huge impact on sustainability
9. Optimised resource management is a paramount key performance indicator (KPI)

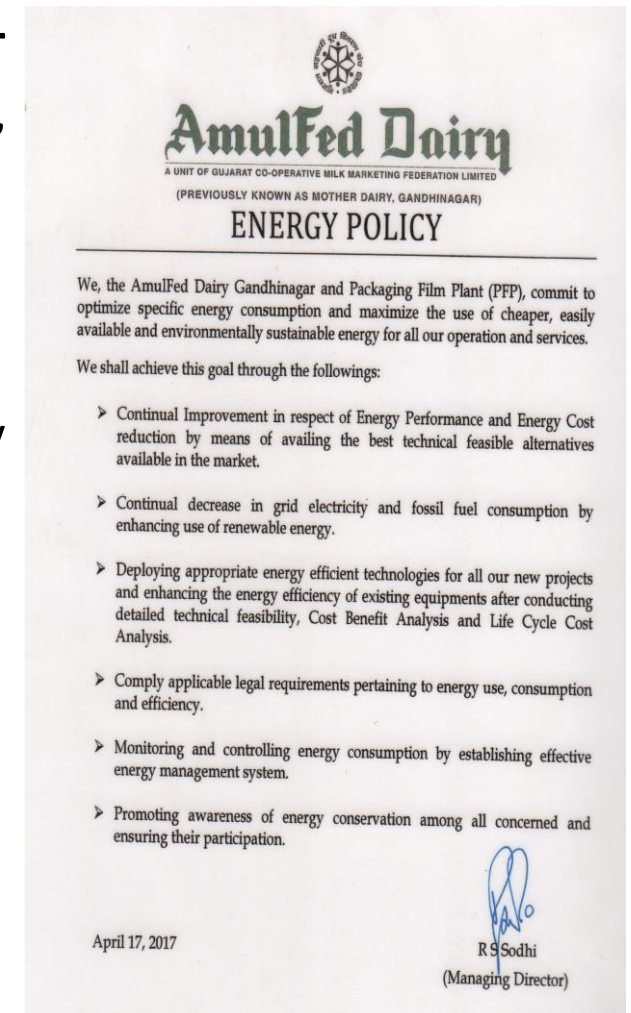
TEAMWORK, EMPLOYEE INVOLVEMENT & MONITORING

- **DAILY MONITORING SYSTEM:**
 - SAP, Log Sheet, Energy Allocation with SEC & SFC, MIS and SCM
- **REVIEW MEETING CHAIRED BY:**
 - Shri Anil Kumar Bayati General Manager
 - Shri Paritosh Kumar Sarkar OSD - Utility
 - Shri Prashant D Sheth Assistant General Manager - Utility
- **SEPARATE BUDGET FOR ENERGY CONSERVATION**
 - Budget is placed in January and is approved in February.
 - Half-yearly review is done to include fresh budgets if required.
 - Major investments are taken as project budget and is placed for approval at any time of the year
- **PROJECT IMPLEMENTD THROUGH KAIZEN**
 - Cooling of air compressor room ambient using cold condensate from air drier-**Workmen level**
 - 50% Reduction of RO polisher reject water - **Supervisor level**
 - Innovative use of existing facility for 24*7 operation of powder plant -**Supervisor level**

IMPLEMENTATION OF ISO 50001/GREEN CO/IGBC RATING

- WE ARE NOT ISO:50001:2018 CERTIFIED COMPANY BUT IMPLEMENTATION PROCESS IS ONGOING FOR TRAINING, DOCUMENTATION AND AUDIT PLANNING.
- LEARNING FROM IMPLEMENTATION OF ISO 50001:2018
 - Importance of energy conservation and awareness to all
 - Total participation is prerequisite for energy conservation
 - Measurement gives monitoring and monitoring unfolds energy conservation potential.
 - A small saving adds up to huge saving over time

YEAR	TOTAL TURNOVER OF PLANT RS.MILLION	ANNUAL INVESTMENT IN ENCON PROJECTS RS. MILLION	INVESTMENT %
2020-21	91500	200	0.22



