

The Arauco logo is located in the top right corner of the slide. It consists of the word "arauco" in a bold, lowercase, sans-serif font. The background of the slide is a dark grey color with abstract geometric shapes in orange, yellow-green, and white.

Energy Management Information Systems –Efficiency Improvements for Industry

CAPCA Spring Conference, April, 2019
Savannah Carroll, Arauco NA

Outline

- Basic concepts and process
- Baseline establishment
- Possible process heat and boiler applications
- SSM Case Study
- Conclusion

Energy Management Information Systems (EMIS) – Industrial Users

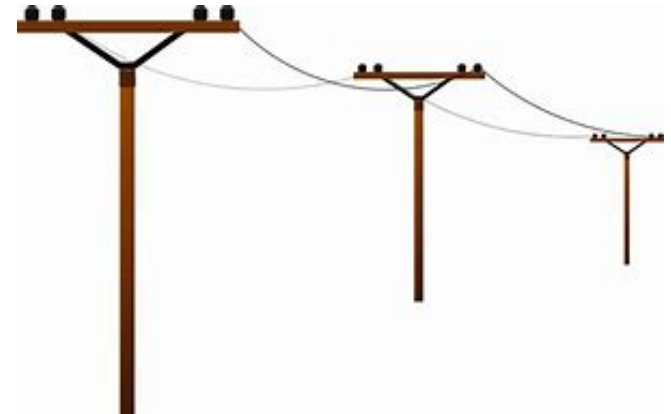
“Energy Management and Information Systems (EMIS) are combined hardware and software products that comprise a broad family of tools and services to manage commercial (or industrial) building energy use.” (US Dept. of Energy)

EMIS Technologies and Uses

- Energy Information Systems
- Benchmarking or Utility tracking systems
- Building Automation Systems
- Equipment-Specific Fault Detection or Catastrophic equipment failure systems

Terminology

- WAGES: Water, Air (compressed), Gas, Electricity, Steam
 - These usages set baseline of energy data for a process
- Power vs. Energy: Power is energy per unit of time (kW/hr) while energy is amount of work that can be performed by force (in this case, electrical work, kW) – energy can be stored, power cannot
- Demand: the amount of energy required to perform specific task



General Approach for EMIS

- Goals and major energy user identification
 - Concept – Cannot measure or control what you do not monitor
- Determination of current equipment and resources
- Identification of necessary equipment and resources
- Planning
- Implementation and troubleshooting
- Baseline establishment
- Optimization
- Benefit realization



