

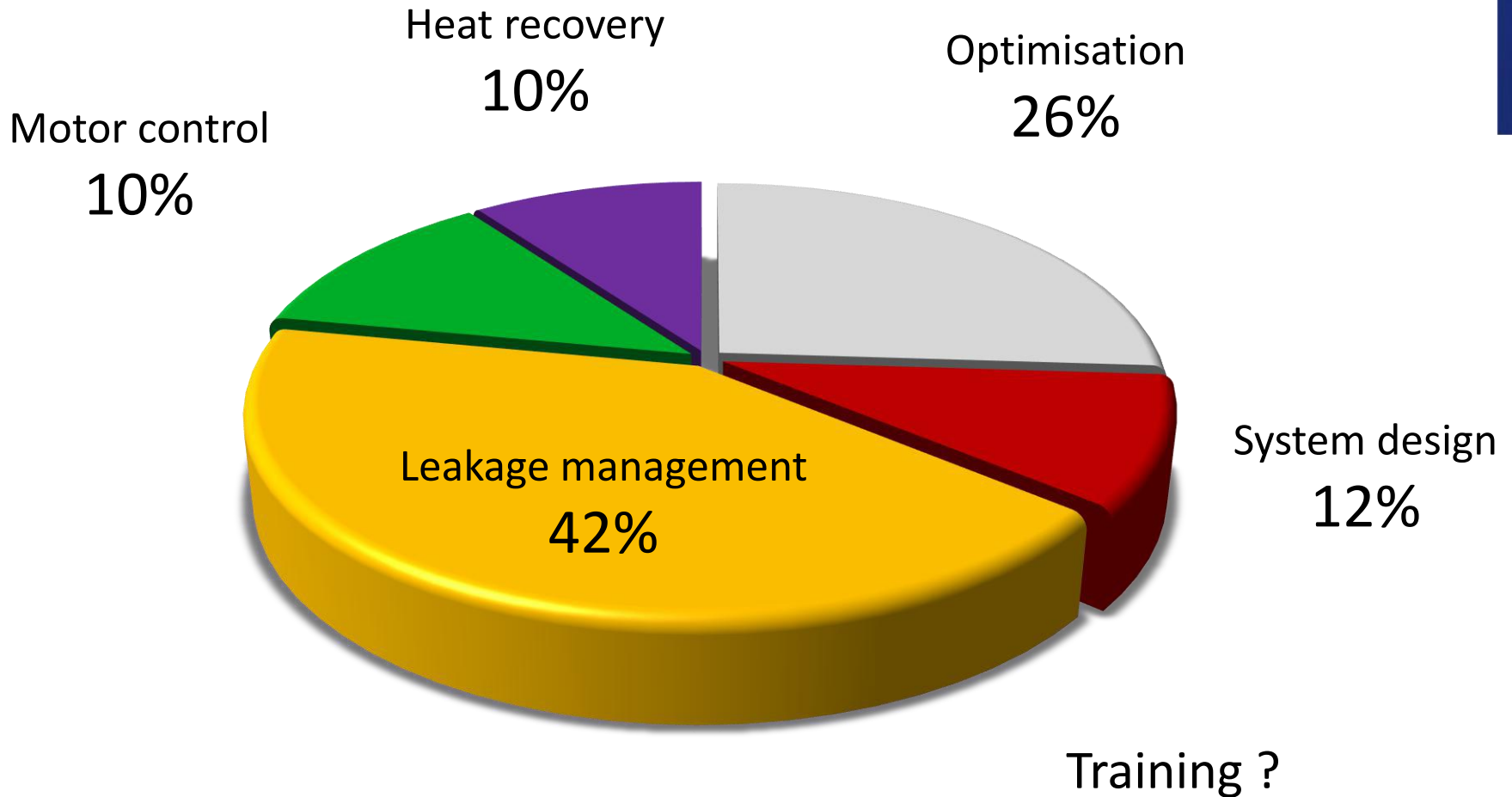


Energy saving services in compressed air systems

Monitoring & Measuring

From guessing to understanding

Where is the savings potential in a compressed air system?



