Performance optimization through predictive modeling

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DESL

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Content

01

About DESL

Introduction
DESL Service Offerings
Our Experience in Sugar Mills
Global references

02

EnEffCo

Introduction
Implementation
Concept

03

Case studies

Cogen performance optimization

Energy saving in large motor loads

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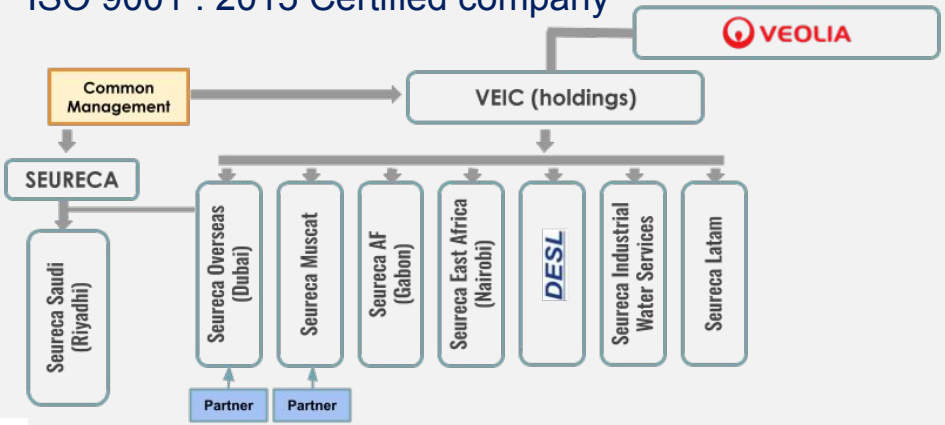
VEOLIA

Organisation

- Subsidiary of Paris based Veolia Environnement Ingénierie Conseil (VEIC)
- Headquartered in in the National Capital Region of India with presence in multiple locations across the country
- Accredited by Bureau of Energy Efficiency as Grade 2 Energy Service Company (ESCO).
- ISO 9001 : 2015 Certified company



25+ years

of expertise

3 Domains

Energy Management
Renewable Energy
Solid Waste Management

Presence in India

Delhi - NCR, Ahmedabad, Chennai, Kolkata, Hyderabad

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Services Portfolio
Energy, Water and Resource Management

Resource (Energy, Water and Material) conservation; Decarbonisation

Macro Studies

- Energy baseline and benchmarking
- Macro assessment of savings (retrofit)
- Design stage interventions
- Lean management
- Carbon footprint assessment
- Blue sky technology assessment

Detailed Studies

- Energy diagnostics (audit)
- Investment grade energy assessment
- Resource efficiency assessment
- Cleaner production assessment

Implementation

- 3rd Party Commissioning
- Procurement guidance
- Implementation action plan
- Performance Measurement and Verification

Strategic Assistance

- Modeling of decarbonization pathways and development of decarbonization roadmaps
- Hydraulic network modeling
- Customizing EnMS - Utility and Process Optimization

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Technology Covered

Fuels & Energy Inputs

- Fuel switching
- Fuel receipt, storage & handling
- Alternative fuels - Biomass, Hydrogen, Methanol
- Residue valorization- Biogas, Bio char

Electrical Utilities

- Transformers
- Electrical distribution system
- Motors
- VSD/VFD
- Illumination

Thermal Utilities

- Boilers
- Gas turbine
- Steam turbine
- Co-generation/ Tri-generation
- Furnaces
- Evaporators

Mechanical Utilities

- Pumps
- Condensers
- Heat Exchangers
- Cooling tower
- Chillers
- Fans & blowers
- Air/Gas compressors

Process Integration

- DCS/SCADA
- Energy accounting
- Building energy management
- Energy monitoring system
- AI based process control and automation

Energy efficient technology (replacement / retrofit)

