UPGRADATION/MODERNISATION OF DAIRY PLANTS FOR IMPROVED EFFICIENCIES & FOOD SAFETY



NEED FOR UPGRADATION/MODERNISATION

- A large number of dairy plants were established in '70s and '80s having capacities from 1 to 4 LLPD
- These were mostly manually operated plants with technology prevailing in the period.
- The present technology provides improved efficiencies and Food safety.
- The plants with old technology recommended for up gradation for improved efficiencies.



TECHNOLOGICAL CHALLENGES

➢Global Competition and Increasing cost of manufacturing.

Consumer's preference for consistent quality & food safety

Steadily rising prices of Raw materials and utilities



UPGRADED TECHNOLOGIES

- Process Automation
 - Control milk & product handling losses
 - Ensure Food safety norms with consistent quality.
 - Maintain hygiene
 - Saves energy and water
- Automated Refrigeration Plant (energy savings)
- Improved Thermal Efficiencies (Boiler)
- Use Renewable / Non-conventional sources of energy
 - Boilers with Agri waste / Briquettes
 - Solar Energy for Thermal and Electrical generation.



PROCESS AUTOMATION

Control Milk/Product losses.

- Accurate water flushing/ purging operation by timer/ volumetric based operation.
- Recovery of milk solids through rinse milk recovery system.
- Product standardization with automated & accurate control of Fat and SNF.

Ensure Food Safety & Consistent quality

- Finer monitor & control of process parameters through PLC.
- Automatic CIP system to ensure cleaning consistently with choice of recipes.
- Closed loop circuit control without human intervention.
- Maintain hygiene with minimal contamination for e.g. product stream maintained at higher pressure than utility thereby avoiding product mixing.



PROCESS AUTOMATION

> Higher plant efficiencies

- Improved plant Capacity Utilisation
- Low utility consumption (electricity and water)
- Low manpower / Human intervention
- Lower ETP requirement due to controlled product losses

> Daily MIS Reports

- Reliable/accurate daily reports
- Fast action taking.
- Historical analysis



AUTOMATED REFRIGERATION PLANT ≻Improve Co-efficient Of Performance (COP)

- Control of accurate suction pressure with plant automation
- Use of Pre chiller before IBT
- Control of discharge pressure with automated Air Purger
- Introduction of Economizer
- Inclusion of de-super heater to save energy and water

➢Use of screw compressors

- Step-less capacity control
- Accurate suction pressure control
- Maintenance free/Minimum maintenance



AUTOMATED REFRIGERATION PLANT

- Use of Evaporative condensers lower power consumptions.
- Refrigerant based oil cooler eliminates water based corrosion issues & hence improve plant availability.
- VFD controlled chilled water pumps to save energy but to maintain required water discharge pressure.
- Introduction of Ice silos for ice storages.



IMPROVED THERMAL EFFICIENCIES

- Auto Recovery of maximum steam condensate from plant using motive steam to pump condensate to Boiler feed water tank.
- Automatic blowdown system to reduce blowdown losses.
- Continuous Flue gas analyser and control of air to reduce heat losses thru Flue gases.
- Introduction of Agri waste / Briquette (renewable source of energy) based Boiler with a payback of 18-24 months.



USE OF SOLAR ENERGY

Solar energy can be utilized in Dairy in the following areas :

 Hot Water Generation Through Flat Plate Collector for Boiler Feed water, Estimated Plant Cost Rs. 12 Lacs, Capacity 300000 Kcal/day, suitable for 500-1000 Kg/Hr Boiler, Payback 2-3 years





USE OF SOLAR ENERGY

Solar energy can be utilized in Dairy in the following areas :

 Steam generation Through Solar Thermal concentrators. Estimated Plant Cost Rs. 32 Lacs, Capacity 800 Kg steam/day. Payback Four years



- Electricity generation Through Photo Voltaics (PV) Panels. Estimated Plant Cost Rs. 39 Lacs, Capacity 300 KWH /day, Payback Five and half years
- Operation of Bulk Milk Coolers Through Solar PV systems. Estimated plant cost Rs. 10-12 Lacs for 5000 Lts. BMC

