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KIRLOSKAR BROTHERS LTD.

Kirloskar
Enriching Lives

ENERGY CONSERVATION

Make your business a sustainable one...

KIRLOSKAR BROTHERS LIMITED
Established 1888
A Kirloskar Group Company

THE 'WHY' AND 'HOW' OF ENERGY AUDITS

What Is Energy Audit?

An energy audit is an inspection, survey and analysis of energy flows for energy conservation in a building, process or system to reduce the amount of energy input into the system without negatively affecting the output(s). Industrial Energy Audits monitor consumption and locate the source(s) of wastage so they can be plugged.

Even as industry today thirsts for more and more energy there is need to use it less and less as it brings with it increasing cost of the product as well as pollution; and curtailing both can have a make or break impact on any organization.

Why Energy Audit Through Kirloskar?

- Pioneer and leader in fluid handling for more than 100 years
- Experience in Pump Energy Audit and providing energy efficient solution for over 12 years
- Global presence and in track of global trends
- State of the art R&D centre to design customized product
- One stop Solution from design to commissioning of energy efficient products
- Post Audit Guaranteed Energy Savings (on implementation of recommendations)

KBL Shows The Way

KBL has set up an Energy Conservation Cell wherein our team of Certified Energy Managers and Auditors undertake energy audit which evaluates actual performance measurement of pumps and motors. The results are compared against the designed performance level or the industry best practice. The difference between observed performance and "best practice" is the potential for energy and cost savings. Specifically, the audit helps to;

Specifically, the audit helps to;

- Identify actions for improving energy performance;
- Prioritize projects; and
- Track progress

Recommendations for suitable pumps, motors and improvement in the pump piping layout are suggested based on the findings. Energy audit also helps decide on how to budget energy use, plan and practice feasible energy conservation methods that will enhance their energy efficiency, minimize energy wastage and thereby reduce energy costs.

Pumping Energy Audit – Step by Step

Preliminary audit

This is the basic step devoted to collection and collation of data vis-a-vis existing pumping system, pumps, their installation and application along with energy consumption pattern, etc. The saving potential is estimated based on this information and a proposal for detailed audit is worked out.

Commercial Proposal

A suitable proposal is made on cost to cost basis. Charges are based on any of the following parameters as preferred by the customer.

- Percentage of achievable savings
- Per day basis
- Per pump basis
- Per kW reduction in connected load for pumping
- Lump sum charges for audit depending upon estimated time required

Detailed Audit

Audit is taken up after the written confirmation from customer. This audit involves:

- Determination of actual pumping requirement at each location from process point of view
- Study the current installations vis-à-vis actual requirement by observing the basic running parameters and measurement of actual reading of total operating head, discharge and power consumption for each location. High accuracy, calibrated equipments are used for all measurements.

Outcome of Energy Audit

- Based on the above data the existing energy consumption for each location is computed
- The saving potential is calculated
- Cost effective modifications are recommended based on the requirement and observations
- Report on recommendations is submitted

Cost Savings

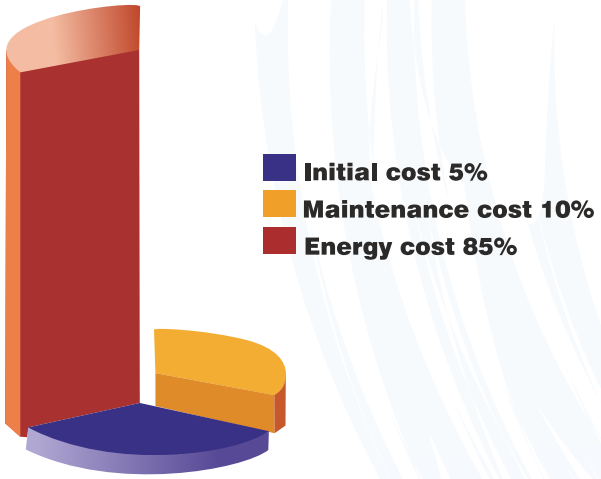
Cost of operating a pump is much higher than buying and maintaining it because 95% cost of operation is incurred by electricity consumption.