Low carbon technology & decarbonization

Technology upgradation

Process improvement

Advance monitoring & control system

Operational upgradation

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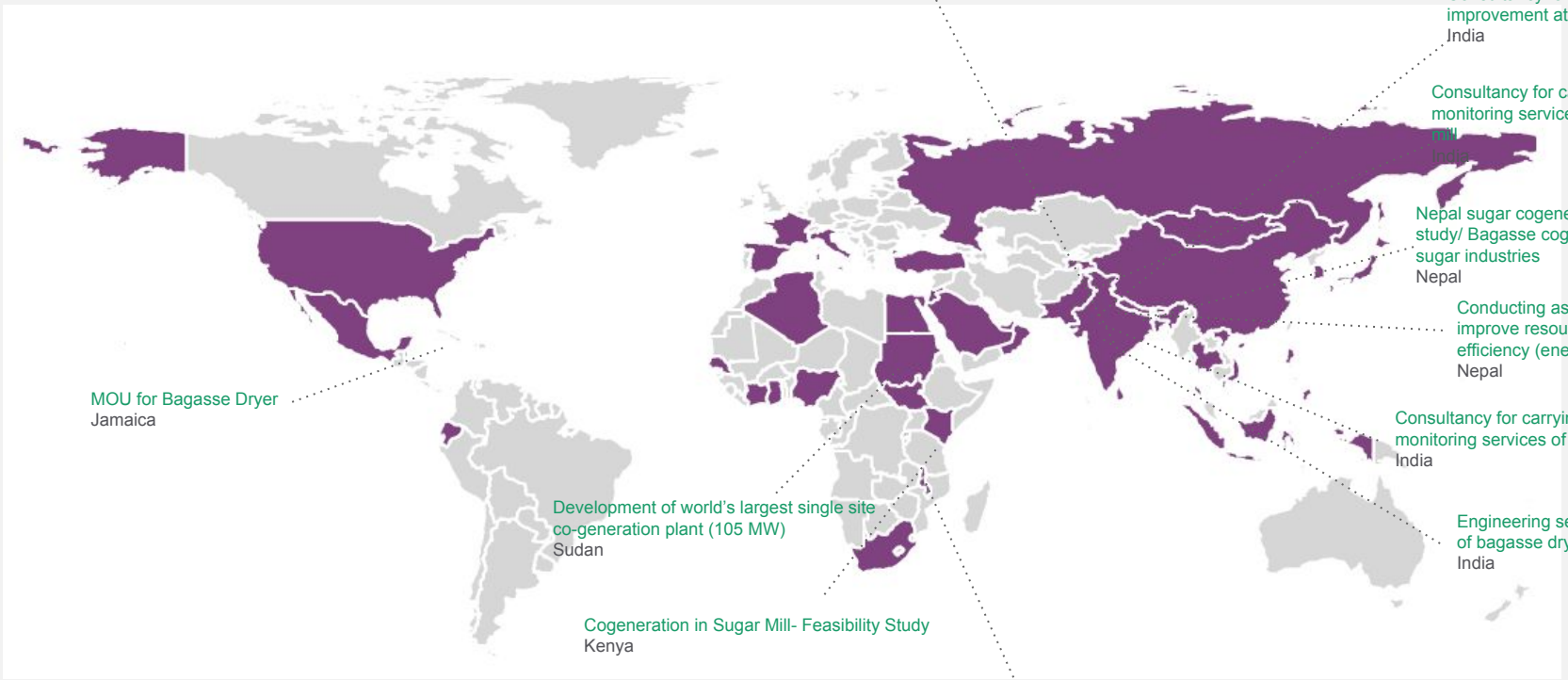
Global references



