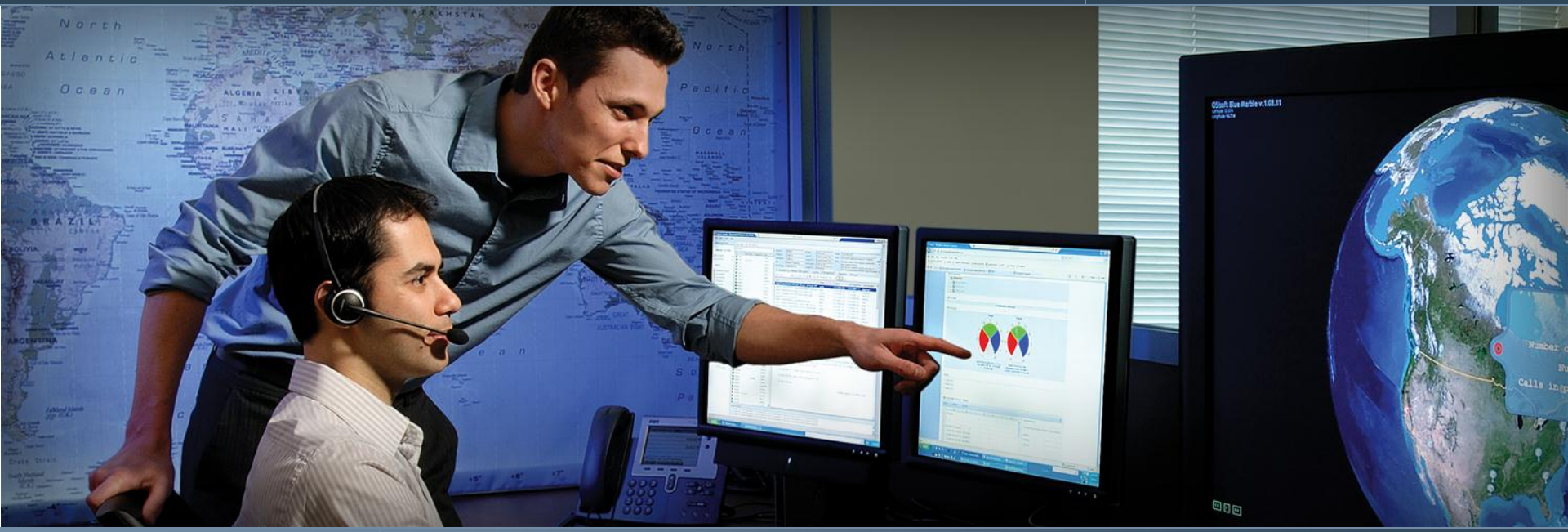
Mexico City Seminar



CEMEX Real-Time Infrastructure

Julio Farrera
CEMEX

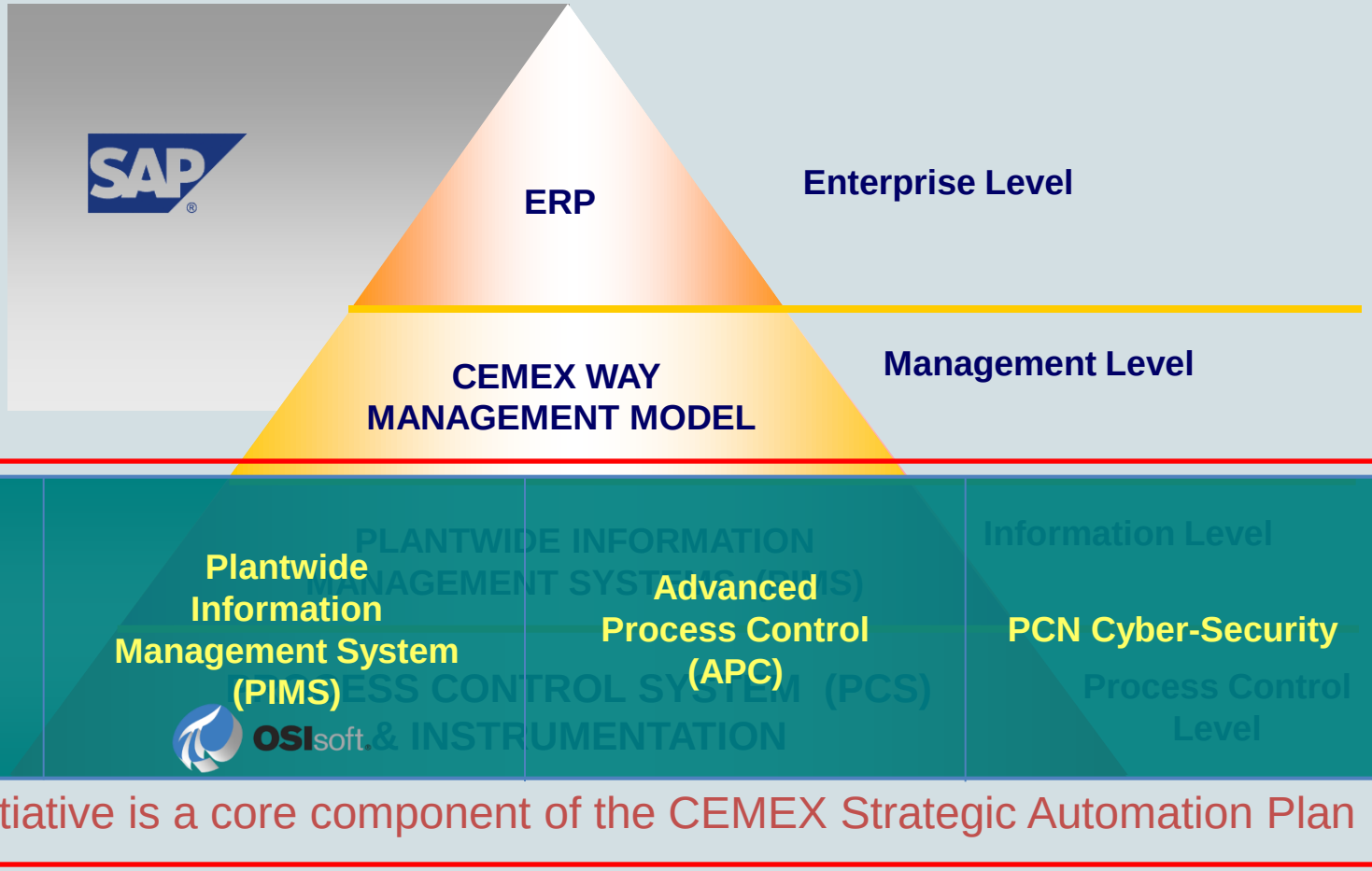
June, 2010

Why Become and EA?

