OSIsoft® UC 2010

Real Time Information — Currency of the New Decade

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Smart Monitoring on Cement Plants for Energy Efficiency

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Agenda

- About CEMEX
- Enterprise Agreement CEMEX-OSIsoft
  - Why become an EA?
  - Existing infrastructure
  - Where we're getting value
  - Corporate Challenge
- Energy KPI application
  - Center of excellence assistance
  - Architecture
  - Implementation (PI ACE + PI MDB)
  - Benefits

About CEMEX

CEMEX is a growing global building-solutions company that produces, distributes, and markets Cement, Ready-Mix Concrete, Aggregates, and related building materials.

- Operations in 50+ countries
- 93 million metric tons of Cement
- 74 million cubic meters of Concrete
- 66 million metric tons of Aggregates
- 69 Cement Plants
- 1,900 Ready-Mix Concrete Facilities
- 394 Aggregate Quarries
- 58 Land-Distribution Centers
- 80 Marine Terminals

CEMEX-OSIsoft History

1995– 2006 License based model:

- PI implementation based in growing projects
- 10 Cement plants with PI server installed

2007 – 2009 Create a corporate infrastructure:

- Internal project:“PIMS”, **P**lantwide **I**nformation **M**anagement **S**ystem based in PI server
- CEMEX-OSIsoft Enterprise Agreement

Enterprise Agreement CEMEX-OSIsoft

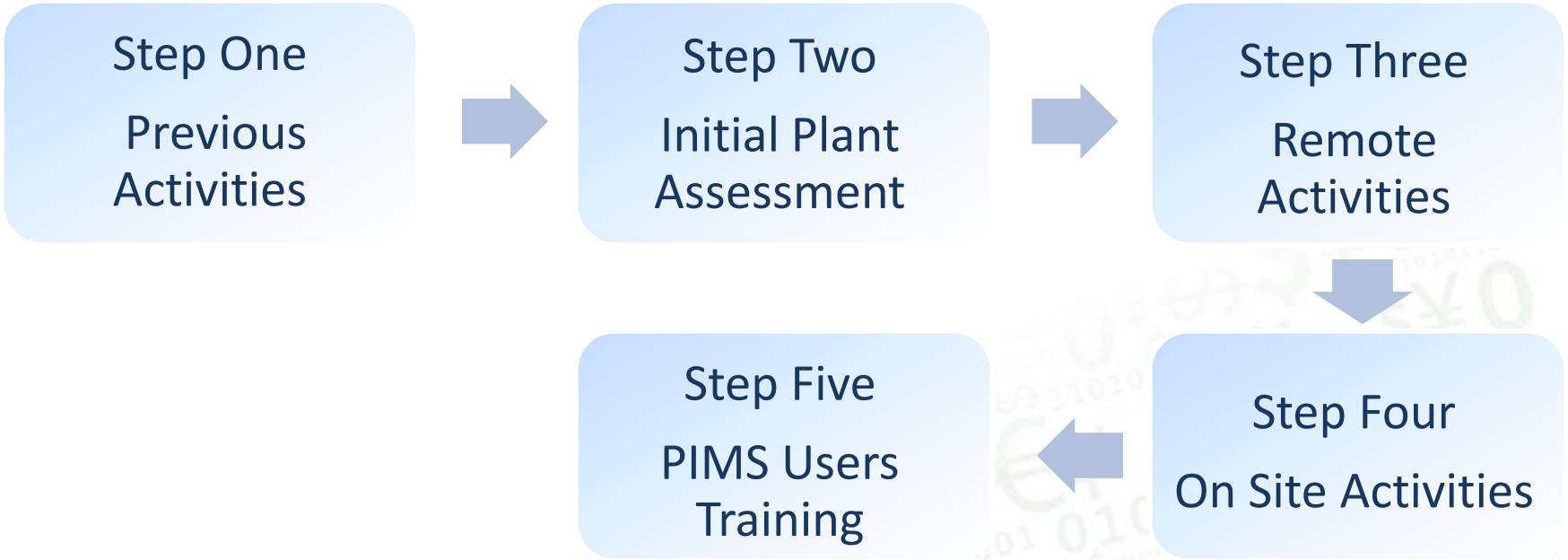
Why become an EA?

