

# **World Class Energy Efficiency in Indian Pulp & Paper sector**

**BEE – 3L Program  
SPB, Erode  
18<sup>th</sup> February, 2010**

***“Making Indian Pulp & Paper  
Industry World Class”***

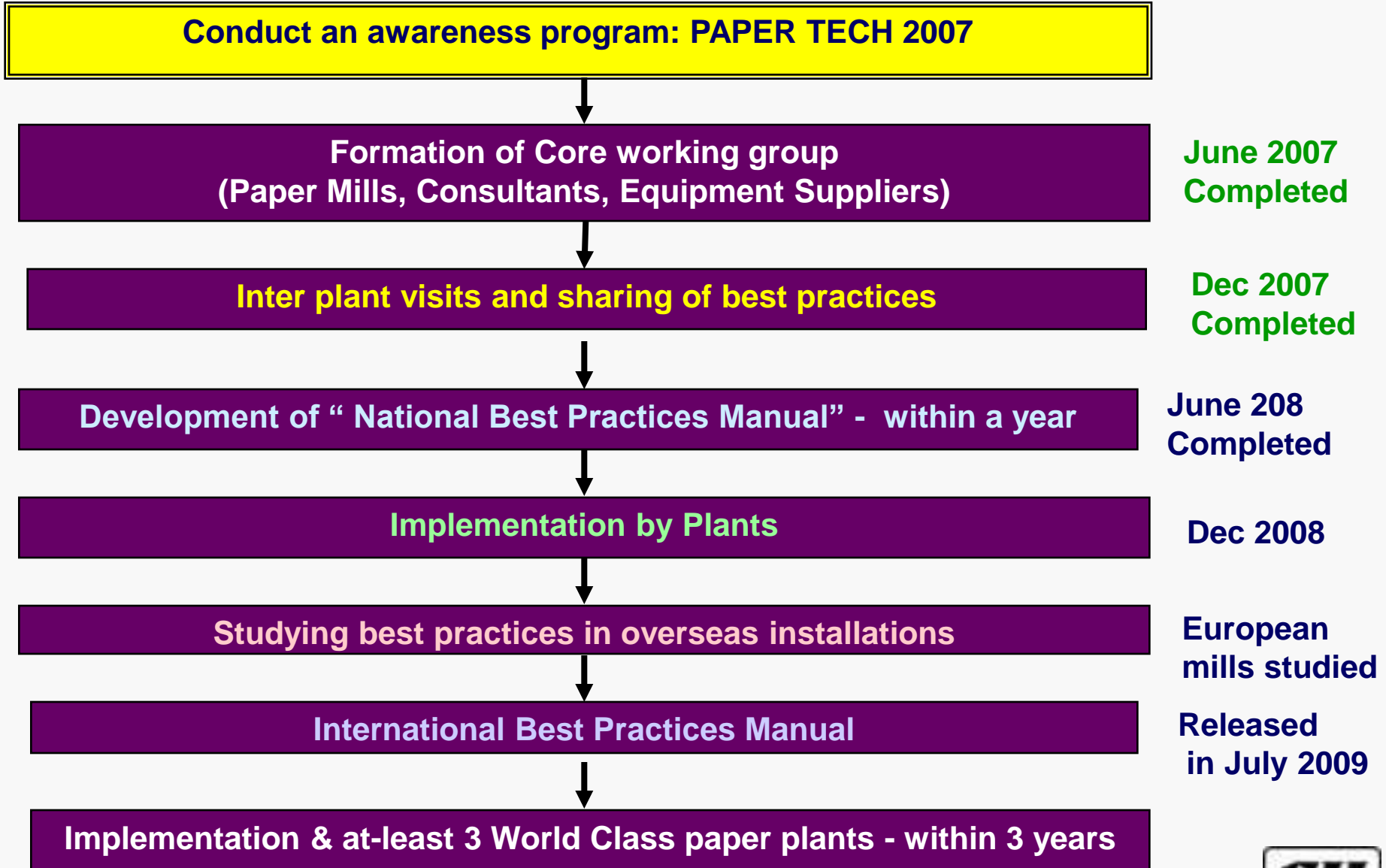
***Focus on Energy, Water &  
Environmental Management***

# Started with 'Papertech 2007'

- **CEO meet**
- **Steering Committee**
  - **Mr Pradeep Dhobale,**  
**Chairman, Energy efficiency**  
**Council, CII Godrej GBC**
  - **Mr K S Kasi Viswanathan,**  
**Chairman, World Class**  
**Energy Efficiency in Pulp &**  
**Paper Sector**



