Advancing each generation.

ALCOA

Alcoa Global Primary Products "Smart Manufacturing"

Overview and conversation on the organizational impacts

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OSIsoft Regional Seminar - Pittsburgh: 4 November 2014

Agenda

- Alcoa and Global Primary Products
- The Alcoa GPP Smart Manufacturing Journey
- Impacts on the Organization
  - Information and Process Systems
  - Management and Operations
- Questions?

Global leader in lightweight metals engineering and manufacturing

- Celebrating **125 years** in 2013; **inventors** of the original **aluminum process**
- Delivers **value-add products** made of **titanium, nickel and aluminum**, and produces **best-in-class bauxite, alumina and primary** aluminum products
- **200+** locations in **30** countries
- 2013 revenues of **$23.0 billion; 60,000** employees

Downstream - EPS

- Fastening Systems
- Power & Propulsion
- Wheels & Transportatio
- Building & Construction
- Forgings & Extrusions

2013
57% Revenue
80% ATOI
value-add

Midstream - GRP

- Global packaging
- Aero, transportation and industrial
- China and consumer electronics

Upstream - GPP

- Bauxite mining
- Alumina refining
- Aluminum smelting
- Power

GPP: Combined Alumina and Primary Metals segments, GRP: Global Rolled Products, EPS: Engineered Products and Solutions
Source: February 24, 2014 BMO conference

Global Primary Products - Aluminum Smelter – A look inside

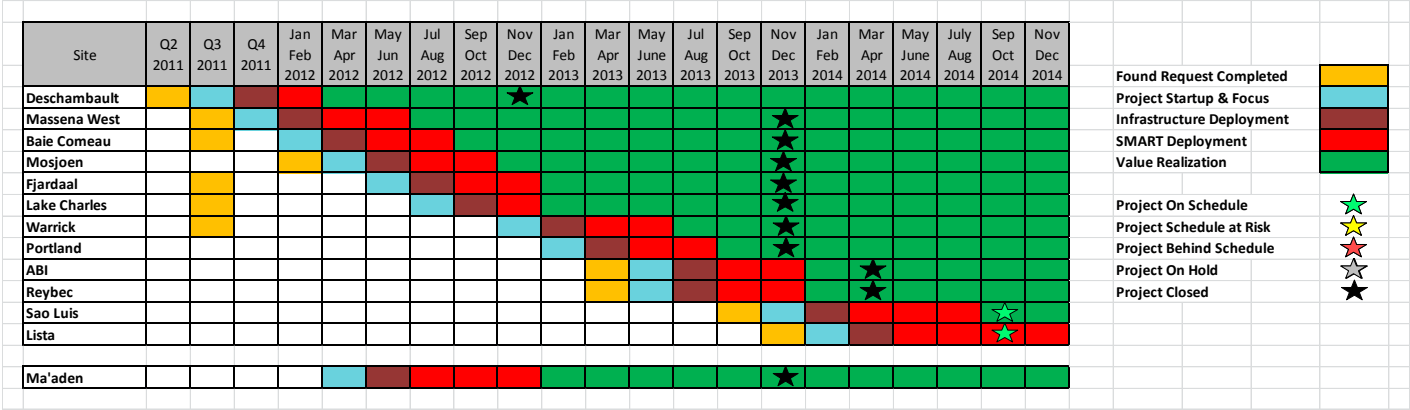
The Alcoa GPP Smart Manufacturing Journey

Why take this journey in our Aluminum Smelters?

- Very large physical footprint
- Legacy has created a diverse set of automation and information systems at locations
- Before PI, each of these systems were information silos with limited historical data and accessibility

The Alcoa GPP Smart Manufacturing Journey

- 2009-2010 Project Definition Phase
- 2010 (Q4) Approval for pilot
- 2011 Pilot Execution and Value Identification
- 2011 (Q4) Approval for OSIsoft Enterprise Agreement
- 2012-2014 (Q1) Intensive Deployment
  - Constant support of OSIsoft resources (EPM, CoE, engineer and technical support services)
  - A new deployment approximately every 2 months requiring 6 to 9 months each
  - Global instance deployed in 2013