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02 EnEffCo

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EnEffCo
Introduction

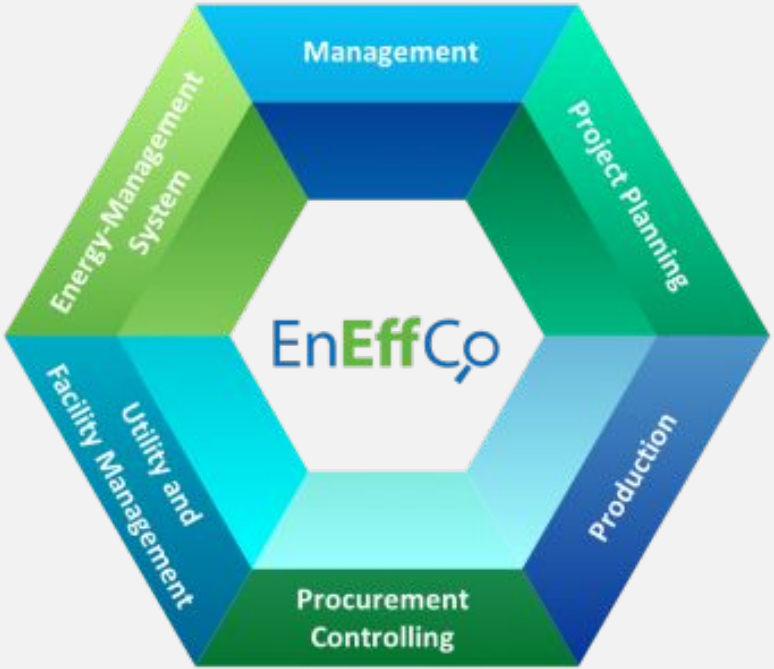
- The EnEffCo is an innovative software solution (DIN EN ISO 50001:2018 complaint) developed by industry practitioners for industry practitioners.
- It enables the comprehensive management of energy efficiency, allowing companies to systematically track, monitor, and evaluate energy system data and processes.

The Advantages of Using EnEffCo®

- Increase transparency
- Improve and maintain efficiency
- Reduce expenditures
- Achieve climate targets
- Ensure regulatory compliance
- Expandable flexibility

EnEffCo
Introduction

EnEffCo has been on the market since 2013 and is an established solution at more than 1,000 sites



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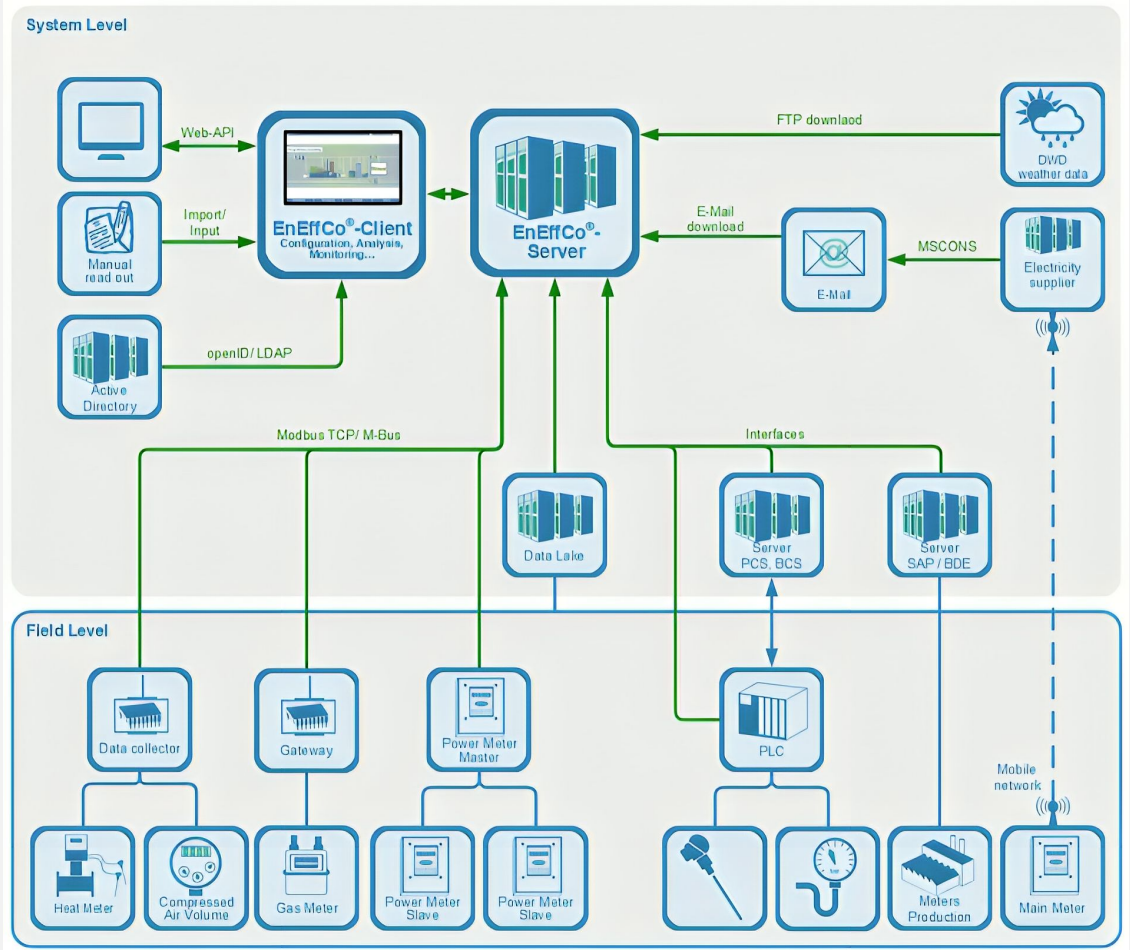
EnEffCo
Implementation