# OVER-ALL ROAD MAP



# National Best Practices

## List of Mills visited (Alphabetical)

1. **APPM, Rajahmundry**
2. **BILT, Bhigwan Unit**
3. **Delta Paper Mills Ltd., Vendra**
4. **Hindustan Newsprint Ltd., Kottayam**
5. **ITC – PSPD, Bhadrachalam**
6. **JKPM, Rayagada**
7. **Naini Tissues Limited, Kashipur**
8. **Rama Newsprints and Paper Ltd.**
9. **Shreyans Industries Ltd.**
10. **TNPL, Kagithapuram**

# International Mission

## ❖ Visited European mills

- ❑ UPM Kymenne Wisaforest (Recovery Island)
- ❑ Stora Enso, Imatra (Pulp Mill)
- ❑ Sunila (Wood yard)
- ❑ M-Real, Kyro (Effluent Treatment)
- ❑ Stora Enso, Stracel (Paper Machine)

## ❖ Compiled the International Best Practices in the form of manual

- ❑ Manual also contains case studies of recently implemented National best practices

# PaperTech Conference



- ❖ **Three Conferences – 2007, 8 & 9**
- ❖ **Two manuals released**
- ❖ **Papertech 2010 – June 16 & 17, Hyderabad**

***Characteristics of  
World Class Energy Efficient Plants***

# World Class Energy Efficiency

## ❖ Concept developed by CII-Godrej GBC

- **Based on study of excellent units**
  - ❑ **India & abroad**
- **Chosen best practice from each organisation**
- **Compilation**



# Good Vs. Best (World class) units

- ❖ **Both appear same**
- ❖ **Awareness level –high**
- ❖ **Significant energy saving achieved**



**“World class energy efficient” units are unique & different**

# Characteristic # 1

## Bench marking & Trend setting

### Good Vs. World class



❖ Follow bench marks

❖ Set Trends & Others follow

# Characteristic # 2

## Implementation of Latest technologies

### Good Vs. World class



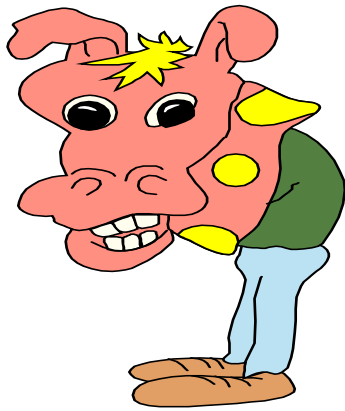
- ❖ **Want proven Technologies**
- ❖ **Need Case studies before implementation**

- ❖ **Pioneers in implementation**
- ❖ **Capacity to take risk at organization level**
- ❖ **Technology developer's first preference**

