

Energy Monitor to Target - BEE MANTHRA.

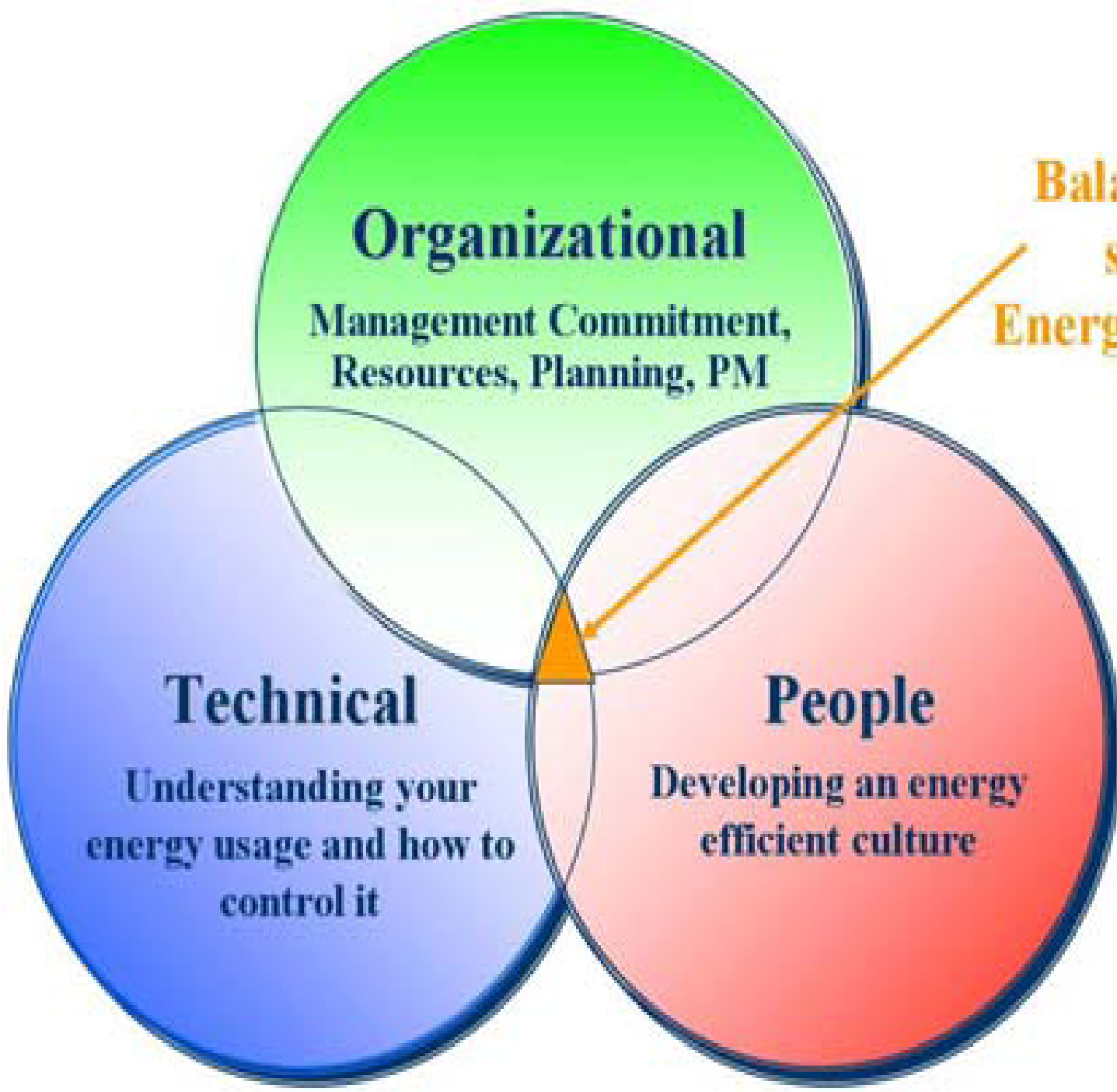
THE MILL CONSUMES say Half LAKHS UNITS / DAY;

**BUT DOES NOT HAVE Full Fledged ENERGY METER
for Relative Condition Monitoring**

**TO DO NOW, THE ENERGY METERING & MONITORING
AT MV, SSB & HIGHER HP MACHINES LIKE FRAME, other machines, etc**

**Machine to machine variations are more in our mill and
this is around 10 % in some cases.**

**The Electricity for machines from 10 hp and above in kwh
is a good indicator About the health of machine.
BEE mandatory guidelines suggest any motor above 10 hp
operating more than 6000 hours an year
i.e. 2 shifts per day to be metered for energy kwh.**



