# Energy use pattern of a seafood processing unit at Cochin, Kerala: An intra-plant comparison

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Energy management is crucial for the existence of seafood processing units and has gained much more significance in this climate change era, as it is highly linked to Green House Gas (GHG)

emissions. Globally, demand for seafood products is increasing over the years through diversification at both products and destination level. However, energy costs of seafood processing units are escalating which ultimately affects the economic performance of the unit. Due to competitive and environmental reasons, it is essential to rework the energy consumption of each operation individually rather than as a whole unit. Hence, energy audit is considered as a prime criterion and being adopted by many processing units towards reducing energy levels in terms of units' of consumption and cost.

In general, electricity is the major energy source of seafood processing units. The level of energy consumption varied over time and between activities. A pilot study on intra-plant comparison of energy use pattern at a seafood processing unit in Cochin, Kerala showed that during 2014, the average annual energy consumption, energy cost and per unit energy cost were 42,137.33 kW, ₹ 7, 84,258.50 and ₹ 18.61, respectively. The energy consumption and costs incurred during the period 2009 to 2014 varied over the years, in accordance with raw material supply and product demand (Fig. 1 and 2).

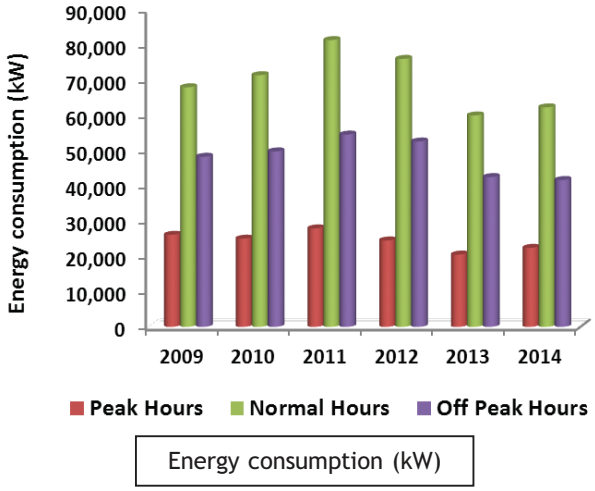


Fig 1. Energy consumption of seafood processing units (kW)

The comparison of energy consumption between the period 2009 and 2014 showed that

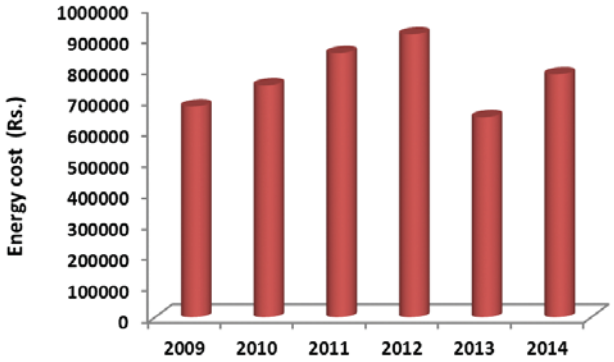


Fig 2. Energy costs of seafood processing units (₹)

even though the current energy consumption was decreased by 11.23%, there was an increase in energy cost by 15.30% from the level of 2009. The seafood processing unit produced 186.14 metric tonnes of products annually which comprised of 82% shrimps and 9% each of squid, cuttlefish and fish-based products. The average annual energy consumption of various products *viz.*, shrimp, fish and other cephalopods were 85815.45, 12259.35 and 24518.70 kW, respectively. Among the total energy consumption of the unit, the energy consumption was high for cold storage (16,854.93 kW; 40%) followed by production (12,641.20 kW; 30%), chilling (8,427.47 kW; 20%) and other activities (4213.73 kW; 10%).

The bivariate correlation between energy consumption and energy cost showed that the total energy consumption was significant and negatively correlated with the energy consumption at various periods *viz.*, peak, normal and off-peak hours, but it was significant and positively correlated in terms of energy costs. This revealed that the energy cost incurred is comparatively more influenced by the functioning of seafood processing units rather than units of consumption. The Pearson chi-square value also revealed that the energy use was significantly influenced by the performance of seafood processing units. As energy is considered as vital, training on energy management at the unit level is to be prioritized for effective energy utilization, optimization, and conservation.