OSIsoft® UC2010

Real Time Information — Currency of the New Decade

Hilton San Francisco Union Square | San Francisco, CA

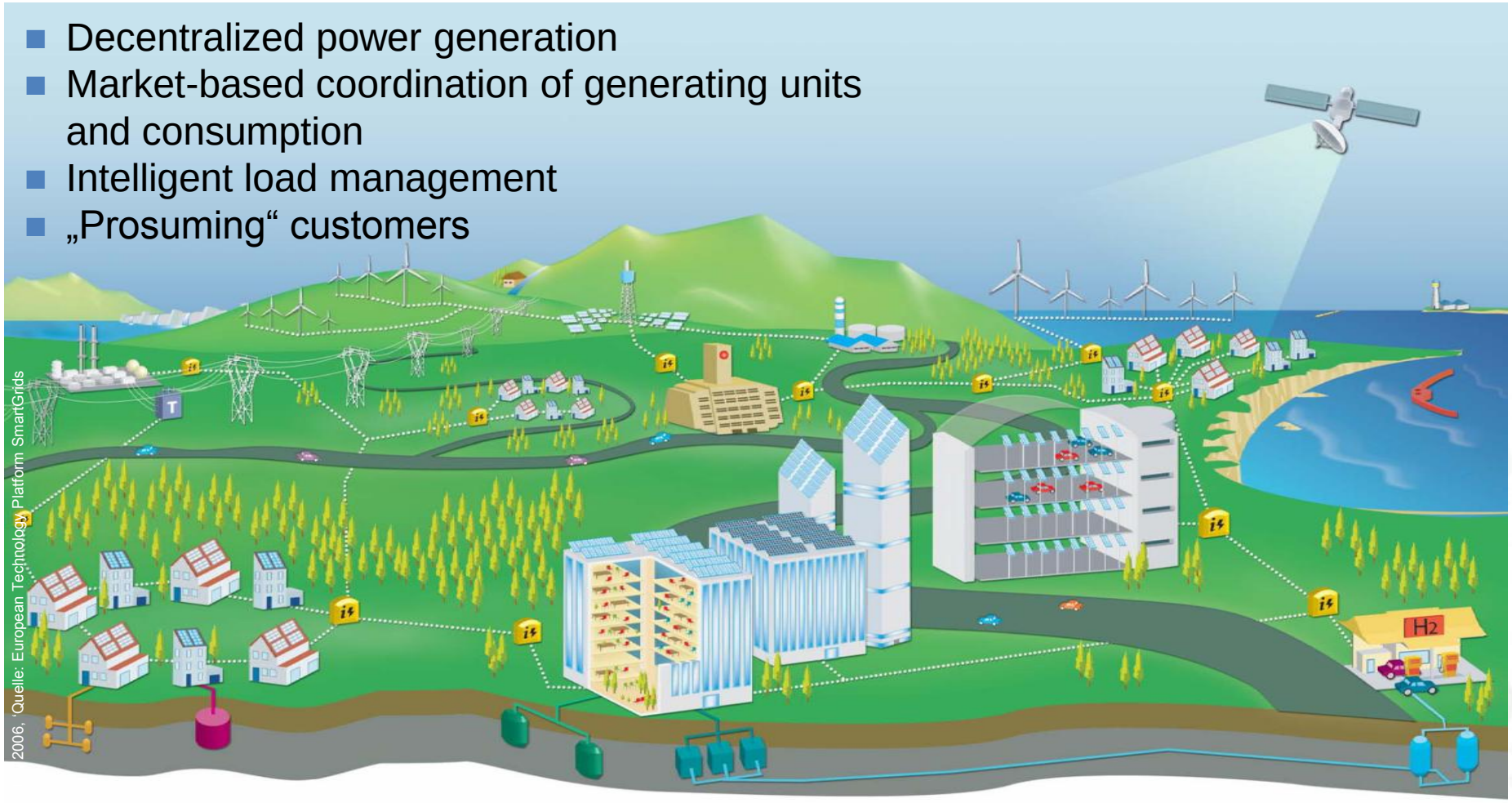
April 26-28, 2010

Energy Industry Challenges

- Global economic crisis; severe hurdles to capital-raising
- Extreme energy price volatility and uncertainty
- Backlash from energy consumers
- Urgent need to achieve energy independence and security
- Impending climate change legislation to address greenhouse gas emissions
- Increasing environmental and jurisdictional constraints
- Aging infrastructure
- Demand for energy Increasing
- Power Generation moving from fossil fuel to renewable assets
- Risk of power supply disruption increasing due to demand and intermittency of renewable is growing