CONCEPT CASE FOR A SUGAR MILL

Operation, Restrictions, Flexibilities

Client Objectives:

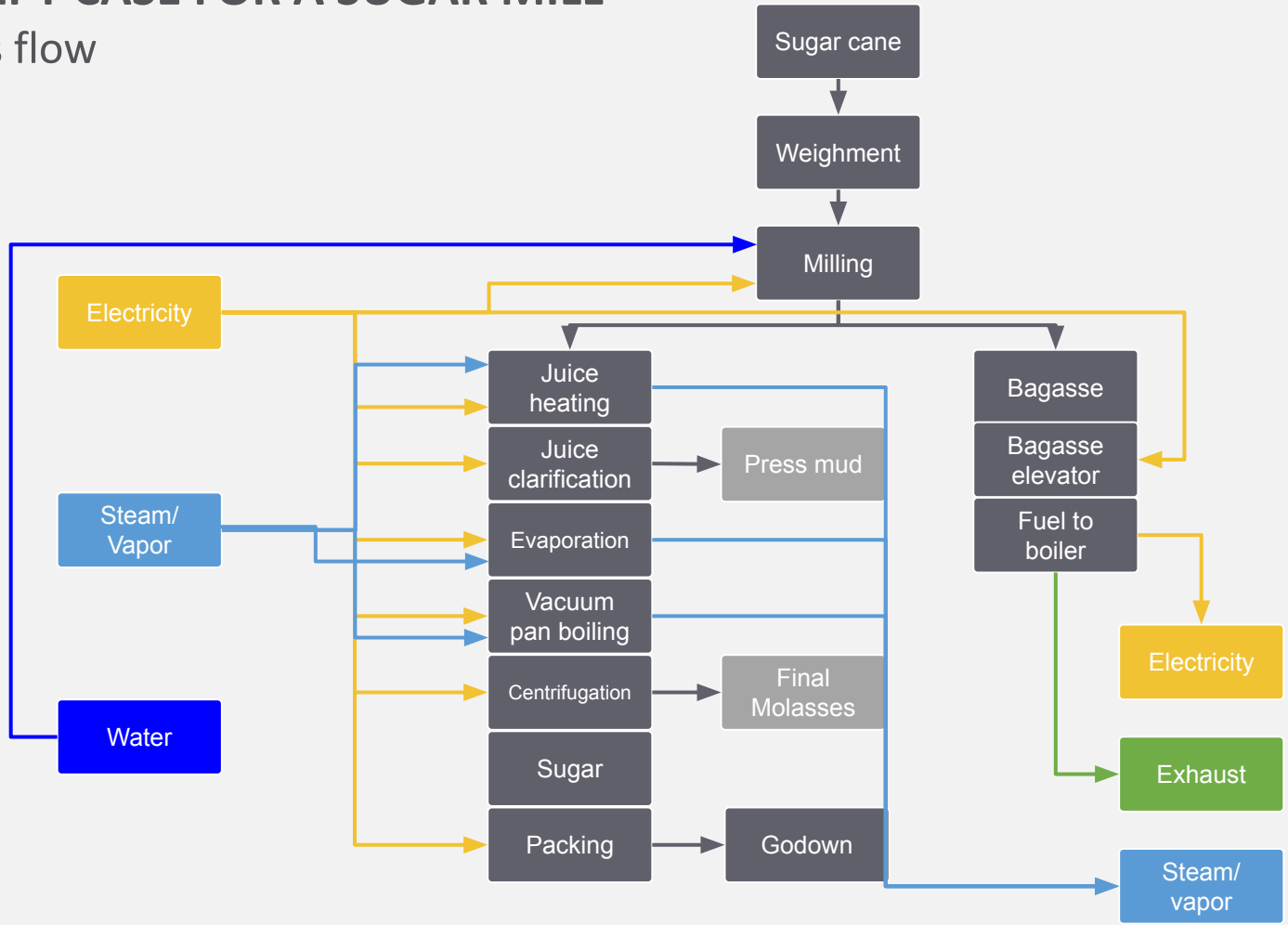
- No shut down of the production during the sugar cane season
- Minimising electricity generation, ideally just cover the sugar mill and distillery demand
- Maximising bagasse sale

