

Compressed Air Solutions (CAS)

Welcome

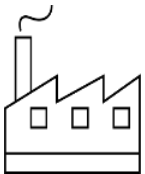
“Energy Saving Opportunities in Compressed Air System”

Kumar A. Jadhav

Date : 8th December 2022

**“We Do Not Inherit The Earth From Our
Ancestors, We Borrow It From Our Children.”**





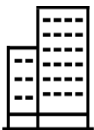
Godrej Industries



Godrej Consumer Products



Godrej & Boyce



Godrej Properties



Godrej Nature's Basket



Godrej Infotech



**Godrej Consoveyo
Logistics Automation Ltd.**



Godrej Agrovet

Godrej & Boyce

- Aerospace
- Appliances
- A V Solutions
- Construction
- **Electricals & Electronics**
- Interio (Furniture)
- Locks
- Lawkim Motors
- Material Handling
- Precision Engineering
- Process Equipment
- Security Solutions
- Storage Solutions
- Tooling
- Vending
- Godrej Infotech



Godrej & Boyce is a **125-year-old** flagship company of the Godrej Group with a turnover of over **10 billion USD** and spread over **3200 acres** in Mumbai. Our family of almost **28,000 Employees** works together to realise a brighter and more sustainable future for our country and communities.



As one of 14 businesses of Godrej & Boyce company, **Godrej Electricals & Electronics** is as old as the company.

Our businesses strives to contribute to the vision of the group by delivering **Sustainable Technology Solutions**.

Compressed Air Solutions is one of the important business vertical of **Godrej Electricals & Electronics**



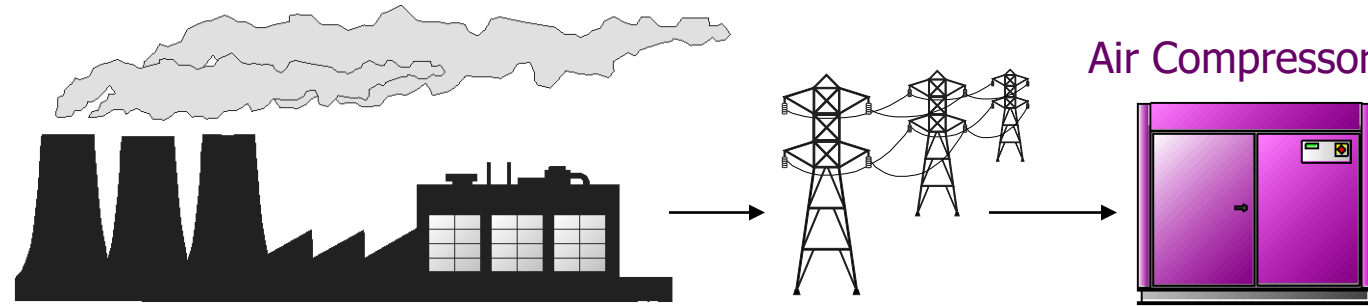


WHY PENUMATIC ENERGY IS THE MOST INEFFICIENT SOURCE OF ENERGY?



Compressed Air Energy

- Compressed Air: Fourth Utility, after Electricity, Natural Gas & Water



10% of industrial electricity used to power air compressors

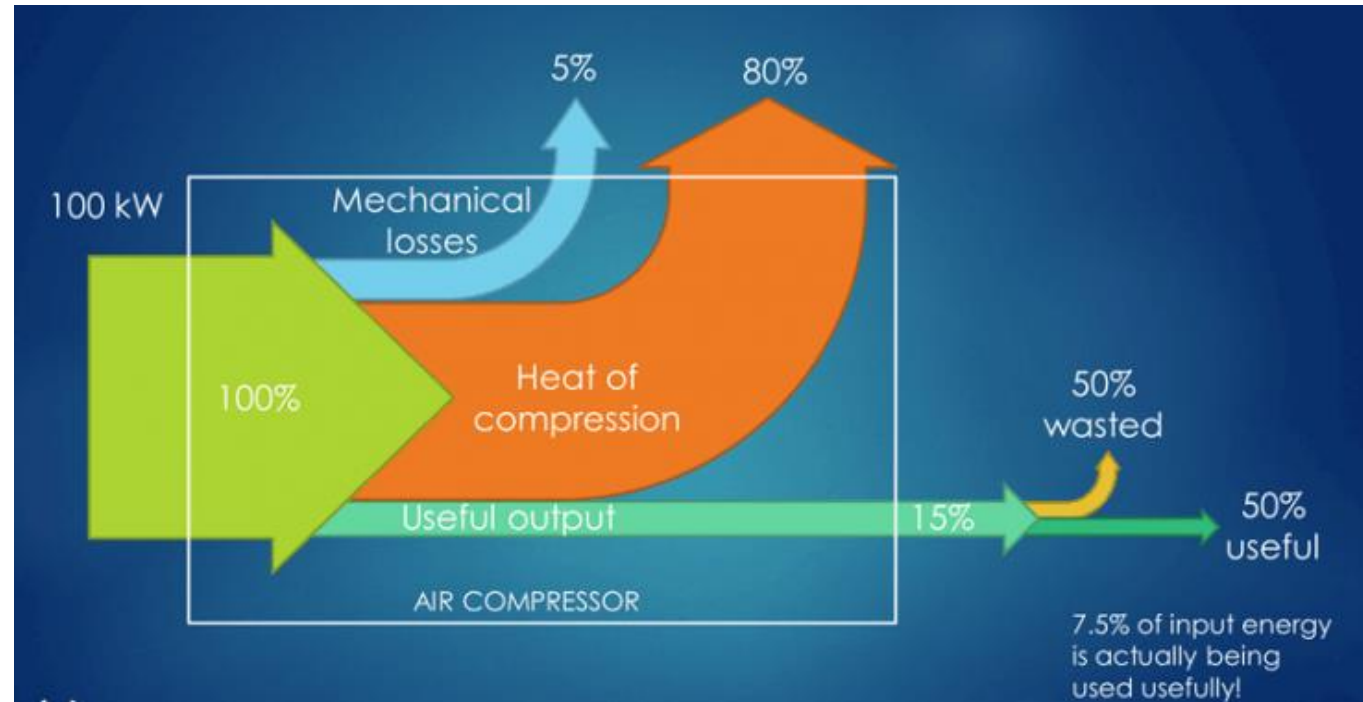
400 TWh electricity consumption in compressed air systems worldwide equals the electricity production of 110 coal fired power stations of 600 MW each & producing CO₂ emissions of 400 Million Tonnes per year