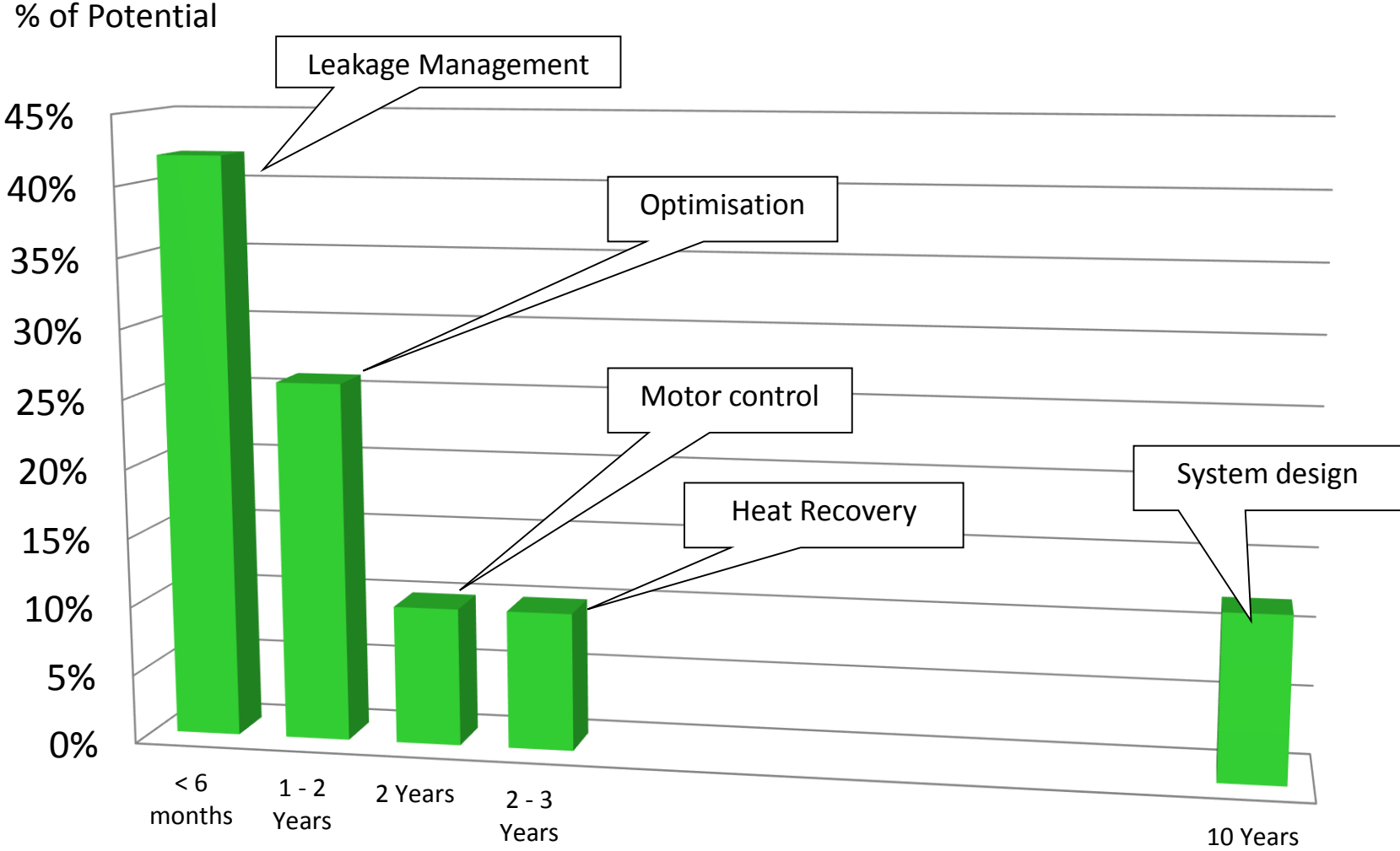
Source: CAS, In the EU

What do leakages cost ? Below is only for ONE LEAK !

| Leakage \varnothing / mm | Volume /m ³ per year | Cost per year |
|----------------------------|---------------------------------|-------------------|
| 0,5 | 7,709 | INR 9,375 |
| 1 | 38,500 | INR 48,000 |
| 1,5 | 65,700 | INR 80,625 |
| 2 | 136,600 | INR 1.7 L |
| 3 | 307,500 | Inr 3.82 L |
| 4 | 546,600 | INR 6.82 L |

Based on 7 barg, INR 1.5/m³, 365/24/7

Return on investment : Sensible Investments reap value



Cost saving process

Level 1

- No measuring
- Cost not established
- No leakage management
- No targets set
- Air quality not established

