

Merino's concern for environment sustainability

Introduction

As a corporate deeply connected with India's soil, the Merino group stands firm by its value of Environment first. It is this value that inspires Merino to not only adhere strictly to all prescribed environmental norms but go a step beyond compliances and bring about a positive change in the environment through ecological improvement.

At Merino, we believe in creating value that is both economic and sustainable. Based on our pillars of excellence and ethics, we strive for responsible competitiveness that put environmental sustainability factors at the heart of all our processes and decision making.



Since inception, we have come a long way. The group has expanded manufacturing facilities at Hapur (Uttar Pradesh), Rohad (Haryana), Hosur (Tamil Nadu) and Dahej (Gujarat). Production in these manufacturing facilities involve usage of various resources like raw materials, water, fuel for power and heat generation etc. along with relevant application of technology. During the process, there is generation of ecological footprints of carbon, water, emissions and waste along with socio- economic benefits for our nation.

Based on our value of environment first, Merino has engaged external agencies/institutes to study to assess carbon and water footprint and to adopt best practices in greenhouse gas (GHG) and energy management. The in-house facilities strive to minimise and monitor wastes and air emissions while we engage in key strategic initiatives to attain a positive balance in ecological footprints.

Merino's sustainable practices can be broadly classified into four focus areas.

1. Energy Management
2. Water Management
3. Waste Management and
4. Care for emission, air quality and soil

Energy management - The future is renewable

Conventional fuel resources based on fossils is one of the prime carbon footprint contributor. At Merino, we believe that the future lies in renewable energy - one that fulfils our objectives of ecological sustenance and energy conservation. To achieve these objectives, we have formulated a three pronged approach for effective energy management

1. Increase the share of renewable energy in Merino's total energy requirement (like solar energy and biogenic fuel (carbon neutral) like biomass and biogas.
2. Constant efficiency upgradation through upgraded electrical appliances, machineries or improved technology in production, utilities and lightening systems.
3. Promoting an environmental friendly work culture. ie. saving electricity through automation and humane responsibilities.

Reducing the ecological footprints through carbon reduction

Ensuring responsible manufacturing practices within our extended operations is an important component of reducing our environmental impact. At present, Merino fulfils its total energy requirement through a combination of both conventional sources of energy like fossil based Diesel-Generators (DG Sets), State Electricity Boards (SEBs) and renewable /alternate energy resources namely, Solar, Biomass and Biogas. These five energy sources are used to power the various factories and establishments of the group.

Reiterating its stand of environment first, Merino industries has taken several key steps that have reduced dependency on traditional power from fossil fuels-based DG-Sets or power from SEBs.

The group has increased the installation and usage of alternative source of energy; mainly solar, biomass and biogas.



Solar Panels on rooftops of factory in Hapur

Biomass has emerged as an important fuel source in the fight against climate change. It is amongst the lowest carbon emission fuel amongst fuel-based technology for production of heat and power. In fact, energy experts agree that when one combines the economic and environmental character of energy sources, biomass tops the list as one of the best energy source.

Merino uses agro-based industrial residues like rice husks and wood or wood product wastes produced in industrial operations like saw dust as major biomass fuels to generate heat and power. Not only does this help in reducing carbon



