SFUM2015

Trusting Data for Action

Leadership in Energy Management at IPLOM S.p.A. (Genoa, Italy)

Customer Case Study

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Abstract

Sigmafine supports Iplom S.p.A. within the ISO 50001:2001 Energy Management System to improve energy efficiency by performing real-time energy and mass balance of the topping furnace, enabling to optimize operations and save energy.

Sigmafine provides trustable data to perform calculations, a model automatically adapting to the frequently changing crude feedstock and a thermodynamic package that supports energy calculations.

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Sigmafine and Energy Management: the IPLOM case study

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- IPLOM, a small refinery in Northern Italy, has been part of the European Union project EFENIS (a consortium of universities and industrial partners) from 2012 to 2015 with the scope of improving energy efficiency in manufacturing industries
- IPLOM has also obtained the ISO 50001:2011 certification for Energy Management in 2015
- Sigmafine has supported these activities providing:
  - Trustable data for the analyses
  - Energy duty and efficiency for the topping furnace on hourly basis
  - Key process unmeasured parameters to optimize real-time operations in the control room

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Sigmafine model based process monitoring

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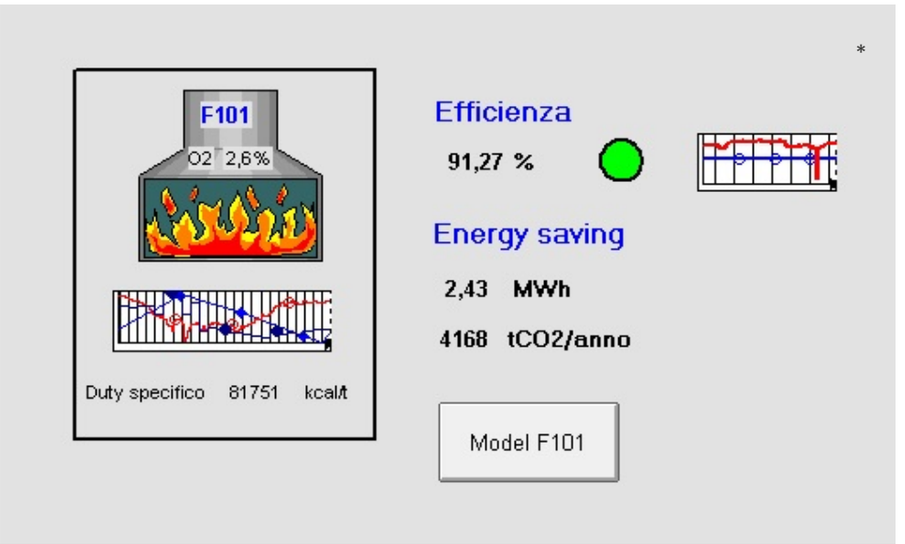
- Hourly integrated mass and energy balance of the topping furnace
- Model automatically adapts on the changing characteristics of the crude feedstock (crude changes every one / two days)
- Energy efficiency calculation and operational parameters like furnace duty and crude vaporized fraction

Efficiency = $\frac{Duty\ used\ by\ process}{Energy\ consumption}$

Savings= $Baseline - Energy\ consumption$



Portion of IPLOM control room panel:
Near real time data shown in the display are coming from **Sigmafine hourly energy balance**

* Courtesy of IPLOM S.p.A

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Sigmafine model based process monitoring