Level 2

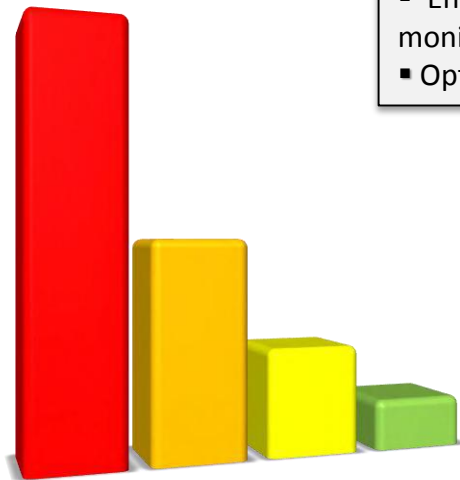
- Limited measuring
- Cost not established
- Sporadic leakage detection
- No targets set
- Energy efficiency not monitored
- Optimisation not initiated

Level 3

- Measuring in real time of all critical parameters.
- Established cost per cbm
- Leakage management on monitored basis
- Optimisation program
- Targets set and monitored
- System for handling of deviating data
- CO2 accounted for

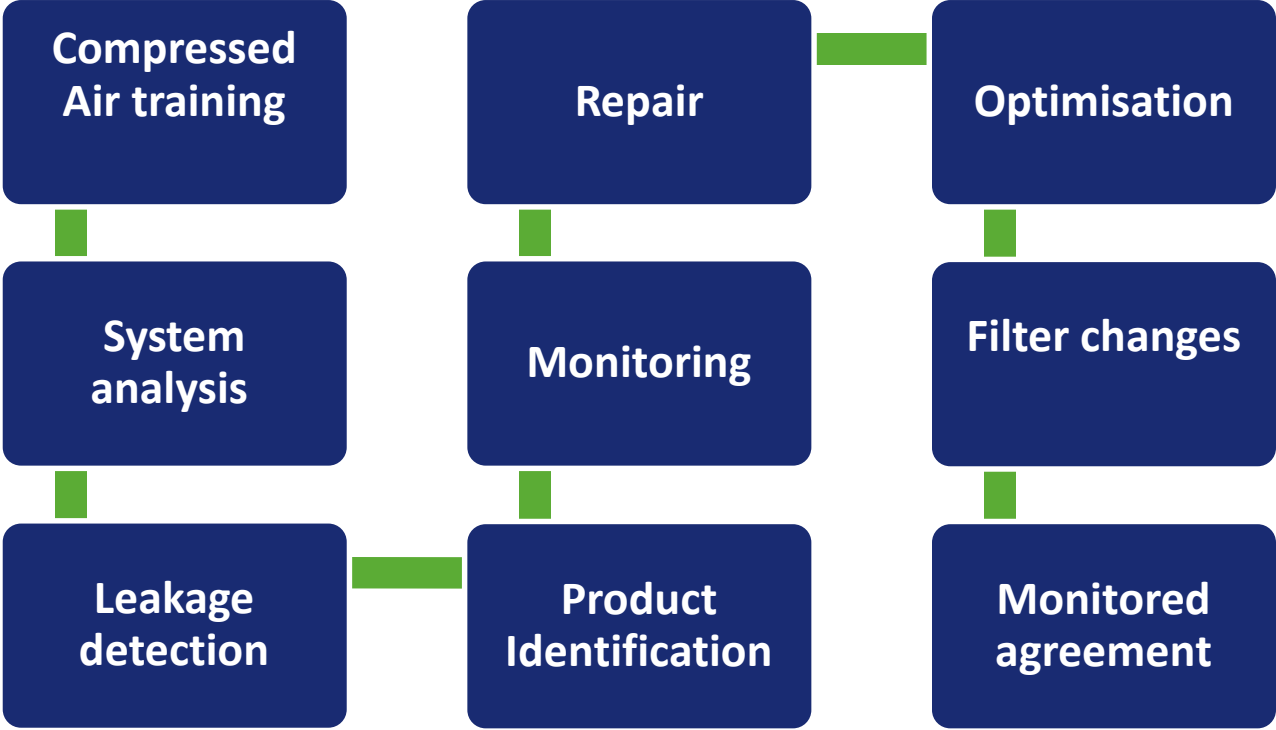
Level 4

- Compressed air cost allocated on product level
- < 5% leakage rate
- Compressor configuration verified
- Energy efficiency verified
- Purchasing directives issued for machine and component suppliers



Possible cost reduction 30-50%

Reduction of compressed air consumption and CO2 emissions



How do you manage the process?