Bio Gas plant in MIL unit-1

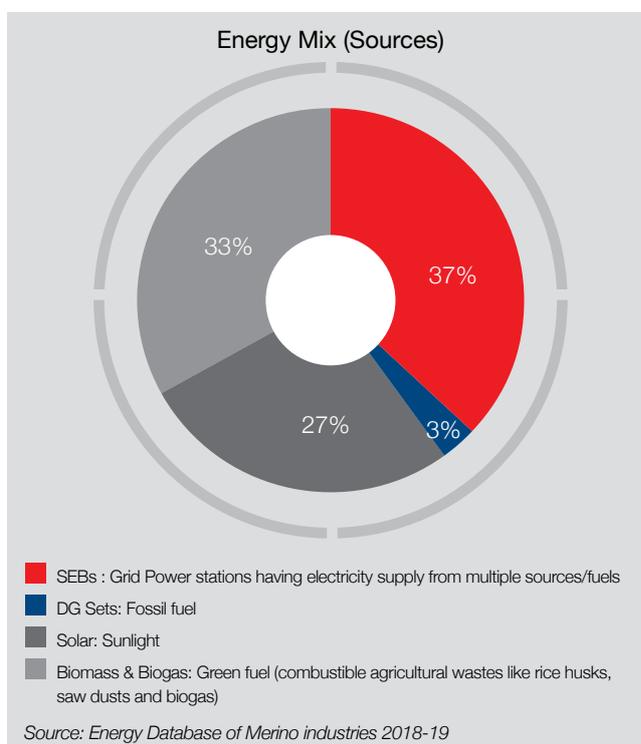


Biomass based TPH

footprint but also creates sustainable livelihood options for people who manages these wastes.

The initial milestone achieved - the 60% threshold crossed.

Constant engagement is the key attribute of sustainable practices. Merino now fulfils 60% of its total energy requirement from renewable and green energy sources through its years of proactive efforts. Powering this feat are the biomass technology turbines and biogas plants that contribute 33% of the total energy requirement while solar power accounts for 27%.



Biomass and biogas Power - The Green fuel

Biomass, being the green fuel is our key fuel source at the Merino manufacturing units at Hapur. The power generated



Co-Gen plant for Turbine Generator MIL unit-1 Hapur

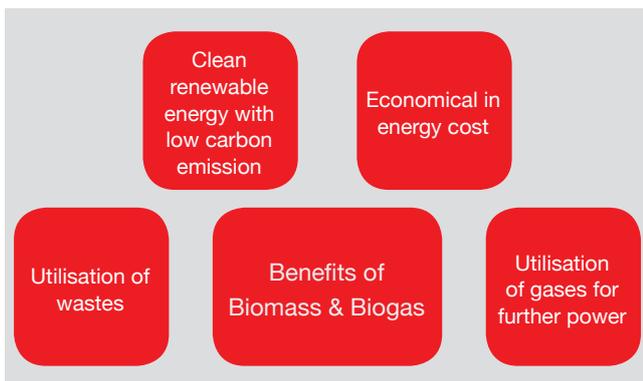
through the biomass turbines accounted for around 77% of total energy requirement of the two manufacturing units. Merino has harnessed 16.3 million kWh of electrical energy annually from biomass during 2018-19.

Combustible agricultural materials like rice husk and biomass like saw dust are used to generate heat in furnaces. This heat produces steam and power through turbines. This has created substantial value as energy harnessed from biomass is inexpensive as compared to coal and oil, costing about 33% less than fossil fuels.



Co-Gen plant for Turbine Generator MIL unit-1 Hapur

Gases obtained from effluent treatment plants and organic decomposition of wastes in biogas plants are also used in power generation. The organisation generates approximately 1,68,500 kWh unit of electrical energy through biogas generator thus utilising the waste from potato flakes plant at Hapur.



Solar Power: The CO2 free energy source

Solar power is the key to a clean energy future. At Merino, we have constantly emphasised on this by implementing installations of various solar systems/plants to power the group's growing power requirement. The group has installed around 9.61 MW solar system/plants that helps generate over 13.5 million kWh of electrical energy annually for production,

utilities and lighting needs. This makes up for around 27% of the total energy requirement of the group.

Merino has installed 1.78 MW solar system (rooftop) at its plant and another 5.5 MW ground mounted solar system with tracker in Budak, Hissar (Haryana). These together take care of almost 51% of the energy needs of Merino Panel Products (MPPL) manufacturing unit at Rohad.



The manufacturing unit of Dahej account for around 10% of energy needs from solar system installed in the campus. Solar energy provide for around 5% of energy requirement at each of the manufacturing units of Hapur and Hosur from solar rooftop panels at factory premises.

Constant upgradation for energy efficiency

Energy efficiency is an important component in sustainable practices. At Merino, this is not just an ideology but a way of life. Technological upgradation to achieve the above objective has been implemented in all processes and productions. Emphasis has been given on the installation of energy efficient (IE3) motors in production and other facilities at all establishments. Merino's Hosur factory has 100% IE3 motors while the Dahej unit has around 85%. Other production units at Rohad and Hapur have also installed around 75 and 61% IE3 motors respectively. We are constantly working towards achieving our objective of gradually replacing the entire motoring capacity with 100% IE3 motors.