- Implementation Strategy
- Architecture & Scope
- Present Status
- Phase two, How to get more value

Why become an EA?

CEMEX Strategic Automation Plan



The PIMS Initiative is a core component of the CEMEX Strategic Automation Plan

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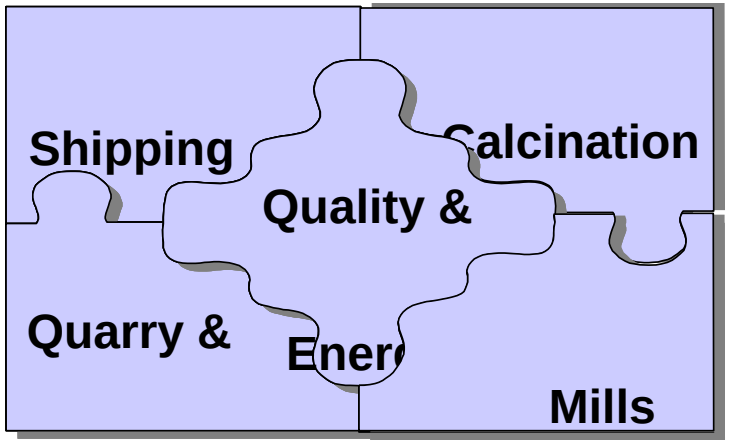
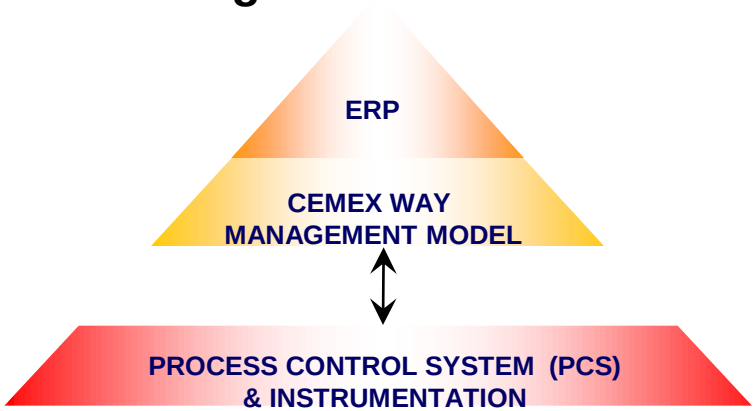
Why become an EA?

Main opportunity areas to integrate process information ...

- Actually, CEMEX has 74 cement plants & grinding.
- Some of those were operating as information islands.
- There was a gap between a business-planning system and real-time process control.

All this raw data, used together and visible to everyone, constitutes vital information and knowledge for decision making





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Why become an EA?

Implement the Plant wide Information Management System (PIMS) Technology in all CEMEX Cement Plants to:

1. Integrate information, people, knowledge, technology, procedures and strategies.
2. Satisfy information needs to support key decision making at different levels of the organization, allowing better-informed business decisions.
3. Provides a unique platform to integrate operations information and a single source to generate KPI's.
4. Standardize the Real-Time Information Systems in CEMEX Worldwide, taking advantages of Global Negotiations and Scale Economies.




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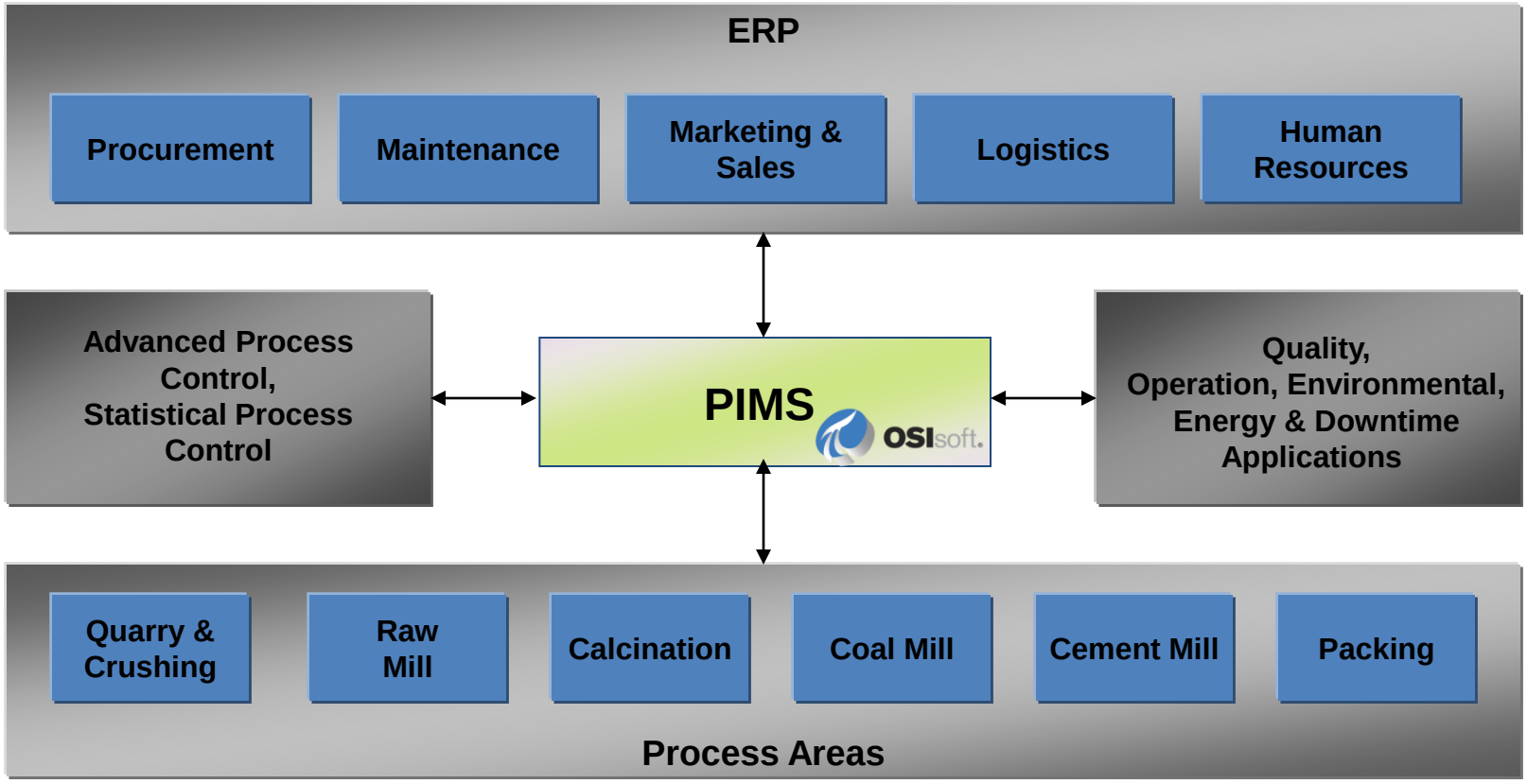
Why become an EA?

