# OFFICE OF ENERGY AUDITOR, JAIPUR(RAJ.)

(B-59, Triveni Nagar, Gopalpura Byepass, Jaipur(Raj.) - 302018)

**REPORT**

## REPLACEMENT OF WATER BY HYDROMAX SOLUTION AS SECONDARY HEAT TRANSFER AGENT – SAVING THEREOF

**FOR**

**THE HOTEL LALIT, JAIPUR**

REPORT NO: Energy Audit/15-16/01/Rev 1.0

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SIGNATURE:

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# FORWARD

Er. L.N. Nimawat , is a retired Chief Engineer from a State Owned Power Transmission Utility of Rajasthan, where he has gained experience in the field of transmission system Planning, designing optimal solutions, energy saving methodology, selection of related equipments , lighting solutions and renewable energy solutions. He is also certified Energy Auditor from Bureau of Energy Efficiency, Ministry of Power, Govt. of India. He has also worked for improving energy efficiency by designing and maintaining VAR control, high efficiency and low loss equipments, assessing heating and chilling requirements of Grid sub Stations and control Rooms. Post retirement he is taking tasks of energy auditing in industries and other large size installations.

M/s Galaxy Energy Solutions had approached to finalize the parameters for calculating energy savings, if any in the HOTEL LALIT, JAIPUR for replacement of intermediate circulating water in the HOT WATER GENERATOR BOILER with HYDROMX Solution. The predefined parameters were collected, discussed and authenticated with Hotel records with their historical data. The HYDROMX solution was introduced in the end of Oct'15, but due to initial trials and setting of temperature limits as per the requirement of HOTEL, the parameters and saving data were analyzed from 07.11.2015 to 31.01.2016 and incorporated in the report.

# CASE STUDY FOR THE HOTEL LALIT

## → Background

The Hotel LALIT is a 5 star category luxuries hotel, situated near airport terminal 2 of Jaipur, having room capacity of 268 for staying as well as for catering needs for comfortable stay, meeting & parties.

The objective of The Hotel Lalit is to provide value added services to its customers, whether they are staying or taking services for arranging conferences and parties. The Management is striving hard to systematically reduce consumption of energy in term of electricity or fuel.It has been reported by the Management that they are pioneers and trend setters in terms of energy consumption for similar size and class of hotels. M/s Galaxy Energy Solutions met the management and apprise them with the energy saving solution to be used in heating or cooling process in the hotel Industry. The Management took it very positively and allowed to conduct study on heating and cooling requirements of hotel. The team of M/s GES and hotel Management had series of meetings and technical aspects and allowed to use HYDROMX solution "a energy saving products developed under the brand name of hydromx by "HYDROMX Energy Saving Solutions, Turkey " and provided full marketing and selling right to M/s Galaxy Energy Solutions in india. The Hotel Management consented to use Hydromx in hot water boiler first.

There are two no. of hot water boilers installed in hotel Lalit. Make and capacity of boilers are;

Thermax make, 61 litres of diesel consumption per hour at full load.

The boilers are heating a primary fluid ( treated Water) up to a maximum temperature of 90 C which in turn heat the two no. of 20,000 litre Capacity tanks at second floor of hotel. One of the tank Is used to provide hot water to rooms ( for guest) of hotel and another 20,000 litre Capacity Tank is providing hot water to common area, lower level apartments, hotel laundry, party packs and kitchen etc.

Hot water lining is in such a way that it readily provides hot water without wastage( circulating hot water in the main pipeline is through one pressure and one vacuum pump).With this arrangement there is always a minimum continuous heating load on the boiler to Maintain the hot water level & temp.

## → Procedure and Parameters.

The Galaxy Energy Solutions installed a data logger to obtain temperature settings and run hours of Boilers. After installation of data logger and having historical data of hot water uses and consumption of diesel, the hydromx solution was replaced in the primary heating circuit.

The G.E.S. replaced the (water) primary circulating fluid by hydromx fluid in the ratio of 50:50i.e. 50 % treated water with Hydromx.

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**The hydromx solution is a state of art heat transfer liquid involving nano technology.** It has low specific heat and high thermal conductivity which enables it to transfer heat very fast by conduction, convection and diffusion.

