Kirloskar

Enriching Lives

ENERGY CONSERVATION

Make your business a sustainable one...

KIRLOSKAR BROTHERS LIMITED

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.

Keeping Energy Crisis At Bay

Energy conservation has become a very important part of any industrial activity. The focus is on increasingly efficient usage of energy with decreasing energy consumption from conventional, non-renewable sources of energy.

Energy conservation initiatives are implemented to reduce quantity of energy used. It supports an eco friendly life-style by saving and generating renewable, non polluting energy, which saves money and at the same time spares the earth of environmental disasters. Efficient use and generation of energy have a direct, positive impact n the environment by curtailing, amongst other natural calamities the global warming phenomenon. Experience shows that energy savings are best achieved by performing an energy audit.

A pioneer in manufacturing of engineering equipment with expertise in the production of fluid handling equipment, KBL has to its credit, clients in core sectors across the world. Keeping pace with global trends, KBL too is committed to green ways of doing things, KBL pursues many initiatives for conservation of natural resources. As the world faces the calamity of climate change, every organization on the globe will need to contribute and define the norms for sustainable business. Although the challenge is great, each step we take in this direction will take us to the goal. One such step is KBLs service offering in the form of Pumping Energy Audit for Pumps and Motors, which take the world closer towards achieving the final goal of doing business in a socially and environmentally responsible way.

Towards A Sustainable Energy Future

The world is moving towards a sustainable energy future with an emphasis on energy efficiency and use of renewable energy sources. A finite planet cannot support infinitely increasing consumption of resources and hence the motto of present times must be to REDUCE, REUSE, RECYCLE.

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.

During the past one year, about twenty organizations approached KBLs Energy Conservation Cell to conduct energy audits. Some amongst these have already implemented the recommendations and have slashed their energy costs up to 30%. This has helped save 11 million KWH electricity and more than Rs 40 million in energy bills. Many more organizations are convinced about the audit outcome and are in the process of implementation of audit recommendations. These customers are from various types of industries like automotive, manufacturing, chemical, process, water supply, lift irrigation schemes, etc. The payback period of the investments made for these improvements has been in the range of 2 months to 2 years depending upon type of industry, type of pumps, pump working hours, etc.

KBLs list of satisfied customers features Godrej & Boyce, Godrej Industries Ltd, Vita Nagarpalika, Cummins India Ltd and many more.

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.

Recommendation Report

- 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

The detailed recommendation report provides complete information on improvements suggested, total potential for energy savings, investment to be made and payback period which facilitates the decision making at the customer's end. It focuses on Life Cycle Cost of the proposed pump which is critical from the user point of view. This is because the pumping system accounts for nearly 20% of world's electrical demand and ranges between 20% to 50% of pump energy usage. For majority of set ups lifetime energy and maintenance cost dominates life cycle cost. (The life cycle cost of equipment is the total 'Lifetime' cost required to purchase, install, operate, maintain and dispose off that equipment)

Besides, on most industrial sites about two-third of the energy is consumed by motor driven applications. In its lifetime the cost of energy consumed by an electric device may be 100 times its purchase cost. Many pumps and motors are operated at full power constantly, irrespective of process needs.

In some sites this offers the potential of large cost reductions. An energy audit willidentify all these issues and calculate the potential savings to be made. It is important that a thorough log of consumptions on each spur is made because excessive energy is sometimes used in the most unlikely places.

Comparison of Life Cycle Cost Pump with Competitor Pump

MODEL		UP 300/46		
		KBL LLC Range	Competitor	
Flow m ^ 3/hr		1315	1315	
Head m.		51.4	51.4	
Pump Eff. %		88.5	89.5	
Motor Eff.%		95	95	Difference
Total Energy Cost First Year	₹	11506014	11441376	-64,638
Total energy Cost After 3 years	₹	34518042	34684698	1,66656
Total Energy Cost After 10 Years	₹	115871765	119956820	40,85,055
Offered Price	₹	4,77,250	2,20,000	2,57,250