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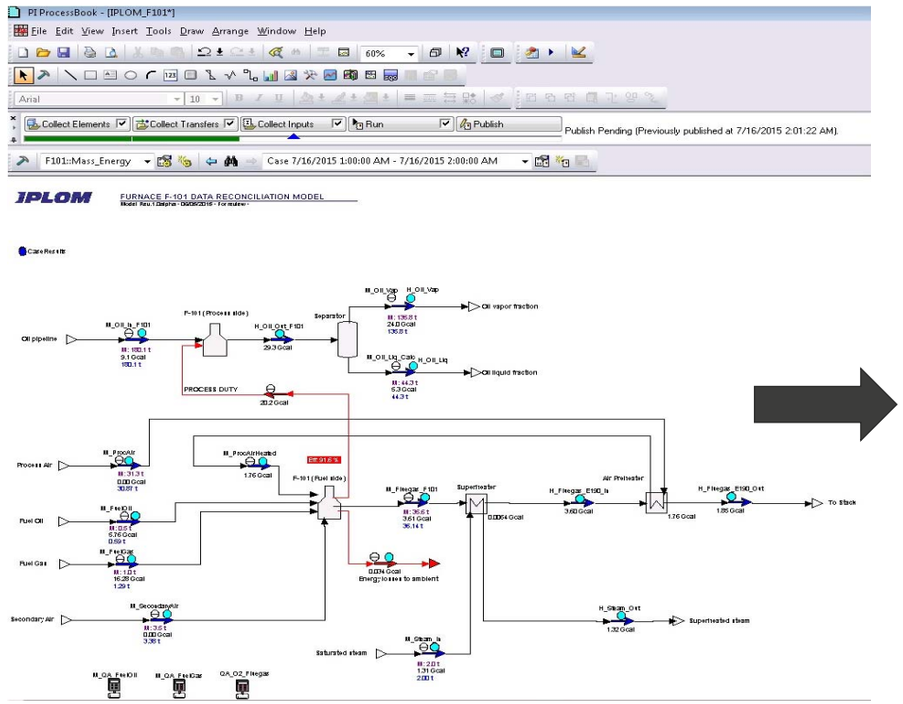
Crude Lab. analysis

Crude Pseudocomponents [NBP, MW, API, %]

Measurements (Flow, Temperature, Pressure, Fuel gas/oil composition)

Powered by the Thermodynamic Package

- Estimation of crude characteristics
- Calculation of enthalpy as function of T, P, composition
- Vapor – Liquid equilibrium



Hourly integrated energy and mass balance

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Sigmafine model based process monitoring
Model outputs

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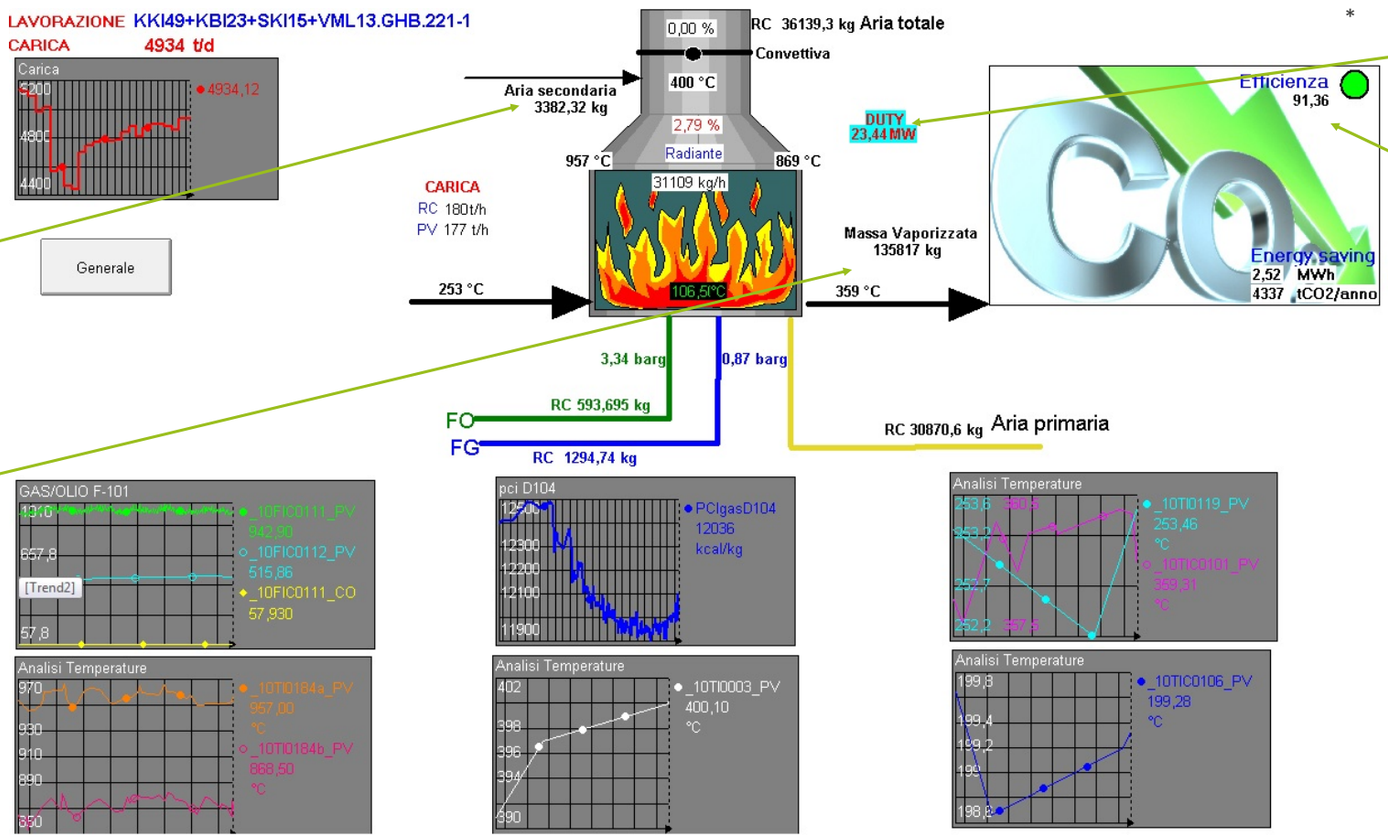
Crude Oil