- Unlimited use of tags
- Unlimited client licenses
- CoE support
- Field Services
- Training
- Asset Monitoring

For more about why and how we became EA partners with OSIsoft, see CEMEX UC 2007 presentation

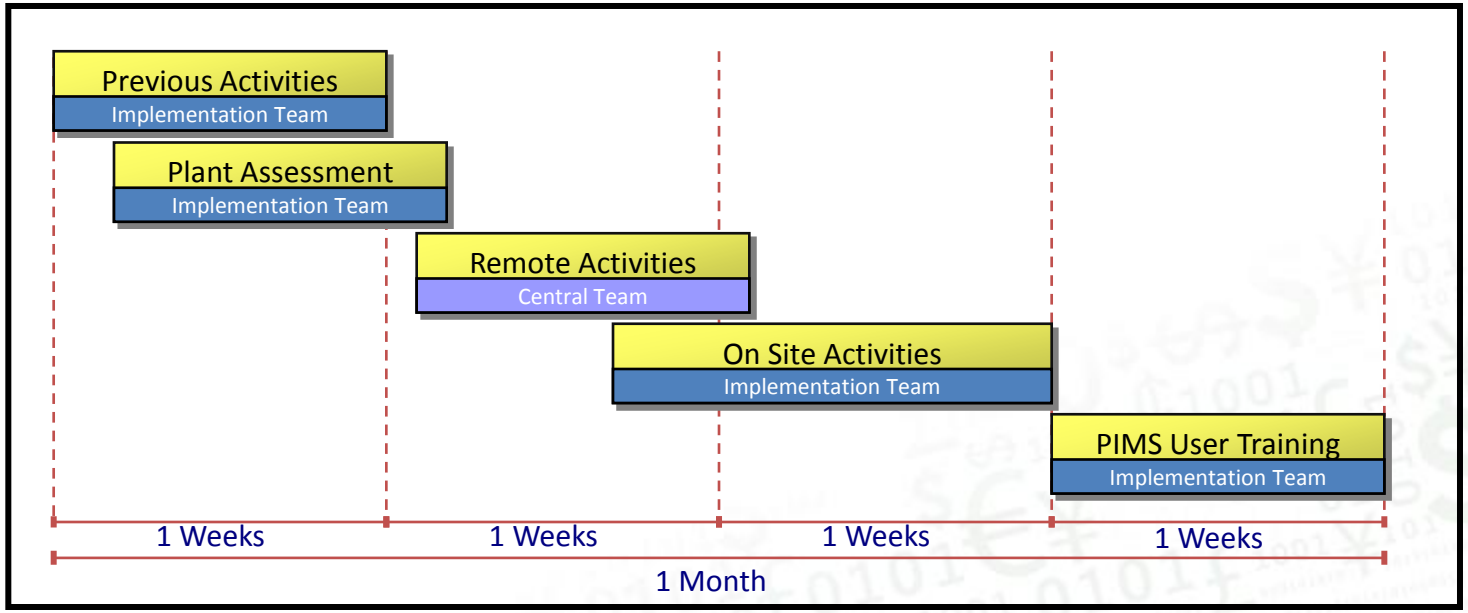
Enterprise Agreement CEMEX-OSIsoft

Plant Implementation Procedure



Enterprise Agreement CEMEX-OSIsoft

Plant Implementation Schedule



Enterprise Agreement CEMEX-OSIsoft

Functional scope of the PIMS implementation includes:

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

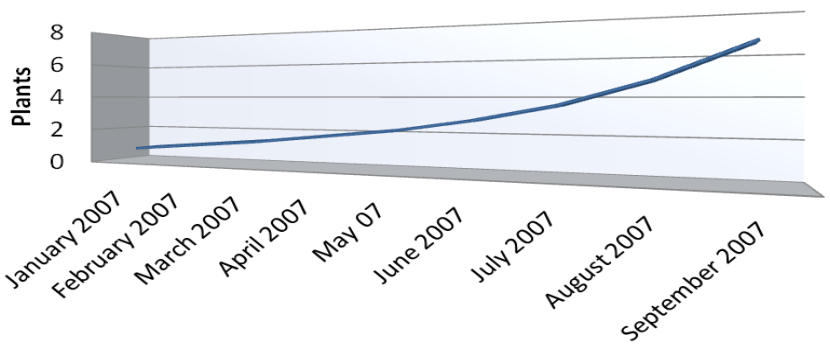
Process scope includes:

- Raw mill
- Kiln
- Coal mill
- Cement mill

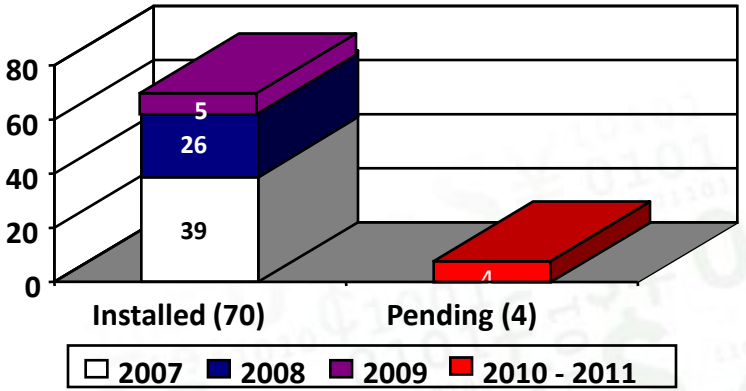
Enterprise Agreement CEMEX-OSIsoft

Plant Implementation Progress

Learning Curve



PIMS Implementations



For more about how we made the EA rollout, see CEMEX UC 2008 presentation

Enterprise Agreement CEMEX-OSIsoft

- 69 Plants monitored by 59 PI Servers
- 65 Plants completed in the first 20 months (2007-2008)

Enterprise Agreement CEMEX-OSIsoft

Where we're getting value

- ✓ Quality
- ✓ Maintenance
- ✓ Environmental
- ✓ Downtime tracking
- ✓ Energy

For more about how we are using the EA infrastructure, see CEMEX UC 2008 presentation

Background

Cement making process: Raw material mix passes through a rotary Kiln at temperatures exceeding 1200°C to form Clinker that is cooled and then ground into cement.

This process uses large quantities of calorific energy to burn the materials in the Kiln that generates CO2 emissions, and electrical energy to grind these materials in the Raw and Cement Mills.

Energy Business Challenge

- Reducing Fossil Fuel & Electric Power costs involves efforts from different process areas, with the majority falling on the Cement Making Operations.

- In addition, a better mix of alternative and fossil fuels could reduce the environmental foot print even more.

Problem Addressed

Need of tools and indicators to accurately measure and control all the energy being consumed by each piece of equipment.

"You can control only what you can measure"

Problem Details

- Detailed energy consumption not available for control purposes
- Calorific consumption detail available only in certain cases
- Electrical energy measurement only for control demand and billing purposes
- Need of a tool to make operational process adjustments for the efficient use of total energy (calorific & electrical), avoiding waste

Solution Challenge

Reduce operational cost and environmental foot print through a better use of Fossil fuels & electrical power.

Should be:

Economical (No budget)

Easy to implement (No developers)

Done by a small team (Avoiding administrative costs)