**Balance all 3 for
successful
Energy management**

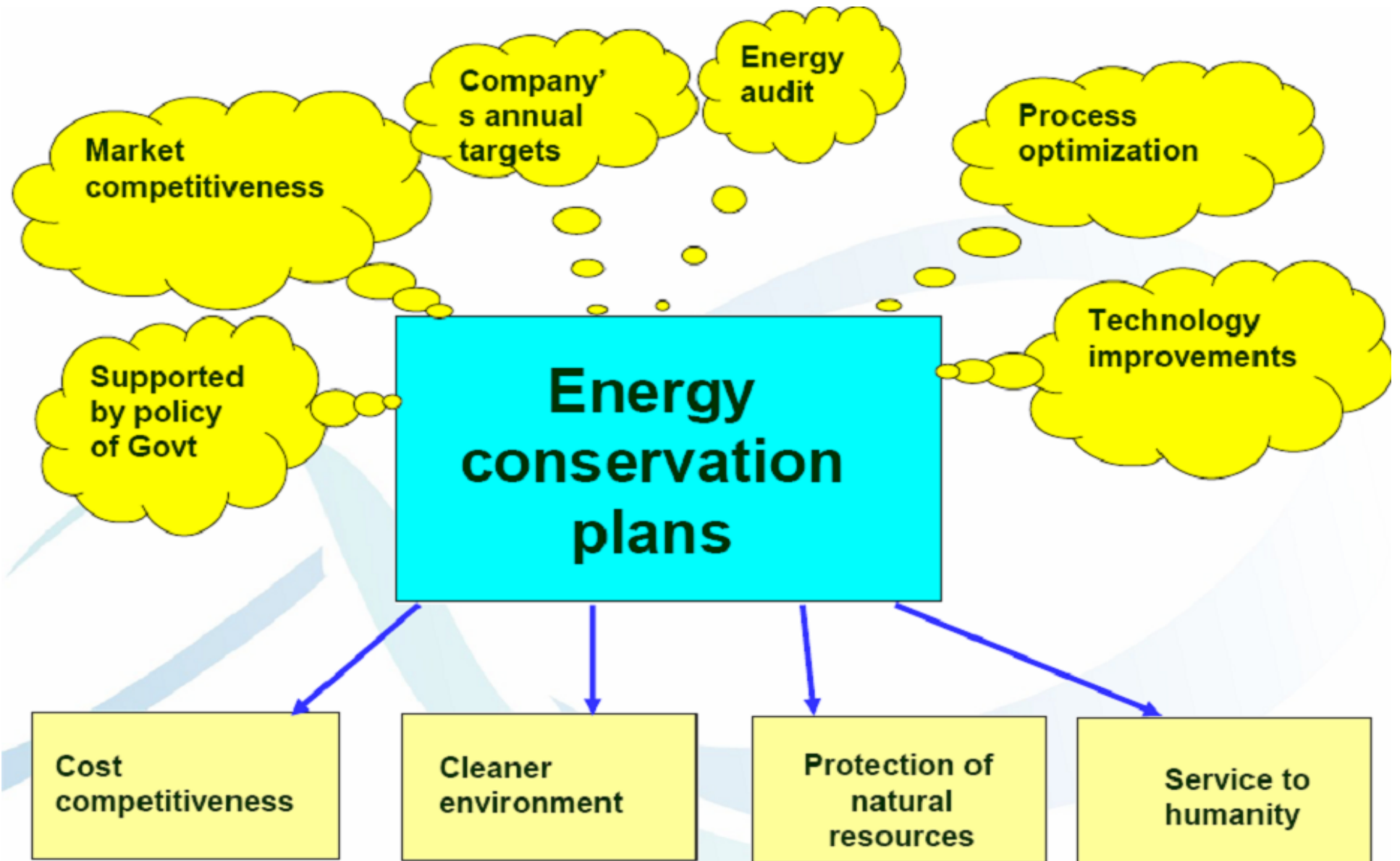
Energy Intake by the industry

Energy Losses (Between the Cup & Lip in industry)

- Voltage Regulation - in Stages upto Load End
- Power Factor - Improvement in Stages
- Harmonics reduction - in stages upto EB end.

- Compressed Air – Cool Dry Air in Stages
- A C Plant - Moisture ingress in stages to yarn.
- Waste Collection- Optimized suction Pascal in stages.

- Energy Measured Digitally & Accurately in stages.
- In between machines, then at SSB, next MV panel
- Measure Energy Deviations from Entrance to Load End .

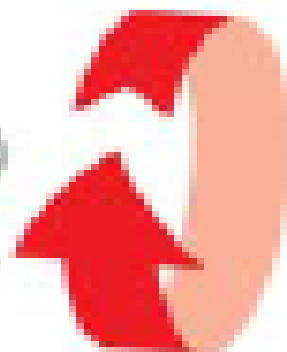
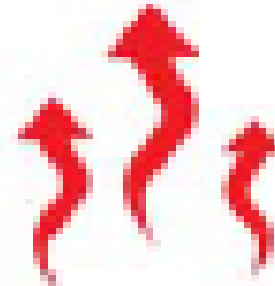


Heat loss is a symptom of Motor poorefficiency

Energy Input
(Electricity)

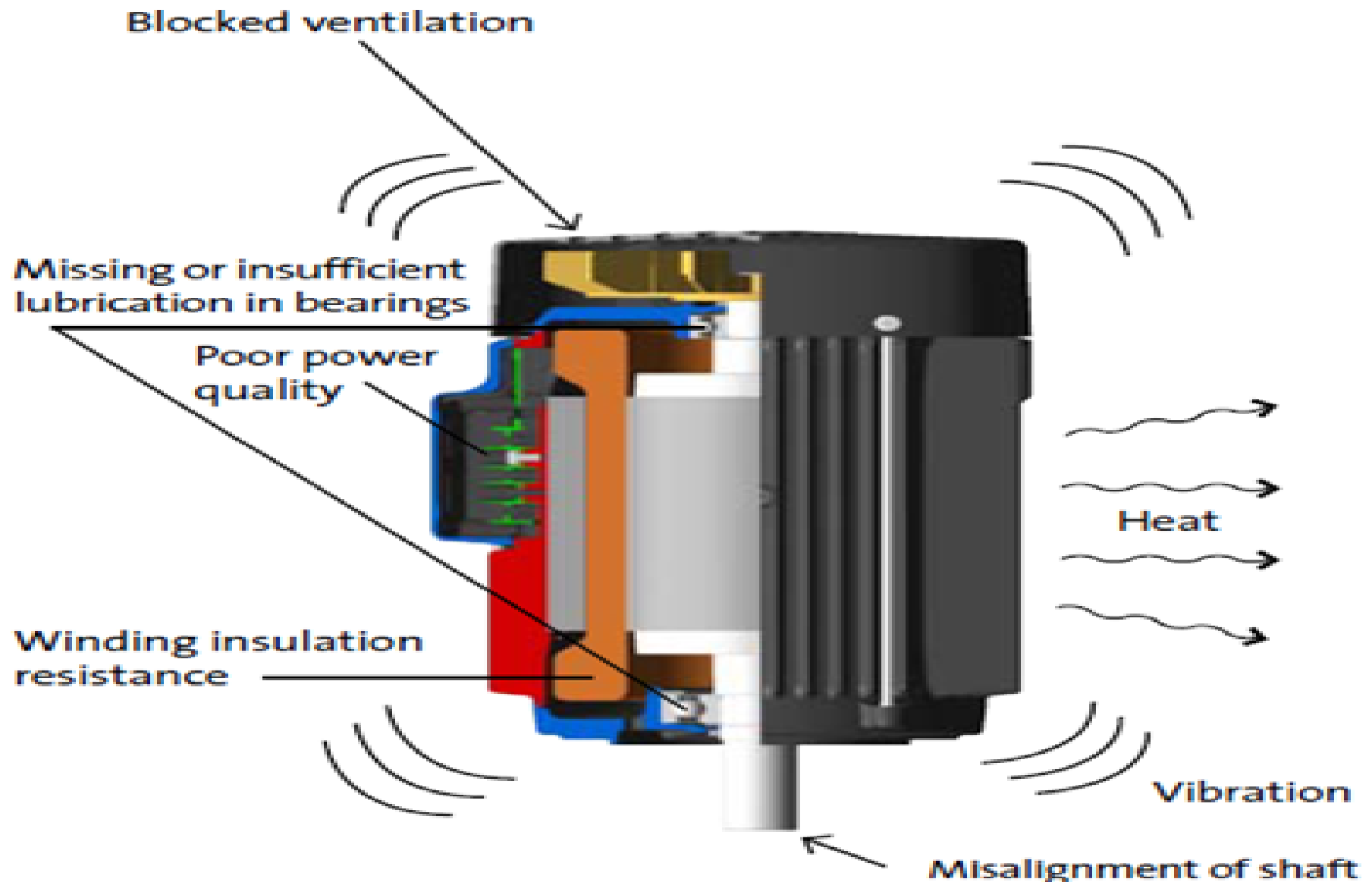


Energy Loss
(Heat)



Energy Output
(Mechanical power)

Motor Efficiency thro its Life can be maintained by , condition Monitored Maintenance