# Characteristic # 3

## Approach to Encon

### Good Vs. World class



❖ **Seen in isolation**

❖ **Holistic**

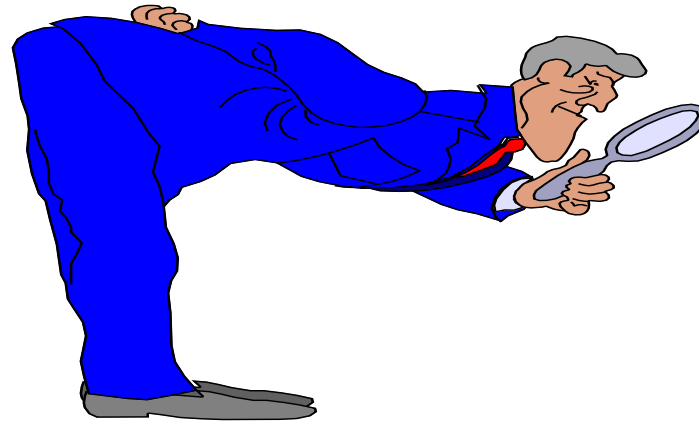
# Characteristic # 4

## Energy wastages

### Good Vs. World class



❖ **Visible**



❖ **Not apparent**

❖ **Difficult to identify**

# Characteristic # 5

## Monitoring & Energy Scorecard

### Good Vs. World class



❖ **Monitoring**

❖ **Excellent data generation**

❖ **Energy score card**

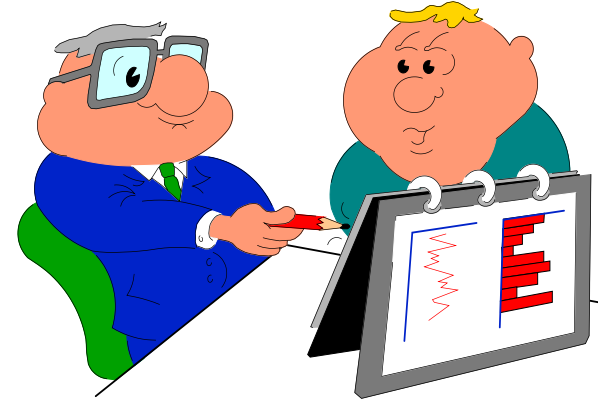
# Example

- ❖ **Control room operators performance**
- ❖ **Survey results**
  - **Operators in different shifts**
  - **Difference in SEC of 3%**
- ❖ **Accolades based on performance**
- ❖ **Training**

# Characteristic # 6

## Encon culture

### Good Vs. World class



#### Energy Manager

- Chases people for Encon proposals
- Tries to do all by himself

#### Energy manager

- Facilitator
- Operation team approach with proposals

# Characteristic # 7

## Encon activity

### Good Vs. World class



❖ **Driven by external factors**

❖ **Energy cost increase**

❖ **Mandatory audit**

❖ **On going activity**

❖ **Top management committed to Encon**

❖ **Resource allocation**

# Characteristics of World Class Energy Efficient units

- ❖ **Trend setter in Norms – Lowest in world**
- ❖ **Leader in implementing Latest Technologies**
- ❖ **Energy Wastage – Nil**
- ❖ **Energy Scorecard**
- ❖ **ENCON “On-going activity” – Management system**



# Case Studies



# Other newer opportunities

## ❖ Use of new tools

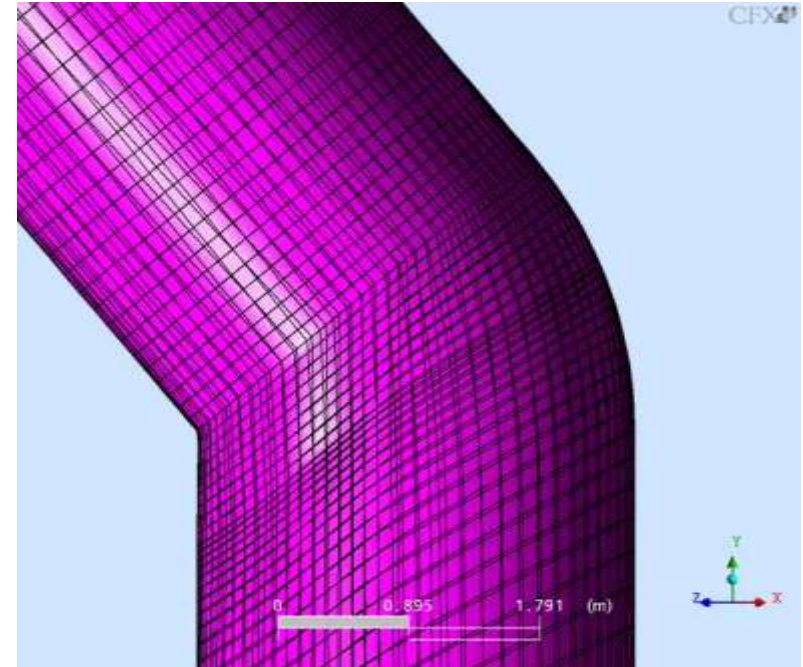
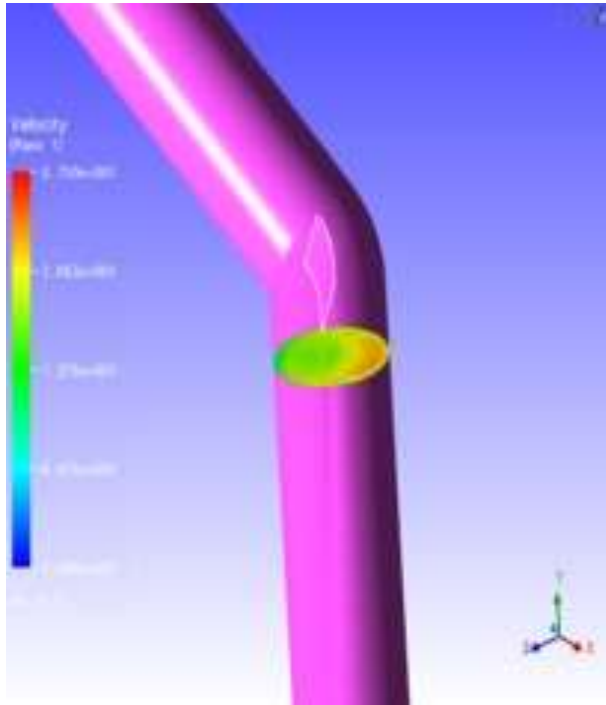
- CFD