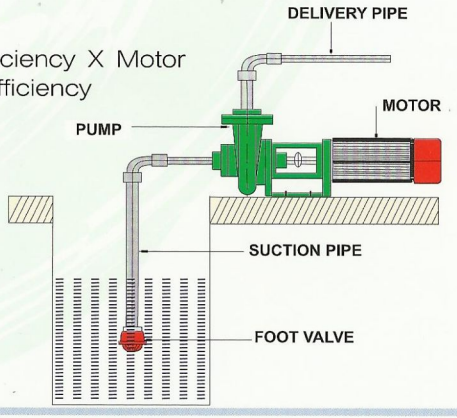
Cost of operating a pump is much higher than buying and maintaining it because 95% cost of operation is incurred by electricity consumption.

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

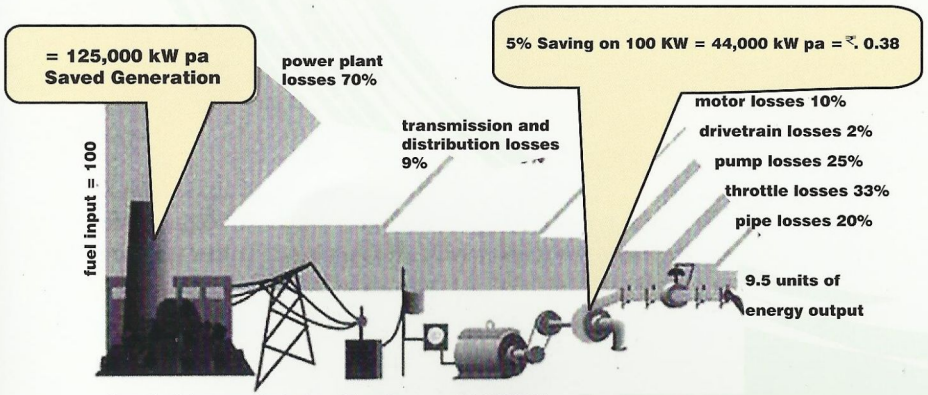


The table below shows rise in pumping cost due to drop in efficiency for 20 kW pump set during the period of operation.

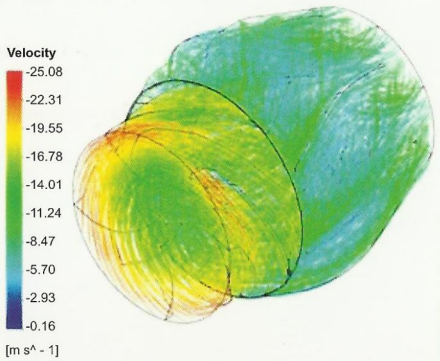
Sr. No.	No of Years	Efficiency(*)	Pumping Cost	
			INR Per Day	INR Per Annum
01	1st Year	80.0%	2160	788400
02	2nd Year	79.2%	2187	798380
03	3rd Year	78.4%	2215	808615
04	4th Year	77.6%	2244	819117
05	5th Year	76.8%	2274	829895
06	6th Year	76.0%	2304	840960
07	7th Year	75.3%	2335	852324
08	8th Year	74.5%	2367	864000
09	9th Year	73.8%	2400	876000
10	10th Year	73.0%	2434	888338

Normally pump efficiency drops at 1% par annum for drinking water application due to erosion and corrosion.

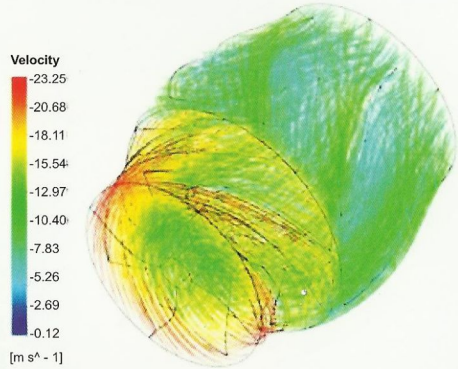
A TYPICAL INDUSTRIAL PUMPING SYSTEM



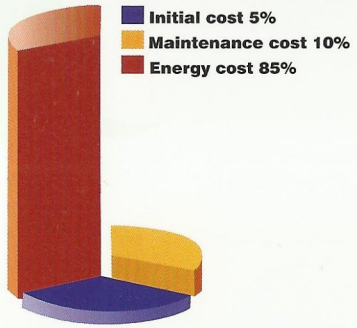
From the Drivepower Technology Atlas Courtesy of E SOURCE, www,esource.com