EnEffCo Solution:

- Study of process data and create:
    a. Steam demand forecast
    b. Boiler monitoring to improve efficiency
    c. Decision support for the operation of the cogen in order to maximise the bagasse surplus for direct sale
    d. Monitoring of other systems and triggering alarms in case of deviation to the best operation mode

CONCEPT CASE FOR A SUGAR MILL

Process flow



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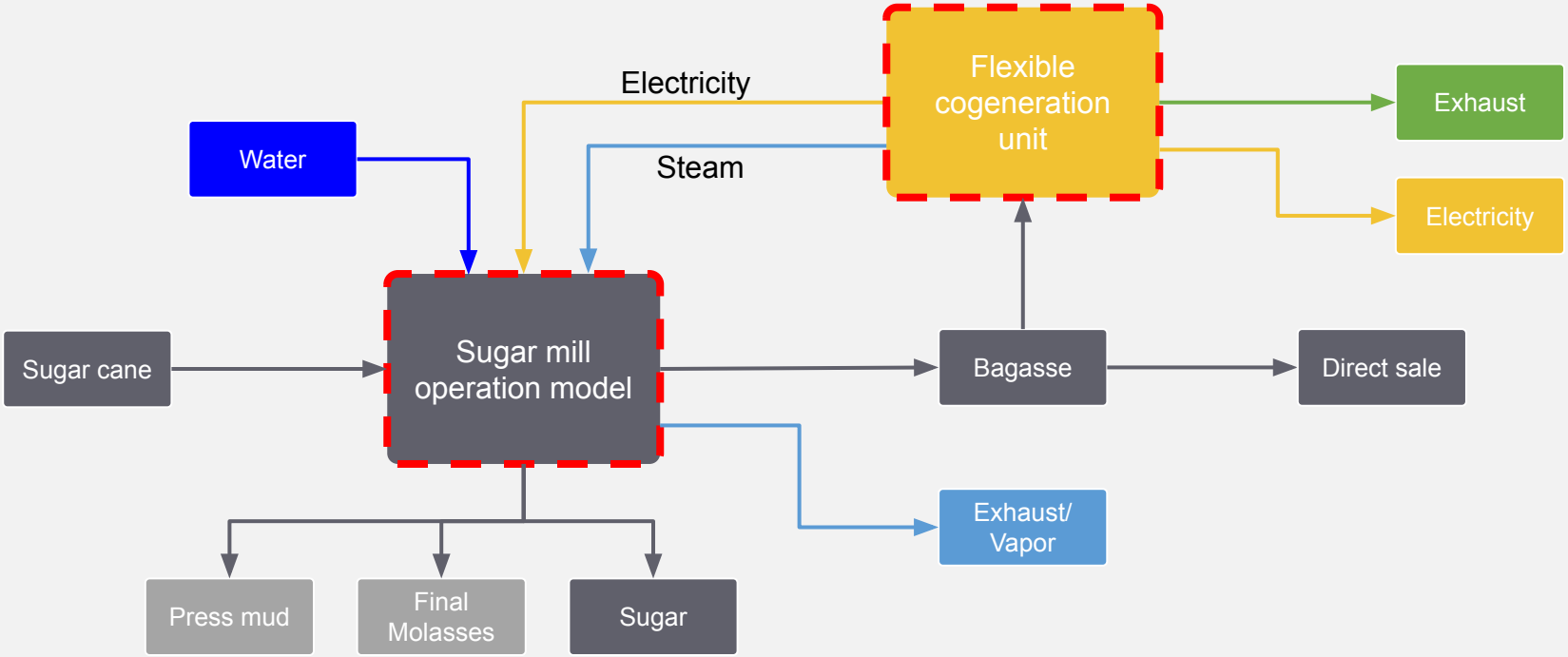
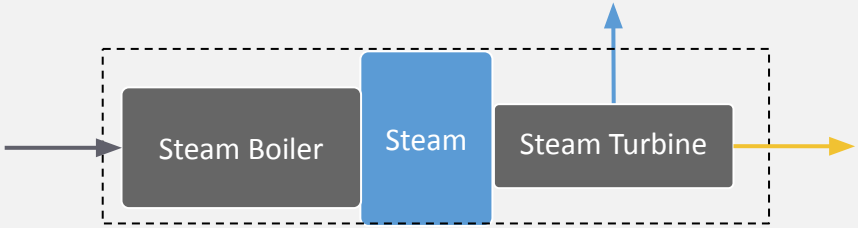
CONCEPT CASE FOR A SUGAR MILL

