ENERGY EFFICIENCY IN COMPRESSED AIR SYSTEM

06th July’ 2017 - BEE Vadodara
Ujval Pandya – 9328 3333 36
## ATLAS COPCO GROUP

<table>
<thead>
<tr>
<th>Established</th>
<th>1873 in Stockholm, Sweden</th>
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<tbody>
<tr>
<td><strong>Four focused business areas</strong></td>
<td></td>
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<tr>
<td>▪ Compressor Technique</td>
<td></td>
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<tr>
<td>▪ Industrial Technique</td>
<td></td>
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<tr>
<td>▪ Mining and Rock Excavation Technique</td>
<td></td>
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<tr>
<td>▪ Construction Technique</td>
<td></td>
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<tr>
<td><strong>Global presence</strong></td>
<td>Customers in more than 180 countries</td>
</tr>
<tr>
<td><strong>Employees</strong></td>
<td>More than 44 000 in over 90 countries</td>
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<tr>
<td><strong>Annual revenues</strong></td>
<td>BSEK 94 (BEUR 10.3)</td>
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</tbody>
</table>
Established in the year 1960
Total employee strength : 2500
Annual Sales : ~ 30 BINR
4 Manufacturing plants in India
Global Engineering Competence Centers at Pune & Bangalore
Annual Indian production 10,000 Screw compressors & 100 Centrifugal compressors
A STRONG BRAND PORTFOLIO

[Branding logos and company names]
UNIVERSE OF SOLUTIONS
Compressed air and gas technologies
INNOVATION TIMELINE

Over a Century of Innovations in Energy Efficient Products and Services
THE IMPORTANCE OF ENERGY EFFICIENT COMPRESSED AIR

Total World Wide Energy Consumption 100%

Energy Consumption Industry
35% … >50%

- Lack of energy efficiency awareness
- Missing or ineffective policy measures and incentives

India: 423,691 Million kWh, as per BEE Target Setting 2015
FACTS ABOUT COMPRESSED AIR

Energy

- Total facility energy consumption
  - Compressors will typically represent between 2% and 40% (12% average)

- Compressor life cycle cost
  - 80% of total compressor lifecycle costs is related to energy

- Air leakages
  - Leakages in the pipe work can take up to 20% of the total air consumption

- Fluctuating air demand
  - In general, even at no demand, compressors will consume up to 20% of the nominal power

- Service
  - Proper maintenance reduces energy consumption
LIFE CYCLE COST OF A COMPRESSED AIR INSTALLATION

Total Life Cycle Cost of a Compressor

Invest 05%

Energy Cost 80%

Maint 15%

Note: Life Cycle for Calculation is considered 10yrs
ENERGY COST OF COMPRESSED AIR

90kW Motor running 24hrs x 365 days with 70% - 30% Load/Unload consumes: 600,000 kWh annually Considering Unit Rate: Rs.7/Unit

Energy Cost: 42 Lacs/yr

Which is 3 to 4 times the cost of Compressor itself!!
PRODUCTS - EXCELLENCE IN CENTRIFUGAL TECHNIQUE

- Horizontally split design
  - Easy preventive maintenance access

- Compact, lightweight, yet robust design
  - Optimized for production
  - Optimized on cost

- Backward leaning impeller design

- 6% more efficient than earlier design with optimization of flow paths & improved design of impellers

- Computational Fluid Dynamics (CFD) optimization on +100 design parameters

Energy saving up to 8-10% is achieved!
MARKET LEADERS IN OIL FREE SCREW COMPRESSORS

- **Skid mounted unit**
  - Complete scope integrated
  - No foundation required

- **Canopied versions**
  - Truly engineered canopies
  - Reduced noise levels
  - Protects the units
  - Appealing aesthetics

- **Footprint**
  - Lowest footprint
  - Reduced installation space requirement
  - Intergrated HOC drum dryers [MD]
  - Layout of maintainance points
SCREW BLOWER PRODUCT EFFICIENCY COMPARISON

Screw Blower 30 - 40 % more energy efficient compared to Lobe Blowers
# BLOWER CASE STUDY

## SSM FINE YARNS (Madurai)
- **Twin Lobe Blower**: 75kW
- **Screw Blower**: 55kW VSD
- **Total Savings**: 18.23Lacs/ Annum

## VATVA CETP (Ahmedabad)
- **Twin Lobe Blower**: 132kW
- **Screw Blower**: 90kW
- **Total Savings**: 21.63Lacs/ Annum

## AMARJOTHY SPINNING (Erode)
- **Twin Lobe Blower**: 30kW
- **Screw Blower**: 18kW
- **Total Savings**: 10.06Lacs/ Annum

## ASIAN PAINTS (Pune)
- **Twin Lobe Blower**: 15.9kW
- **Screw Blower**: 10kW
- **Total Savings**: 3.94Lacs/ Annum
BLOWER INSTALLATIONS IN INDIA
OPPORTUNITY OF 50% ENERGY SAVING – OIL INJECTED SCREW

A VSD+ HAS 60% SMALLER FOOTPRINT

Energy savings of 50% on an average

THAN A COMPARABLE FIXED SPEED MACHINE
GA VSD+ DESIGN: THE HEART OF THE VSD+

Small heart, huge performance

- Permanent Magnet motor
- Pressure-tight IP66 motor
- Direct Drive:
  - No belts, gears or seals
  - Negligible energy losses
- Vertical set-up
- Oil-cooled drive train
  (one oil circuit for motor, element, bearings)

Motor: SER -4%
Transmission: SER -2%
Sentinel: SER -1%
Element: SER -1%

We challenged ourselves and achieved the above savings against our own previous designs which had already set a performance benchmark in the industry !!!
GA 7-75 VSD+ MOTOR EFFICIENCY

Motor: SER -4%

Efficiency of Atlas Copco’s GA 7-75 VSD+ Range
WHY ATLAS COPCO COMPRESSORS
WHY COMPRESSED AIR SYSTEM OPTIMIZATION?