Easily replicated for all company assets having the appropriate infrastructure

Center Of Excellence Assistance

CoE Engineer

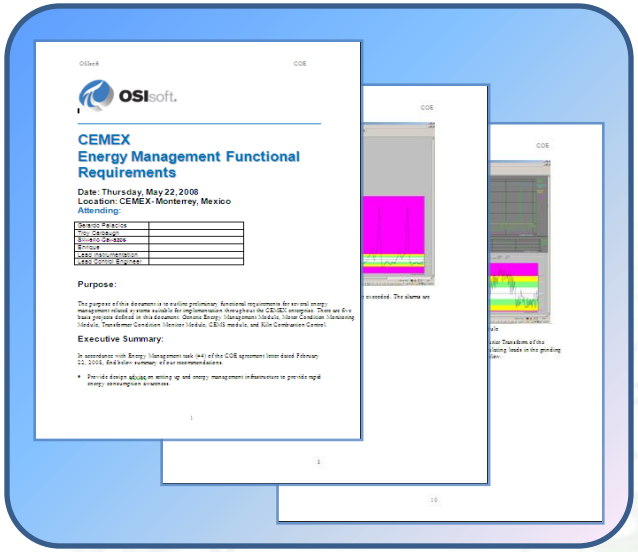
- Chuck Wells

Activities

- 1 Kick off meeting
- 2 Remote meetings

Deliverables

- Letter of scope
- Technical specifications



Solution

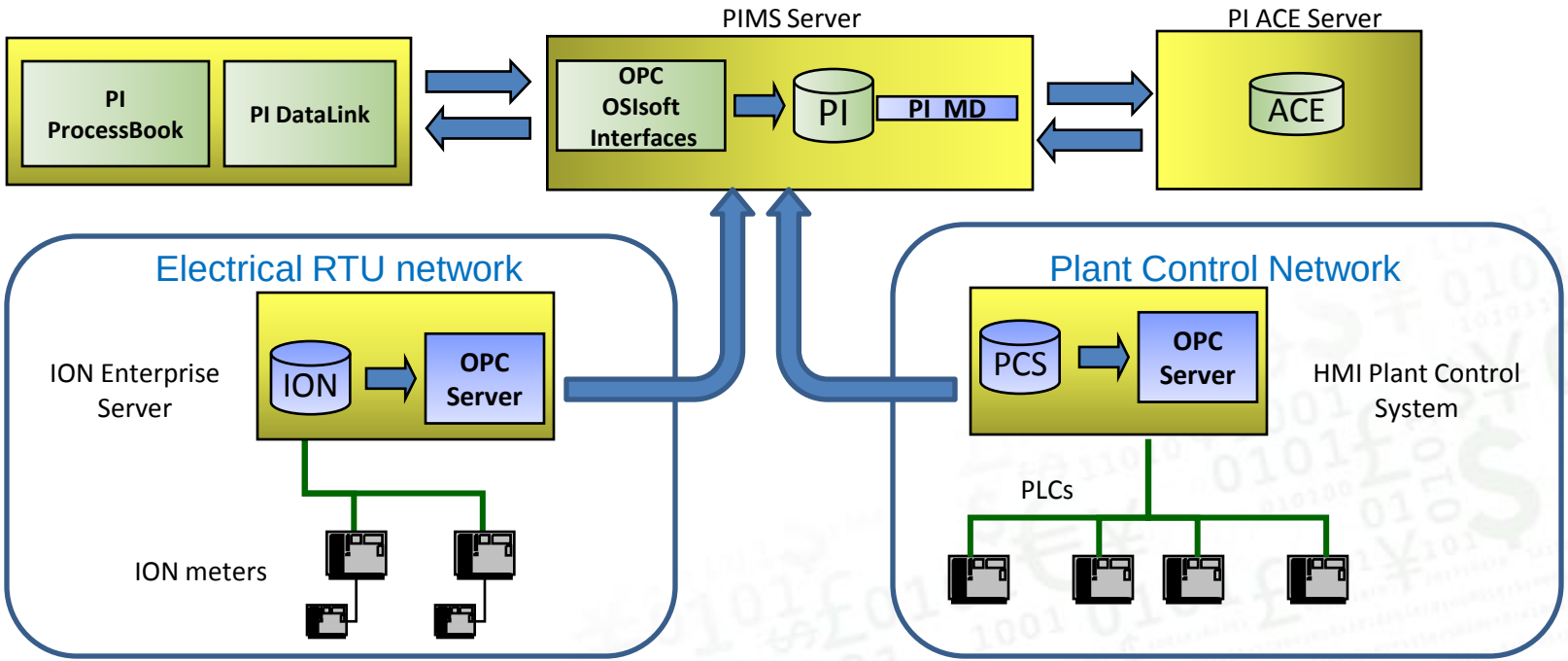
Energy KPI application based on ACE and Module Database

Technical Details

- Standard metrics: Same KPI (calculation & units) for all major equipment in every Cement Plant
  - –Specific electrical consumption: kWh/ton
  - –Specific calorific consumption: kCal/kg
  - –Specific total energy consumption: Mj/ton
- Replicable: Easy (almost zero effort) for deployment in the remaining plants
- Minimum investment: Use existing Real Time Infrastructure - PI ACE & PI MD (due to Cemex – OSIsoft EA)