Modelisation of the sugar mill



EXAMPLE: MODEL UNIT COGENERATION

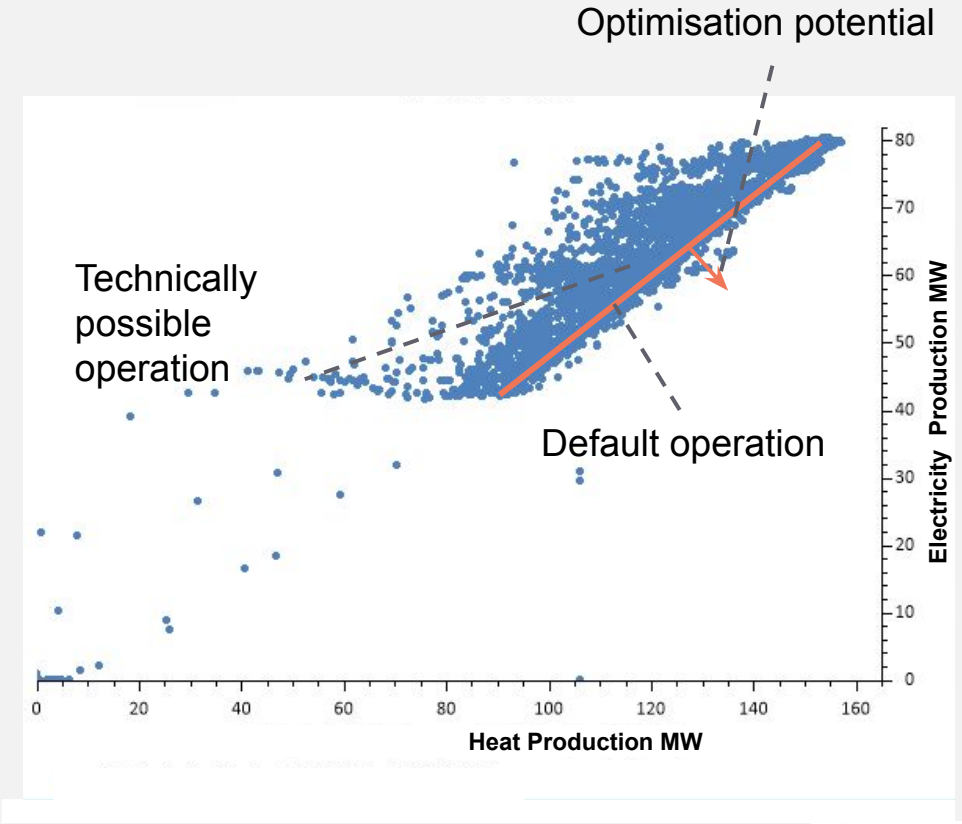
Operational Setups for Heat and Electricity Production



⇒ Operation of the system determined mainly by heat demand/production

⇒ Unit has flexibility regarding the mix of electricity and heat generation, mathematical description of flexibility conducted

⇒ Based on the steam demand forecast and the system constraint, the best operation scenario is proposed.



