



Digitization of production processes for sustainable resources management

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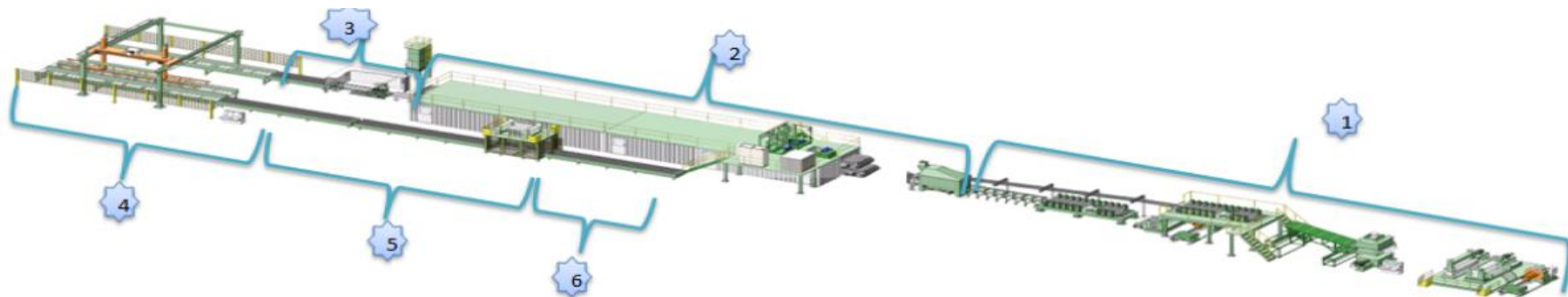
Introduction

- Case study description
- Digitalization solution proposed
- Impacts

Case study description (1/2)

Description of the company

- SME in the region of Castilla y León
- Manufacturing of metal panels with insulation
- High diversity of product types
- Strong dependence on external factors
- 2 production lines + furnaces + compressed air
- Each product has different energy & raw material costs



Case study description (1/2)

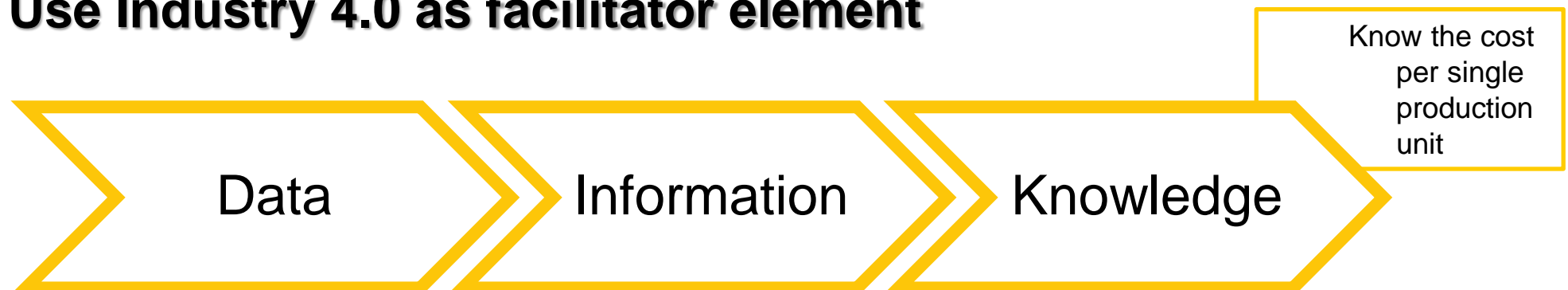
Necessities

- Optimization of operation parameters
- Increase the working load of production lines
- Reduce unscheduled stops
- Reduce raw materials waste