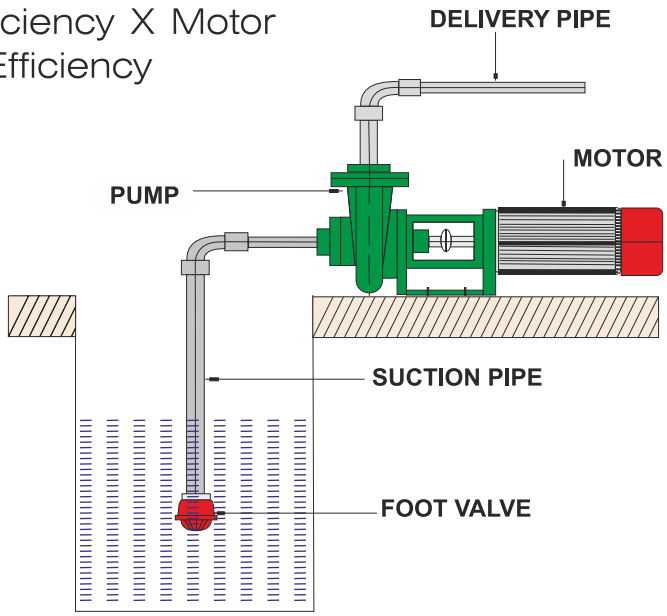
e.g. A 20 kW pump requires

- 20 KWH i.e. ₹ 90/- per hour @ ₹ 4.50/- per KWH
- ₹ 2160/- per day
- ₹ 64800/- per month
- ₹ 7,88,400/- per year

The initial cost of pump + motor is about Rs 60,000/- i.e. only 8% of the running cost.

Pumping System Efficiency = Pump Efficiency X Motor Efficiency X Piping Efficiency X Foot Valve Efficiency