Estimated (unmeasured) secondary air

Estimated (unmeasured) vaporized crude



Calculated furnace duty

Calculated furnace efficiency

* Courtesy of IPLOM S.p.A

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Energy Efficiency Credits (EECs) Market

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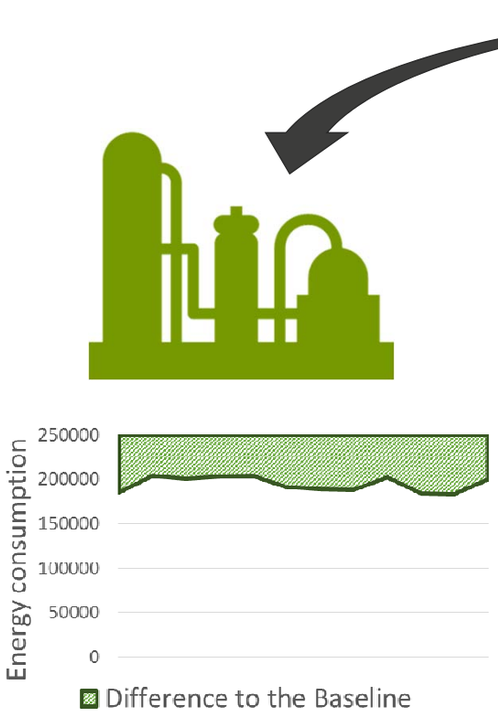


Efficient plants that perform better than the BAT-Ref

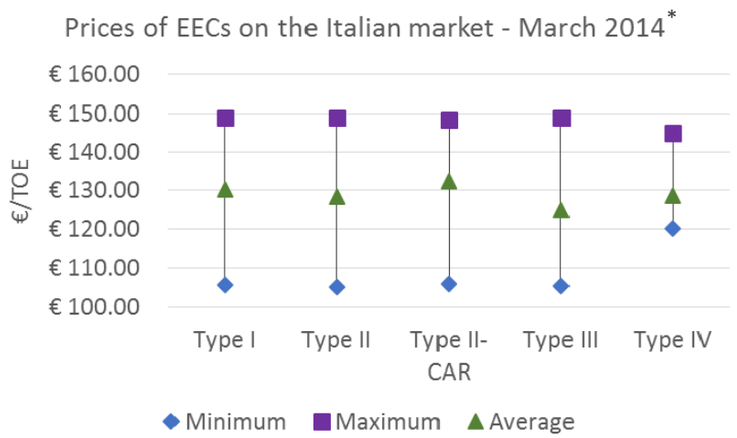
GSE Gestore Servizi Energetici

Validation of the EECs

GME Gestore Mercati Energetici

EECs emission and trading

Power supplier and distributors with >50,000 customers



* Data Source: GME

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From project to EECs

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Energy Management Directive ISO 50001