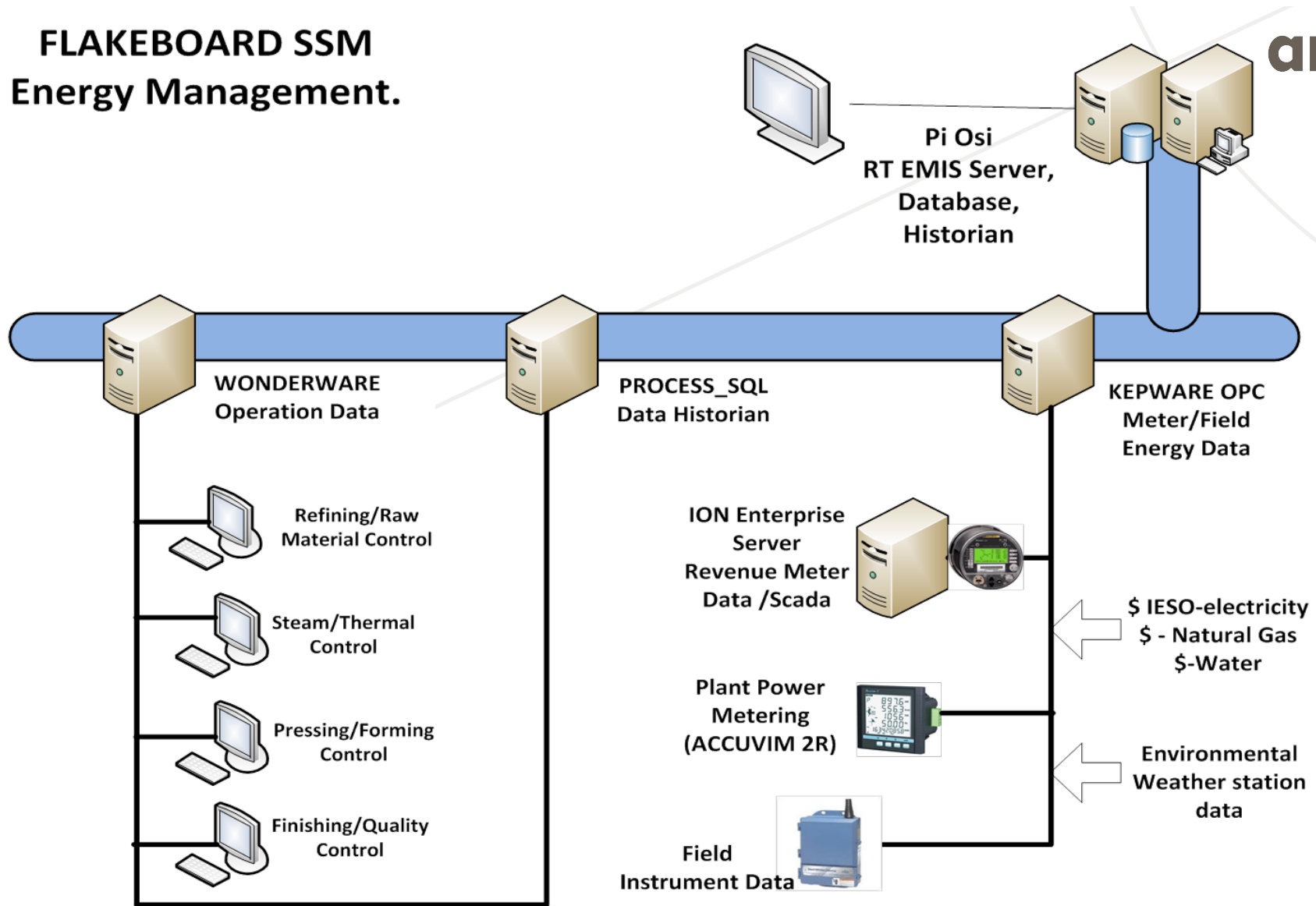
Goals and Major Energy User Determination

- Purpose of installation:
 - Energy, GHG, Carbon footprint reduction
 - Equipment/process optimization
 - Maintenance
 - Cost savings
- Process Break-up: Energy Account Centers - WAGES



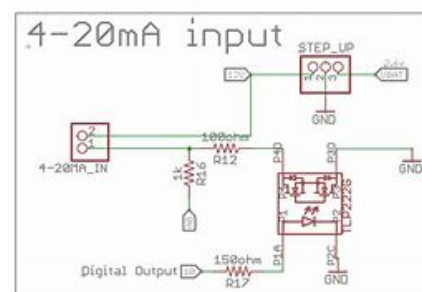
FLAKEBOARD SSM Energy Management.

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Baseline Establishment

- For necessary optimization, it is crucial to establish a baseline for energy use
- Generally, a year of data is necessary to establish a reliable data set
- Achievable targets can then be determined and incorporated based on trending from data set
 - M&V analysis and certification



Benefits and Challenges

Challenges

- Resources – time, expertise, capital, lost production, etc.
- Data, data, data
- Training/buy-in

Benefits

- Reduction in energy usage and carbon footprint
- Return on Investment
- Improved equipment life and optimized processes
 - Lean manufacturing
- Rebate and incentive programs