- Use of thermography

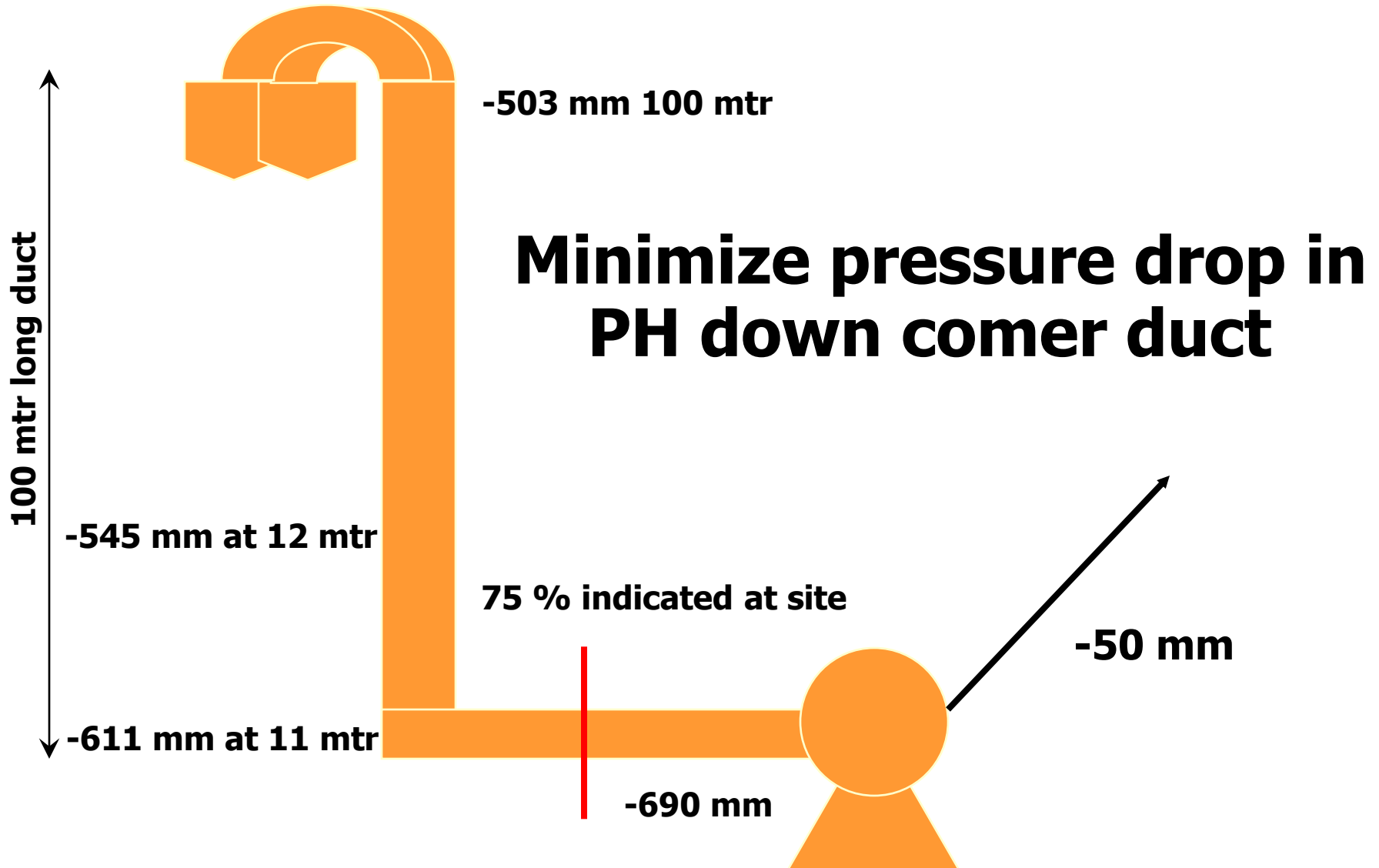
# What is CFD?