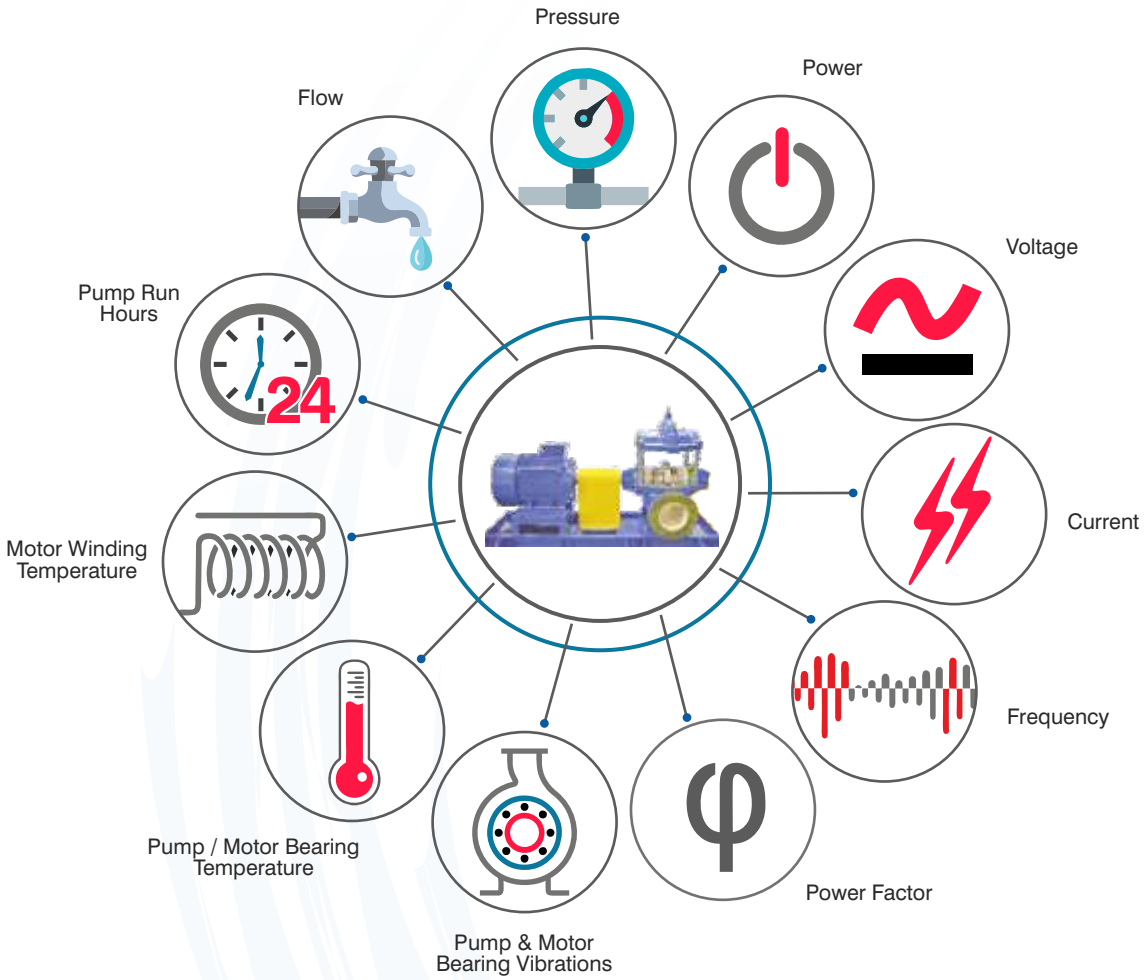
Selecting the Right Pump

- Calculate total head & required discharge
- Choose suitable pipe diameter, material and layout to limit frictional losses to max. 10%
- Choose suitable foot valve with 'K' factor less than 0.8
- Choose the suitable type of pump set to be used
- Select a suitable pump with maximum efficiency at Duty Point i.e. matching of Best Efficiency Point with Operating Point so that efficiency zone for the maximum period of pump operation and also ensure that pump works at Peak Load Conditions

Our Energy Audit Team helps customers to select the pump which operates in the most efficient zone, with the help of Pump Selection Software, ultimately helping customers to save energy.

Some solutions through Energy audit

'KIRLOSMART'



'KirloSmart' is an IoT (Internet of things) product with unique capability of measuring and transmitting the field parameters for "Remote Monitoring" on KBL's web based portal / Cloud for analytics and generating alerts for the probable causes leading to failure of the pump/ motor.

'KirloSmart' enabled system helps user in monitoring the pump health and operation behaviour of pump on real time basis by appropriately sensing the critical health and operational parameters of the pump. 'KirloSmart' remotely manages the pump/ motor and notifies its current state by transferring the data using wired Ethernet or Mobile Data (GPRS)

Benefits

- Reduces operational cost, repair cost, labor hence improves profitability
- Reduces unplanned breakdown, improves process / plant Safety & reliability
- Increased equipment life & less down time
- Eliminates cost of assets like Servers, Modems, Computers etc.
- Improves equipment efficiency

Pump as Turbine (PaT) up to 100kW per unit

An Innovative Solution

KBL is offering a unique solution in form of Pump As Turbine (PAT) for micro hydro power (up to 100 kW/Unit). Pump as turbine offers a distinct advantage of economy combined with balance of ecology & protection of environment.

A centrifugal pump that operates in reverse mode as a turbine, works on the same principle as a Francis turbine. The energy is recovered from pressure differences (head); while flow is fed back into the existing system. Both, direct drives of machinery (e.g. a Pump) & electricity generation (grid connected or isolated) or combinations of both of these are possible using PAT just as with a conventional turbine.

To improve the accuracy of prediction, Kirloskar Brothers Limited have invested in testing & verifying results, using computational techniques of large number of pumps of various capacities & specific speeds in turbine modes and have acquired the capabilities to offer PAT specific to needs of customers.

Key benefits – PAT

- Lower initial cost as it is a standard pump (almost half the cost of conventional hydro-turbine of equivalent size)
- Direct drive of machinery, electricity generation (in parallel to a large grid or isolated) or combinations of these is possible just as with a conventional turbine
- Off the Shell product-hence economic
- Simple & sturdy construction
- Easy maintenance as pumps has fewer parts than turbines
- No special equipment or skill is required for maintenance
- Spares are easily available

1x40 kW PAT System at Tansa Dam, Maharashtra

Applications

- Ideal alternative to micro hydro-generation
- Off-grid power source on river locks & barrages
- Alternative power generation across pressure reducing valves (PRV) in industry & water distribution networks
- Small hydro power systems
- Chemical & petro chemical plants
- Village scheme, mainly for house-hold lighting
- Electricity for remote farms
- Battery charging and other intermittent load application
- Exotic tourist destination & Hotel industry where DG sets are not permitted
- Army remote locations
- Construction sites having water availability

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KIRLOSKAR BROTHERS LIMITED

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