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Arauco EMIS Systems



Show Tree
Show Units
Dual Report
Energy Type Electricity

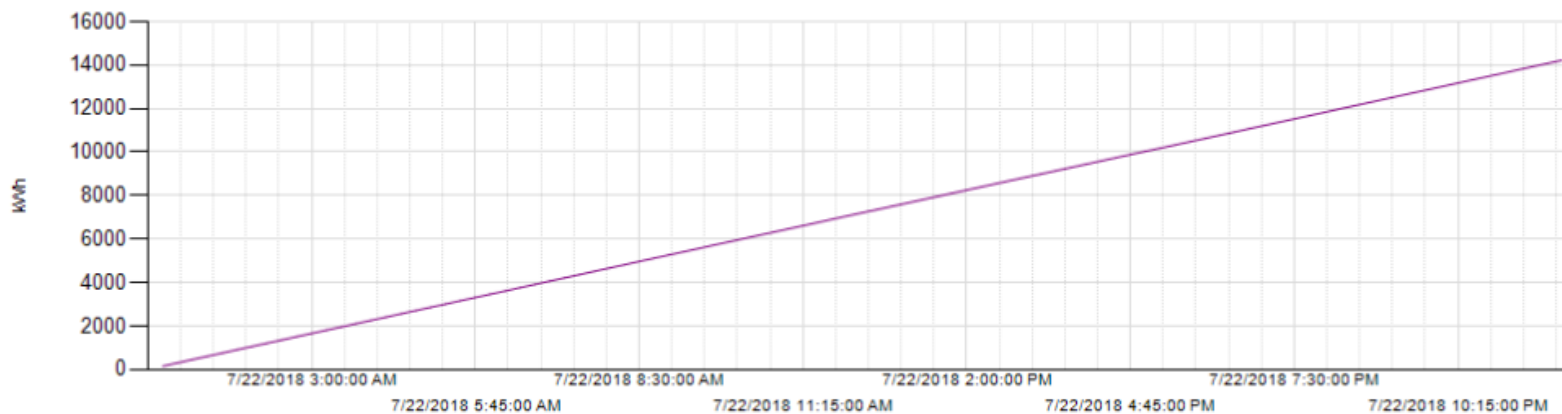
RfEMIS - SSM - MDF Production Energy - DRYING - Flash Tube Dryer - Electricity: Energy Report
 Yesterday Start 7/22/2018 12:00:00 AM End 7/23/2018 12:00:00 AM Generate

RtEMIS-SSM-MDF Production Energy-DRYING-Flash Tube Dryer- Electricity
 Start Date: 7/22/2018 12:00:00 AM End Date: 7/23/2018 12:00:00 AM

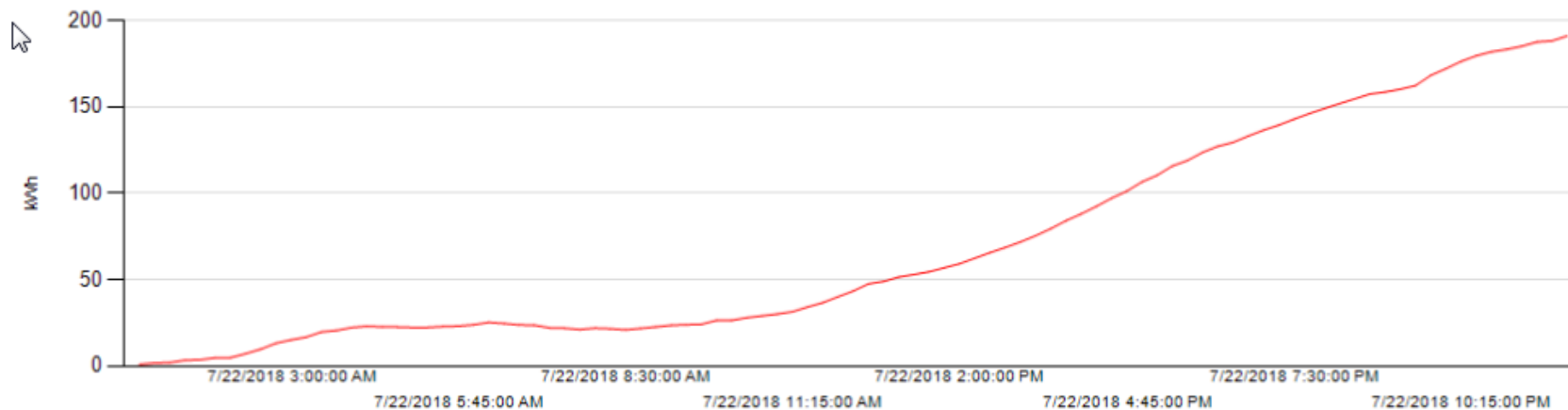
Target vs. Actual Consumption Rate

Electricity Total: 14217 kWh

Electricity Total: 14217 kWh



Cumulative Sum of Savings vs. Target



Show Tree
Show Units
Dual Report
Time
KPI
Status
Cost
CuSum
CPU
Energy
Energy Type: Gas