The Goal…



Have all information into one platform and make it available for different applications for all organization levels…

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Why become an EA?

1. Unlimited use of tags and required DCS/PLC and other equipments (such as lab equipment, power measurement, etc.) interfaces. This opens the project to integrate all plant process areas and do not restrict some “special tags” as calculated tags, totalizers, etc.
2. Unlimited client licenses. Deployment and applications made them easy by final users.
3. Architecture Assistance. Options for implementations. CoE support.
4. OSISoft installation and configuration. Standard way for all the corporation.
5. Asset Monitoring. Focus on our operations not in supporting the real-time infrastructure, using the OSIsoft’s NOC Services.

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Implementation Strategy

Strategy and History
Initial Plant Assessment
Remote Implementation
Onsite Implementation
Training

Corporate Implementation Strategy

Process:

**CTC= CEMEX Technology Council*

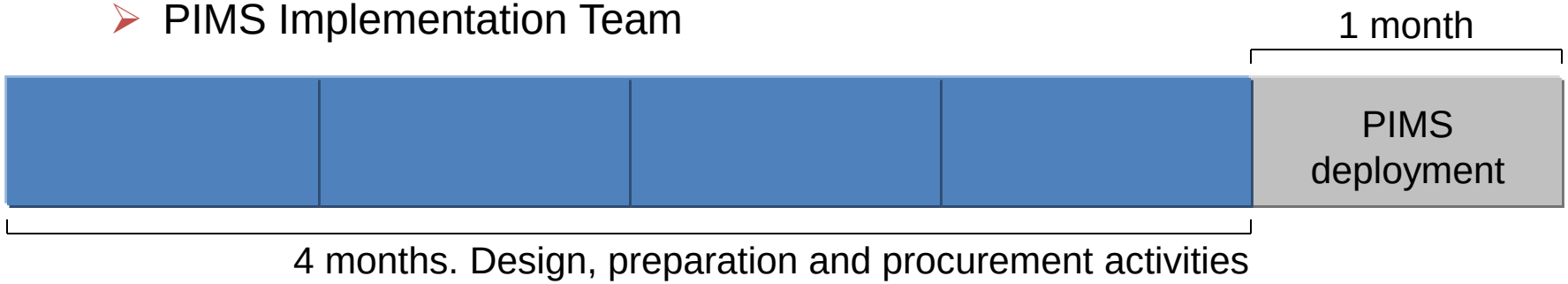
Plant Implementation Strategy

Process:

Global preparation phase requires 4 months for design and procurement activities and a single plant requires a month for PIMS deployment (remote & on-site). This is possible by joining efforts from different areas of the company such as:

- Top Plant Management
- Controllership
- Procurement
- IT Department
- Automation Plant Department
- PIMS Implementation Team

Note: The duration may vary due to the assistance of the members involved, PIMS scope and complexity of the plant's process layout.



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Step One For a Plant – Previous Implementation Activities

- Show Corporate Project to Plant Manager and his team.
- Set Plant Contact Network for all the people involved in the process with Plant Manager.
- Open a business unit accounts to start purchase process from PIMS hardware required.

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Step Two For a Plant – Initial Plant Assessment

- The Plant Assessment provides information from the current equipments such as kilns, mills, crushing, packing & shipping to determine their current technical capabilities to communicate with PIMS. This information will be crucial to decide which interface will be used.
- Request current Graphics & Tags Database from the Process Control System, this allows to the PIMS Team to work remotely.

- Define the place where the PIMS hardware will be installed. (The nearest point from the Control Room is recommended). Decision is made between PIMS Implementation Team, Plant Automation & IT responsible.
- Hardware mounting and basic configuration of OS as CEMEX Standards establishes.
- Wiring from each Process Control Systems that will be integrated to the PIMS Hardware.

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Step Three For a Plant – Remote Implementation Activities

- Based on the information gathered from the Plant Assessment and the PIMS Hardware Installation, the PIMS Implementation Team* makes the basic PIMS configuration remotely through the CEMEXNet.

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Step Four For a Plant – On Site Implementation Activities

- PI Interfaces configuration and system setup.
- Process variables data validation. PIMS vs. PCS screens.
- Reports, Overviews & Graphics are tested.
- Basic final users training will be provided by PIMS Implementation Team.