400 TWh = 400,000,000,000 kWh

Source: Energy Audit 2006 seminar Finland



Fig : Sankey Diagram For Compressed Air System



Out of 100 % Electricity Input,

- 5 % are mechanical losses
- 80 % are heat losses
- Finally, only 15 % is Actually Used

Compressed Air: Most Expensive Form of Energy!



Energy Cost

Energy Cost of Running Air Compressor - Example:

500 cfm, 100 psi(g) Air Compressor

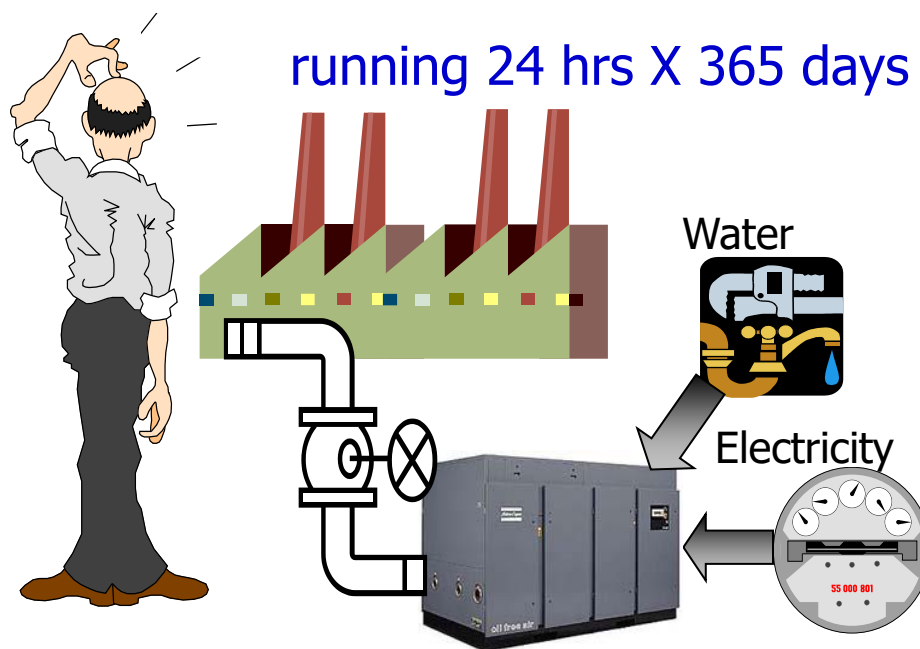
i.e. 120HP / 90kW Motor

running 24 hrs X 365 days with 70% Load Factor consumes

≈ 600,000 kWh annually

at rate of Rs. 7/kWh,

Costs Rs. 42 Lacs/year

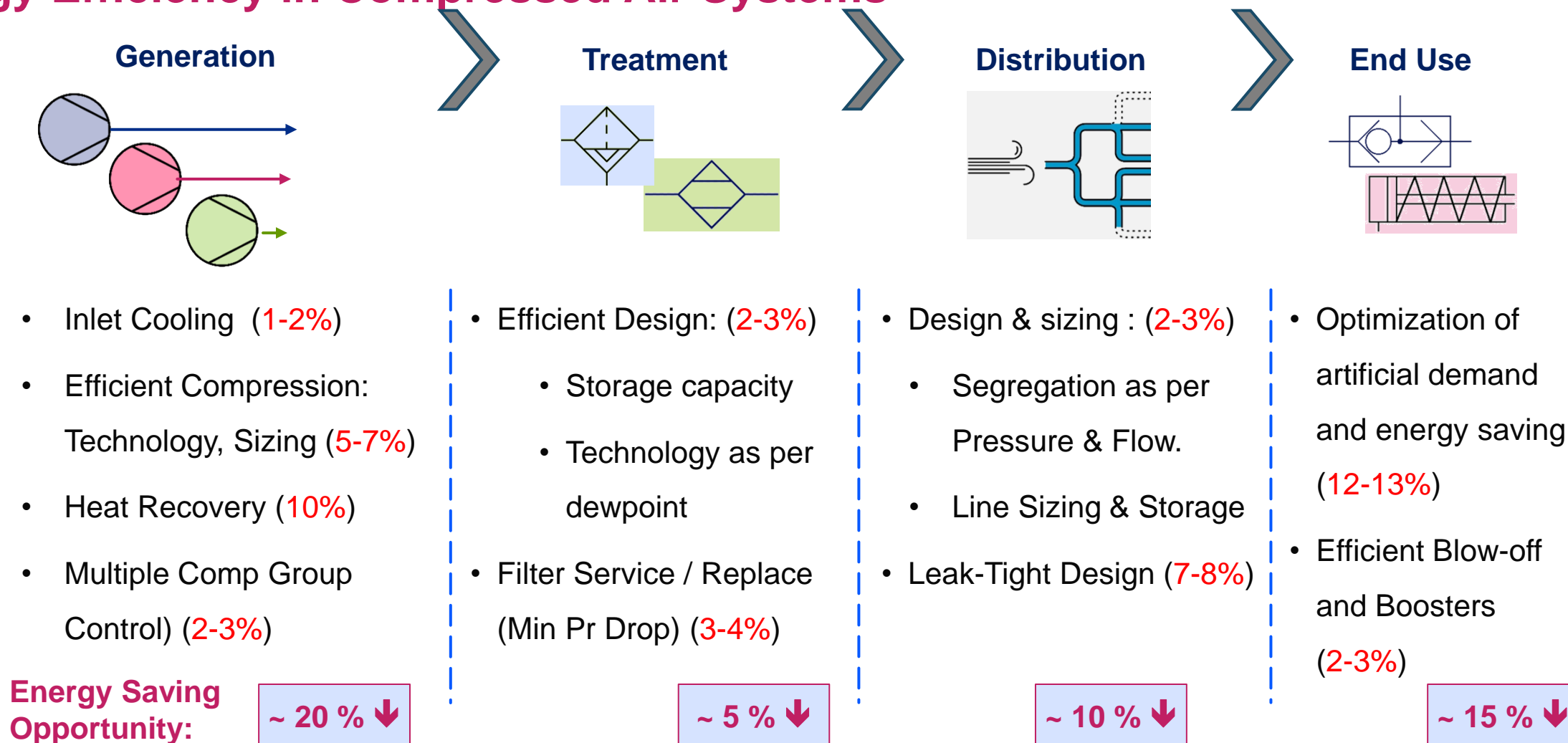


Which is 3 to 4 times the cost of Compressor itself !!

Compressed Air: Most Expensive Form of Energy!



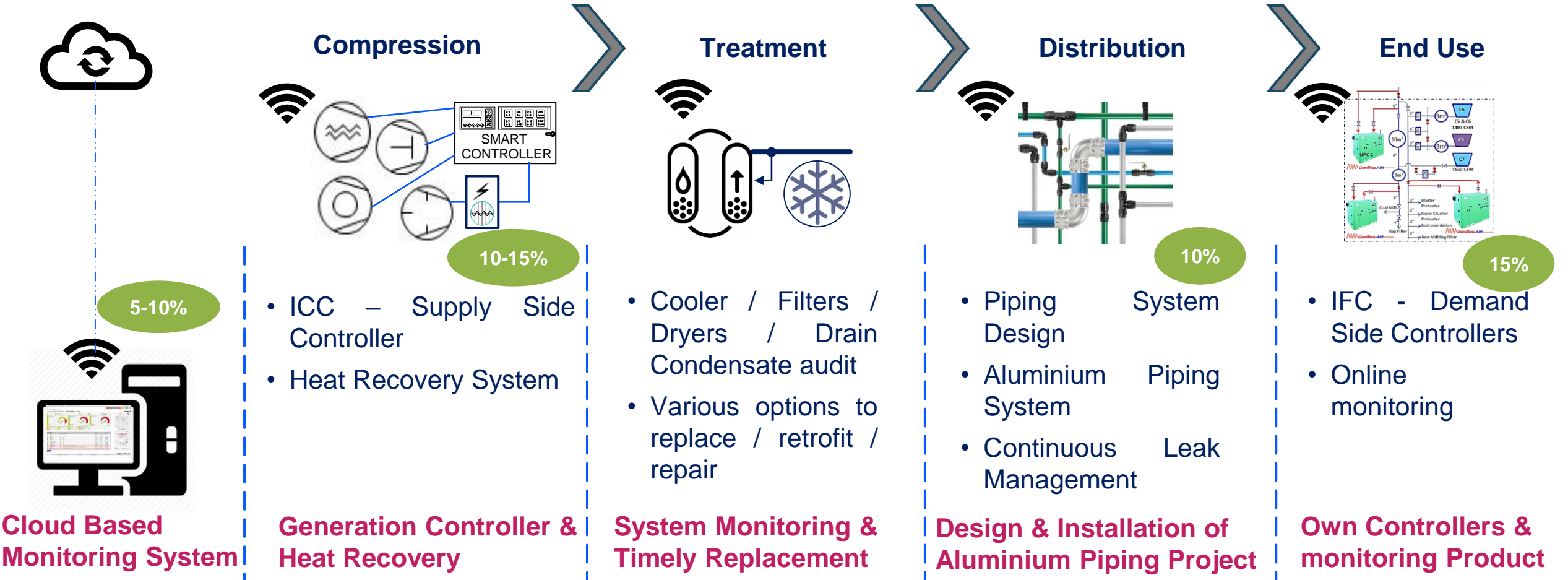
Energy Efficiency in Compressed Air Systems