Reliability



Flow
Pressure
Temperature



MONITORING & MEASURING OF COMPRESSED AIR SYSTEMS

Dewpoint



kW
Energy efficiency



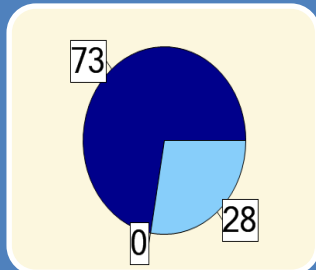
Key areas to monitor in a compressed air system

Reliability – Critical levels



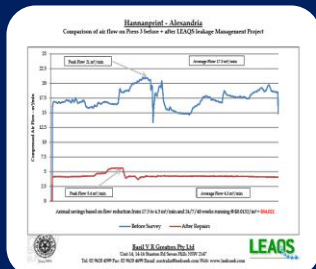
- Flow
- Pressure
- Dewpoint

Identify the savings potential



- Energy efficiency
- Leakage levels
- Compressor diagnostics

Verification of actions taken



- Optimisation of applications
- Changes in pressure
- Optimal interval of leakage detection
- New compressors
- Energy audits or complying to – ISO 50001

**Survey and Repair provides
the answer to the real cost
of leakages**

See example in next slide

M/S Kandui Energy Cost Calculation: (As per Data)

| | | |
|-------------------------------------|-------------------------|----------|
| Total consumption of power (approx) | $43.5+42+9.2+9.2=103.9$ | KW |
| Hours/Per Day | 22 | Hours |
| KwHr consumed per day | 2285.8 | |
| Unit cost | 6 | Rs/Kw.hr |
| Calculated Cost per year | 4937328 | Rs |

SAVINGS POTENTIAL:

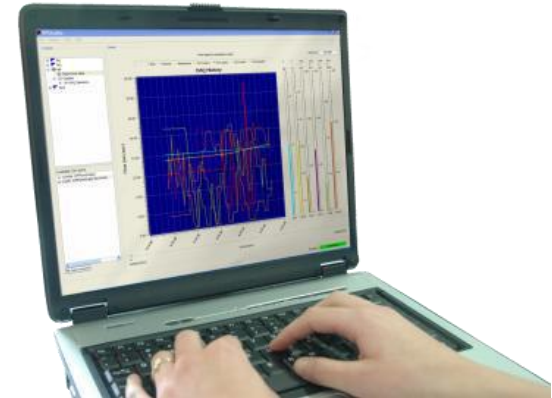
Leakage 39 percent

Saving s potential 1925557.9 Rs (approx 20 lakh Rs/year)

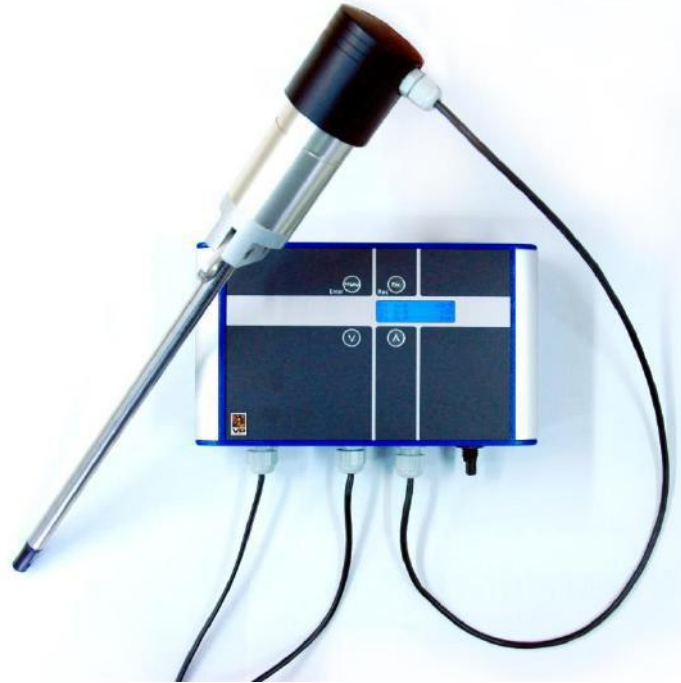
REMARK:

If we will arrest all the leaks **we can save approx 20 lakh Rs per year.**

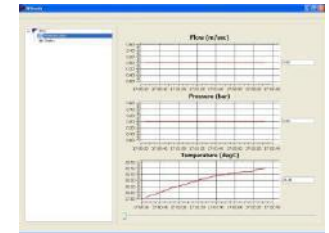
Temporary & Mobile measuring



Display terminal - Permanent monitoring



Till Din PC
via Ethernet



Ethernet



Flow



Modbus



Pressure

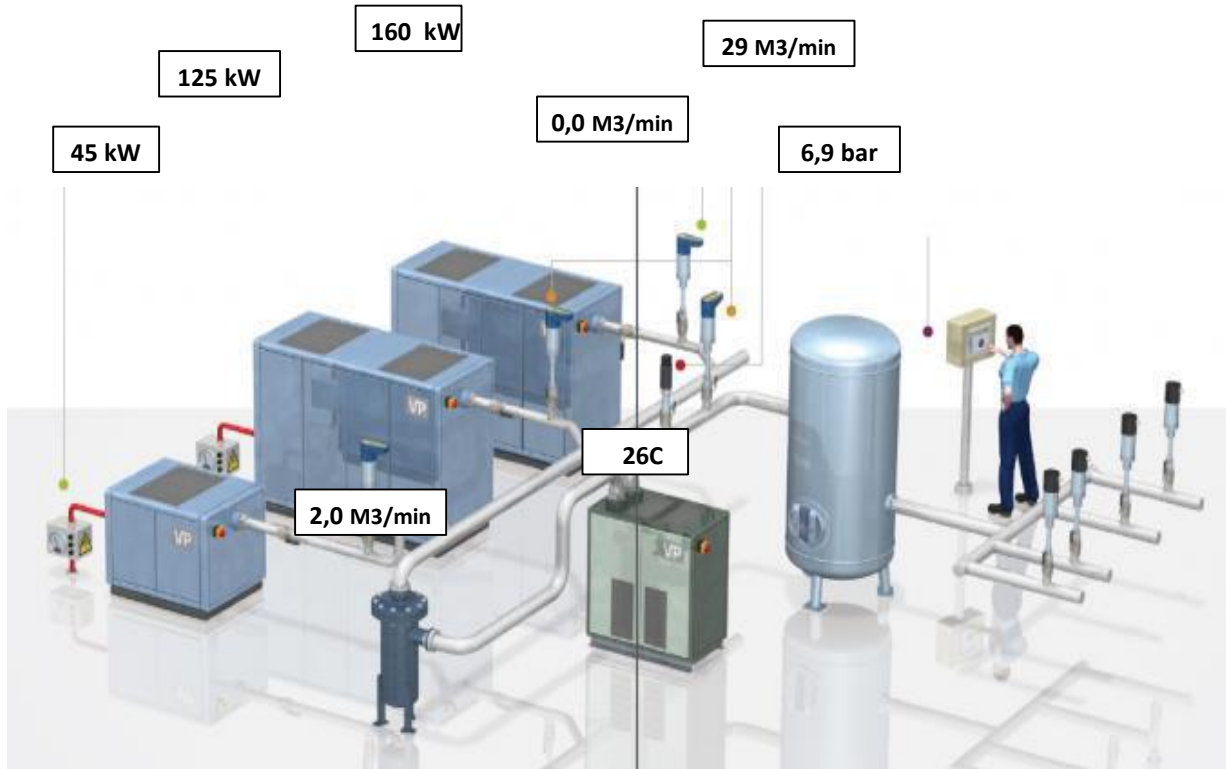


USB



Temperature





















Control over key parameters



Create your own dashboard



From guessing to knowing and understanding

| | Know | Don't know |
|---|--|--|
| Do we have enough air if our biggest compressor breaks down? |  |  |
| Energy efficiency – kW per produced M3? |  |  |
| Leakage level? – 5 or 55%? |  |  |
| What is our dew point? |  |  |
| Does the compressor produce air? |  |  |
| Alarm functions – pressure, dew point, leakage, efficiency, motor starts? |  |  |
| Costs? – per cbm, per department, per machine, per product? |  |  |
| Service interval– compressors, leakage detection? |  |  |
| Calculated or real air consumption? |  |  |
| Preventive – control interstage pressure, temperature increases? |  |  |