- RIEMIS
- SSM
 - LAMINATION Production Energy
 - Pressing
 - MDF Production Energy
 - DRYING
 - Flash Tube Dryer
 - Electricity
 - Gas
 - FINISHING
 - Board Handling
 - Dust Systems
 - Sanding line
 - FORMING
 - Forming Line
 - Material Handling
 - PRESSING
 - Press Line
 - Press Outfeed
 - REFINING
 - Plug screw
 - Primary Refiner
 - Refining Feed
 - Secondary Refiner
 - RMS
 - Reclaim system
 - Truck Dump
 - STEAM GENERATION
 - COILTUBE#1
 - COILTUBE#2
 - THERM OIL BOILER**

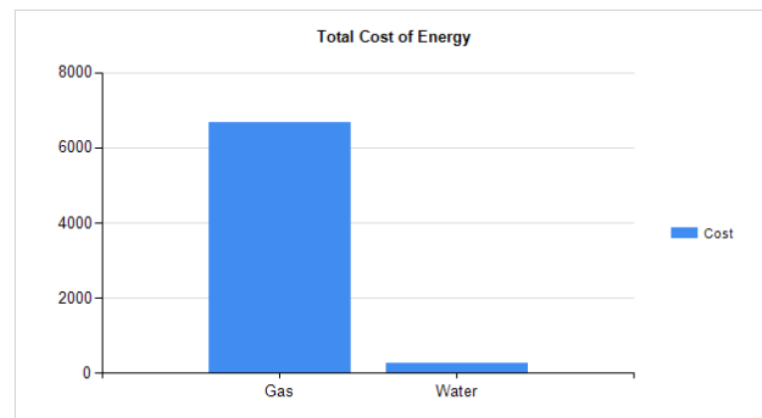
RIEMIS - SSM - MDF Production Energy - STEAM GENERATION - THERM OIL BOILER: Cost Report

Yesterday | Start 7/22/2018 12:00:00 AM | End 7/23/2018 12:00:00 AM | Generate

Cost Report: SSM-MDF Production Energy-STEAM GENERATION-THERM OIL BOILER



Start Date: 7/22/2018 12:00:00 AM | End Date: 7/23/2018 12:00:00 AM



| Gas \$ | Water \$ | Generated Steam \$ |
|----------|----------|--------------------|
| 6,682.55 | 268.96 | 0.00 |

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Possibilities for Boiler/Process Heater Optimization

- Essentially what factors affect what, and by how much:
- Boiler efficiency – are you getting as much steam as you should?
 - Where are your losses – Piping, inefficient combustion, water loss, etc.
- VFDs on big drives/motors
- Which fuels are most efficient?



Boiler and Process Heater Applications – SSM case study

Use of EMIS to optimize DA and feedwater process in industrial boiler



Boiler Feedwater System - SSM

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- 3 Industrial process boilers used to produce steam for MDF process and one thermal oil boiler for lamination
- Meters installed on natural gas feed to combustion burner, ID fan motors, feedwater, make-up water, steam flow
- Baseline energy data and calculations determined that large amounts of potential thermal energy were exiting the system through flue gas heat
- 3 units rerouted to flow through exhaust stack to preheat deaerator feedwater
 - Recover thermal losses to pre-heat feedwater through Deaeration tank loop



Boiler Feedwater System - SSM

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- EMIS continued to grow and optimize at SSM over a number of years
 - As system grows, so does specificity – “low hanging fruit” first
- Eventually put meters on boiler air compressor
- 25 mmBTU thermal oil boiler has gas-fired economizer
- Ran city water through boiler air compressor heat exchanger and directed hot water to gas fired economizer
 - Water was closer to setpoint – lowered gas input to the economizer by ~10-20%
 - M&V analysis provided financial justification for project



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Questions?

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