Energy KPI application

Solution Architecture Diagram



Energy KPI application

Technology

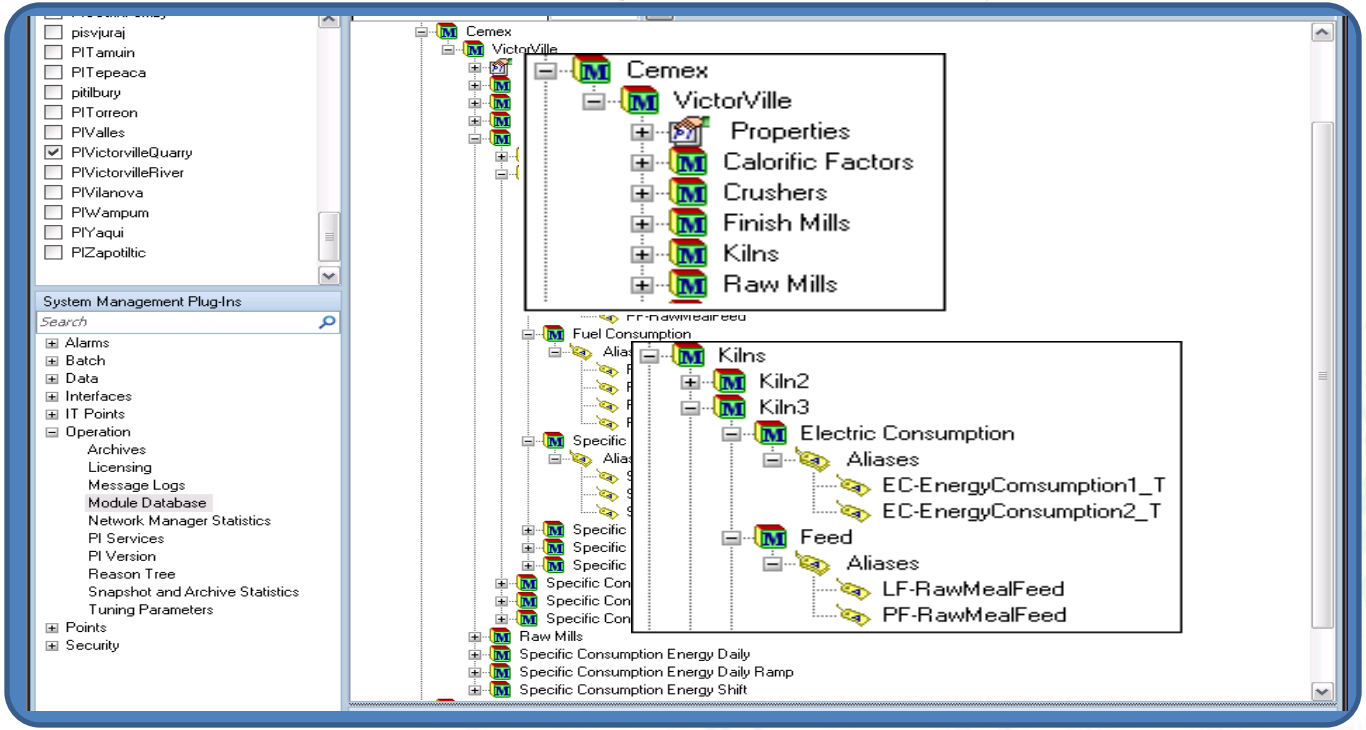
- PI ACE
  - Standardized KPI calculations, units' conversions, totalizers' modes and periods
- PI Module Database (MD)
  - Input & output tags, conversion factors, type of energy