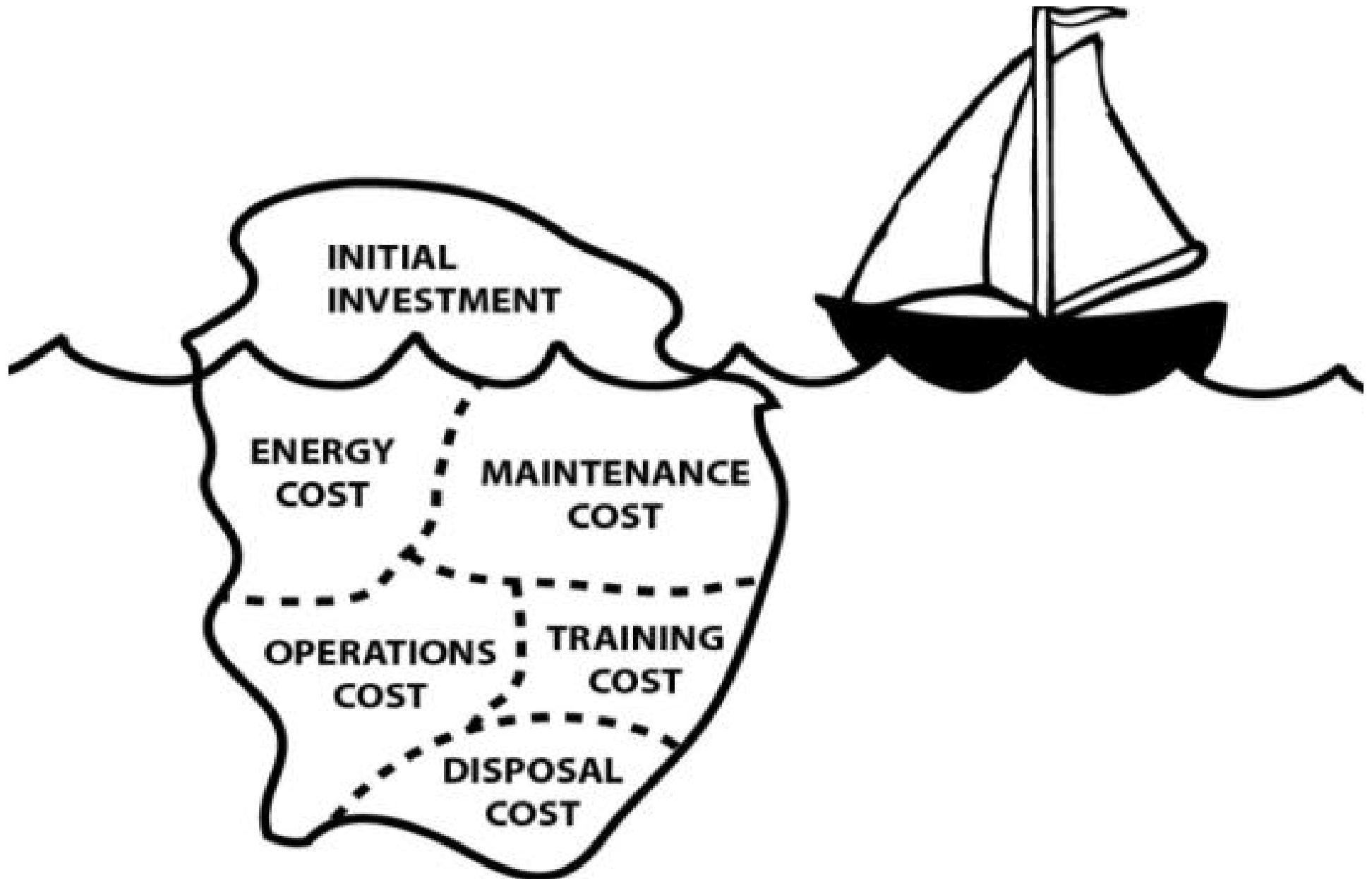
Motor Savings – Have we achieved now ?

A 20% reduction in motor speed will result into almost 50% power savings

All new replacements should be done with energy-efficient motors having 3%–5% higher efficiency. This results into significant energy savings and simple payback period in most of the cases is less than three years

It is better to replace the old motor which has undergone rewinding 3 times. Motor efficiency goes down by 3% – 5% after each rewinding