Expansion in economic activities calls for an increase in lighting requirements for better and safe working environment at all Merino establishments. Therefore, the group has ensured optimal lighting system in all factories with a gradual shift towards installation of LED lights by phasing out conventional Tube Lights/ Sodium/Mercury Halogen lights. LEDs now have replaced around 78% of conventional lighting and its usage has brought about a 30% saving in electrical consumption.

Our factories at Hosur, Rohad and Dahej have installed almost 100% LED lighting at their respective facilities and we are working towards replicating the same at the rest of our units across India.

Water management and Water Conservation

Ground water is the prime source of water supply at all the Merino establishments. A holistic approach had been undertaken for water management in and around the units with focus on conservation of ground water. These constructive conservation efforts can be classified into three key actionable implementations

- Focused practices to reduce water consumption
- Recycle and reuse of water
- Replenishing and restoration of water sources.

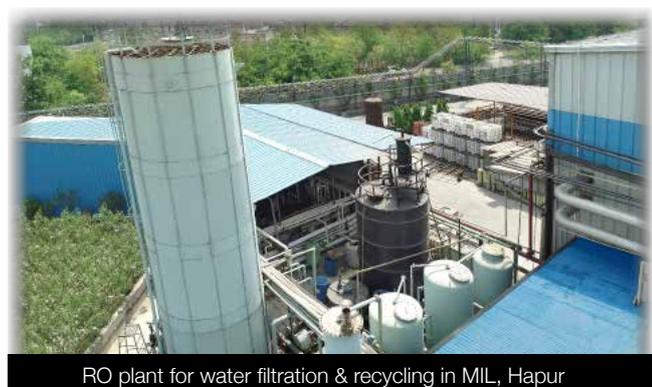
Saving water is the call of the hour. At Merino, we have brought about all possible measures to reduce water consumption across all our operations at our manufacturing units across India. The group has installed 200 and 250 CHM Adiabatic Cooling Towers at Hapur plants.

Replacing the conventional cooling tower with the upgraded Adiabatic Cooling Tower has helped us save more than 27,880 KL annually. Our flash steam recovery system further helps us to save around 15% of water used in steams.

All the manufacturing units of our group have moderated water consumption per unit of laminate produced. This is possible through increase in water efficiency by use of upgraded technology and better water management.

Recycle and Reuse of Water through ETP, SBT and STP

Another key aspect of our water management efforts is recycling of waste and unused water discharged from our manufacturing units. This is diligently implemented at all our manufacturing facilities through the use of ETPs (Effluent Treatment Plants) based on both aerobic and anaerobic techniques, SBT (Soil Biotechnology) and STPs (Sewerage Treatment Plants).



RO plant for water filtration & recycling in MIL, Hapur

All these three water treatment systems are available at our Hapur plant. The capacity of ETP, STP and SBT are of 250, 70 and 150 Kilo Litre (KL) per day respectively - thus recycling over 100,000 KL of water annually for reuse at the Hapur premises.

Waste water coming out of effluent treatment plants (ETPs) is treated under Soil Biotechnology (SBT) that has an environment friendly bio-conversion process. The Rohad plant has installed capacity of ETP and STP of 50 and 100 KL per day respectively. It helps to make over 50,000 KL of reusable water annually from waste/used water in the premises. Similarly, with the use of STPs in the manufacturing premises of Hosur and Dahej, the company reuses over 10,000 KL of water annually.

Replenishing and restoration of water sources:

Marching towards Zero discharge and double recharge

Merino has taken several initiatives to replenish and restore the ground water by setting up rain water harvest systems at all establishments of the group. The rain water harvest system is an effective way to naturally restore and replenish the ground water tables. Merino has installed rain water harvest system with reservoir capacity of over 1,00,000 litres at Hosur.



Newly constructed pond for water recharge in MIL-2 unit of Hapur

The group has built reservoirs and installed ground water recharge system in and around the factory premises. Three ponds have been developed to recharge ground water at Hapur. These are effective to restore nearly 5,53,815 KL of water cumulatively in a year.