Generation to End Use Approach: 50% Saving Potential



Total Approach to *Energy Efficiency* in Compressed Air Systems



Value Proposition: 'End to End' Energy Savings



Energy Savings



Carbon Footprint Reduction



Operating Cost Reduction



Productivity Improvement



Godrej ControlAiR™ Intelligent Flow Control (IFC) System

Demand Side Management System



Malaysia Green



*Saves Energy
4% ~ 25%*



*Constant Pressure within ± 1 psig
(± 0.07 bar)*

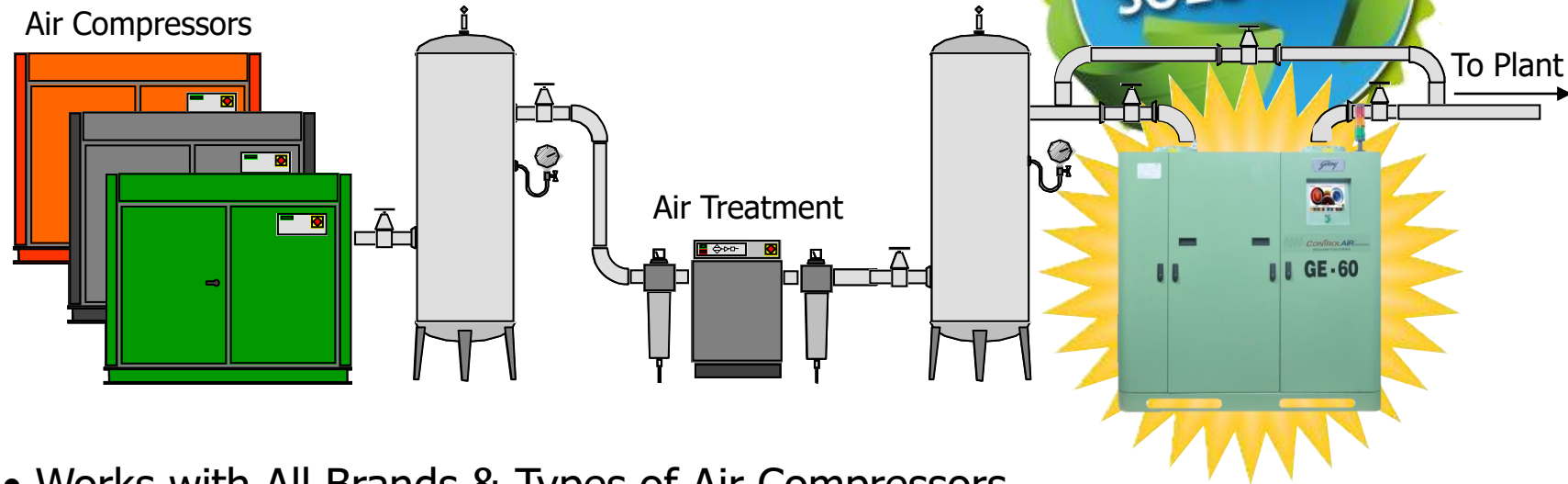
Reduces Artificial Demand

Industry 4.0 Ready





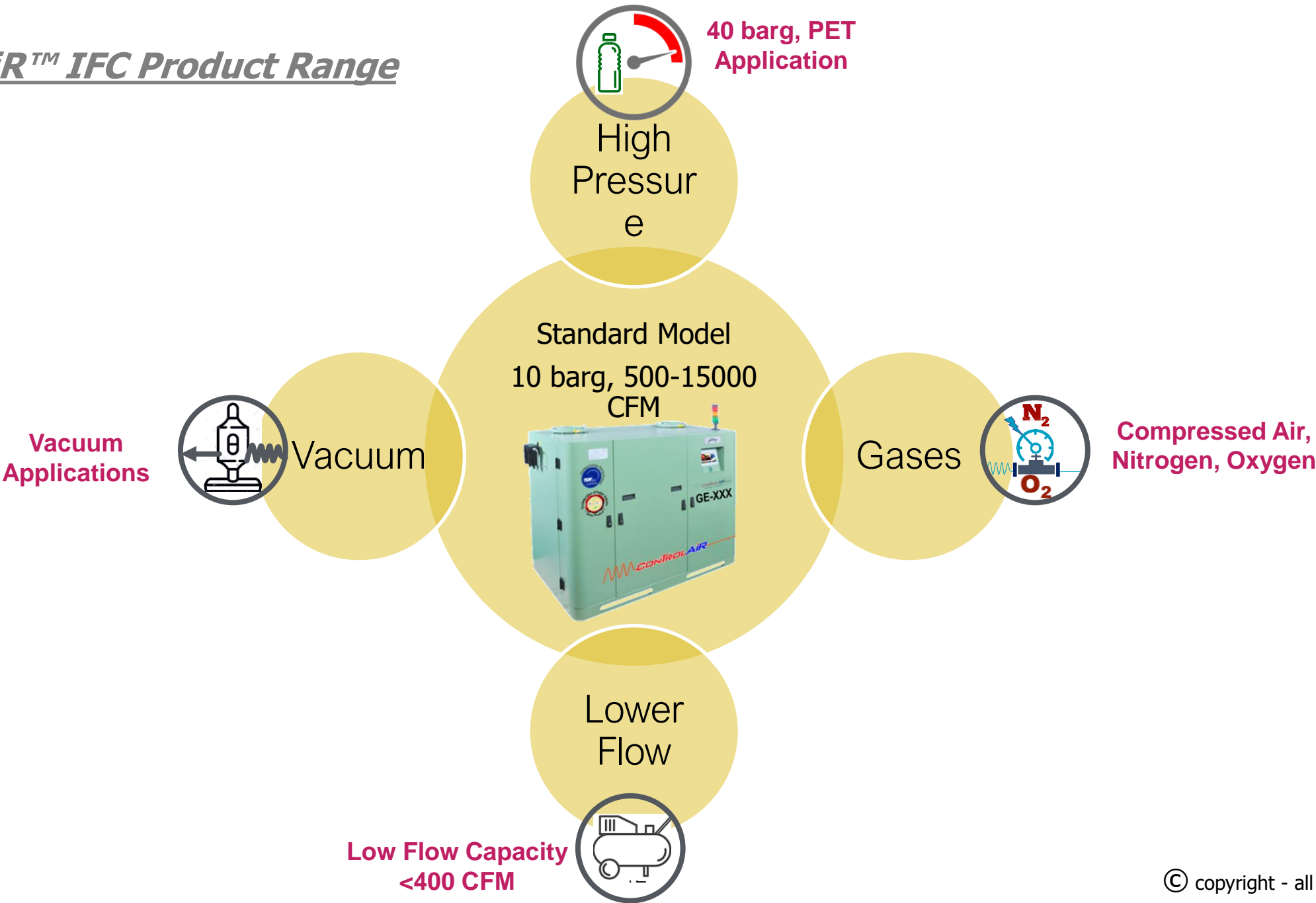
Where to install the IFC & Features of IFC