THE ESSENCE OF LIFE CYCLE COSTING



System Energy losses viewed from Input KW to motor

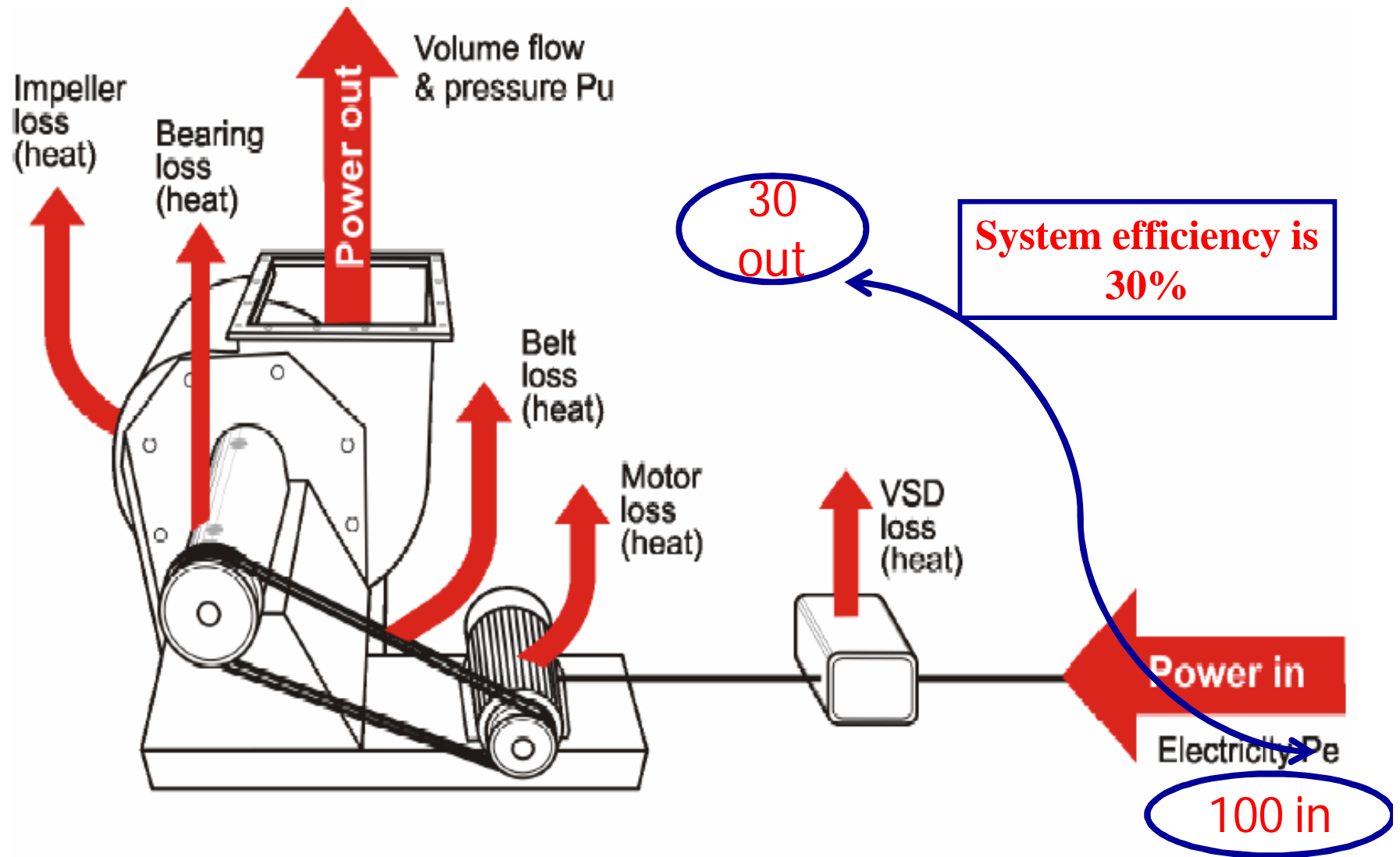
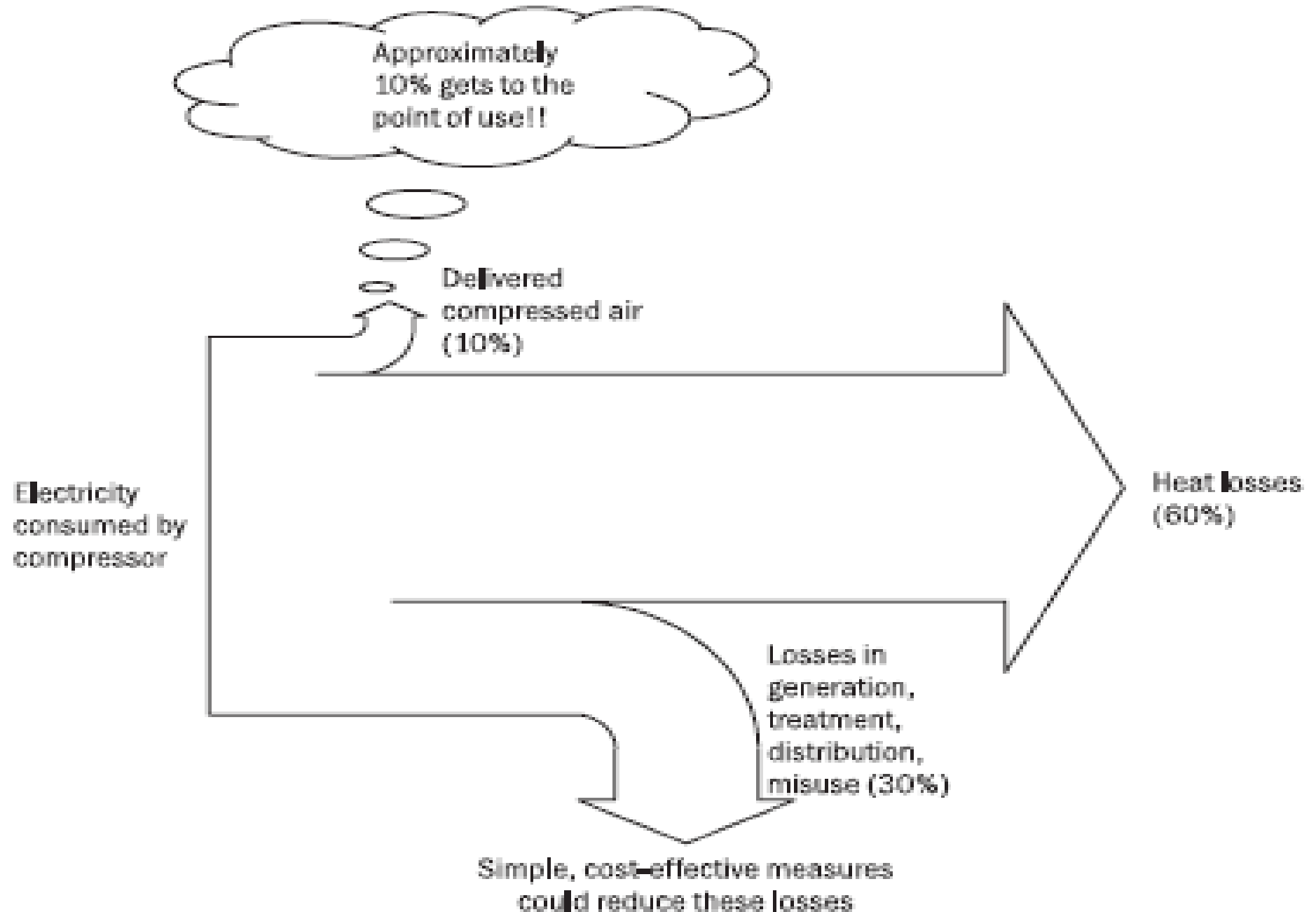


Diagram showing the losses from a fan system including VSD, motor and belt drive.

Compressed Air Delivered to Machine is only a Fraction of Produced ?



AUTOMATION - ROUTE TO ENERGY MANAGEMENT

- **Our Industry is market driven in day to day operations.**
 - **is to AUTOMATE the various production & utility equipments and the process routines, sub routines.**
- **The bye product of automation is Safety and in turn**
 - **leads to Energy Conservation automatically.**
- **Measurement is the first step to**
 - **Manage & Conserve Energy.**



MOTOR SURVEY Recommendations

- The following recommendations suggested after motor loading survey
 - Identify motors with less than
 - 50 % loading,
 - 50 – 75 % loading,
 - 75 – 100 % loading,
 - over 100 % loading.
 - Identify motors with low voltage / power factor / voltage imbalance for needed improvement measures.
 - Identify motors with machine side losses / inefficiencies like idle operations, throttling / damper operations for avenues like automatic controls / interlocks, variable speed drives, etc.
 - For motor less than 40% load, Conversion to star mode if load is constant.
 - Installation of star-delta change device if load varies some times.
 - Replace with smaller size motors. Reduce the load on 100% loaded motors or replace with higher size motors.