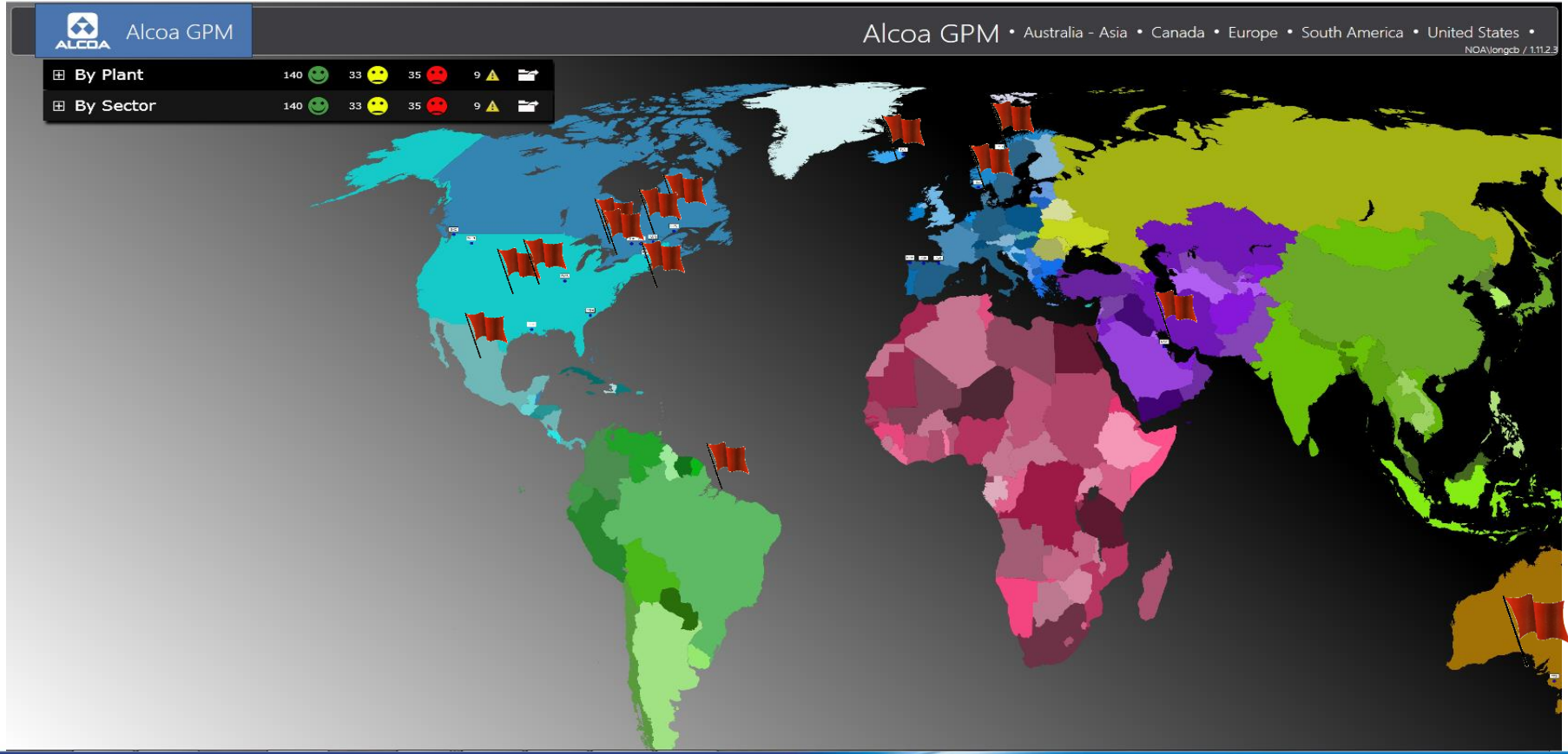
- 2012 (Q3) Value realization per plant begins and continues to date!

So data that lives everywhere in our plants

So data that lives everywhere in our plants is now accessible

With the advantage of the infrastructure, tools and the OSIsoft Enterprise Agreement, Alcoa is now collecting close to 1M tags per plant in PI Historians with the same “Data Model” at the base and is continuing to realize value per plant.