- Works with All Brands & Types of Air Compressors
- Reduces Artificial Demand & Save Energy, 4 ~ 25 %
- Provides Constant Pressure at the End Use, within +/- 1 psig
- Fail To Open System with Autobypass facility
- **Improves control performance of VSD Compressors**
- 99 Pressure scheduling & remote PC Visualization software can be done
- ROI < 1.5 years



ControlAir™ IFC Product Range





Intelligent Compressor Control: Supply Side Management Solution

Intelligent Control, Automation,
Monitoring, Visualisation & Energy
Savings in Air Compressors

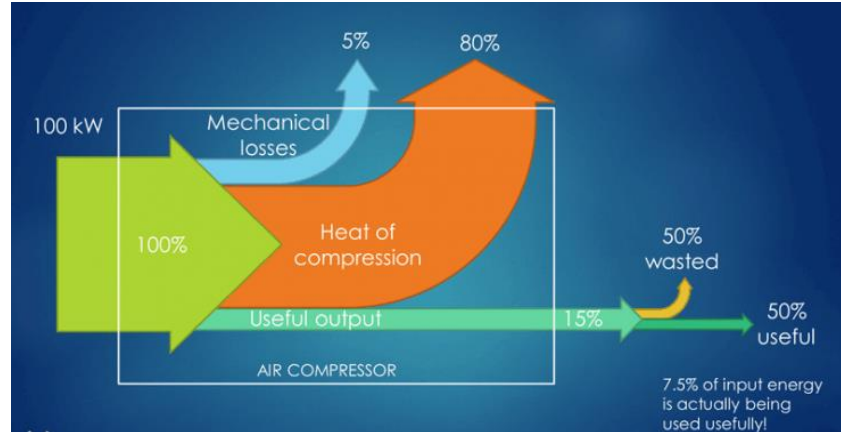


Solution

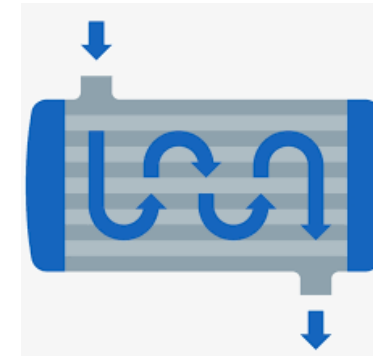


Waste Heat Recovery in Compressed Air System

Compressed Air Generation Inefficiency

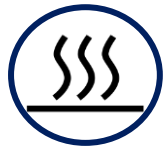


Waste Heat Recovery System for energy saving & improving system efficiency



Heat recovered
↓
Water Temp. Rise
↓
Use Hot Water in Process

Applications



- ~65-75% heat is rejected in Oil



- Heat Available in Oil at 80-100 °C



- @ 65% Heat can be recovered from Oil to Water



Engineering + Chemical
(Boiler Feed Water)



FMCG
(Washing Process)



Automobile
(Washing Surface Treatment)

Waste Heat Recovery can deliver additional 10 - 12% saving © copyright - all rights reserved



Efficiency Improvement with Aluminum piping

Benefits over Conventional MS Piping



- 50% Quicker Installation
- Highly Safe. No Welding at site



- Rust Free



- Minimal Pressure Drop



- Minimal Air Leakages
- Easy rectification at site



- Light Weight. 1/4th of MS Pipe



- Life of Installation >10 years



Efficiently Designed AI Piping Project to deliver ~10% saving



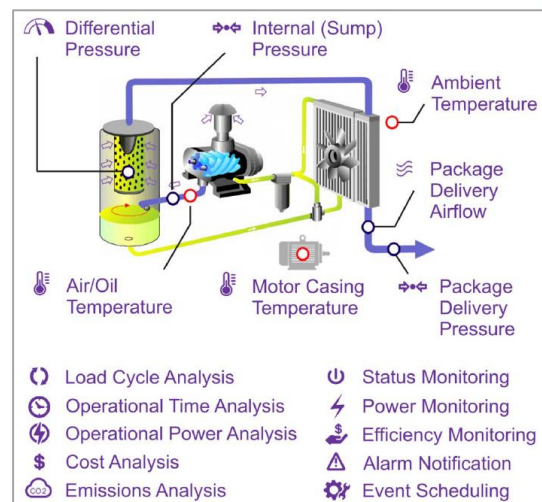
Cloud Based Online Monitoring of CAS

Losses At Every Stage → Saving Opportunity

- System improvement Decision making
- Report Generation & Analysis



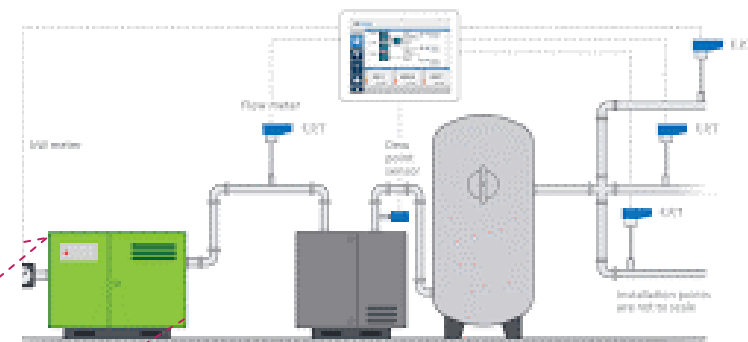
- Real time Continuous monitoring for Compressors
- Health Monitoring for planning risk mitigation