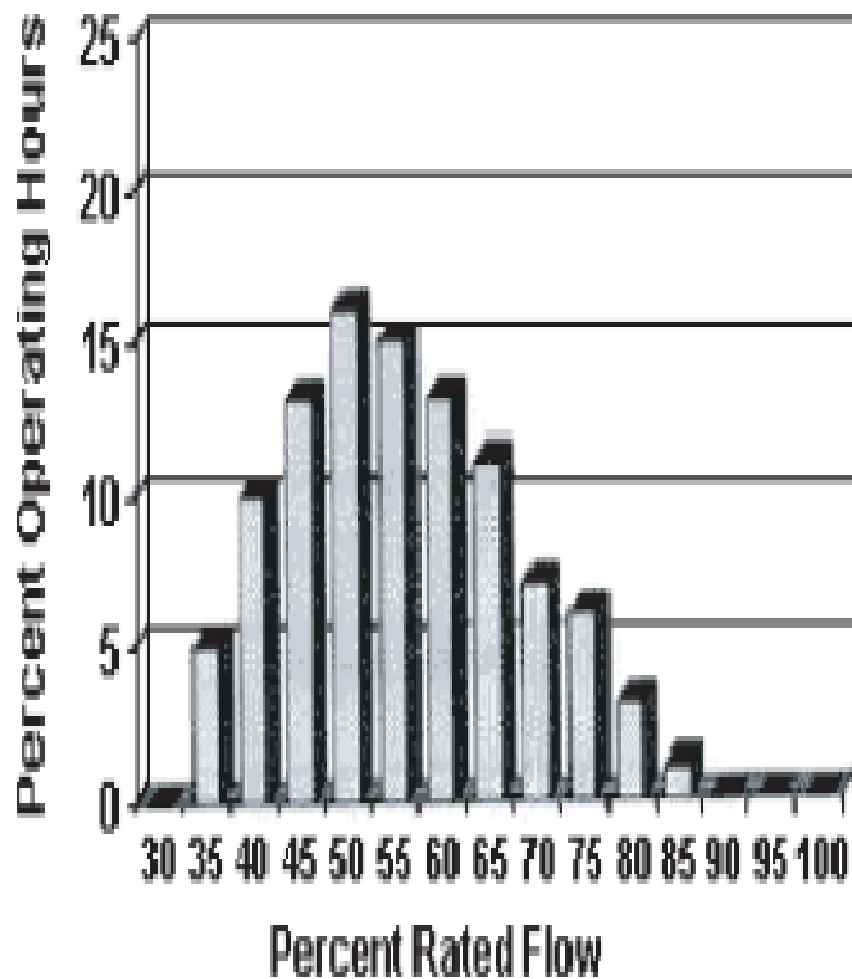


Figure 5.3 Example of an excellent variable speed drive candidate

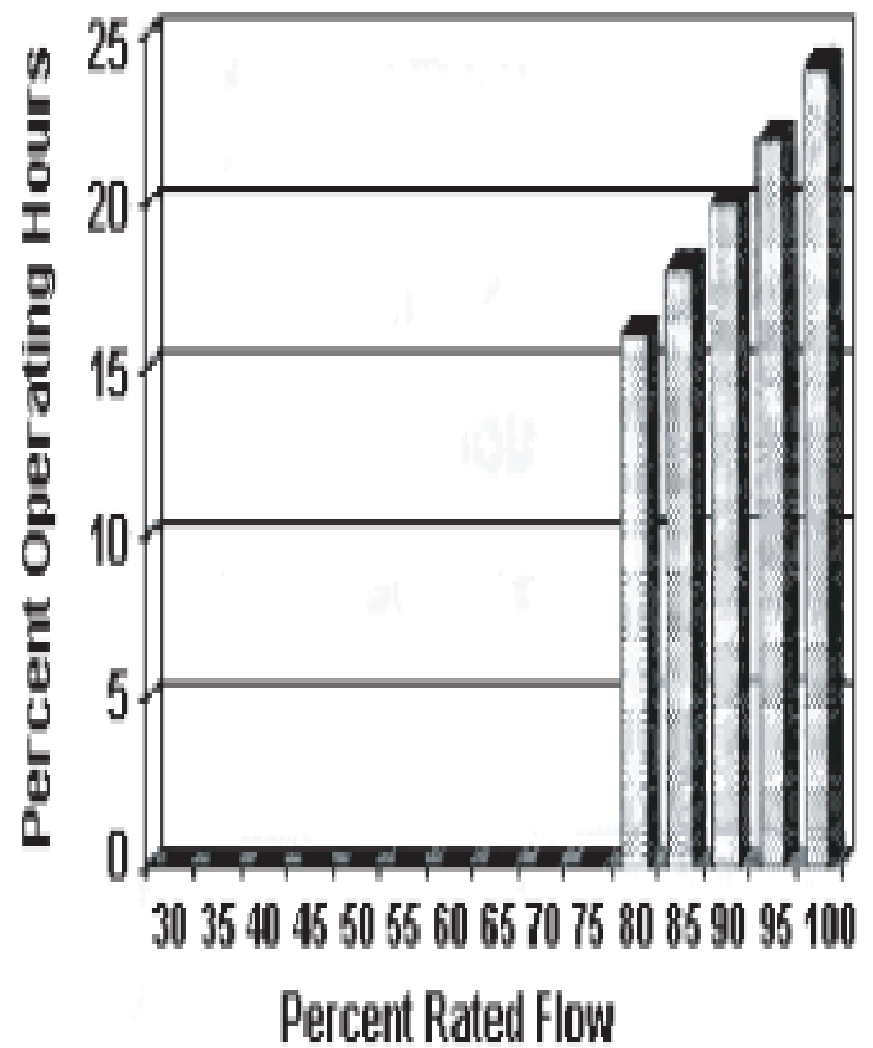
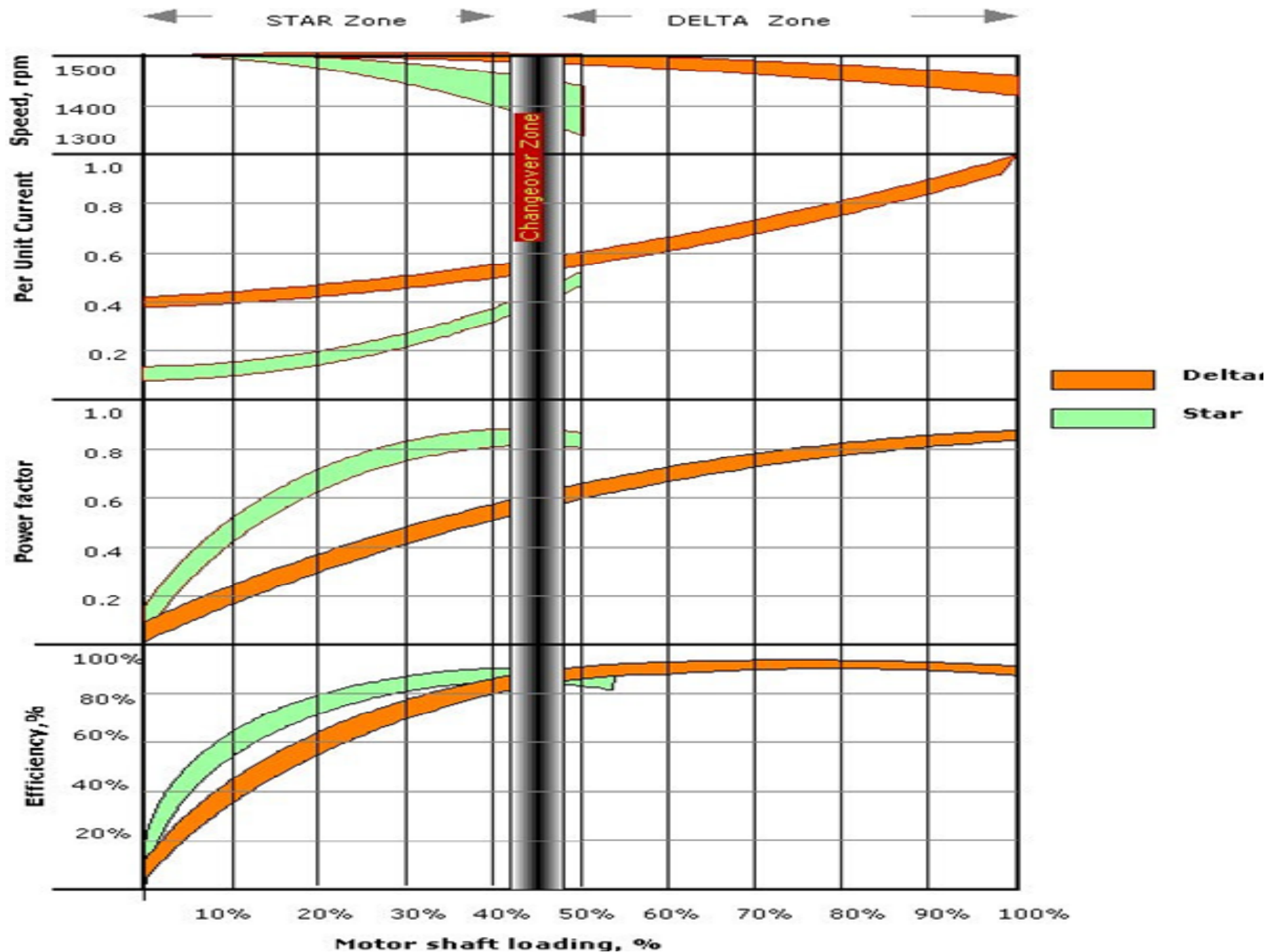