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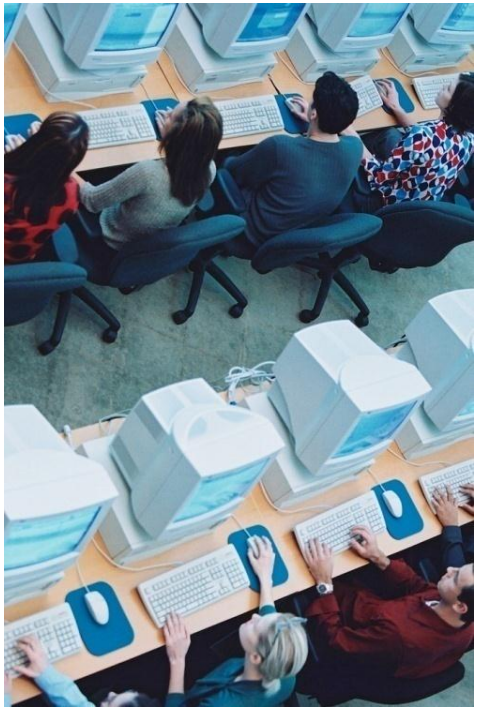
Step Five For a Plant – PIMS Users Training

- After On-Site Activities, final users training is required:
  - **Real Time Plant Information System**. It gathers the Process Information through the connection with the Process Control Systems of the plant.
  - **Web Visualization Interface System**. Makes available the information of the PI System on the CEMEX Intranet.
- Training is intended for:

  Plant, Production & Maintenance Managers, Process & Maintenance Engineers (Mechanic, Electric, Automation and Control), Operators, etc.
- PIMS Implementation Acceptance Letter is signed by PIMS Plant Administrator and PIMS Implementation Leader.



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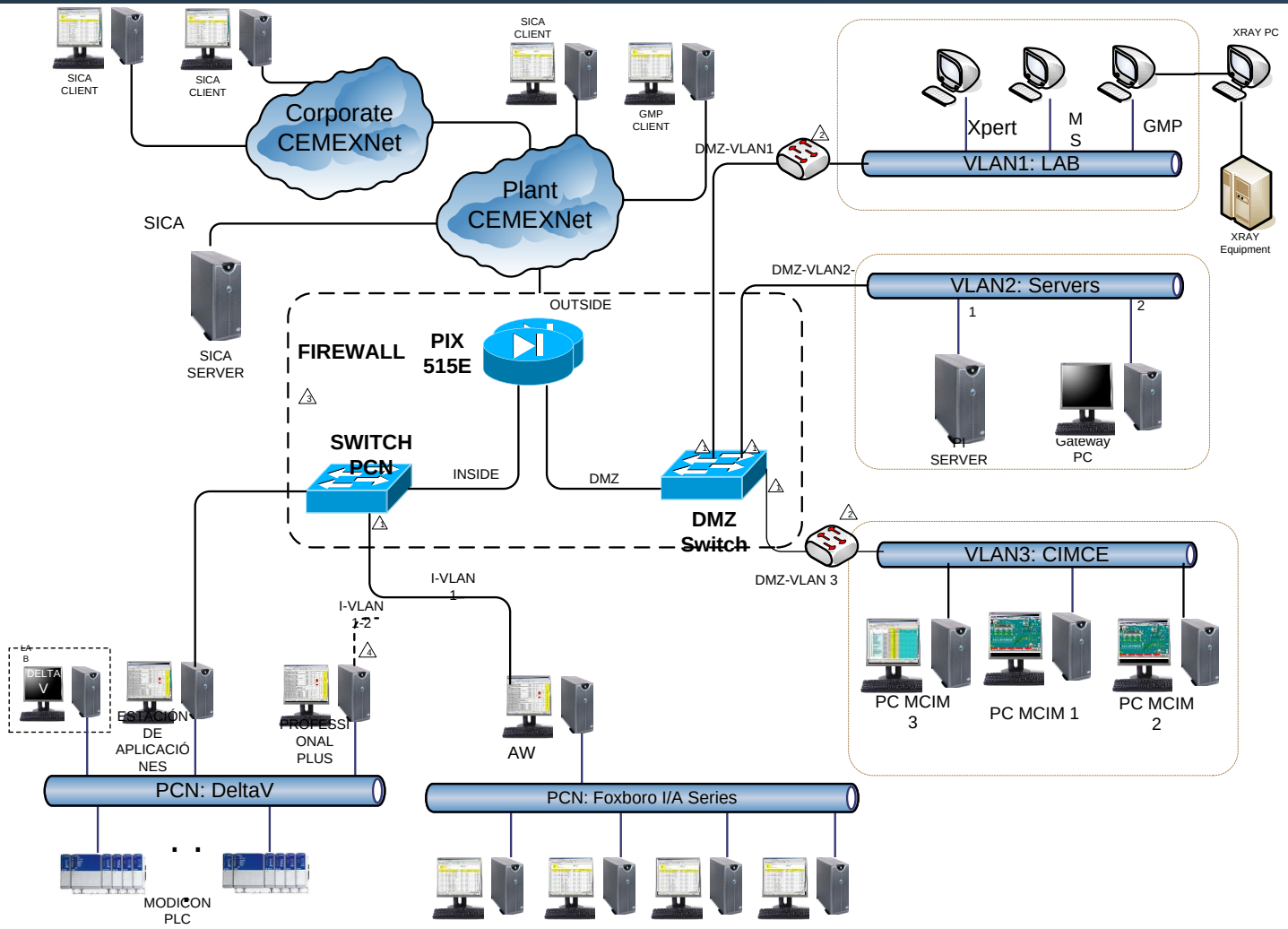
Architecture and Scope

