

Nepal energy storage systems

By Kushal Devkota Energy has become a major source of existence in today's globalized world. Global energy demand rose by 2.3% in 2018 – the fastest pace in the last decade. Continuous rise in the level of greenhouse gas emissions and the increment in fuel prices are the main driving forces behind efforts to come […]

In latent heat storage (LHS), a phase change occurs between solid and liquid or liquid and gas due to the heat absorption and release by the storage material. LHS devices are advantageous because they have high energy storage density. Also, they can store heat at a constant temperature.

Latent energy storage systems deal with the phase change of a material. LHS system with solid to liquid phase change is considered to be the most efficient for use. A number of materials are found suitable for this as they melt with a moderate to high heat of fusion. Selection of PCM for a given application requires proper examination of the properties of the substance or mixture. Thus, improving the thermal conductivity enhances the energy storage efficiency by improving its charging and discharging processes.

Organic materials can freeze and melt repeatedly without any phase segregation and are non-corrosive in nature. Paraffin and non-paraffin compounds are limited to use due to their low and moderate temperatures. High heat of fusion, low thermal conductivity, instability at high temperature, etc are some of the properties of these groups of materials.

Finding a suitable organic phase change material for thermal energy storage applications is pivotal in our quest to scathe energy conservation with increasing energy demand in Nepal, triggered by urbanization, technical progress and increasing industrial sector.

With a fair portion of refrigeration and air conditioning industry still based on traditional and elementary standard of practice, implementation of latest studies in real-time scenario is a far-fetched idea.

As the number of hotels in Nepal grows, energy analysis for consumption as well as preservation is required. Since only five-star and similar hotels find it feasible to establish a dedicated cold storage room for food storage, other hotels are obliged to use private facilities. According to Business Directory of Nepal, only 13 industry-level cold storage facilities exist in Nepal. None of these facilities have implemented the use of phase change materials to acquire efficient energy consumption and prevention, a conservative study shows.

In an effort to overcome the lack of practice in this particular field, the need for the development of experiments and trials customizable to the local context and its application to Nepal - a developing country with a very high need of energy segregation and planning to suffice for the possible future energy sustainably – is the need of the hour.

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