Maximize Your Facilities Management, Maintenance and Energy Performance
Agenda

• Facility Management Areas
• Facility Maintenance Challenges
• Facility Management Opportunities
• How Do We Get There
• Maximize Your Opportunities
• Case Study
Facility Maintenance Areas

• Areas of Interest
  – Health and Safety
  – Fire Safety
  – Maintenance Systems
  – Periodic statutory testing and inspections
  – Operational
  – Commercial property management
  – Business continuity planning

• Each of these areas has their own specific disciplines, aspects and processes
Facility Maintenance Systems

• Heating, ventilating, air conditioning and refrigeration (HVAC)
• Preventive and predictive maintenance
• Corrective maintenance/Reactive repairs
• Building automation systems
• Building fabric and decorative
• Grounds maintenance and horticulture
• Computerized maintenance management system
Business Challenges We See

- High facility maintenance costs dilute margins
- Lack of insights into facility and equipment health
- Constantly evolving rules and regulations
- Too much data, too little clarity
Opportunities: What if you could?

- Increase ROA with an effective maintenance strategy
- Pre-empt asset emergencies
- Lessen risk of compliance related violations
- Replace guesswork with facts
How Do We Get There?
Predictive Maintenance

Reduces Unexpected Facility Failures

- **Intelligent Indicators**
  - Early warnings of asset conditions

- **Automatic Actions**
  - At first indication of problem

- **Dynamic Inventory**
  - Ensures never short-handed

- **Mobile Access**
  - Equips field for immediate action

“If there is a problem, it shows up easily. We can often catch problems before they occur.”
Conditioned based maintenance (CBM) reduces lifecycle costs

- Checklists power inspections
- Variances generate actions
- Meters time optimal maintenance
- Automated claims submissions

Increase ROA
Infor EAM PdM Implementation
Inspection Check List (iPad)
Facility Structure

Campus

BLD 01
- Floor 01
- Floor 02
- Floor 03
- Room 301
  - Desk
  - Chair
  - Computer

BLD 02
- Floor 01
- Floor 02
- Floor 03

BLD 03
- Floor 01
- Floor 02
- Mechanical Room
- Pump 01
- Pump 02
- Pump 03
Work Process Flow

Projects\CBM\PdM
- Email Notification
  - Labor
  - Materials
  - Outside Service
  - Verify Warranty
  - Collaboration

Request\Call Center
- Work Order
  - Plan
    - Schedule
      - Perform
        - Complete
          - Analyze

PM Schedule
- Email Notification
  - Labor Hours
  - Materials Used
  - Book Vendor Hrs.
  - DT Hours
  - Comments
  - Check Lists
  - Closing Codes
Work Request

Work Request: 34644
Description: Leaking
Facility/Equipment: BLD-866-F1 Floor #1
Location: POLY01 NA Location
Department: FAC1 Safety

Work Request Details
Type: Breakdown
Class:
Status: Work request
Priority: High
Reject Reason:

Scheduled Start Date: 10/15/2013
Cost Code: 00121
Problem Code: LEAK
Assigned To: CTROWHILL

Origination
Requested By: DMAXWELL
Date Reported: 10/15/2013 12:49

Custom Fields
Warranty Verified?: FULL

Comments
Add/Edit Comments
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<tr>
<th>Activity</th>
<th>Note</th>
<th>Trade</th>
<th>Task</th>
<th>Material List</th>
<th>Estimated Hours</th>
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<th>People Required</th>
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### Work Order Activities

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<tr>
<th>Work Order</th>
<th>Description</th>
<th>Activity</th>
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<th>Hours Remaining to be Scheduled</th>
<th>People Remaining to be Scheduled</th>
<th>Sched. Start Date</th>
<th>Sched. End Date</th>
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<td>Unit Will Not Turn On</td>
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iPad Menu
<table>
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<tr>
<th>Event</th>
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<th>Failure Code</th>
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<tr>
<td>34598</td>
<td>ORG1</td>
<td>Emergency</td>
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# WO Cost Details

**Currency:** US Dollar

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**Unreturned Core Charges:** 0.00
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<th>Labor Cost</th>
<th>Tool Cost</th>
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Total Material Cost: 46,599.33
Total Labor Cost: 20,782.40
Total Tool Cost: 0.00
Total Overall Cost: 67,381.73
Maximize your Opportunities

• Energy Performance Management
• Capital Planning
• Procurement Engineering
• Project Management
• Space Management (CAD)
Energy, Sustainability Monitoring

Improves Awareness & Calls to Action

- Fully Integrated Energy Management
- Energy Alerts
- Improved Energy Efficiency
- Managed GHG Footprint and Sustainability Reporting

**Infor Difference:** Monitor energy performance at the asset level plus GHG reporting

“With Infor EAM Asset Sustainability, we gained annual energy savings of $200,000 during the first phase, and increased overall efficiency and maintenance productivity by 25%”
Infor EAM PdM Implementation

Source

INFOR EAM

PdM Data Model

Building Automation

SCADA/PLC

Databases

Plant Historians

Smart Grid Sub-Meters

Inspection or Integration

Grid Designer

Schedule (Minutes, Hours, Days, Weeks, Months)

Before SQL

Standard WO

Work Order

Email Notification

PdM Schedule and Execution

Grid Parameter

Grid Data

Email Alert

Email Template

PdM Output

Alert History

After SQL

Exception

Email Notification
Data Population

4 Ways to Populate Energy Data to EAM
Automation, flat file transfer, manual entry, EDI

1. i.Lon, or PI System, or other
   → Infor ION
2. Meter / Sub Meter Data
   → BMS
3. Email Alerts Anomalies
   → 810
4. Utility bill data, EDI