PIMS & PCN Cyber-Security Architecture



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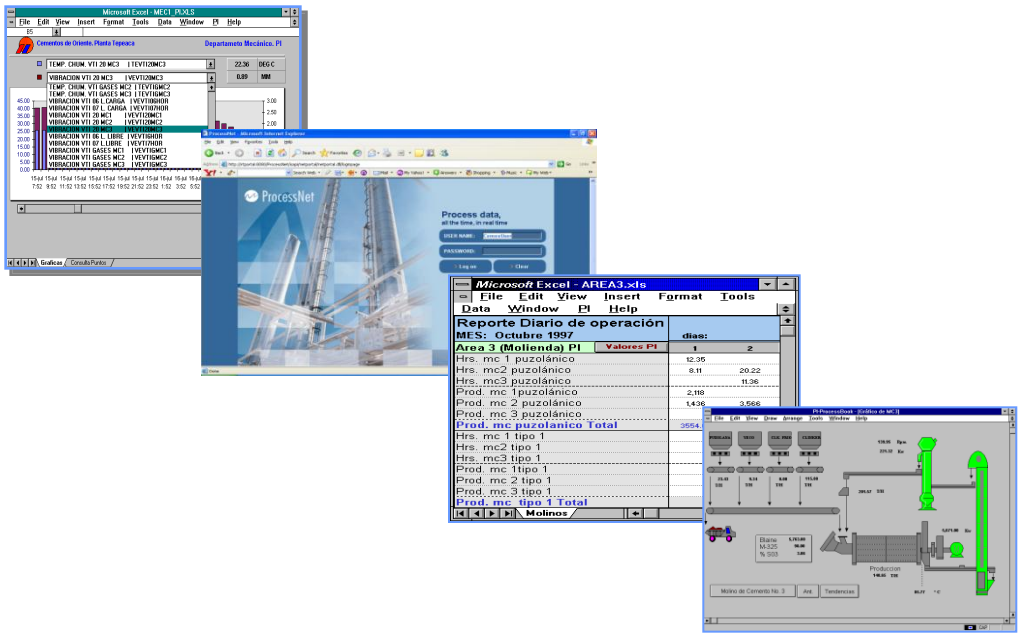
The challenge…

Move existing applications to a CEMEX Worldwide standard :

- Trend and Graphics Displays
- Automatic Key Performance Indicators
- Operation Reports
- Production Reports
- Maintenance Applications
- Environmental Monitoring
- Excel and Maxi-Sheet Interface
- Energy Consumptions Reports
- Energy and Mass Balance
- Manual Captures
- Downtime Tracking



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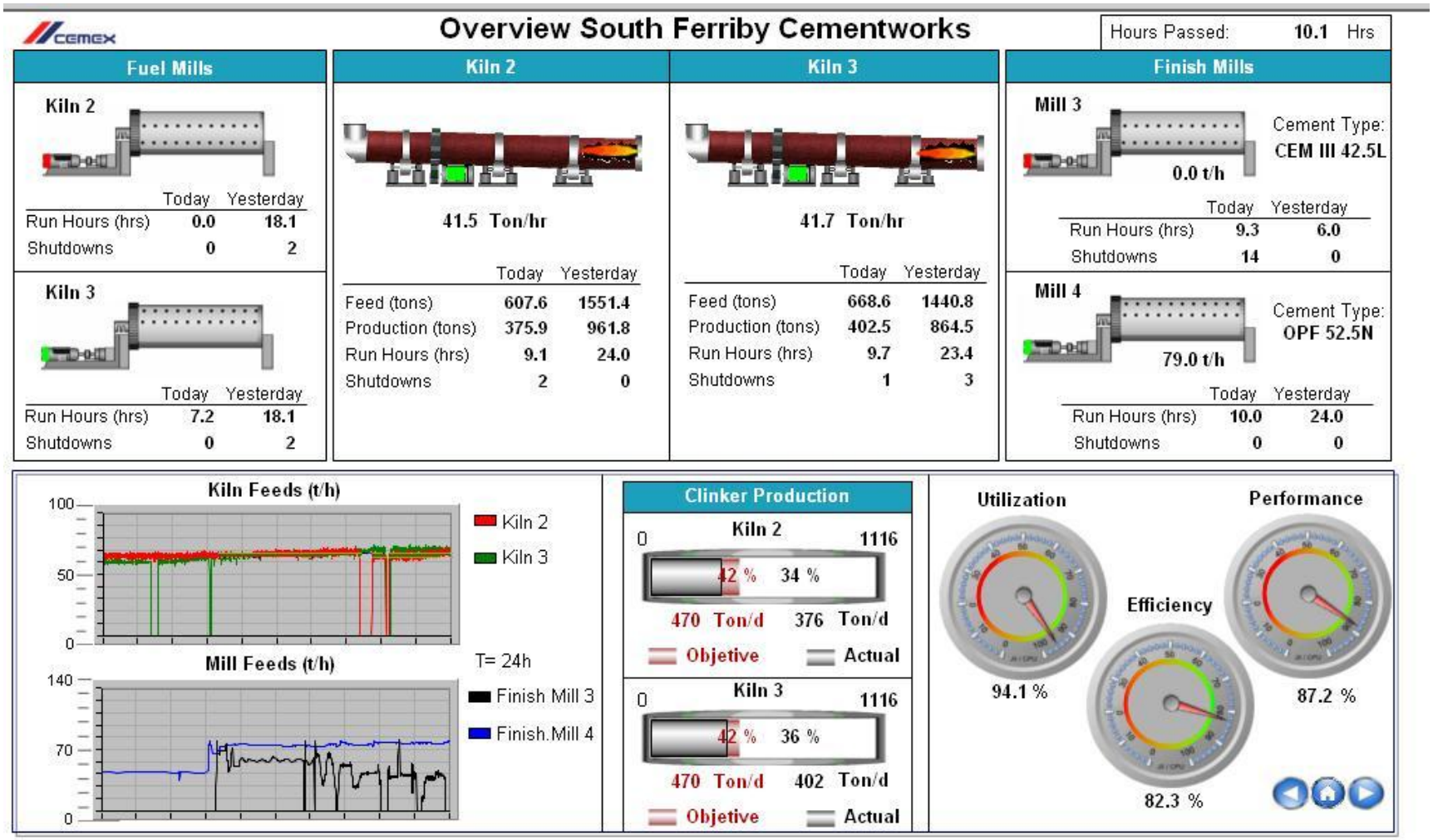
Overview Displays