Scope

- Pilot implemented in Victorville Plant in California, US

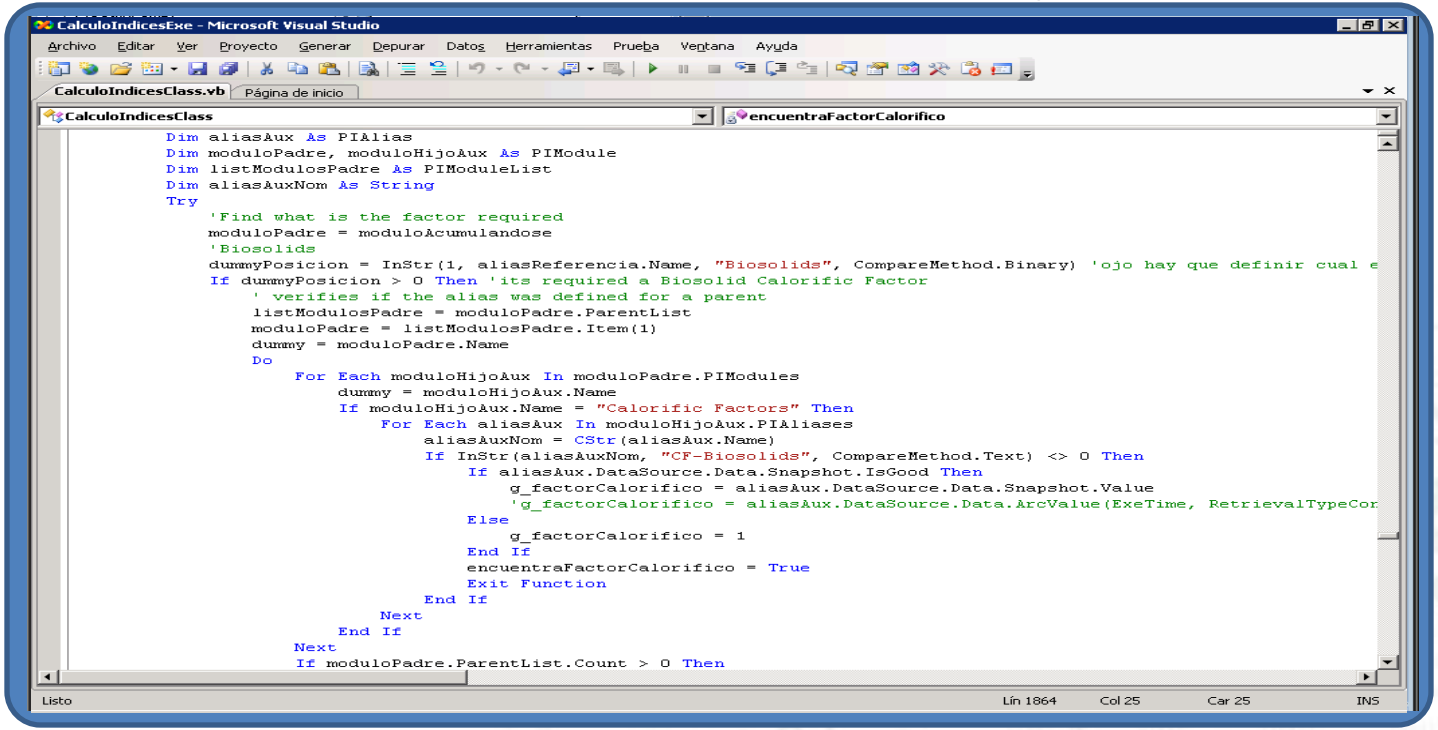
Energy KPI application @ Victorville plant