Original Pump Efficiency. 83%



Modified Design Pump Efficiency. 89.5%



Efficiency curve rises to a peak value and then again falls with increase in discharge. Hence calculation of Total Head (Static Head+Frictional Head), Pump discharge, Piping Size & Layout, Properties of Liquid (being handled by pump), etc are very important and critical while making the pump Selection. The right choice is made without compromising customer's latest requirements on pump deliverables.

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 misconceptions / wrong practices followed by customers while achieving energy savings

The table below lists some misconceptions and wrong practices followed by customers in their quest to achieve energy savings –

Misconceptions / Wrong Practices	Correct Approach
Old pump should be directly replaced with an equivalent new pump (new pump of the same model and make)	Energy audit of existing installation and mapping of latest requirements as against actual head/discharge should be done and new pump model should be selected accordingly
Refurbishment of old pump increases efficiency	Refurbishment improves pump efficiency only by few percentage points and does not replicate its best potential
Reduction in HP of existing pump hampers pump output, affecting the user's production and process requirements	Energy audit should be conducted and new pump should be selected in line with the latest requirements
Efficient working and adequate size/capacity of a pump can be gauged by the amount of water. Sufficient water signifies the appropriate capacity and working	Energy audit may reveal that the necessery pumping requirements can be adequately handled by a pump of lower size/capacity
Pump of a size bigger than required should be procured to address future expansion plans	Pump addressing current requirements should be procured
Pump should be selected on the basis of HP and not on actual head and discharge requirements	Multiple pumping options should be considered to ensure enhanced safety
Pump of a size bigger than required ensures enhanced safety by addressing inconsistent water flow or discharge	Multiple models of the same HP and hence pump should be selected on the basis of head and pump discharge requirements
Pumps of bigger sizes are more beneficial than that of smaller sizes	Big and small pumps serve different purposes and hence both are indispensaible. Multiple pumping options provide flexibility and help in saving power depending upon process requirements
Standardization on Pump Models (i.e. use of pumps of a particular make and specifications in most of the facility) benefits in smaller inventory and facilitates ease of maintenance and interchangeability	Standardization may lead to wrong pump selection, and subsequently energy wastage. Pump model must be selected based on duty requirements
A BEE Star Label on pumps certifies their energy saving quality and hence head and flow/discharge requirements can be overlooked	Pumps, when selected based on head & flow/discharge conditions, improve optimization. BEE Star Label will affirm further energy savings

Come, let us join our hands together

To conserve our nature

In the national interest

In the business interest

Leave your worries to KBL's pump expert and rest assured

your saving's account grows continuously.....

Regional Offices

AHMEDABAD
Kirloskar Brothers Ltd.
11, Mill Officers Colony, Behind
La Gajjar Chambers,
Ashram Road, Ahmedabad,
Pin : 380 009
Tel: 079-26583739
Fax : 079-26583786
Email : ahmedabad@kbl.co.in

BANGALORE
Kirloskar Brothers Ltd.
No. 5, Lakshmi Complex, II Floor,
10th Cross, RMV Extension,
C. V. Raman Road,
Bangalore, Pin : 560 080
Tel: 080-23619914/15
Fax : 080-23610095
Email : bangalore@kbl.co.in

BHOPAL
E-1, Shankarnagar, 6 1/2 Bus Stop,
Opp. Parul Hospital,
Bhopal, Pin : 462 016
Tel : (0755) 4218341
Email : bhopal@kbl.co.in

BHUBANESWAR
Kirloskar Brothers Ltd.
E-1, Shankarnagar, 6 1/2 Bus Stop,
Opp. Parul Hospital, Shivaji Nagar,
Bhopal, Pin : 462 016
Tel: 0755-4075670
Email : bhopal@kbl.co.in