- ❖ **Stands for “Computational Fluid Dynamics”**
- ❖ **Basically it is a tool for digitalizing a system**
  - **Creating the equivalence in a computer**
    - ❑ **Involves lot of computational power**
    - ❑ **Requires special software and higher level computing**
  - **Results of Modifications can be simulated**
  - **Best for trial and error type of problems**

# CFD Application



# CFD in cement industry



# Minimize pressure drop in PH down comer duct

- ❖ **Preheater down comer duct pressure drop**
  - **Major area of concern in all cement plants**
- ❖ **PH down comer drop : 110 mmwg (Duct drop of 100 m alone)**
- ❖ **Gas velocity  $\sim$  19 m/s (as per limits)**
- ❖ **Theoretical pressure drop  $\sim$  25 mmwg**

# Minimize pressure drop in PH down comer duct

- ❖ **Good potential to minimize the pressure drop**
  - **Atleast 30 mm can be lowered**
- ❖ **One of the major fans in the plant**
  - **4.5 % of total power of the fan**
- ❖ **Substantial savings**
  - **~ 68 units per hour**
- ❖ **CFD Analysis**

# Computational Fluid Dynamics (CFD)

- ❖ **Extensively used in various sectors**
  - **Power Plants, Petrochemicals, Refinery, etc.**
- ❖ **In all industries – cement, paper industry**
  - **Used by OEMs during design**
- ❖ **Excellent application for improvement opportunities**

# Minimize pressure drop in Preheater down comer duct (in cement plant)

<b>Annual Saving</b>	-	<b>Rs 20.50 Lakhs</b>
<b>Investment</b>	-	<b>Rs 10.00 Lakhs</b>
<b>Payback period</b>	-	<b>6 Months</b>

# Opportunities of CFD in Paper industry

- ❖ **Pressure drop reduction in air/gas lines**
  - **Boiler FD/PA/SA fans**
  - **Flue gas path**
  - **PM pocket ventilation systems**
    - ❑ **Air flow profiling**
    - ❑ **Dryer capacity de-bottlenecking**
- ❖ **Stock/water flow pumps pressure drop**
- ❖ **Location and placement of agitators**
- ❖ **Steam & Condensate system in paper machine dryers**

# Approach for CFD in a pulp & Paper plant

❖ **First identify areas where there is a potential**

➤ **Examples**

- ❑ **High pressure drop in air ducts**
- ❑ **High pressure drops in pipelines**
- ❑ **High power consumption in agitators**
- ❑ **Airflow distribution problems in PV system**

❖ **Work with CFD service providers to identify options**

# Thermography

- ❖ **What is thermography?**
  - **Basically: Temperature display of a surface with colours**
- ❖ **Emerging as a major tool in different sectors**
  - **Thermal hot spots**
  - **Building Airconditioning leaks**
  - **Cracks in buildings**
  - **Even tracking terrorists in forests**

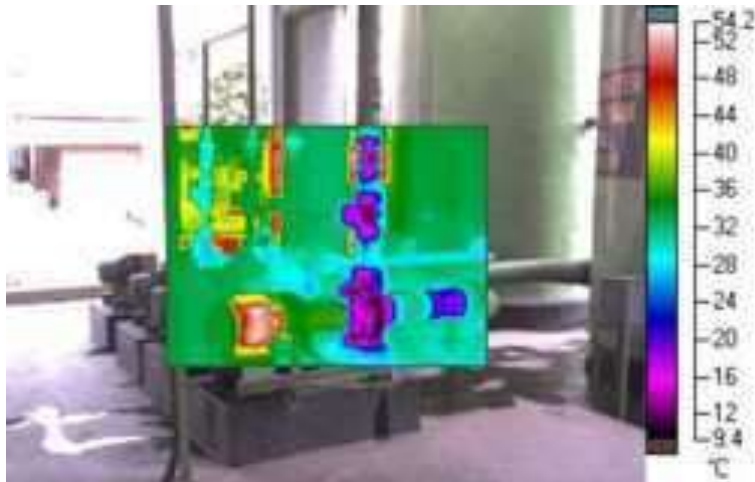
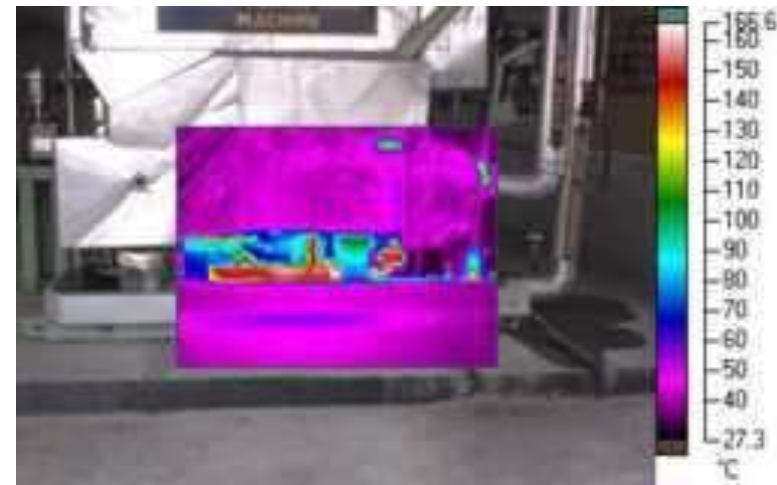
# Applications of Thermography

