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Reducing energy requirement with Phase Change Materials

March 10th, 2014 - 1 year, 52 days ago [BuildoTech Magazine India - Editor](#)

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According to the Central Electricity Authority, India faced a power deficit of more than 9,000 MW during the peak hours in the financial year 2012-13 as scarcity of coal continued to haunt electricity generation. The peak power demand in the country during the month of April stood at 1, 30,676 MW of which 1, 21,656 MW was met (The Hindu, Business Line, 2013). At the same time, fuelled by stable economic growth and a flourishing middle class, there is a rapid expansion in India's building infrastructural development. McKinsey & Company has found that India's building footprint will grow from eight billion square meters in 2005 to a projected 41 billion square meters in 2030 (Henley, 2013). Around 70 per cent of

Indian buildings in 2030 will be new structures (Henley, 2013). Most of India's power is being used in buildings. Clearly, adopting energy-efficient technology and building practices can help minimize India's growing demand-supply gap.

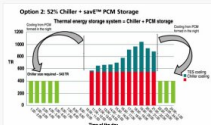
A number of technologies advanced over recent years are available to increase the energy efficiencies. But like in most Business situations, the reason for slow adoption and implementation towards high performing building is influence of the Pareto Principle or the 80-20 rule which is a rule of thumb that states that 80% of outcomes can be attributed to 20% of the causes for a given event. In this article we are trying to draw attention to the cause that might be the solution to 80% of the power problems.

The Pie chart shows the detailed breakup of the % end uses simulated by ASHRAE. In buildings, HVAC contribute to 40 – 60% of the total energy use which means all or most of the energy vows can be address by focusing on the HVAC system alone.



While trying to reduce the usage of power consumption an innovative strategy being adopted globally is to manage the energy effectively by demand side management. The concept of demand side management is to use save™ Phase change Materials having a high thermal energy storage capacity which uses power during off peak hours to store the energy and release it during On-peak hours. This strategy allows almost 50% of the HVAC load to be shifted to the night time/off peak hours, which translates to an overall reduction of more than 25% in the total electrical load of a building

A case study of a commercial mall of approx. 1000 TR air-conditioning capacity show, how the electrical load shift happens.



A comparison of the connected electrical load of the two systems above show that there is a reduction by 42% for the option 2 which means lesser electrical demand towards HVAC system, demand, lesser Diesel Generators and downsized equipment in the same proportion. This reduction of 42% on the HVAC system corresponds to more than 20% reduction in the connected load of the entire Mall.

For the end user this reduction in the electrical load translates to saving of 30% in the annual bill paid for the contractual electrical demand. Considering the current power deficit, save™ PCM based thermal energy storage system for Buildings allows opportunity to reduce the peak demands thereby enabling power companies to cater to a larger consumer base without having to expand the power infrastructure.



Samit Jain
Managing Director
Pius Polymers Pvt. Ltd.

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| | Conventional Systems (kVA) | Systems with thermal storage (kVA) |
|--------------------------|----------------------------|------------------------------------|
| Chillers | 965 | 489 |
| Primary pumps | 56 | 69 |
| Secondary Pumps | 111 | 109 |
| Condenser Pumps | 123 | 61 |
| Cooling Tower | 41 | 20 |
| Total Power (kVA) | 1294 | 748 |

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E-waste awareness in Gurgaon

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Pluss Polymers, a materials research and manufacturing company recently initiated a campaign towards e-waste awareness among the Gurgaon community. The campaign aims to spread awareness on the impact of electronic waste on health and environment while emphasizing the need for their safe disposal. "We are a small organization, but we believe that CSR needs to be done by every organization, large or small", says Samit Jain, Managing Director, Pluss Polymers.

As part of this campaign, the company's employees are organizing awareness sessions and e-waste collection drives in various residential complexes and schools in Gurgaon. All the collected e-waste will be sent to an authorized e-waste recycler for segregation, recycling of recyclable components and safe disposal of the remaining scrap. The program is being conducted with knowledge support from Advit Foundation – a not-for-profit organization closely working with Pluss Polymers on various environment initiatives both within the organization as well as in the neighbourhood.

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