CHENNAI
Kirloskar Brothers Ltd.
Raj Paris Trimeni Towers,2nd Floor,
147 G. N. Chetty Road,
T.Nagar, Chennai, Pin : 600 017
Tel: 044-28156546/47/48
Fax : 044-28156549
Email : chennai@kbl.co.in

JAIPUR
Kirloskar Brothers Ltd.
102, Riddhi Siddhi Apartments,
Jaipur, Pin : 302 001
Tel: 0141-2361434/12
Fax : 0141-2375670
Email : jaipur@kbl.co.in

KOCHI
Kirloskar Brothers Ltd.
Veejay Towers, 38/239A,
Salim Rajan Road,
Gandhinagar, Ernakulam,
Kochi, Pin : 682 017
Tel: 0484-2206651/52
Fax : 0484-2206653
Email : kochi@kbl.co.in

KOLKATA
Kirloskar Brothers Ltd.
KCI PLAZA', 1st FLOOR,
23C, Ashutosh Chowdhury Avenue,
Kolkata – 700 017. W.B. (India)
Phone : 033-2461 5065 / 5934 / 5325 /
Fax : 033-24614519
Email : kolkata@kbl.co.in

LUCKNOW
Kirloskar Brothers Ltd.
B-1/7, Sector A,
387, Aliganj,
Lucknow, Pin : 226 024
Tel: 0522-2326367/ 393/ 374
Fax : 0522-2326365
Email: lucknow@kbl.co.in

MUMBAI
Kirloskar Brothers Ltd.
10, Corporate Park,
Sion-Trombay Road,
Swastik Mills Compound,
Chembur, Mumbai-400 071.
Tel: 022-25289320 to 28
Fax : 022-25289329
Email : mumbai@kbl.co.in

NAGPUR
Kirloskar Brothers Ltd.
Plot No. 1-9, Flat No. 7, Sagar Palace,
Laxmi Nagar, Behind 'Bal Jagat'
East High Court Road,Nagpur, Pin : 440 022
Tel: 0712-2234275/ 6
Fax : 0712-2234276
Email : nagpur@kbl.co.in

NEW DELHI
Kirloskar Brothers Ltd.
Jeevan Tara Building,
5, Parliament Street
New Delhi, Pin : 110 001
Tel : 011-41501055 to 62 / 41500040
Fax : 011-23342002
Email : delhi@kbl.co.in

PUNE
Kirloskar Brothers Ltd.
Udyog Bhavan, 'B' Building,
Tilak Road,
Pune Pin: 411002
Tel: 020-24440770
Fax : 020-24440156
Email : pune@kbl.co.in

JAMSHEDPUR
Kirloskar Brothers Ltd.
No. 4, Meghdeep Bulding,
Q.Road, beside Hotel South Park,
Bistupur, Jamshedpur Pin : 835 001
(Jharkhand)
Mob: 9430935888
Fax : 0651-2330385
Email : vikrant.kumar@kbl.co.in

SECUNDERABAD
Kirloskar Brothers Ltd.
Post Box No. 1580, 403,
Jade Arcade,
126, M.G. Road, Paradise Circle,
Secunderabad, Pin : 500 003
Tel: 040-66874700/12 to 37
Fax : 040-27894598
Email : secunderabad@kbl.co.in

DEWAS
Kirloskar Brothers Ltd.
Station Road, Dewas,
Madhya Pradesh, Pin : 455001
Tel : 07272-227402 / 227341
Fax : 07272-228747
Email : kblin@kbl.co.in

DS/003/EA/Oct.2011, 01-Jan,2012/5000

maestro1@vsnl.com • print@pragati.com

Kirloskar

Enriching Lives

TOLL FREE SERVICE HELPLINE : 1800-10-34443

Visit our Pump Energy Audit Website :www.pumpenergyaudit.com or mail your queries on info@pumpenergyaudit.com

KIRLOSKAR BROTHERS LIMITED

Corporate Office : 'Yamuna' S. No. 98 (3-7), Baner, Pune 411045 (India).
Phone : +91 20 2721 4444 Fax : +91 20 2721 1117 Email : kblin@kbl.co.in