MDB Configuration Example



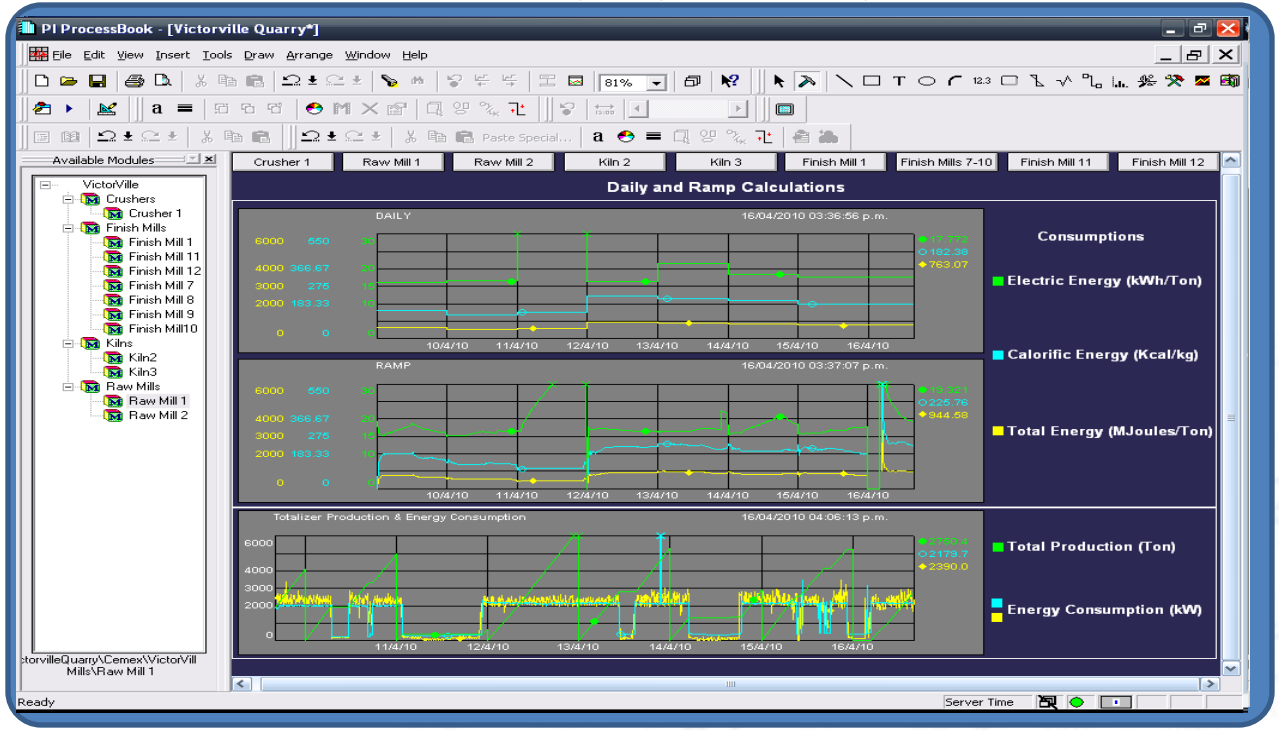
Energy KPI application @ Victorville plant

ACE VB:NET Code example



Energy KPI application @ Victorville plant

PB Displays Examples



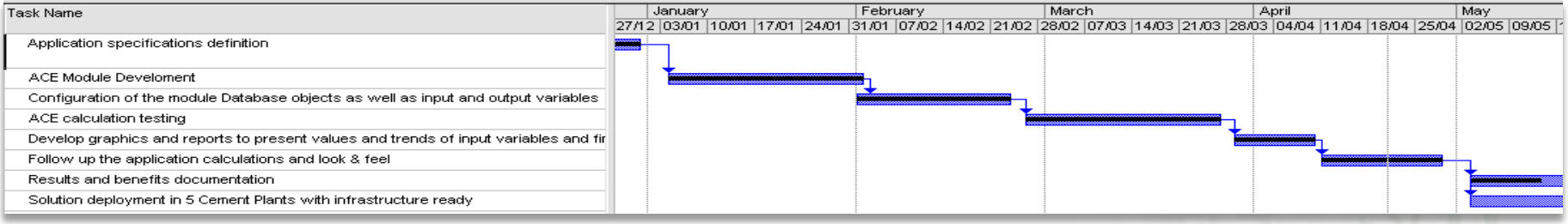
Energy KPI application @ Victorville plant

Results & Benefits

- Enhanced online detailed view of energy consumption
- Reduction in the use of fossil fuels
- Cost reductions in the use of energy (cost estimation being evaluated)
- Project applicable for carbon credits
- Easy replication in other facilities

Energy KPI application @ Victorville plant

Project Schedule



Energy KPI application @ Victorville plant

Next Steps

- Result and benefits documentation
- Solution deployment in 5 Cement Plants with infrastructure ready
- Deployment in the rest of CEMEX Cement Plants around the world

Energy KPI application @ Victorville plant

Recap

- Benefits from the EA with OSIsoft
- 70 plants using PI server and clients tools
- Need for a reduction in the use of electric and calorific energy
- Application for energy measurement and benefits
- Q & A

Thank you