EXAMPLE: MODEL UNIT COGENERATION

Operation, Restrictions, Flexibilities

Availability

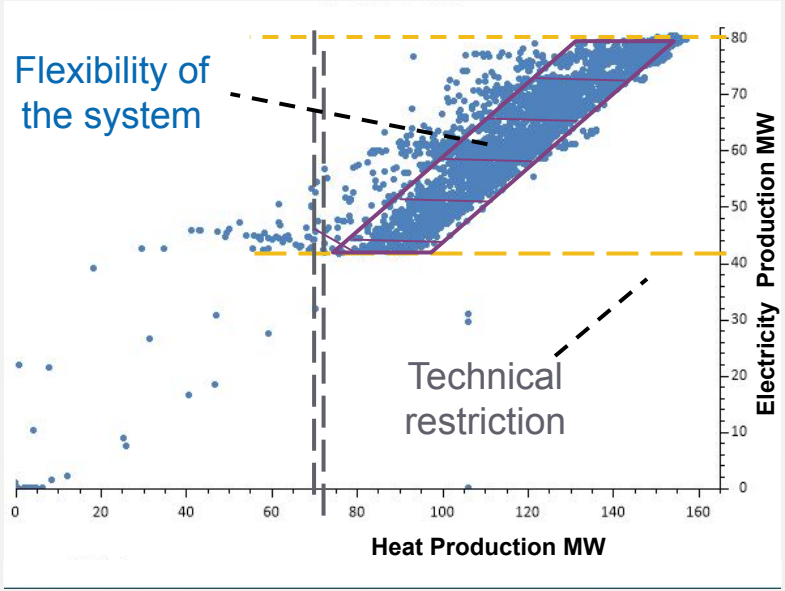
- 100% availability between November and May
- Maintenance possible between June and October

Flexibility in Operation:

- Thermal power = MIN - MAX MW_{th}
- Electric power = MIN - MAX MW_{el}

Estimated savings (Bagasse):

- **Flexibility: 5,500 - 10,000 tons/year**
- **Boiler monitoring: 6,200 - 12,500 tons/year**



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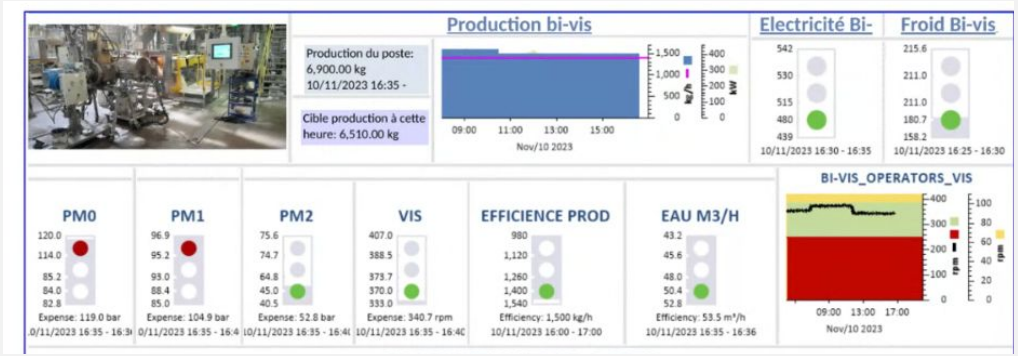
ENERGY SAVINGS BY PREDICTIVE MODELING OF LARGE MOTOR LOADS

Case study

- Using predictive modeling, EnEffCo was able to reduce the power consumption of large motor loads (>500 kW) by 7% against the baseline.
- This was achievable by optimising the influencing parameters (pressure, temperature) of the power consumption based on the feedback received from the model.



CONCLUSION

- Predictive modeling offers a transformative approach to optimizing performance in sugar mills, leveraging data-driven insights for informed decision-making.
- As technology evolves, the transition from predictive learning to deep learning and artificial intelligence presents exciting prospects for further enhancing predictive capabilities and driving even greater efficiencies in sugar mill operations.
- Embracing a culture of innovation and collaboration, sugar mills can unlock new opportunities for growth and competitiveness in the dynamic landscape of the sugar industry.

Our Core Values

Customer Focus | Integrity | Innovation | People Development

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