Figure 5.4 Example of a poor variable speed drive candidate



Maximize motor life - proper lubrication & temperature

- Bearing needs specialty lubricant for optimum life, reliability.
 - Under-greasing results in bearing wear or heat damage.
- Over-greasing significantly increase operating temperatures

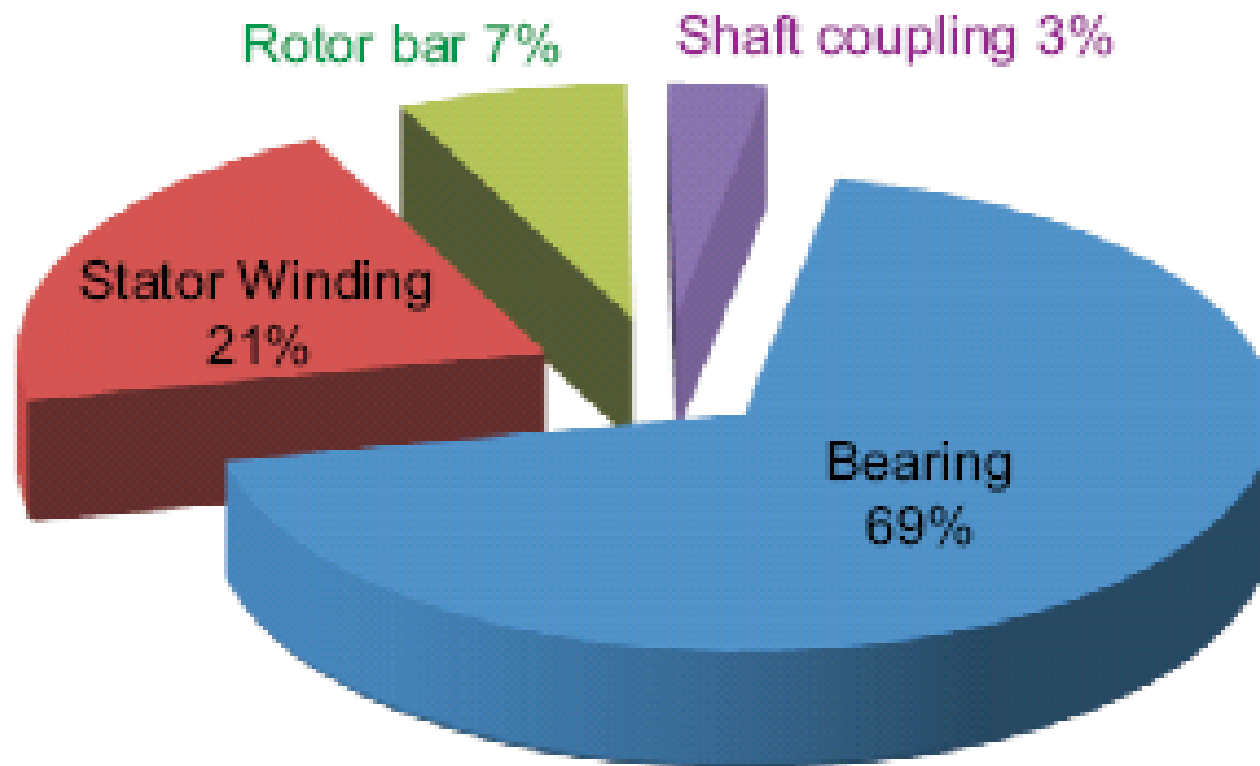


Fig. 5. Extrapolated distribution of failure by motor component

MOTOR BELT TRANSMISSION

- **BEE TABLE** regarding Motor drive transmission belt losses.
- **Alignment** is one of the area where in the given motor KW can be fully utilized to drive load more, hence more productivity / not less power.

Motor drive transmission efficiency - Visible losses seen in Belt Losses from motor to load

The efficiency of mechanical power transmission depends on grip between pulley and belt, further depends on μ (Co-efficient of friction) and strength (Tensile) of the belt. In case of