→ Goals

- ↑ Performance
- ↑ Competitiveness
- ↑ Feasibility
- ↑ Sustainability

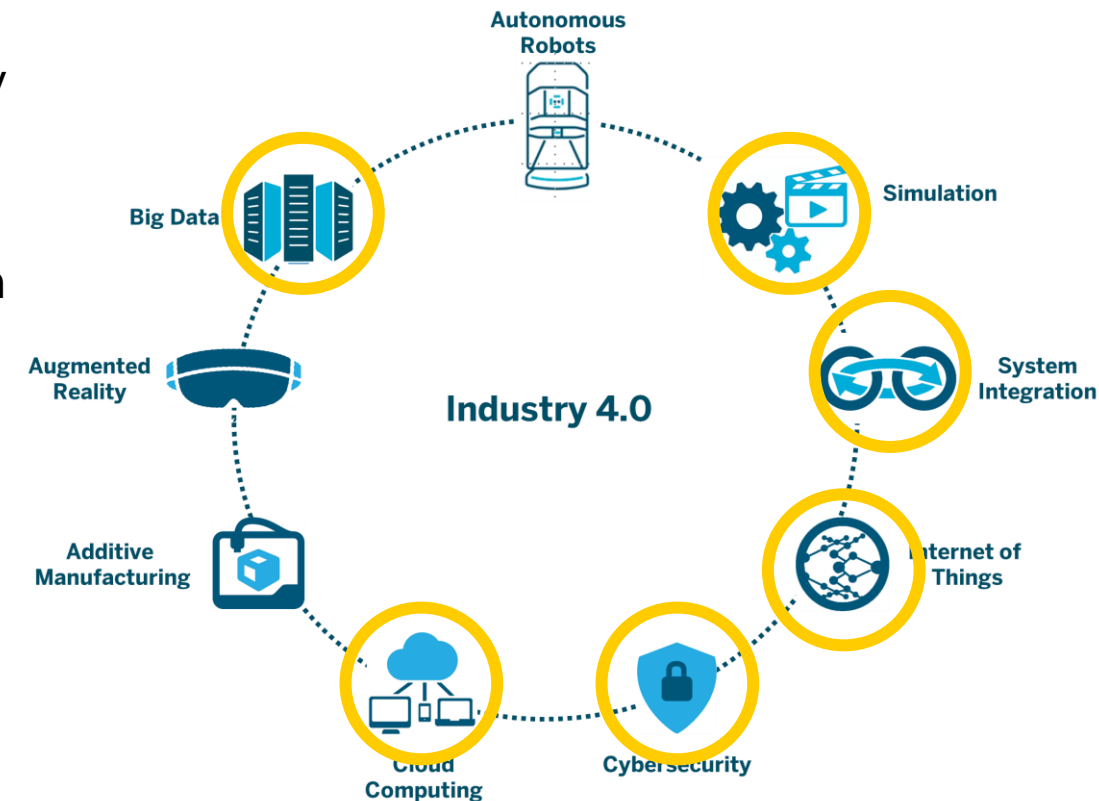
- **Knowledge to improve decision-making processes.**
- **Use Industry 4.0 as facilitator element**



Digitalization solution proposed (1/2)

Industry 4.0 technologies

- **Internet of Things** – get operation parameters from different processes and equipment (IIoT)
- **System Integration** – be able to compare energy & raw material consumption with real production and planning
- **Big Data** – manage large amounts on information (get data every 5 sec and store every 1 min)
- **Cloud Computing** – run mathematical model to generate useful information, supported by AI algorithms
- **Simulation** – enable simulation of real processes to know the impact of hypothetical scenarios
- **Cybersecurity** – integrate secure solution to protect data



Digitalization solution proposed (2/2)

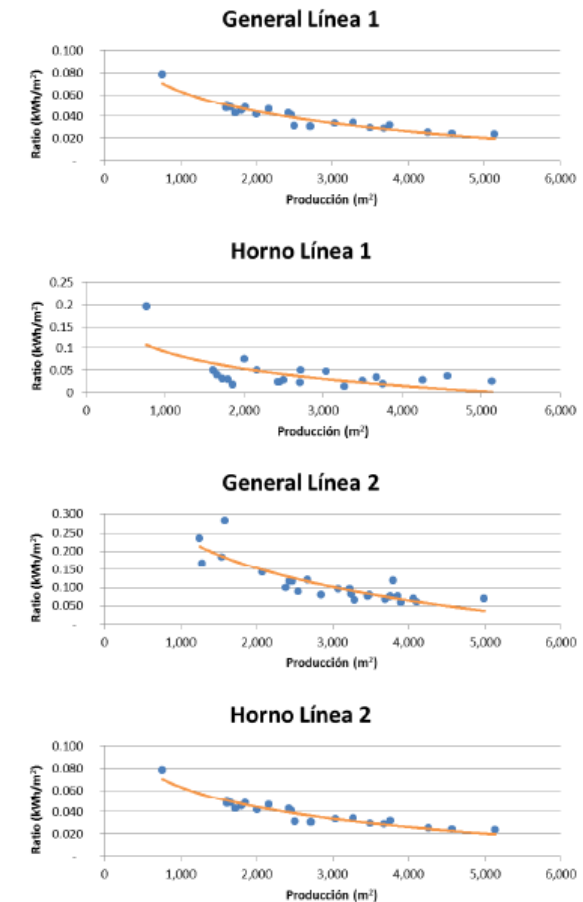
Activities carried out within company framework