LEARNING FROM CII ENERGY AWARD 2020

DID NOT PARTICIPATE

MAJOR ACHIEVEMENTS

- 24 * 7 OPERATION OF 150TPD POWDER PLANT USING EVAPORATOR OF 100 TPD POWDER PLANT
- INSTALLATION OF THERMAL ENERGY REGENERATION SYSTEM FOR UHT BUTTERMILK PROCESSING PLANT
- CONSTRUCTION OF NEW REFRIGERATION PLANT FOR OLD PROCESS AND FERMENTED SECTION
- REPLACEMENT OF EXHAUST FAN AT 100 TPD POWDER PLANT
- CONDENSING ECONOMISER IN BOILER HOUSE
- 1 MWp-SOLAR ROOF TOP PV SYSTEM
- CHILLER FOR AIR CONDITIONING LOAD
- FLASH STEAM RECOVERY FROM BOILER BLOWDOWN
- HOT & COLD WATER SEGREGATION
- VRF BASED AIR CONDITIONING SYSTEM

MAJOR ACHIEVEMENTS

- **EVER HIGHEST PRODUCTION/DISPATCH**

Sr. No.	Department	Period	HIGHEST PRODUCTION/DISPATCH
			Prod'n/Desp
1	FPP _ Fermented Product Production	Monthly	564 MT
2	Butter Production	Single Day	120.33 MT
3	Butter Plant - Packing	Monthly	2514.4
4	Pouch - Butter Milk Packing	Monthly	234193 LPD
5	FPP _ Fermented Product Production	Monthly	1217.62
6	FPP -Dahi Packing	Monthly	37.96 MT/dat
7	FPP -Dahi Packing single day	Single Day	57.49 MT
8	FPP -Dahi Packing	Monthly	38.16 MTPD
9	FPP _ Fermented Product Production	Monthly	1252.56



THANKS
&
NAMASTE

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AMULFED DAIRY – LIST OF ENCON PROJECTS

ENERGY CONSERVATION PROJECTS	YEAR
VRF BASED AIR CONDITIONING SYSTEM	2018-2019
CHILLER FOR AIR CONDITIONING LOAD	2018-2019
SOLAR ROOF TOP PV SYSTEM	2018-2019/2019-20/2020-21
FLASH STEAM RECOVERY FROM BOILER BLOWDOWN	2018-2019
LED LIGHTING	2018-2019
BIOGAS	2018-2019
HOT & COLD WATER SEGREGATION	2018-2019
USE OF VFD	2018-2019

AMULFED DAIRY – LIST OF ENCON PROJECTS

ENERGY CONSERVATION PROJECTS	YEAR
24 * 7 OPERATION OF 150TPD POWDER PLANT USING EVAPORATOR OF 100 TPD POWDER PLANT	2020-21
INSTALLATION OF THERMAL ENERGY REGENERATION SYSTEM FOR UHT BUTTERMILK PROCESSING PLANT	2020-21
CONSTRUCTION OF NEW REFRIGERATION PLANT FOR OLD PROCESS AND FERMENTED SECTION	2020-21
REPLACEMENT OF EXHAUST FAN AT 100 TPD POWDER PLANT	2020-21
CONDENSING ECONOMISER IN BOILER HOUSE	2020-21

AMULFED DAIRY – LIST OF ENCON PROJECTS PLANNED

ENERGY CONSERVATION PROJECTS

BIO-DIGESTER

TIME MATCHED REGENERATION

COMBINED CYCLE GAS TUEBINE

LNG STATION

WIND SOLAR HYBRID

VRF-AIR CONDITIONING SYSTEM

YEAR	ANNUAL ELECTRICAL SAVING-KWH	TOTAL ANNUAL SAVING-(Rs.million)
2018-19	101000	0.8

- Replacement of Chilled Water Based System to Variable Refrigerated Flow (VRF) System for Comfort Cooling.

SOLAR ROOF TOP PV SYSTEM

YEAR	CAPACITY	ANNUAL ELECTRICAL SAVING-KWH	TOTAL ANNUAL SAVING-(Rs.million)
2018-19	520 KWp	728000	5.77
2019-20	492 KWp	688800	5.75
2020-21	150 KWp	210000	1.68





CHILLER FOR AIR CONDITIONING LOAD

YEAR	CAPACITY	ANNUAL ELECTRICAL SAVING-KWH	TOTAL ANNUAL SAVING-(Rs.million)
2018-19	250 TR	204000	1.6