Building

Database
EAM

CSV File
CSV File
Web Service Alerts
XML

Hand-key data to ASE screens
Spreadsheet upload utility

RED = Automation of data from meters/submeters
BLUE = Automation of meter data via BMS
ORANGE = Manual data entry
GREEN = EDI utility bill data directly from utility co.
## Operations & Energy Management

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Gas Index</strong></td>
<td>Monitors power use. Informs user of energy efficiency degradation in relation to asset performance</td>
</tr>
<tr>
<td><strong>Phase Imbalance</strong></td>
<td>Monitors power quality. Informs user of energy quality, efficiency, and asset performance degradation due to unequal (phase) incoming line voltage</td>
</tr>
<tr>
<td><strong>Total Harmonic Distortion (THD)</strong></td>
<td>Monitors power quality. Informs user of energy efficiency, system losses, and asset performance degradation due to system harmonics. See: Power Factor</td>
</tr>
<tr>
<td><strong>Power Factor (PF)</strong></td>
<td>Monitors power quality. Informs user how effectively electrical power is being used. See: Harmonics</td>
</tr>
<tr>
<td><strong>Interval Data Purge</strong></td>
<td>Purges obsolete interval data, Retains purged interval data as daily summation</td>
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</table>
# Operations & Energy Management

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<thead>
<tr>
<th>Time-of-Use (TOU)</th>
<th>Informs user of abnormal energy use by period of day, helps facilitate control changes and behavioral change.</th>
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<tbody>
<tr>
<td>Peak Demand</td>
<td>Monitors interval (15 minute) consumption. Informs user of approaching or exceeded established or experienced peak demand consumption during month.</td>
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<tr>
<td>Utility Bill Audits</td>
<td>Based on Monthly Utility Bill and surrogate Utility Meter monitored interval data. Identifies billing problems warranting immediate attention prior to payments</td>
</tr>
<tr>
<td>Utility Bill Analysis (Load Factor)</td>
<td>Load factor analysis of monthly Utility Bill. Informs user whether they should focus on reducing energy consumption or TOU demand</td>
</tr>
<tr>
<td>Budget (Base Year)</td>
<td>Monitors energy consumption and cost against base year (incl. weather normalized). Informs user of budget performance issues on a month-to-date and year-to-date basis. Helps identify where to focus energy management efforts, and enables setting realistic energy management goal</td>
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</tbody>
</table>

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**NFMT 2014**

National Facilities Management & Technology

March 4-6, 2014 • Baltimore
<table>
<thead>
<tr>
<th>Operations &amp; Energy Management</th>
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<td><strong>Budget (Base Year)</strong></td>
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<td><strong>YTD vs. Base</strong></td>
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<td><strong>MTD vs. Base</strong></td>
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<td><strong>Base-load</strong></td>
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<td><strong>Utility Bill (Missing)</strong></td>
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<tr>
<td><strong>Invoices waiting on approval</strong></td>
</tr>
</tbody>
</table>
PM vs. Energy Loss

Equipment

AC-2 :: Air Conditioner 2

Year 2013

Gas Index

PM vs Energy Loss Costs

Cost

Week
Organization: City
Select Tags: City Operations

Energy (MWh) by Source:
- Diesel: 51.51% (36,992.4 MWh)
- Gasoline: 44.58% (34,052.37 MWh)
- Natural Gas: 1.5% (1,055.19 MWh)
- Purchased Electricity: 2.11% (1,598.27 MWh)

Energy (MWh) by Facility:
- Station 002: 13,286.79 MWh
- Municipal Bldg 2100: 12,907.12 MWh
- Station 001: 11,751.06 MWh
- Mayor's Office: 11,726.95 MWh
- Office 2200: 11,612.3 MWh
- Station 003: 11,530.55 MWh
- Others: 0 MWh
<table>
<thead>
<tr>
<th>Source</th>
<th>Facility</th>
<th>Level</th>
<th>Energy (MWh)</th>
<th>Period</th>
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<tr>
<td>Diesel</td>
<td>Vehicle Fleet CPD</td>
<td>Municipal Operations: Police Dept</td>
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<td>Diesel</td>
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Space Management
For
EAM
OpenCad for EAM Provides

- Full CAD Capabilities
- Plant, Operations and Facilities
- Navigation Plant & Buildings
- OpenCAD Graphics Query and Requestor
- Route Planner
- Space Planner
- Full Integrated with EAM
OpenCAD allows you to manage EAM assets (as room) into CAD drawings (DWG and DGN format) using text and polyline for surface calculation, without using AutoCAD or Micro Station.
Bentley University

- Located near Boston, Massachusetts
  - 49 facilities
  - 5,000 students & 1,200 employees
- Dedicated to preparing a new kind of business leader
- Offers a unique blend of business and liberal arts education
- Using Infor EAM for several years
  - Manages 42,000 annual work orders
- Turned to Infor to find ways to reduce energy consumption & carbon emissions
Seeing the Results

• Reduce electrical consumption by nearly 10%—
  – more than 2 million kWh,
  – equal to turning off campus electricity for 30 days
• Automate dorm room inspections and processing of 42,000 work orders per year
• Improve direct labor productivity by 25% while reducing overtime costs
• Reduce equipment failures via predictive maintenance
• Capture ad hoc asset data quickly using mobile devices
• Upgrade work management processes, reducing training and IT costs
Thank You

Dwayne Maxwell
Business Solutions Consultant, Infor
dwayne.maxwell@infor.com