The Alcoa GPP SMART Manufacturing – The Journey Continues



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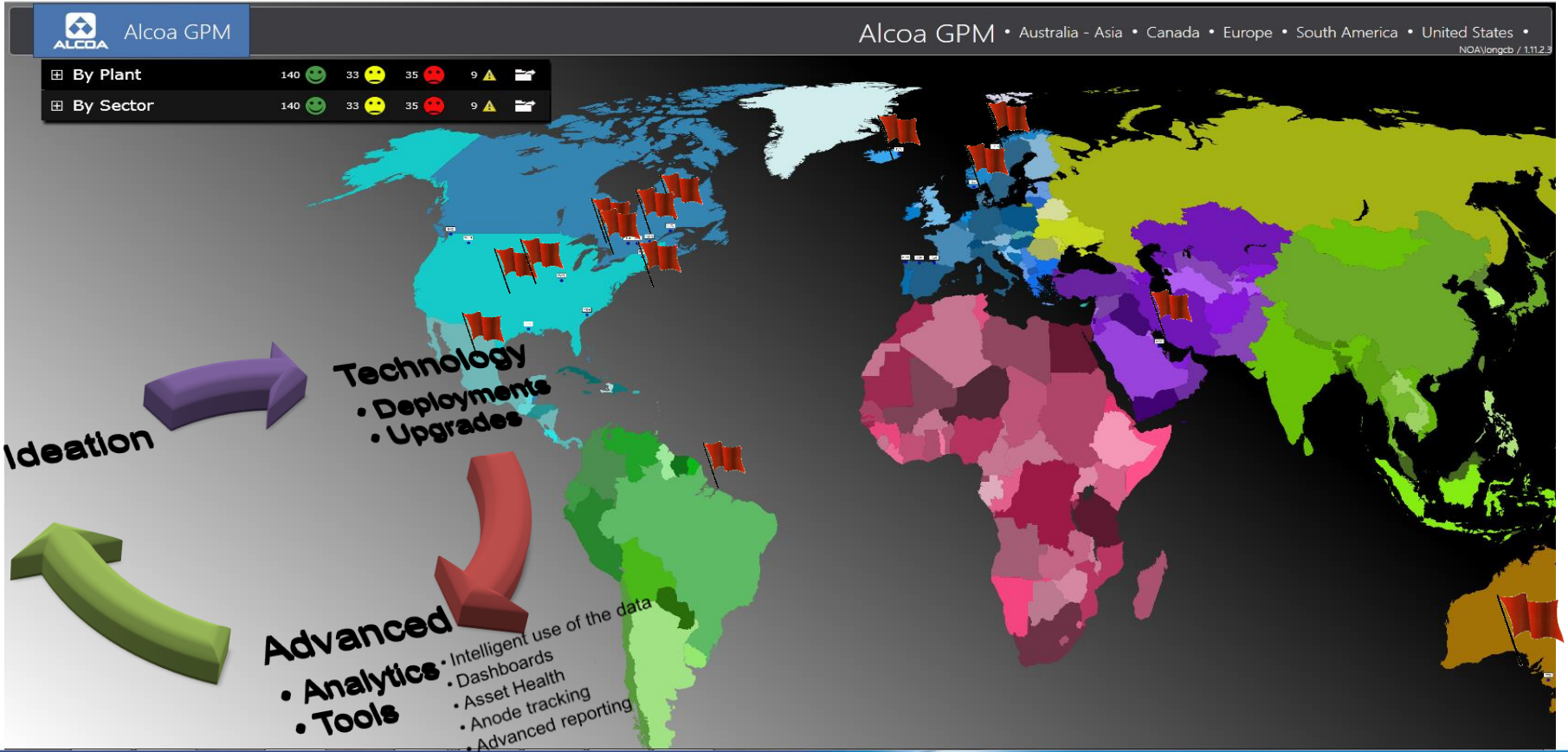
The Alcoa GPP SMART Manufacturing – The Journey Continues