- Perform a **complete diagnosis** of production processes (energy audit, assessment of production planning...)
- Definition & **installation of sensors + data acquisition** on existing information sources
- Creation of **mathematical model and A.I. algorithms** for data analysis & simulation and knowledge generation.
- Enable a **DSS-based tool for data management** and exploitation
- **Use generated knowledge to improve** processes performance and organizational structure of production.

Impacts (1/3)

↑ Energy Efficiency and global performance

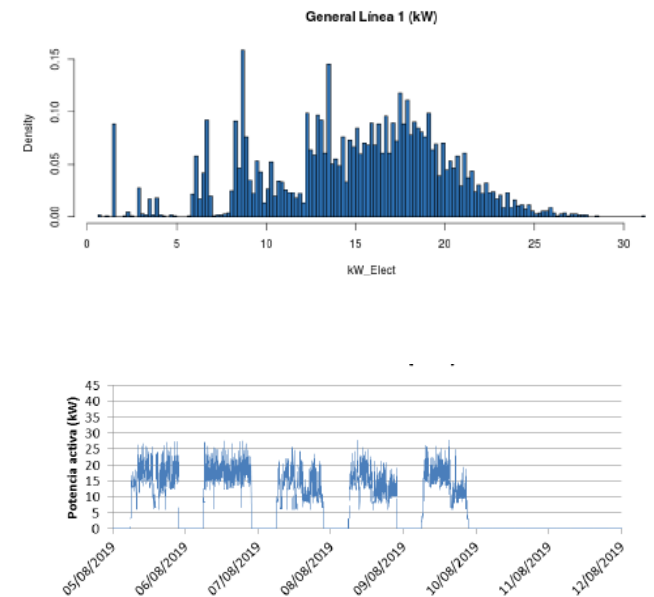
- Enable a Smart Energy Management System
- Monitoring of KPI per system and production unit
- Automatically search for best operation parameters for each production scenario
- Increase Energy Culture of the company (Recently certificated on ISO 50001:2018)
- *Better use of energy resources (contribution to circular economy)*



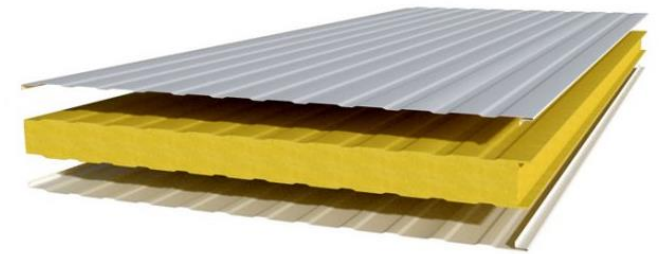
Impacts (2/3)

↑ Competitiveness through production planning

- Use of AI data analysis to generate new optimization criteria for production planning
 - Increase working loads of production lines
 - Enable a continuous improvement and learning process to optimize production planning
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- *Better use of facilities (contribution to increase effectiveness of production)*



- Early Alert System for system failure anticipation
- Enable programmed maintenance stops instead of unscheduled line stops (which provokes high material waste)
- Reduce materials waste
- Reduce waste-treatment costs that are difficult to reuse (foams and additives)
- *Better use of resources (contribution to circular economy and sustainability)*





European Union
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Thank you!

Questions welcome



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