Constant engagement and a holistic water conservation plan means that Merino is right on track to achieve its twin goals of zero discharge system and double recharge (recharging double of what we consume at our premises)

Waste Management:

A close look at nature reveals that nothing goes waste. Incorporating this philosophy, Merino has focussed on reducing waste generation and further reusing these waste through adoption of innovative ways to create value. Updating to technologically advanced machineries and implementation of raw material conservation practices has brought about a paradigm shift in waste management as the company moves steadily towards its long term goal of zero waste.

Merino industries has adopted many innovative methods to reuse wastes. To start with, there is a system in place to collect all wastes and segregate into various categories like hazardous (non-recyclable), non-hazardous (recyclable), organic, non-organic, liquid and solid. This helps to properly plan the reuse of recyclable wastes and carefully dispose the hazardous ones.

Combustible agricultural wastes like rice husks, sawdust and waste from manufacturing activities like residue of paper materials, laminates, panel products etc., are used in furnaces to generate heat used for drying the biomass (key source of energy)

Ash generated from boilers and incinerators along with ash from NTPC power plant are used for manufacturing of bricks and tiles. These are used for internal pavements inside our premises.

Organic wastes from processes and canteens as well are converted into manures through bio-conversion processes like use of bacteria or other micro-organisms. The manures obtained from organic wastes are used for plants/plantations in Merino establishments.

Treatment and reuse of wastes of potato flakes plant in Merino Industries

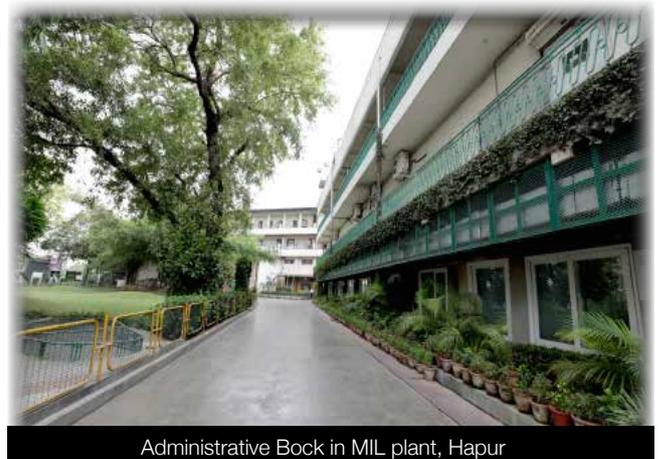
The potato flakes plant (PFP) is no different from the other facilities in waste management implementation. Wastes produced in different forms like liquids, semi solids are properly segregated, treated and reused. Liquid waste and sludge is processed in the effluent treatment plant (ETP). In ETP, the waste goes through USABR anaerobic decomposition process to produce bio-gases which are then channeled for electricity generation or used for cooking purposes directly. After anaerobic treatment, the discharged liquids has substantially reduced COD (Carbon Oxygen Demand) and BOD (Biological Oxygen Demand). This is further treated with aerobic decomposition process. Post this treatment, the released water is used for plantation, washing potatoes and flushing systems. Thus this whole process helps in recycling of water and energy generation.

The decomposed (mineralized) slurry from the bio-gas plants is used as fertiliser in gardens, crops or plantation fields. Solid waste from potato peels and unused potatoes is collected and converted into compost. This compost is an effective manure for enrichment of soil in agricultural lands. The annual production of compost from the potato flakes plant is around 50 metric tons.

Care for emission, air quality and soil

Reiterating the group's engagement in sustainable practices, all the manufacturing units at Merino diligently adhere to maintain

lower emission than stipulated under manufacturing activities to bring about a positive and real change.



A major part of Merino's cooling needs are addressed by VAM chillers that use waste heat instead of the conventional compressor run on refrigerant gases. Wet scrubbers installed in our laminates plants at Hapur, Rohad and Dahej help control air pollution.

Additionally there are electrostatic precipitators and bag filters in manufacturing units to control emission. The chillers in the production units for process and comfort cooling operate on the latest technology and are more environmental friendly than the conventional cooling system.



An important aspect of industrial emission is ozone depleting gases (ODG) that get released in the atmosphere. At Merino, we have addressed to mitigate this through proper knowledge, training and technological upgradation.