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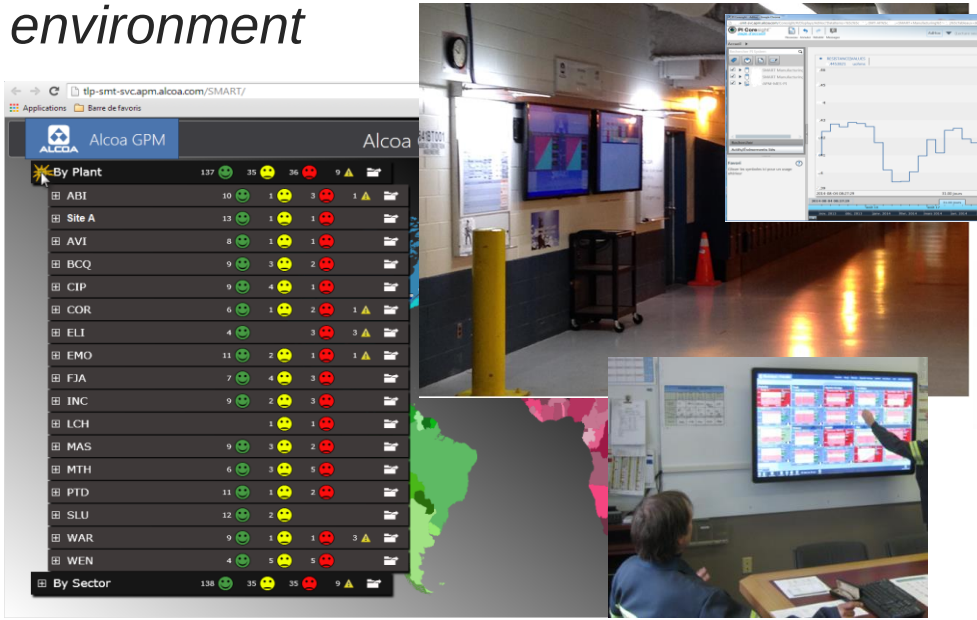
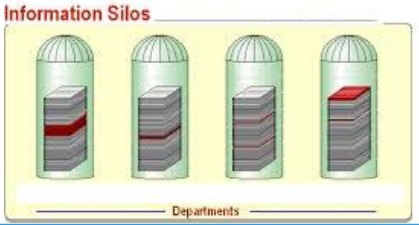
The Alcoa GPP SMART Manufacturing – Impact of the Journey

- *GPP Smart Manufacturing represents the integration of production data with the expertise of our people to make it possible to take proactive and intelligent decisions in a dynamic manufacturing environment*

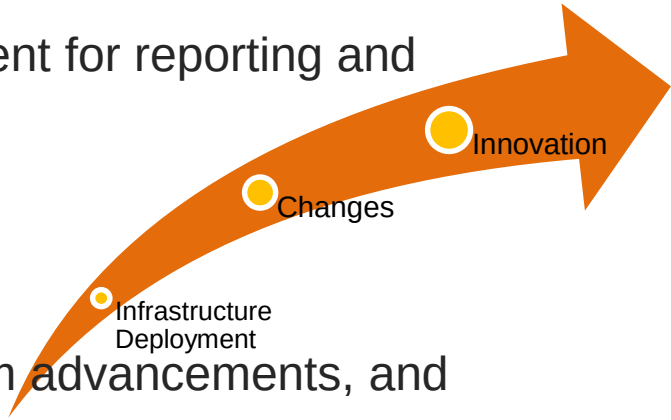




The Alcoa GPP SMART Manufacturing – Impact of the Journey

Information and Process Systems Organization:

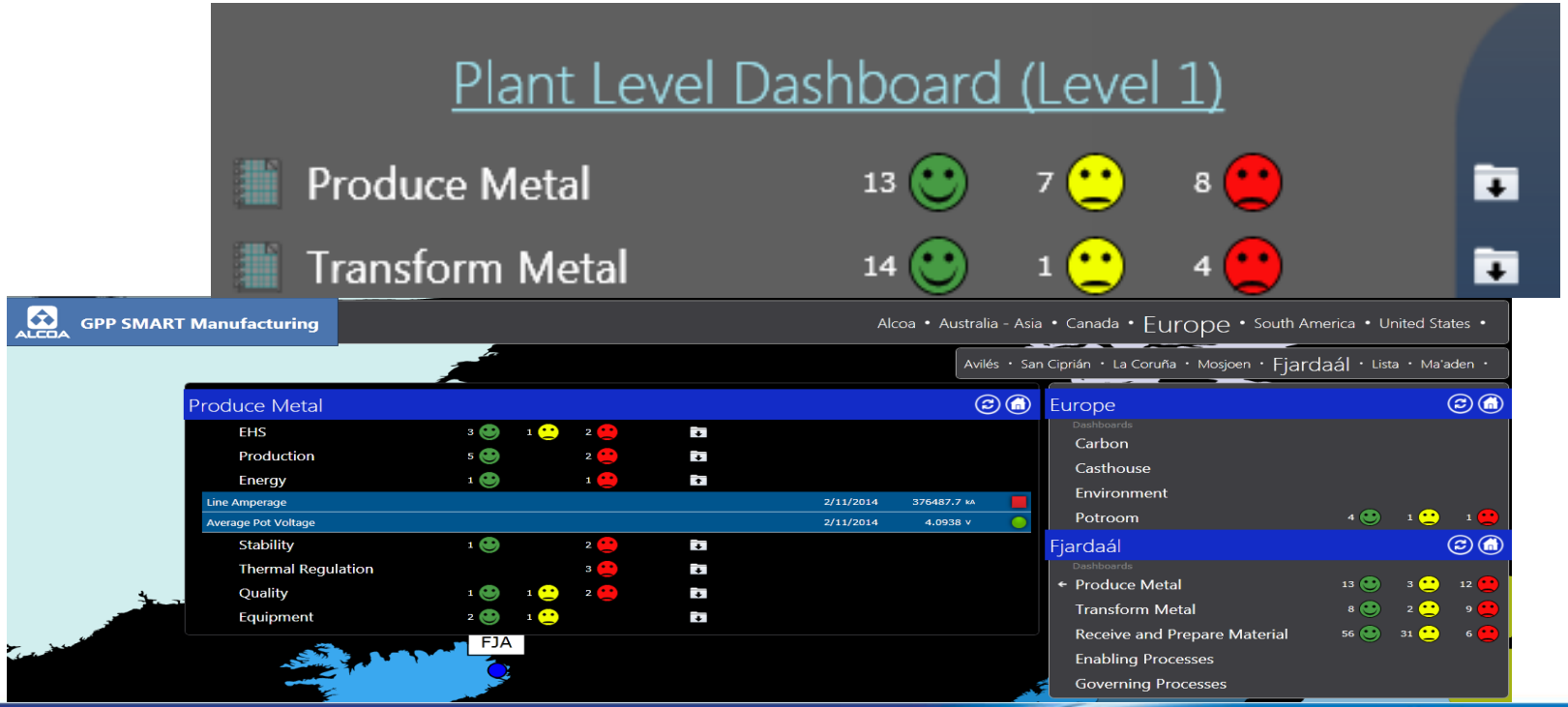
- GPP Smart Manufacturing Infrastructure has fast become the new ecosystem for information and process system analysts to deliver data, information, reporting, and has impacted strategy and work activities for analysts with the shift for the :
  - Reduction of customize application development for reporting and visualization tools
  - Migration of legacy system components for
    - reporting and visualization tools
    - data collection, alarm processing, repositories
  - Tackling of more value add analytics, algorithm advancements, and specialized software development



The Alcoa GPP SMART Manufacturing – Impact of the Journey

Management and All Operation Levels:
Roll Up data to various levels of the business

Transparency
Visibility



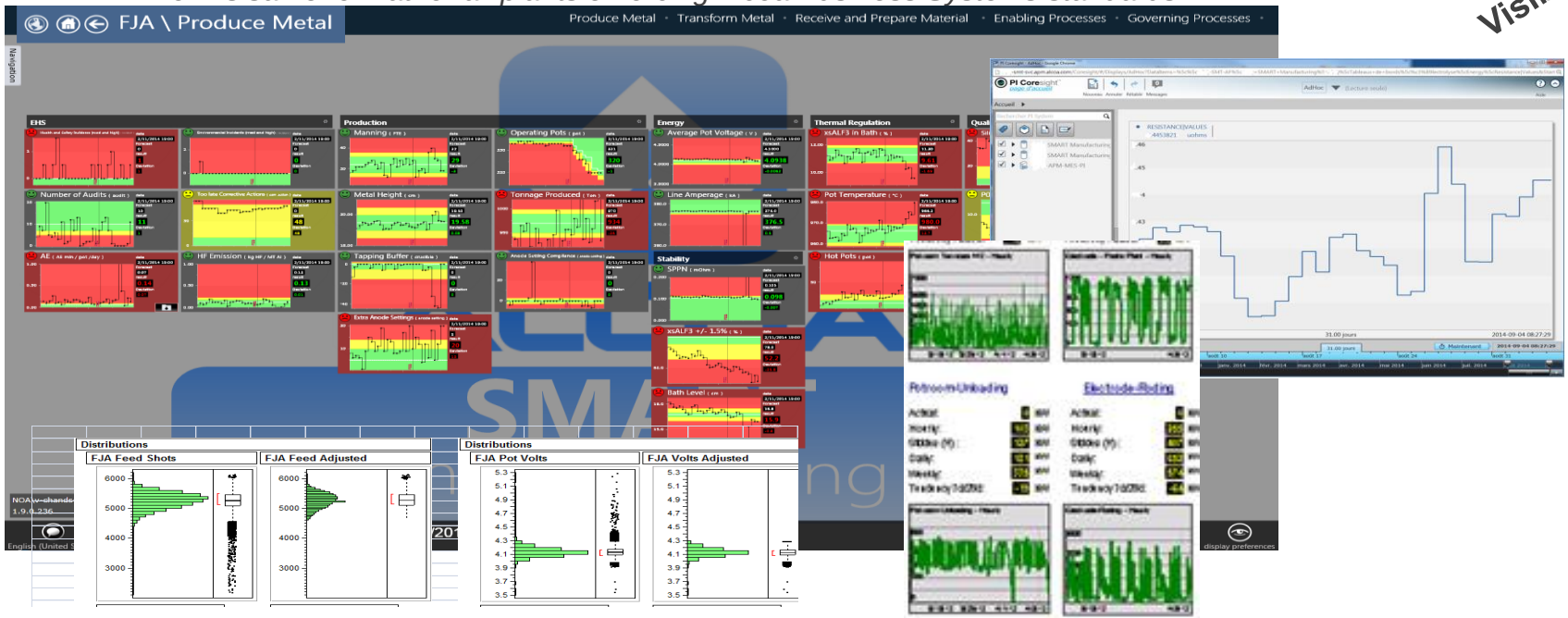
The Alcoa GPP SMART Manufacturing – Impact of the Journey