- Measure Losses at every stage
- System Efficiency Measures

Improve

Measure



New Energy Efficiency opportunities through Online Data Monitoring



Industry Sectors Benefitted with ControlAiR IFC



Automobile



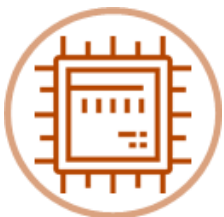
Automobile Ancillary



Engineering



Textile



Electronics



Appliance



Cement



Steel



Healthcare & Pharma



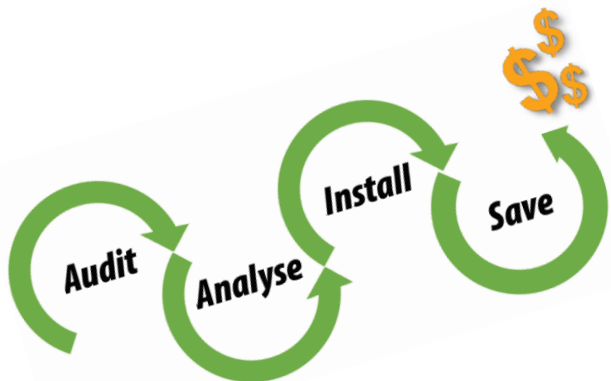
Food & Beverage



Power Plant



Chemical

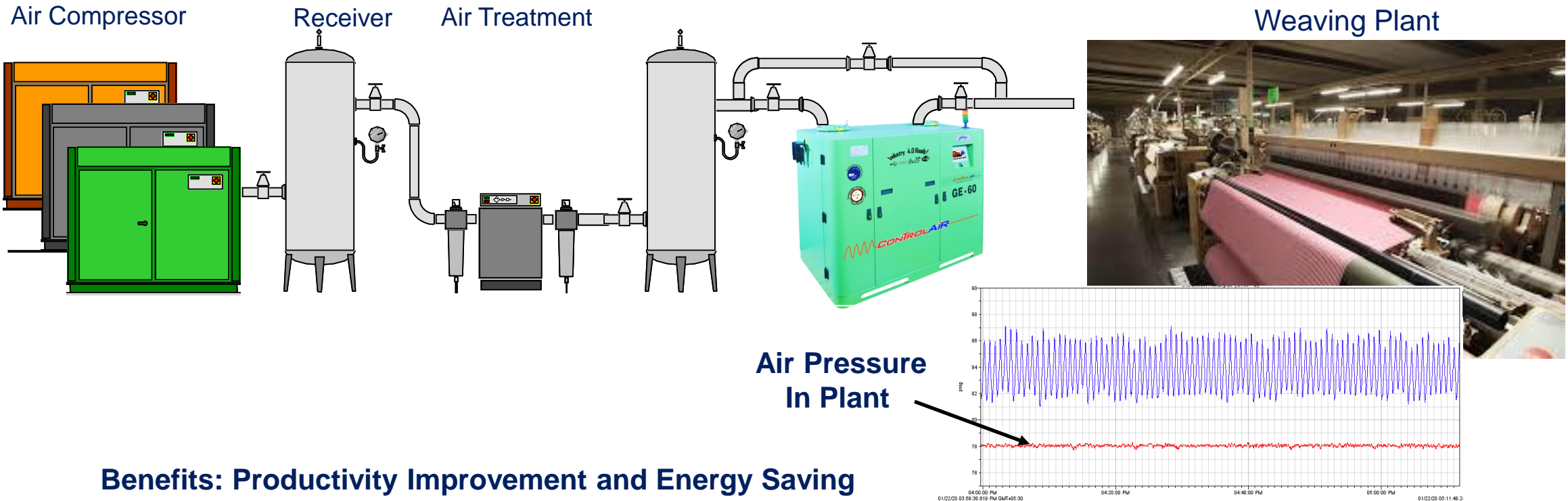




ControlAiR™ IFC Case Studies



ControlAir™ IFC Case Study in 7 barg Network @ Textile Industry



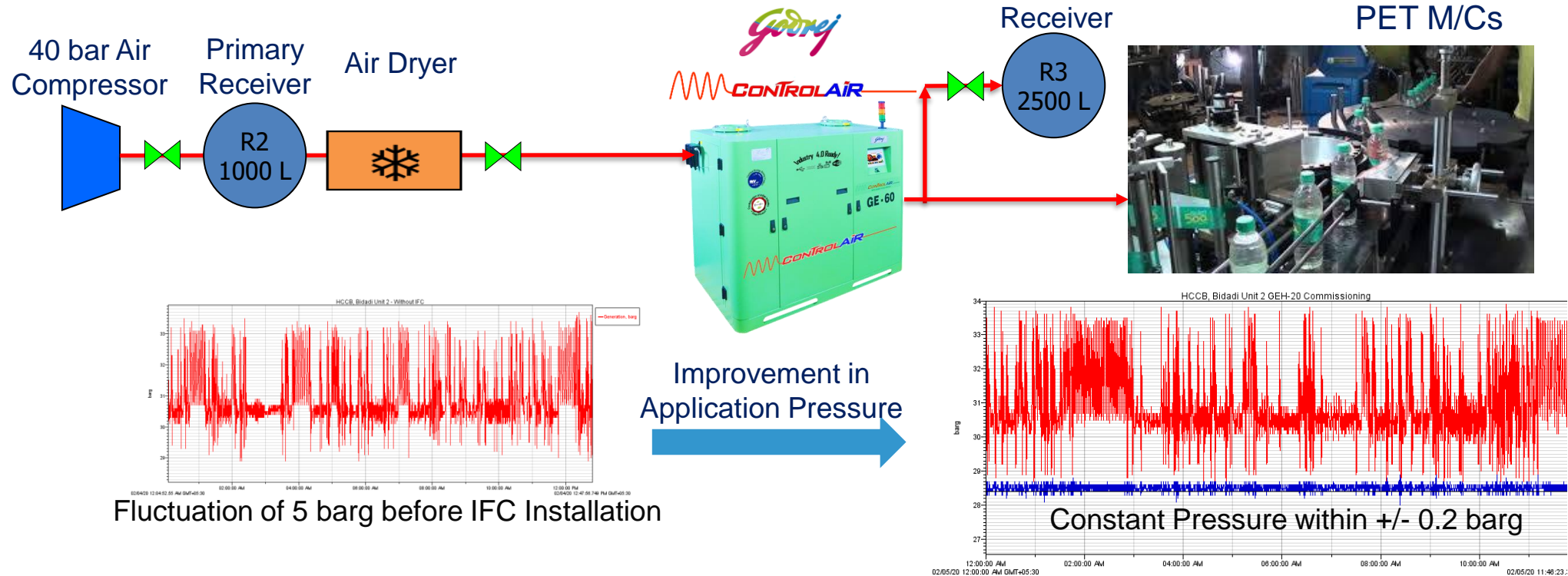
Benefits: Productivity Improvement and Energy Saving

- Reduction in Artificial demand leading to energy saving in air compressors
- Constant plant pressure within +/- 0.5 psig
- Reduced Yarn breakages by 17% leading to higher production due to less downtime