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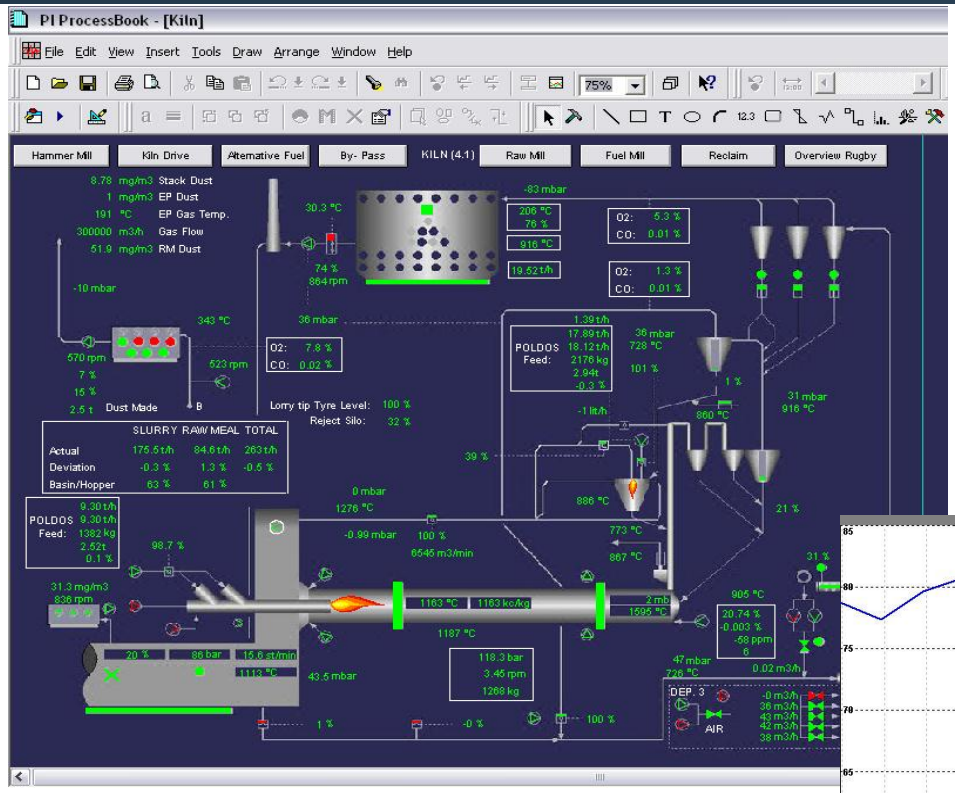
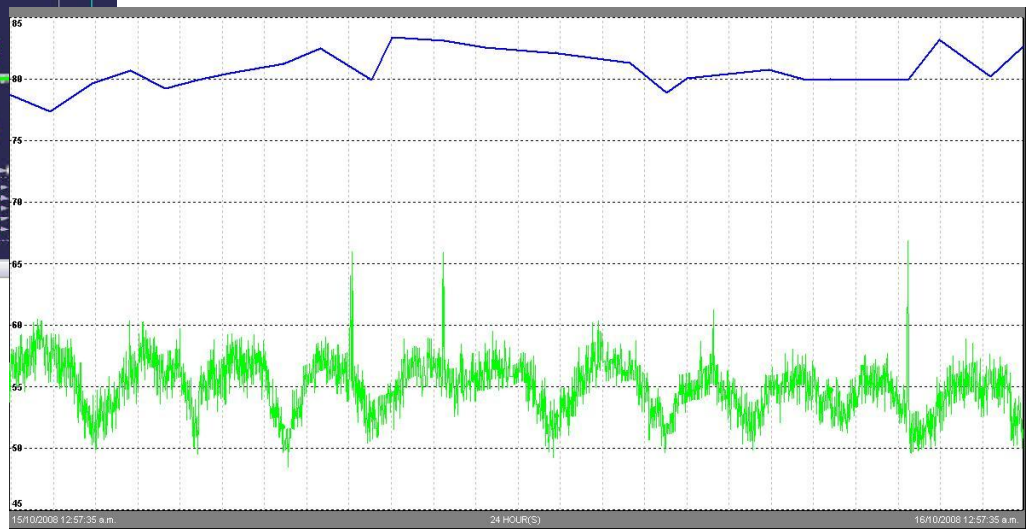
Trend and Graphics Displays



Kiln Display

Operation Trend



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Present Status

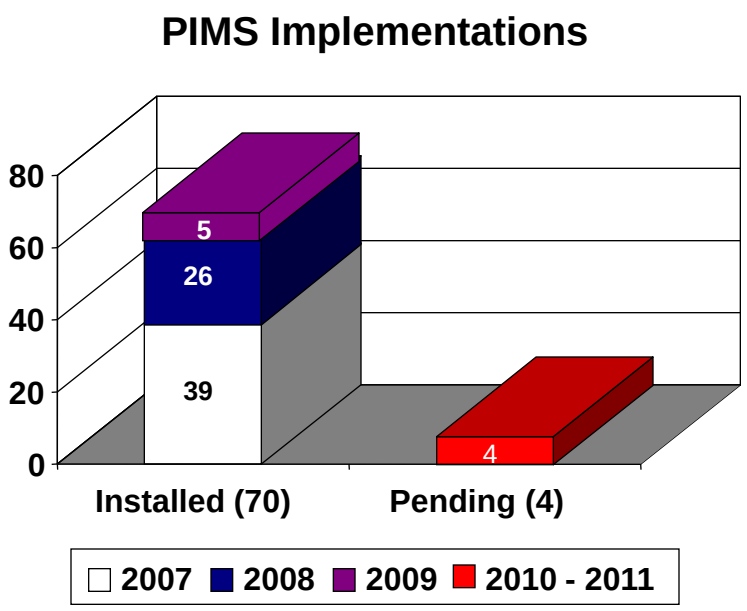
Implementation Scope and Status

Functional scope of the PIMS implementation includes:

- PI Database
- System control Interfaces
- Development and deployment of Process Book & DataLink clients
- PI Interface with Institutional Quality System (SICA)

Process scope includes:

- Raw mill
- Kiln
- Coal mill
- Cement mill



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World Wide Status

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Phase 2 - How to Get More Value

Simply call the CoE!!!!