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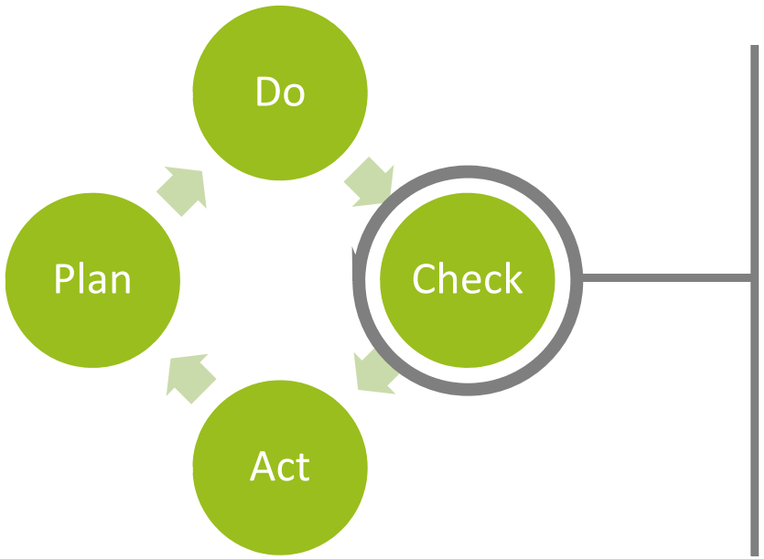
"Using energy efficiently helps organizations save money as well as helping to conserve resources and tackle climate change. ISO 50001 supports organizations in all sectors to use energy more efficiently, through the development of an energy management system (EnMS)."



- Monitoring, measurement and analysis (likewise ISO 9001 and ISO 14001)
- Compliance with legal requirements (likewise ISO 9001 and ISO 14001)
- Internal audit
- Evaluation and investigation of non-conformities (e.g. non-achievement of target values)
- Controls of records

→ Massive quantity of data to be handled

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Energy Management Directive ISO 50001

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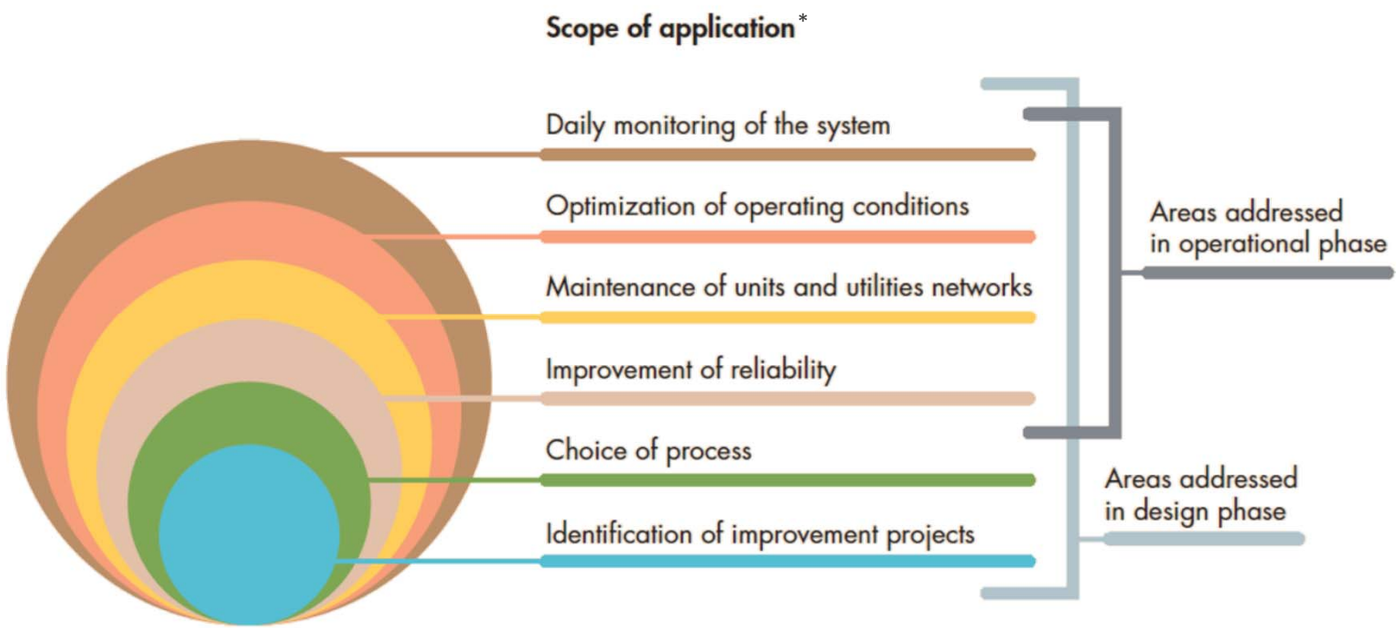
- Areas of energy focus at different stages of the project:



Need of trustable data

* From «Guidelines for implementing ISO 50001 Energy Management Systems in the oil and gas industry», OGP/IPIECA 2013

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Sigmafine and PI support implementing Energy Management System

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Massive quantity of data to be handled

Improvement of reliability

Optimization of operating conditions

Daily monitoring of the system

OSIsoft PI infrastructure

- Data handling in an organic and traceable way

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- Data validation and reconciliation to provide trustable data
- Real-time mass and energy balance to support operations

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Sigmafine on the Cloud

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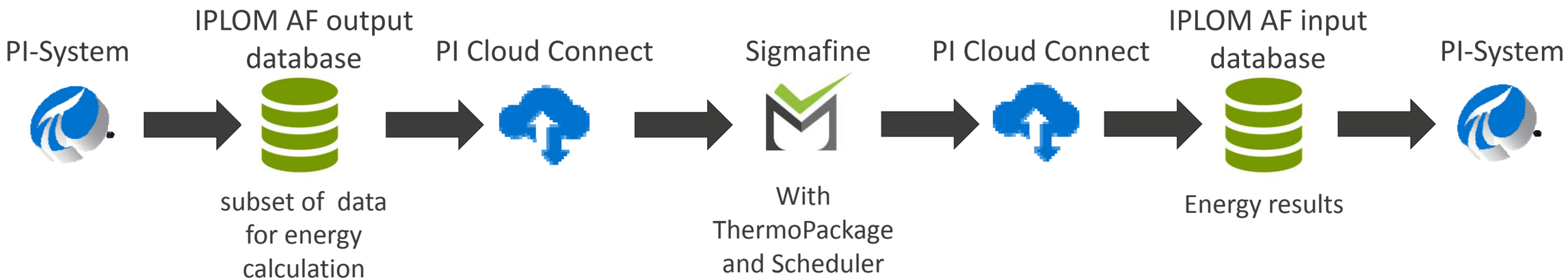
- IPLOM proof of concept has been developed leveraging cloud resources
- Only meaningful data are tunnelled via OSIsoft PI Cloud Connect to and from Sigmafine
- Sigmafine Scheduler runs the balance on hourly basis



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Summary

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- Sigmafine can provide trustable data in near real-time to take effective decisions moving from weekly to hourly basis
- Sigmafine supports Energy Manager activities within the ISO 50001 framework providing energy balance derived calculation such as duties and energy efficiency
- Sigmafine has been equipped with a Thermodynamic extension to support Enthalpy calculation and to infer crude oil properties from basic laboratory data
- Sigmafine project delivered in a new manner: proof of concept running on the Cloud through the OSIsoft PI Cloud Connector

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QUESTIONS

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For better insight on the
Sigmafine Thermodynamic Package,
you are welcome tomorrow at the dedicated Product Pod

THANK YOU!

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