Simple Payback Period with Energy Saving @ 8%: 09 months



ControlAir™ IFC Case Study in 40 bar PET Application @ Beverage Industry



Benefits: Quality Improvement and Energy Saving

- Very Stable air pressure : 5 barg fluctuations reduced to just within 0.2 barg
- Reduction in Artificial Demand → Energy saving ~15% in Compressed Air!
- Simple Payback Period with Energy Saving @ 15%: <6 months

Simple Payback Period with Energy Saving @ 16%: 2 months



ControlAir™ IFC Case Study in Nitrogen Application @ Auto Ancillary Company

Air Compressor

N2 Generator



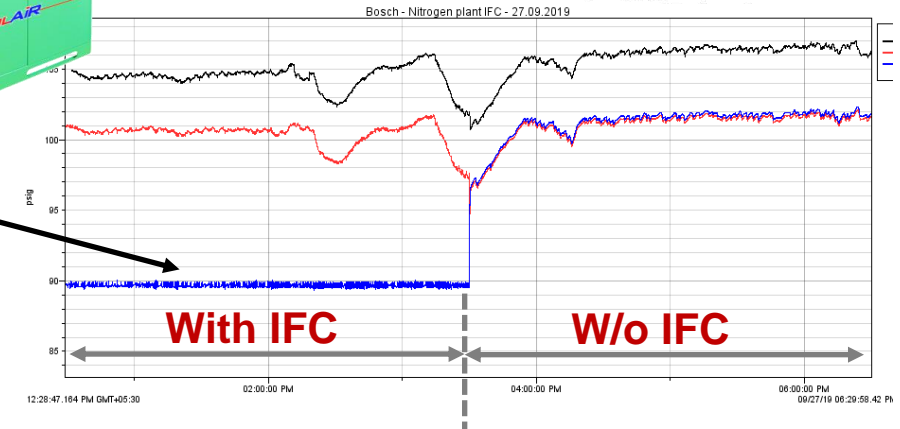
N₂



Wave Soldering M/Cs



N2 Pressure
In Plant



Benefits: Productivity Improvement and Energy Saving

- Very Stable N2 Pressure – **Production interruptions completely eliminated**
- Equivalent reduction in Artificial Demand → 2X Saving in Nitrogen than in Compressed Air!
- N2 Generator Capacity Reduction by 27%