Phase two - Scope

PIMS areas and processes to integrate (in progress):

(I) Cement Areas

1. Crushing, Quarries and Packing

(II) Support Processes

1. Energy
2. Quality
3. Maintenance
4. Environmental
5. Downtime tracking

(III) Standardization

1. Servers

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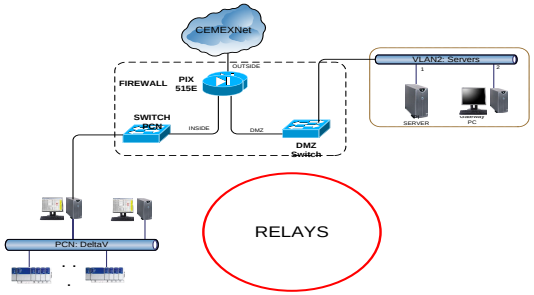
Phase two - Crushing

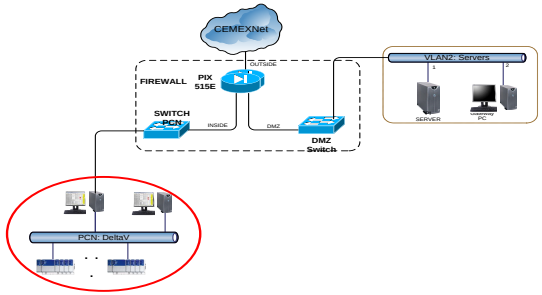
Objective: Collect information from Quarries and Crushing areas in all CEMEX Plants.

The Integration for the Quarries will be Manual Input. For Crushing areas different situations were found represented by the next scenarios.

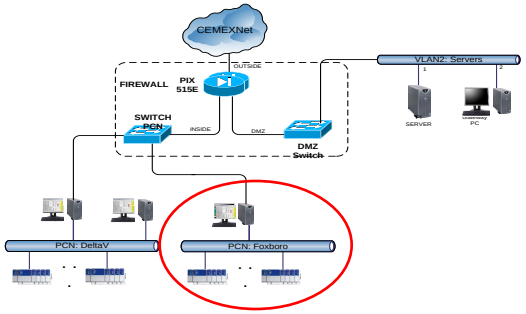
Process Control System based on Relays



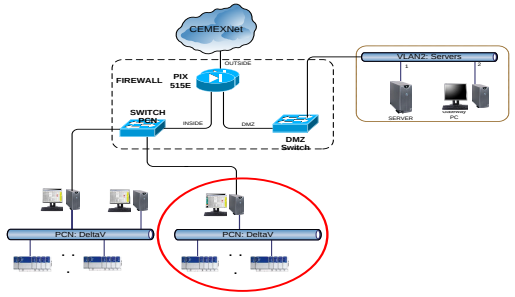
Process Control System integrated with the Current PIMS



Process Control System isolated and different with the rest installed and currently connected with PIMS



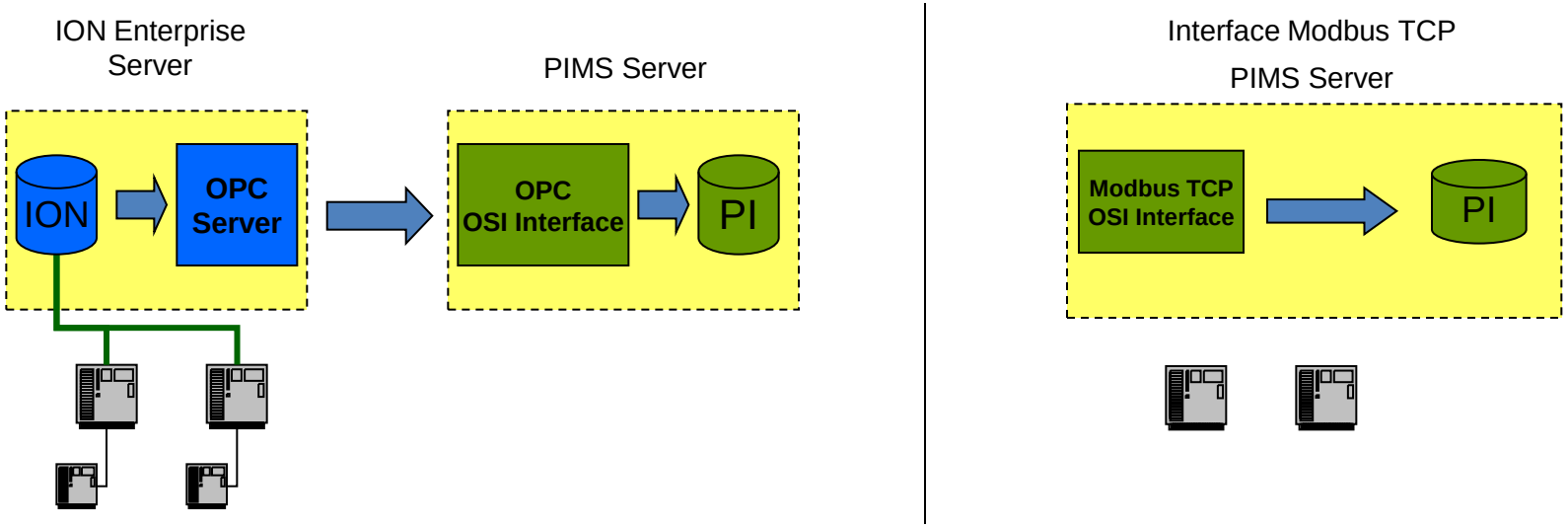
Process Control System isolated the same brand that is currently connected with PIMS



Phase two - Energy

Integrate information from Energy Monitoring Systems
in 24 CEMEX Plants.

Two Integration Scenarios have been considered.



Project already started, supported by OSIsoft'S CoE

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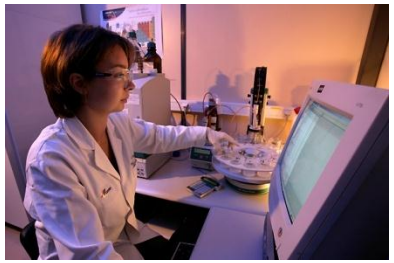
Phase two - Quality

Integrate Quality Lab Equipment to PIMS and develop new functionality in order to replace actual Institutional Quality Systems.