20% of the energy performance of old compressed air installations are lost through leakages.

25% of the nominal energy is consumed by compressors running unloaded.

10% energy cost reduction through better control of your pressure band.

90% of the heat generated by a compressor can be recovered and reused.

Room for improvement.

Air is free. Compressed air is not.
COMPRESSED AIR USAGE DISTRIBUTION

Conventional Usage of Air in an Industry

- Leaks: 30%
- Artificial demand: 10%
- Inappropriate use: 10%
- Production: 50%
AIRnet : Contaminants Free

Always clean, as from day one

- As aluminium and polymer will guarantee air quality, they are becoming often used as raw material in critical environments, e.g. food industries, medical applications...

+ Rust
+ Internal contamination
+ Product spoilage
+ Thickness reduction
+ Leakages
+ Higher friction factor
+ ΔP Increase
+ High maintenance cost
+ Shorter lifetime of the hole system
EXAMPLE OF AIR LEAKAGE:

HOLE DIAMETER : 1 MM
LEAKAGE @ 6BAR : 1 L/S
POWER LOSS : 0.3 KW
UNIT RATE : 5 RS./UNIT
ANNUAL RUNNING HRS : 4,320

FORMULA : KW X U.R. X A.R.H.
LEAKAGE LOSS : RS. 6,480 / 1MM HOLE
CONSIDERING 20 LEAKAGES : RS. 1,81,440

Using AIRnet the leakage losses are almost ZERO

<table>
<thead>
<tr>
<th>Hole Dia (mm)</th>
<th>Leakage @ 6bar (l/s)</th>
<th>Power Lost (kW)</th>
<th>Unit Rate (Rs.)</th>
<th>ARH (Hrs.)</th>
<th>Leakage loss (Rs.) pa.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0.3</td>
<td>5</td>
<td>4,320</td>
<td>6,480</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>3.1</td>
<td>5</td>
<td>4,320</td>
<td>66,960</td>
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<tr>
<td>5</td>
<td>27</td>
<td>8.3</td>
<td>5</td>
<td>4,320</td>
<td>1,79,280</td>
</tr>
<tr>
<td>10</td>
<td>105</td>
<td>33</td>
<td>5</td>
<td>4,320</td>
<td>7,12,800</td>
</tr>
</tbody>
</table>
RECOVER AND SAVE

Compress

Pressure band reduction

reduce

Stop at unload

Detect and stop leakages

recover

Save

Stop at unload

AtlasCopco
Heat energy recovery efficiency can reach 70%!

Produced hot water temperature can get to 85°C!
Heat energy recovery efficiency can reach 90%!

Produced hot water temperature can get to 90°C!
SUCCESS STORIES

http://www.atlascopco.com/videogallery/detail/34c9e476-2657-4333-87a9-33aace211b10

http://www.atlascopco.com/videogallery/detail/2cca9121-262e-4395-a149-b60d5fb96f28

http://www.atlascopco.com/videogallery/detail/70b764b6-94b6-4510-9e32-600745359532
SUCCESS STORIES

http://www.atlascopco.com/videogallery/detail/23abeb11-faf8-43c4-9fba-e6024a77a3e8

http://www.atlascopco.com/videogallery/detail/5a7da6bf-0c01-42d6-8b4e-f1b36c736b71
DID YOU KNOW?

The dinosaur “Atlastcopcosaurus” is named after Atlas Copco for providing the equipment that discovered it in Australia.
Did you know that VSD compressors from Atlas Copco saved 240 million KWh of electricity in the UK alone since it was launched?
DID YOU KNOW?

Atlas Copco has been ranked amongst the world’s top 100 most sustainable companies 10 times?
DID YOU KNOW?

Oil-free compressors from Atlas Copco are used to process coffee* with the highest demands on purity and energy efficiency.

(*We helped make the mug too)
DID YOU KNOW?

Medical gas solutions from Atlas Copco provides clean air to hospitals around the world.
DID YOU KNOW?

Vacuum is used to manufacture touch screens and 90% of all flat screens in the world are manufactured using our vacuum pumps.
UNION MINISTER PIYUSH GOYAL VISITS ATLAS COPCO

Stockholm, Sweden - 3rd Nov 2016 (last week)
REACH US AND STAY CONNECTED WITH US ON:

- Reach Us - http://www.atlascopco.in/INUs/contactus/contactct/
- Toll Free Number – **1800 200 0030**
- Atlas Copco Website – http://www.atlascopco.in/INUs/aboutus/sales/ct/
- Enquiry : info.compressor@in.atlascopco.com
- Facebook - https://www.facebook.com/ACCTCCIndia
- LinkedIn - https://www.linkedin.com/company/atlas-copco-compressor-technique---india
- Twitter - https://www.twitter.com/AtlasCopcoIndia
- You tube - https://www.youtube.com/user/atlascopcocompressor
- Instagram - https://www.instagram.com/atlascopcogroup/
QUESTIONS
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SUSTAINABLE PRODUCTIVITY.
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