Simple Payback Period with Energy Saving @ 16%: 2 months



Installation in Textile Plant



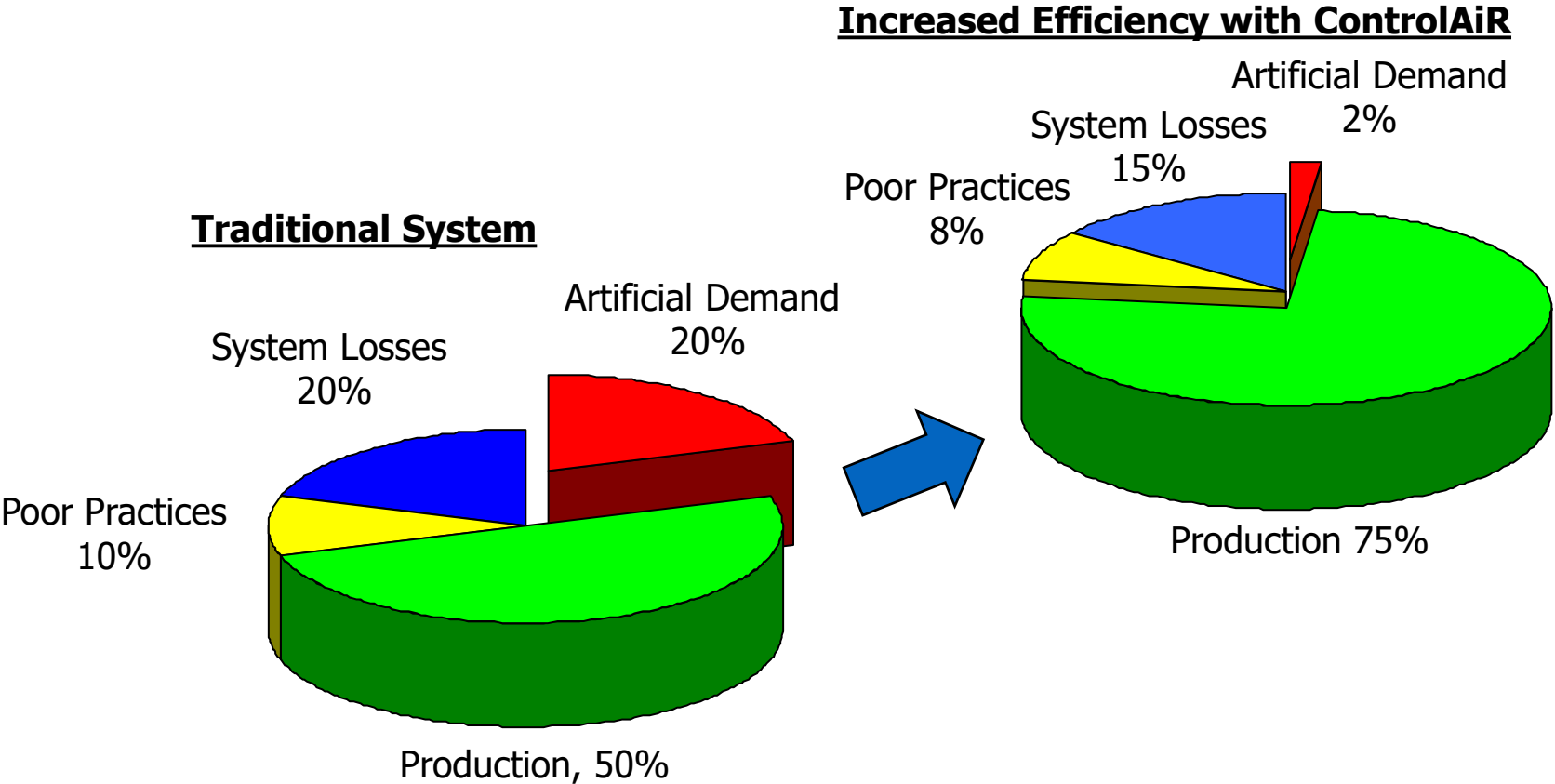
Installation Glimpses

Installation in Electronics Plant, Thailand





Increased Efficiency Using Godrej Control Systems





"Energy Conservation Is The Foundation Of Energy Independence"



*Our Solutions Are Helping The Industry
To Save Energy
Everyday*



ControlAiR IFC's Achievements & Credentials

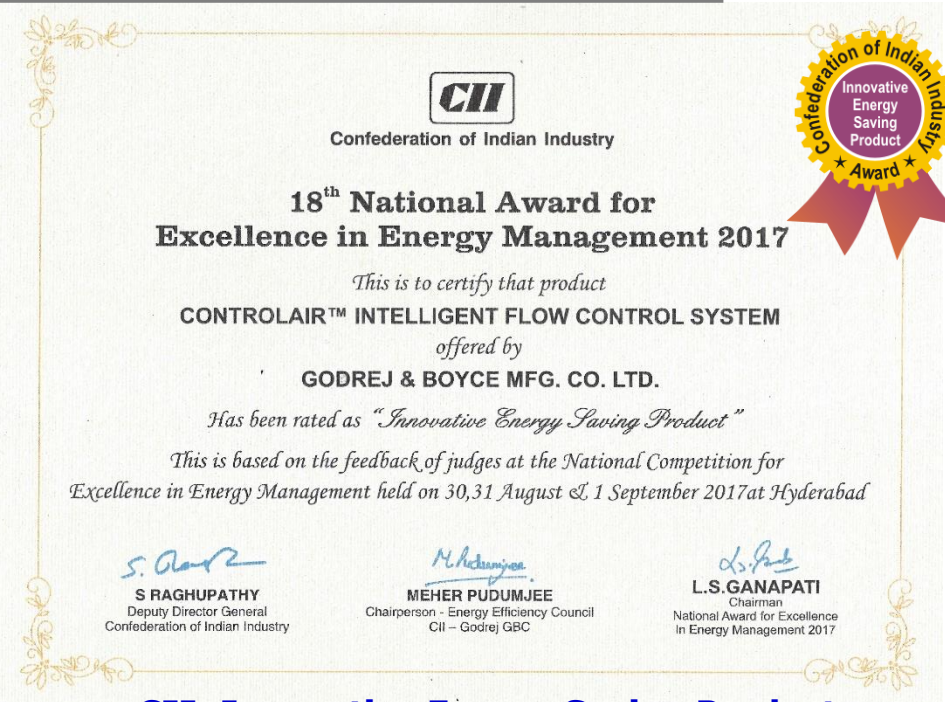
Confederation of Indian Industry (CII): Green Product Certification



MyHIJAU: Green Label

by Government of Malaysia

(Ministry of Energy, Green Technology & Water)



CII: Innovative Energy Saving Product

TÜV NORD Group (India): Verification & Certification





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- PHILIPPINES
- TAIWAN
- THAILAND





"Create Wealth from Thin Air!"

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