Chlorinated Fluorocarbon (CFC) refrigerants have been replaced by the technologically advanced hydrofluorocarbons

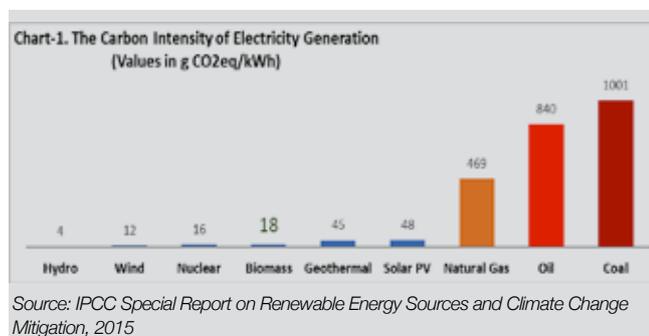
(eg R-410A) refrigerant in over 376 tons of refrigeration (TR) systems annually. This has helped to mitigate equivalent amount of ODG from the environment. Merino's plants at Hosur and Dahej have complete refrigeration facilities based on Non-CFC refrigerants.

Based on our sustainable practices, waste at our facilities is directly converted into useful gases and composts without greenhouse gas emission into the environment. This has significantly improved the air quality in and around our establishments. Further use of biomass and solar energy as fuel sources have helped in lowering carbon footprints.

The transformation of biomass (and its embodied "biogenic" carbon) into products has brought about effective carbon sequestration as these products effectively store CO₂ over a period of time. Thus the use of biomass contributes to reduction in the CO₂ level in the atmosphere and addresses the key issue of global warming.

Compared to fossil based energy sources, CO₂ and toxic emission is substantially lower in biomass.

The carbon intensity (gCO₂ equivalent/kWh) of electricity generation are 56, 47 and 26 times respectively for coal, oil and natural gas in comparison to biomass. (explained in the table below)



The study conducted by Visvesvaraya National Institute of Technology (VNIT), Nagpur for assessment of carbon and water footprint of industrial activities of Merino in Hapur using ISO 14044:2006 methodology for Life Cycle Assessment (LCA) & compliance to ISO 14064:2006 for Green House Gas (GHG) evaluation, shows that 2.97 kg CO₂ equivalent per laminate sheet production and 0.72 kg CO₂ equivalent per kilogram of potato flakes production are GHG emissions. The above data translates into 25,620 kilo tonnes of CO₂ equivalent GHG emissions.

The Merino group has undertaken green cover activities like plantations, farming and agroforestry for carbon sink or carbon sequestration practices. Together around 14,000 kilo tonnes

of CO₂ equivalent GHG has been effectively removed through Merino's green initiatives during 2018-19.

Sustainable agricultural activities and Care of Soil

Sustainable farm health and soil conservation form the ethos of our agricultural division at Merino.

Leveraging the domain knowledge of national agricultural institutes like ICAR and other experts, we have implemented a host of projects. The primary goal of these initiatives has been to promote need based usage of agricultural inputs to sustain soil health and crop ecology amongst the large number of farmers who have been associated with the Merino group.

Innovative methods adopted for pest and nutrient management based on soil conditions done through soil testing have transformed the farms. Not only has the usage of pesticides and fertilisers reduced by around 49% and 20% respectively, the targeted yield and quality have also been achieved. This project has been implemented at over 1400 acres of land under potato farming and other crops during 2018-19



Crop fields of Merino

This exemplary practices of Merino is rated as one of the best examples of public private association by Dr. Ashok



Vermicompost made by Merino for soil organic care

Dalwai, Chairman “Doubling farmers income by 2022 mission committee” & Additional secretary, Ministry of Agriculture Cooperation and Farmers Welfare, Government of India, during a seminar organised by National Horticultural Research and Development Foundation, Delhi on 12th of March, 2019.

Taking a constructive step towards soil conservation, Merino has engaged in enriching the carbon content of soil with

the application of organic composts and other sustainable practices. The group produces over 200,000 kg vermicomposts annually. The vermin compost not only enriches the soil but replaces the requirement of chemical fertilisers on around 80 hectare of farming lands. Overall, the sustainable farming practices at Merino also help in achieving the carbon sequestration of around 12,000 kilo tons of CO₂ equivalent annually as environmental care along with its soil care.



Merino's Agroforestry and along farm fields



Vermicompost bed in Bamboo forestry