- ❖ **Insulation effectiveness**
  - **Steam lines**
  - **Boiler furnace walls**
  - **Lime kiln**
  - **Hot storage vessels**
- ❖ **Electrical joints – voltage drops**
- ❖ **PRDS / ARC passing !!**

# Improve insulation in identified areas

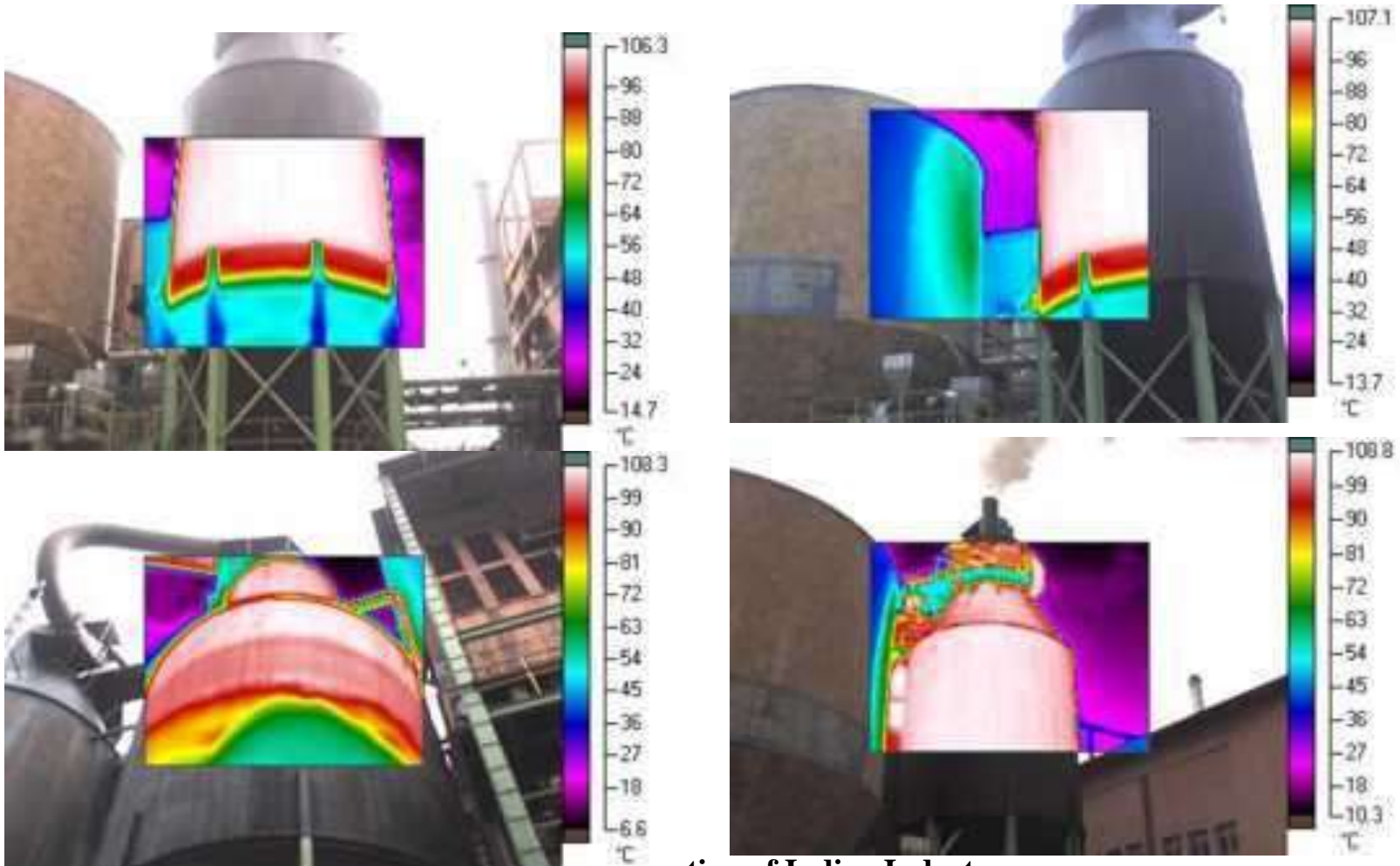
## ❖ Pulp mill CLO<sub>2</sub> plant

- VAM heat exch.
- chilled water pumps
- tanks



# Improve insulation in identified areas

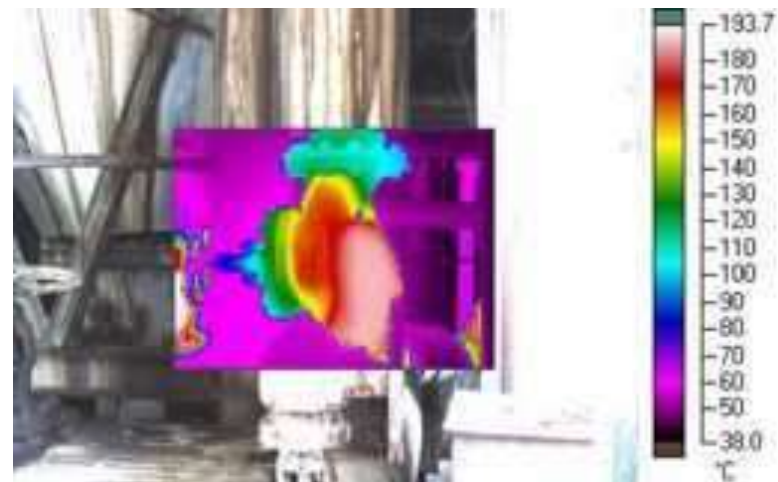
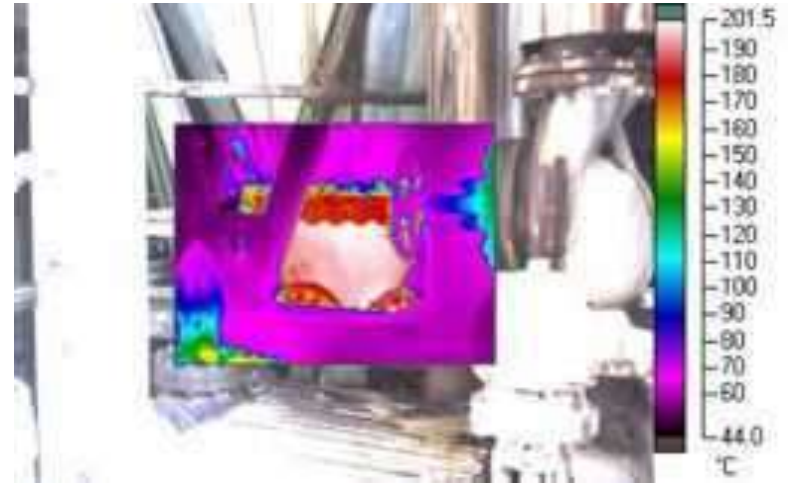
## ❖ Pulp mill blowtank



# Improve insulation in identified areas

## ❖ Pulp mill digester house

- Digester bottom
- Heat exch. side
- Valves and pipes



# Applications of Thermography

- ❖ **Example one: Auto Recirculation valve passing**



# **In conclusion**

- ❖ **CII under the leadership of a Steering Committee is working towards facilitating World Class energy efficiency in Pulp & Paper sector**
- ❖ **Request all Mills to participate in this initiative**
- ❖ **CII will be glad to assist Mills in becoming World Class Energy Efficient Mills**



***Thank You***

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