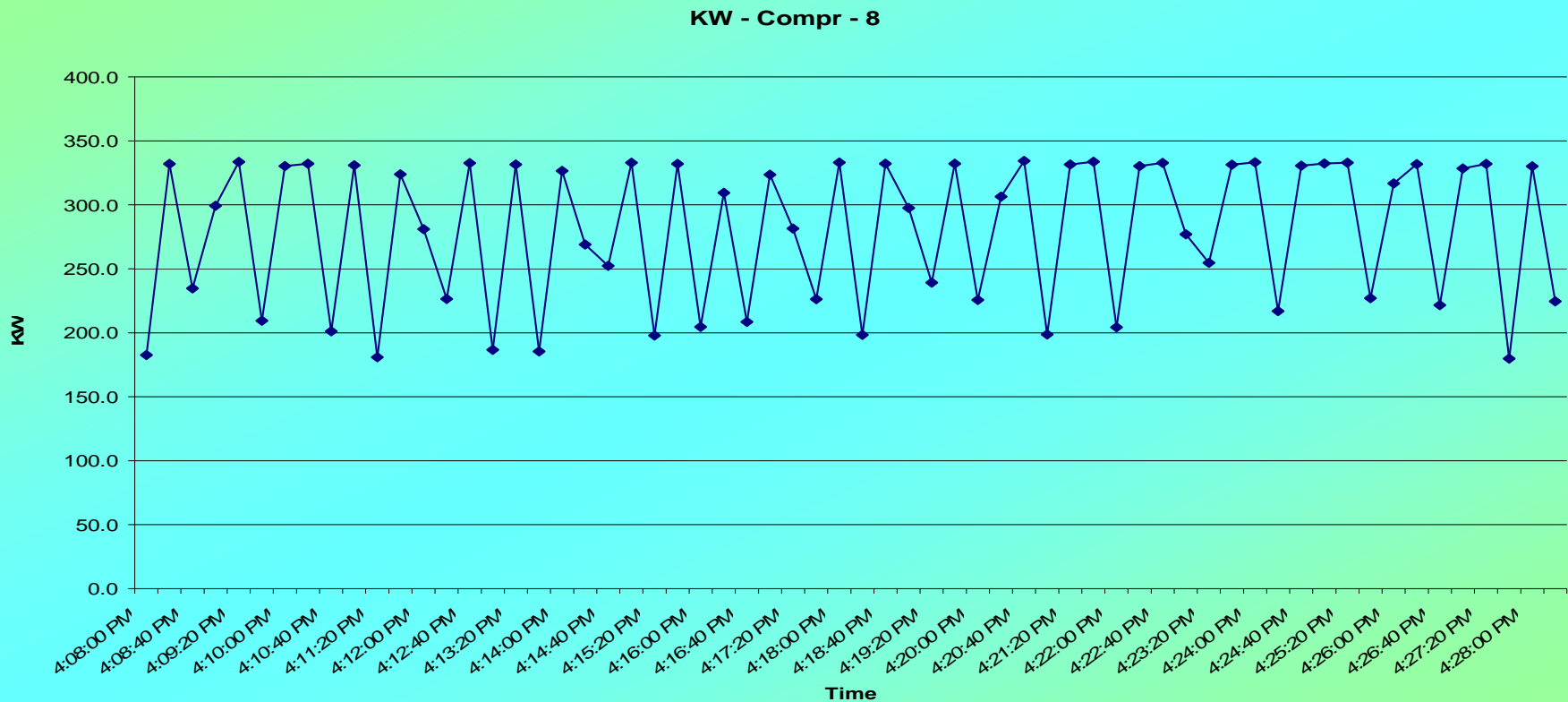
Table 3.4: Losses in V Belts

Sr. no.	Motor HP	Losses %
1	2	8-15
2	3	7-13
3	4	6-12
4	6	5.5-10
5	8	5-9
6	10	4.5-8.2
7	20	3.5-7
8	30	3.2-6
9	40	3-5.5
10	60	2.8-5
11	80	2.5-4.5
12	100	2.5-4.5



ENERGY MANAGEMENT in Industry NORMALLY YIELDS = SAY up to 10% SAVINGS.

**BUT COMPRESSOR HEALTH, COMPRESSED AIR SAVING AT
GENERATION, DISTRIBUTION,
AND LOAD END SAVING YIELDS = overall 30 % possible now !**



COMPRESSED AIR CLEANING - MAKE IT SAFE & SAVING TOO !

Install Ball Valves At The User Point To Avoid Compressed Air Wastage

Background



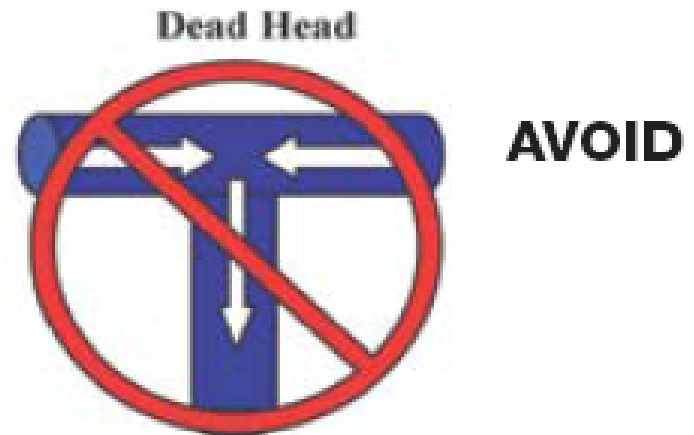
👉 Compressed air used for cleaning

👉 After every 2 minutes operator has to walk 10 to 15 feet to close valve

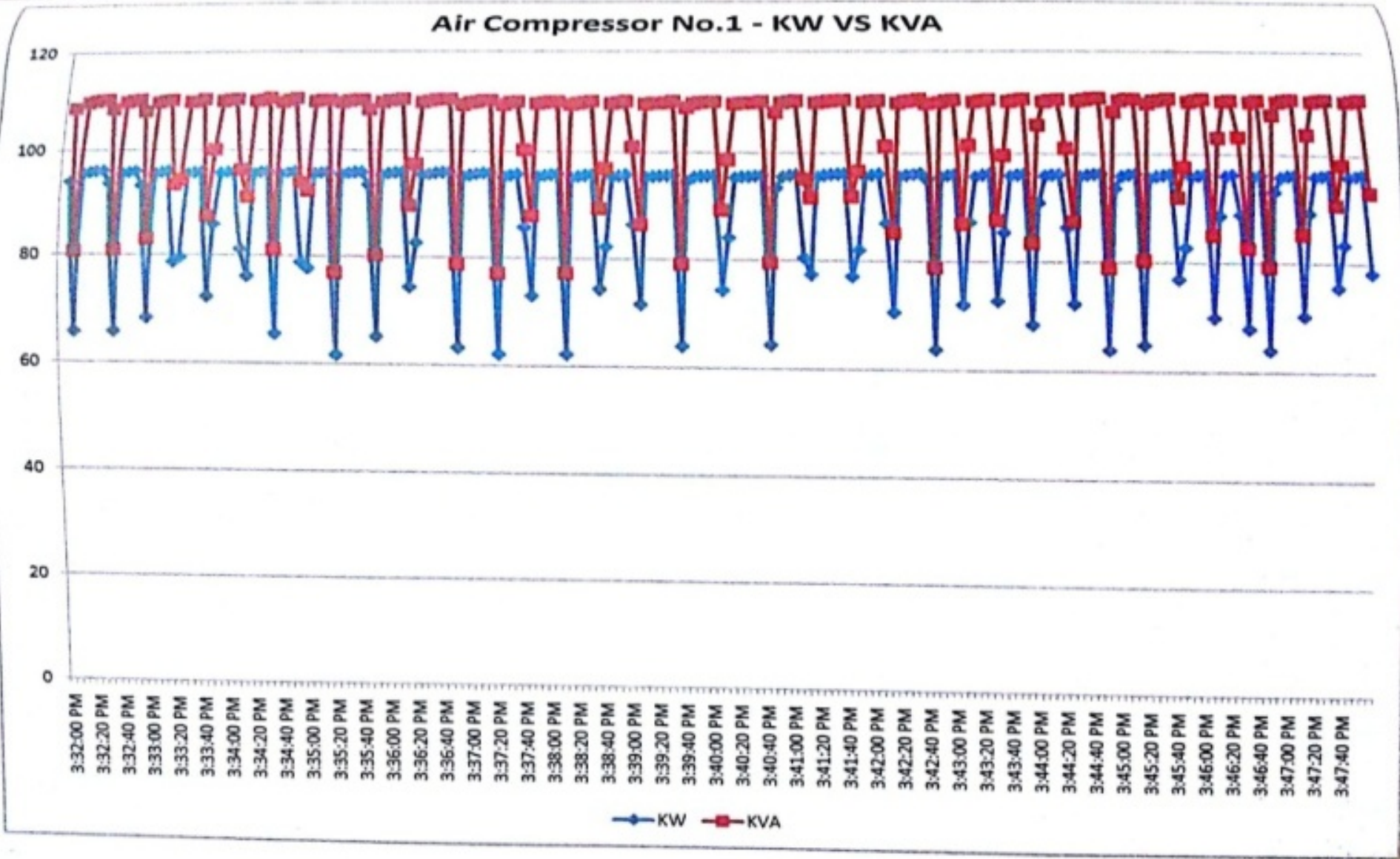
Action

👉 Provide a ball valve at the end of the pipe

Compressed air piping improvements in the compressor house gives instant Energy savings.



Compressor pressure control sensor relocation to receiver yields instantly and improves compressor health drastically.



Allow compressor to exhaust easily Else, this leads to Accelerated Ageing, Premature Breakdowns.



AC PLANT – WATER CIRCUIT Nozzles not to jetting / pissing /oozing but Fogging spray dwell time of water in air gives 95 % RH at & after the Mist Eliminator.

Modification of air washer no 1 of spinning hall in Rayon Plant.