Though the heat load requirement of hotel is dependent on overall atmospheric temperature through out the day, the number of occupants, their habits, type of foods to parties etc. but in over all terms it was decided that average hot water requirement on monthly basis and ability of boiler to heat water in one litre of diesel may form basis for comparision. Thus we may easily find out the quantum of diesel required in past from historical data and quantum of diesel that would have been used if it was burnt at older rate the difference will give the saving.

After 10-12 days of running on Hydromx, it was decided to process the results on monthly basis as such base historical data of part Nov'14 and Jan'15 were taken from the hotel records and entire data for corresponding period in current year was observed.

| | | | | |
|---|---|---|---|---|
| | 7 nov.15 to 30 nov.15 | | | |
| | CALCULATION | | | |
| | HYDROMX | | WATER | |
| | 2015 | | 2014 | |
| ROOMS | 2969 | | 2175 | |
| PCK | 16534 | | 11696 | |
| HI ZONE(LTS) | 238000 | | 200000.0 | |
| LOW ZONE(LTS) | 188000 | | 150000.0 | |
| HSD CONSUMED | 3460 | | 4510 | |
| | | | | |
| PER ROOM WATER CONSUMED(LTS) | 80.1616706 | | | |
| PER PCK WATER CONSUMED(LTS) | 11.37050925 | | | |
| | | | | |
| TOTAL WATER CONSUMED(LTS) | 426000 | | 350000.00 | |
| HOT WATER GENERATED PER HSD(LTS) | 123.1213873 | | 77.60532151 | |
| | | | | |
| SAVING FOR 24 DAYS | 36.96844779 | % | | |
| | | | | |
| | | | | |
| | CALCULATION | | | |
| | 1 dec.15 to 31 dec.15 | | | |
| | HYDROMX | | WATER | |
| | 2015 | | 2014 | |
| ROOMS | 4417 | | 3798 | |
| PCK | 24403 | | 20472 | |
| HI ZONE(LTS) | 250000 | | 214964.9 | |
| LOW ZONE(LTS) | 332000 | | 278519.2 | |
| HSD CONSUMED lts | 4960 | | 6990 | |
| | | | | |
| PER ROOM WATER CONSUMED(LTS) | 56.59950192 | | | |
| PER PCK WATER CONSUMED(LTS) | 13.60488465 | | | |
| | | | | |
| TOTAL WATER CONSUMED(LTS) | 582000 | | 493484.11 | |
| HOT WATER GENERATED PER HSD(LTS) | 117.3387097 | | 70.59858466 | |
| | | | | |
| SAVING FOR THE PERIOD | 39.83350861 | % | | |
| | | | | |



## CALCULATION OF ENERGY SAVING WITH HYDROMX

| | CALCULATION | | | |
|---|---|---|---|---|
| | FOR 7TH NOV'15 TO 31ST JAN'16 V/S CORRESPONDING PAST PERIOD | | | |
| | HYDROMX | | WATER | |
| | 2015-16 | | 2014-15 | |
| ROOMS | 11462 | | 9576 | |
| PCK | 61563 | | 71059 | |
| HI ZONE(LTS) | 707000 | | 608465 | |
| LOW ZONE(LTS) | 677000 | | 572219 | |
| HSD CONSUMED lts | 13730 | | 17530 | |
| | | | | |
| PER ROOM WATER CONSUMED(LTS) | 61.68 | | | |
| PER PCK WATER CONSUMED(LTS) | 10.99 | | | |
| | | | | |
| TOTAL WATER CONSUMED(LTS) | 1384000 | | 1180483 | |
| HOT WATER GENERATED PER HSD(LTS) | 100.8 | | 67.53 | |
| | | | | |
| SAVING FOR THE PERIOD(APP 3 MONTH) | 33.18 % | | | |
| | | | | |

12/2/16

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## ➔ Observation and final calculation

With the analysis of data it is observed that total hot water consumption of hotel for the period of app. three months has increased from 1180.6 kL to 1384.4 kL where as HSD consumption has reduced from 17530 litres to 13730 litres in the period, thus a saving of app. 33.2% on account of fuel, was observed. Since the consumption of HSD depends up on numerous factors viz atmospheric temperatures, nature and use by customers, occupancy and party catering status etc. We may **safely conclude the saving of more than 33% in all conditions**.