Management and All Operation Levels:

Or … Drill down to the Individual KPI Performance or PI Tags

Drill Downs same format for all plants enforcing Alcoa Business Systems standards

Transparency
Visibility



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The Alcoa GPP SMART Manufacturing – Impact of the Journey

Management and All Operation Levels:

- Elimination of data mining activities is forging advanced focus on analysis and problem solving
- Direct leveraging of specialized analytics and tools is growing rapidly (Asset Health, dashboards, process books, notifications…)

Transparency
Visibility

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The Alcoa GPP SMART Manufacturing – The Journey Continues

Phases of ‘SMART Manufacturing’

- Phase I – Data Integration ➔ Visualization of Actionable Information
- Phase II – Advanced Analytics / Modeling / Intelligence
- Phase III – Product & Process Innovation / Market Intimacy

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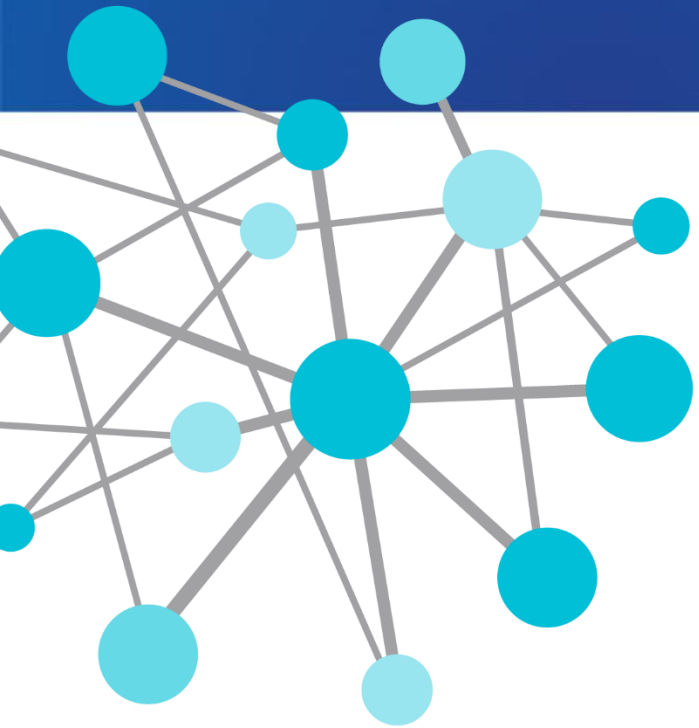

Questions

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OSIsoft Product Names

- OSIsoft
- OSIsoft vCampus
- PI Advanced Computing Engine (PI ACE)
- PI Asset Framework (PI AF)
- PI Coresight
- PI Interface for several Data Sources
  - PI Interface for OPC DA
  - PI Interface for Modbus Ethernet
- PI Interface for Universal File and Stream Data (UFL)
- PI Manual Logger (PI ML)
- PI Notifications
- PI OLEDB Enterprise / PI OLEDB Provider
- PI ProcessBook
- PI SDK and AF SDK
- PI Server
- PI System Management Tools (PI SMT)
- PI to PI Interface
- PI Web Services