- Analyze and evaluate alternatives to integrate Quality information on a single platform and replacing Quality applications functionalities such as:
  - ✓ Data extraction (interface)
  - ✓ Manual Input
  - ✓ Plant Configuration
  - ✓ Reports
  - ✓ Quality Assurance Margin indicator
  - ✓ Interfaces to another systems

- Replacing these functionalities allows CEMEX to reduce TCO costs, by eliminating actual Quality Systems expenses like:
  - ✓ Application Support
  - ✓ Hardware Maintenance
  - ✓ Software Upgrades



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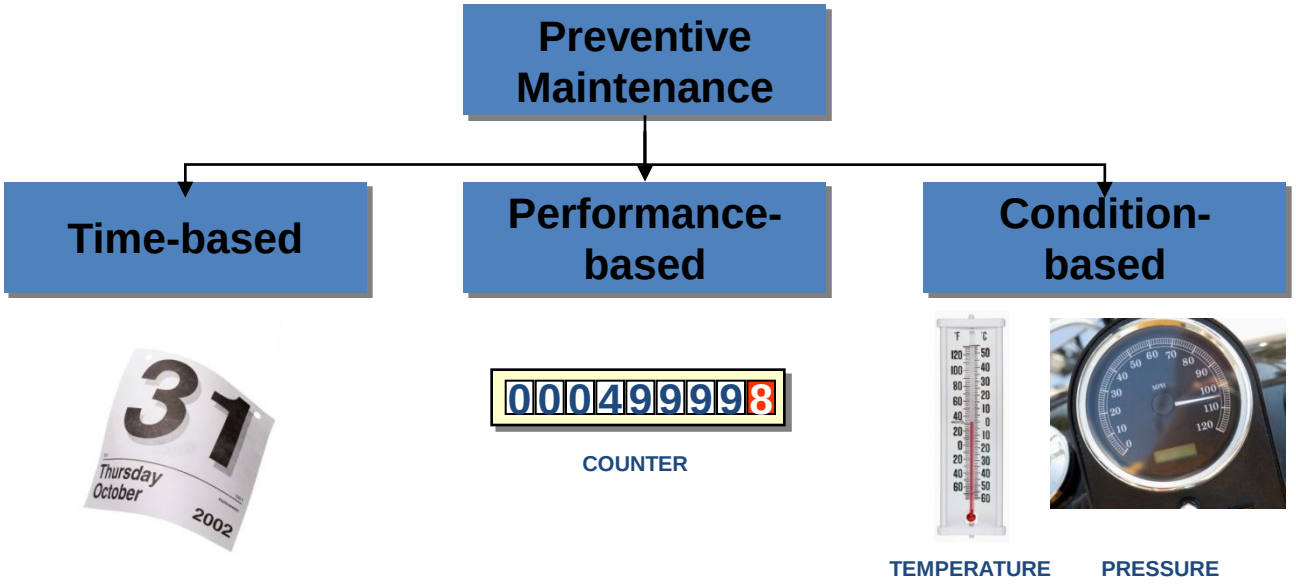
Phase two - Maintenance

- Improve assets utilization and reduce maintenance costs by providing indicators and trigger tags for preventive maintenance based on performance and operation conditions.

- Integrate process control data from the main equipment to calculate tags that trigger automatically work orders for preventive maintenance through the ERP.



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Phase two - Environmental Emissions

- Design and build the infrastructure to integrate the Continuous Emissions Monitoring System Information to the Process Control System.
- Applications to correlate it with process control conditions. (83 Kilns were integrated in 2009).
- KPI's and statistical information for Operations and Sustainability Users.

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Phase two - Downtime tracking

- Increase utilization KPI for plant equipments.
- Generate reports & graphs to support downtime root-cause analysis.
- Integrate downtime information to ERP systems.

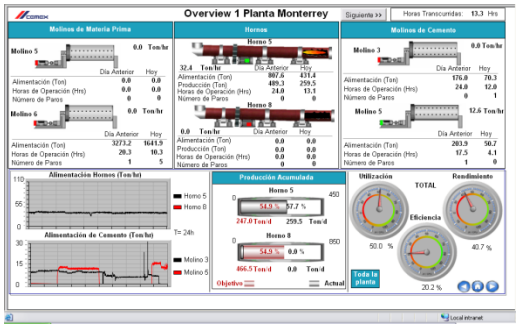
Phase two - Standardization

Standardize how we generate and deploy our applications, including:

- Variable Naming and Structure, Dashboards, Formulas and PI upgrades. (Early PIMS Implementations).
- Variable Naming and Structure, Formulas and PI upgrades (Late 2007 Implementation).
- Formulas. (Latest implementations 2008).
- All this using of Module Database and PI ACE.

Example Calculation Formula:
IF MOTOR = ON AND
FEEDING > 5% Hourly Equipment Capacity
THEN MILL = ON ELSE OFF

Overviews:



Example Variable Naming:
DE-RDF-CON-21301-60005-61201-DTH (Germany-Rüdersdorf-Consumptions-Gypsum-Cement Mill 5-CEM I 32,5 R-Draft Totalized Hourly)

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EA Supporting CoE Services

For all these projects the OSIsoft Center of Excellence provides supporting services:

- Value Mapping Design Sessions
- Architectural Roadmaps
- Project Advisory Services

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EA advantage for CEMEX

- Focus on deliver standardized cement applications for all the corporation.
- Reduce TCO, moving existing applications to PIMS based on OSIsoft infrastructure.
- Reduce time and money on new applications deployment (use the infrastructure no more licenses required).

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Key steps for successful rollout

- Internal sale
  - The strategy vision of the use of the technology to the top management
  - To implement the infrastructure project
- Integration of a multidisciplinary team.
- Integration of the IT and Automation areas
- Team work
- Equipment Assessment
- Design and procurement pre-site activities
- Use as much as possible remote activities (remote installation, webex, etc.)
- Use the OSIsoft CoE to generate value projects

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Q&A

Thanks for your attention!!!

Questions

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Thank you

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