Old Air Washer

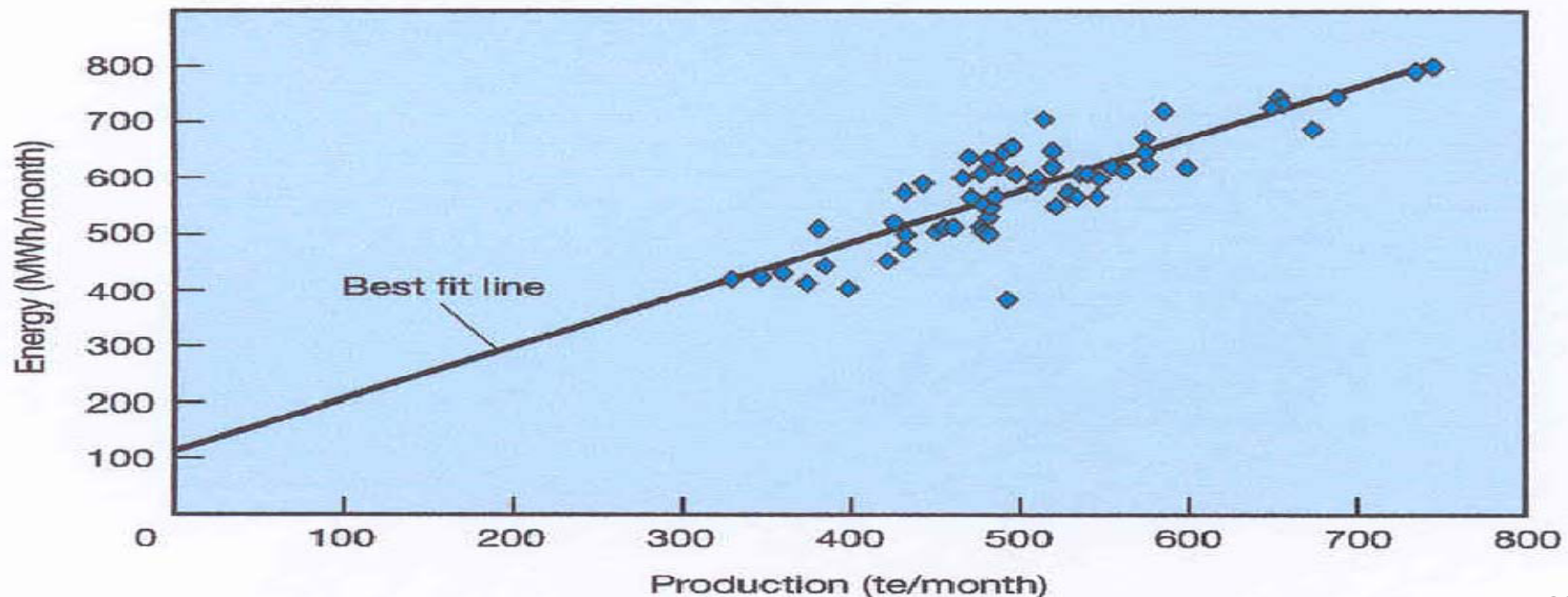


New Air Washer

What is the Relative monthly Power to Production costing % Above or Below LINE ?

**$Y = MX + C$: Energy consumed for the period $Y =$
 $M \times$ Production for same period $+ C$**

M is the energy consumption directly related to production (variable) and C is the "fixed" energy consumption (i.e. energy consumed for general auxiliary services)



ENERGY CONSERVATION IS IN YOUR HANDS

- There are two kinds of Employees / Managers in your industry.
 - **Some believe they can make things happen,**
 - **and others believe that things happen to them.**
 - The first group believes that the outcome of Energy conservation works is more or less in their own hands
 - **The other group takes wait and watch approach: -**
 - **They sit around & wait for bus to take them somewhere slowly.**
 - **Now please Decide where & how fast you can save our energy**

Safe & Best operating practices Automatically yield Energy Savings along with better machines' health

- **Thinking & Acting on Conservation Measures**
 - **catalyzes our social responsibility,**
- **caring for others and sacrificing our selfish comforts.**
- **When we are safe and healthy, conservation prevails.**
- **If safety fails, conservation fails and Pollution starts.**

**Lighting purpose is comforting the worker?
Visual tasking improves productivity by 6 % or
Poor lighting reduces productivity by 6 % : C II study**

Usually light is needed as follows,
depending upon the age:

10 years children	1 time
20 years boys	1.5 times
30 years persons	2 times
40 years man	3 times
50 years man	6 times
60 years old people	15 times

General Guidelines for Improving Energy Efficiency

Dos

Undertake regular energy audits to identify energy saving potential

Sensitize plant personnel on the benefits of energy conservation

Encourage people to provide ideas for energy savings and reward them

Promote group activities for information sharing at cluster level

Don'ts

Do not work in isolation

Do not be stagnant

Do not always believe in what you hear

Do not look for only short-term benefits

Search constantly for energy-efficient technological solutions

Avail external expertise to develop and undertake technological upgradation

Participate in workshops and training programs on energy efficiency improvements

Share success stories and discuss energy efficiency improvement strategies with co-entrepreneurs

Do not be afraid of adopting new technologies

Do not always depend on in-house technical capacity

Do not think low-cost solutions are always economical

Do not be apprehensive to approach banks for loans to invest in energy-efficient technologies



ECON is a Low Hanging Fruit now.

If left un-plucked now, this will silently eat your operating profit margin soon & later too.

- Having done Energy audit in the mill now, we have given 5 to 10 % savings with One year Payback period.
- If your Power Bill is Rs.100 Lakhs per year,
- you could save 10% thro better energy practices

• **ASK YOURSELF**

- How much product / yarn to sell to earn Rs.10 Lakhs net / year
- This 10 Lakh Rs is within yourself and make use of it NOW !

Energy conservation

Building awareness and motivation to employee

Why do people carelessly waste energy in their organization ?

- 1. No concerns in energy cost**
- 2. No problems in energy supply and consumption**
- 3. Not their duties to save energy**
- 4. Daily work load make no time to think about energy savings**
- 5. No energy saving policy from top management**

How to implement Energy conservation ?

Motivation steps towards Employees.

1. **Allow participation in decisions making**
2. **Let them the know problems and reasons**
3. **Admire their work results**
4. **Believe in their responsibilities**
5. **Rewarding when success**

ROOF Rain WATER HARVESTING in mills

- Compared to other industry, textile mill is built in huge land area.
- The same can be utilized and go for rain water harvesting pond.
- Some textile mill have gone 50 Lac liter pond which is just a collection of rain water inside the premises and predominantly
 - the roof water collected and brought to pond.
- This pond serves the mill for the whole year the excellent rain water collected from roof & surroundings, with lowest TDS to the mill AC plant
 - and thus helps the mill to sustain thro out the year with no need of RO / external water resource
 - but with the God given rain thro roof water collections only.
 - By this, the textile mill can improve the ground water levels in the locality where they are located.
- Now the mill can serve for us AND other people surrounding our mill.

Let us Conserve now for a Better Tomorrow.

Thank you

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For the Energy saving Case studies in detail,

- **Please visit the site :- www.energymeasuretosave.com,**
 - **info@poweronprojects.in**
- **Having done Energy Audits in hundreds of mills including the Designated Consumers, we are sharing the above.**
 - **M/s. POWERON PROJECTS / Coimbatore.**