An Integrated Energy System

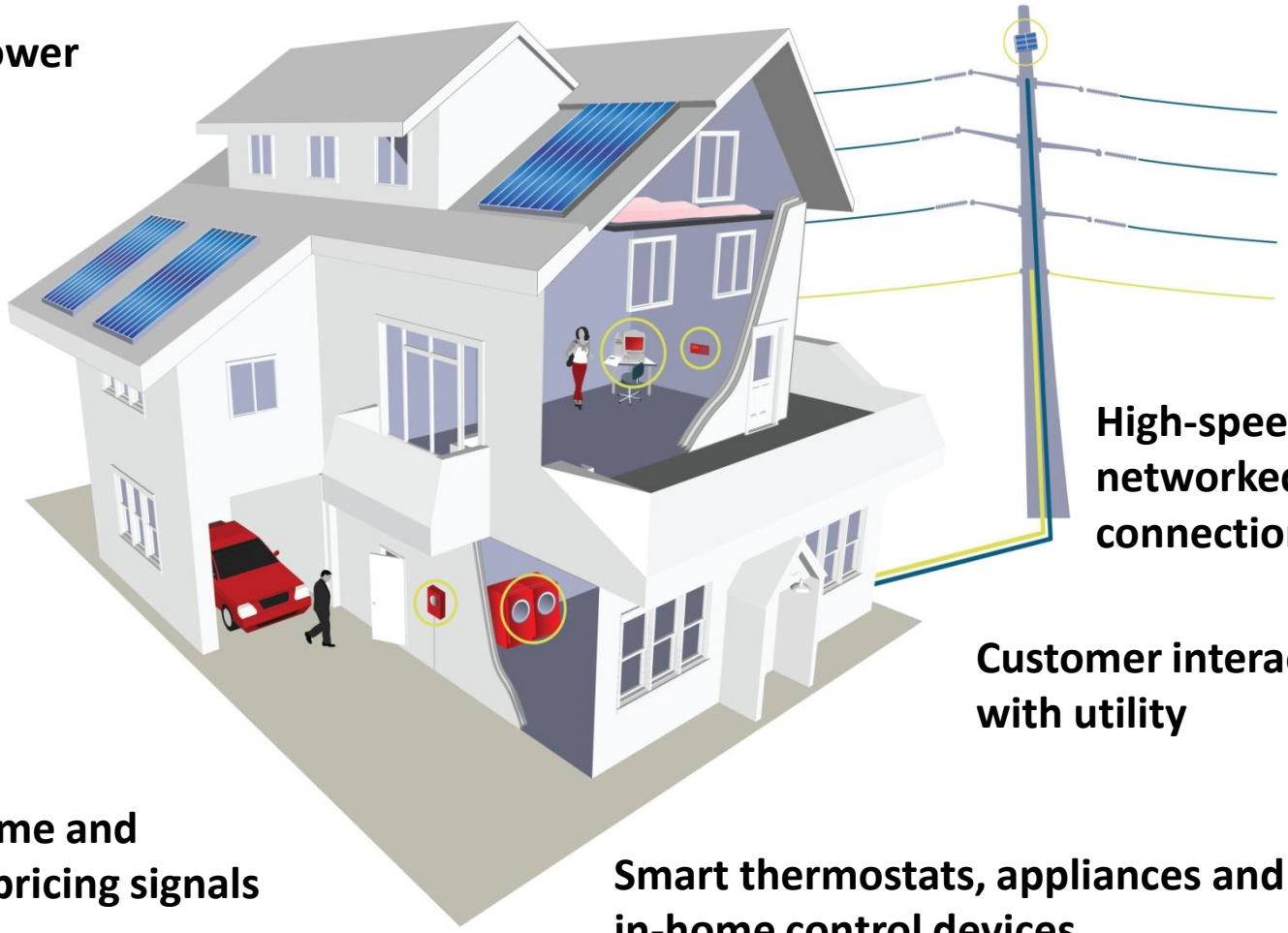
- Decentralized power generation
- Market-based coordination of generating units and consumption
- Intelligent load management
- „Prosuming“ customers



2006, 'Quelle: European Technology Platform SmartGrids

The Smart Home

Added green power sources



High-speed, networked connections

Plug-in hybrid electric cars

Customer interaction with utility

Real-time and green pricing signals

Smart thermostats, appliances and in-home control devices

Advanced Metering Infrastructure

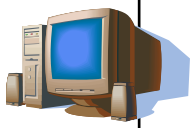
- Visibility in energy consumption
- Involve consumer
  - Energy efficiency
  - Conservation
  - Demand Response
- Metering approach
  - Promotes energy efficiency
  - Defers investment in generation
  - Defers investment in infrastructure
- Requirements
  - Higher resolution Data
  - Reduced Latency of meter data
  - Better methods to disseminate consumption Information
  - Shortened data acquisition sampling intervals

Intel® Intelligent Home Energy Management Proof of Concept

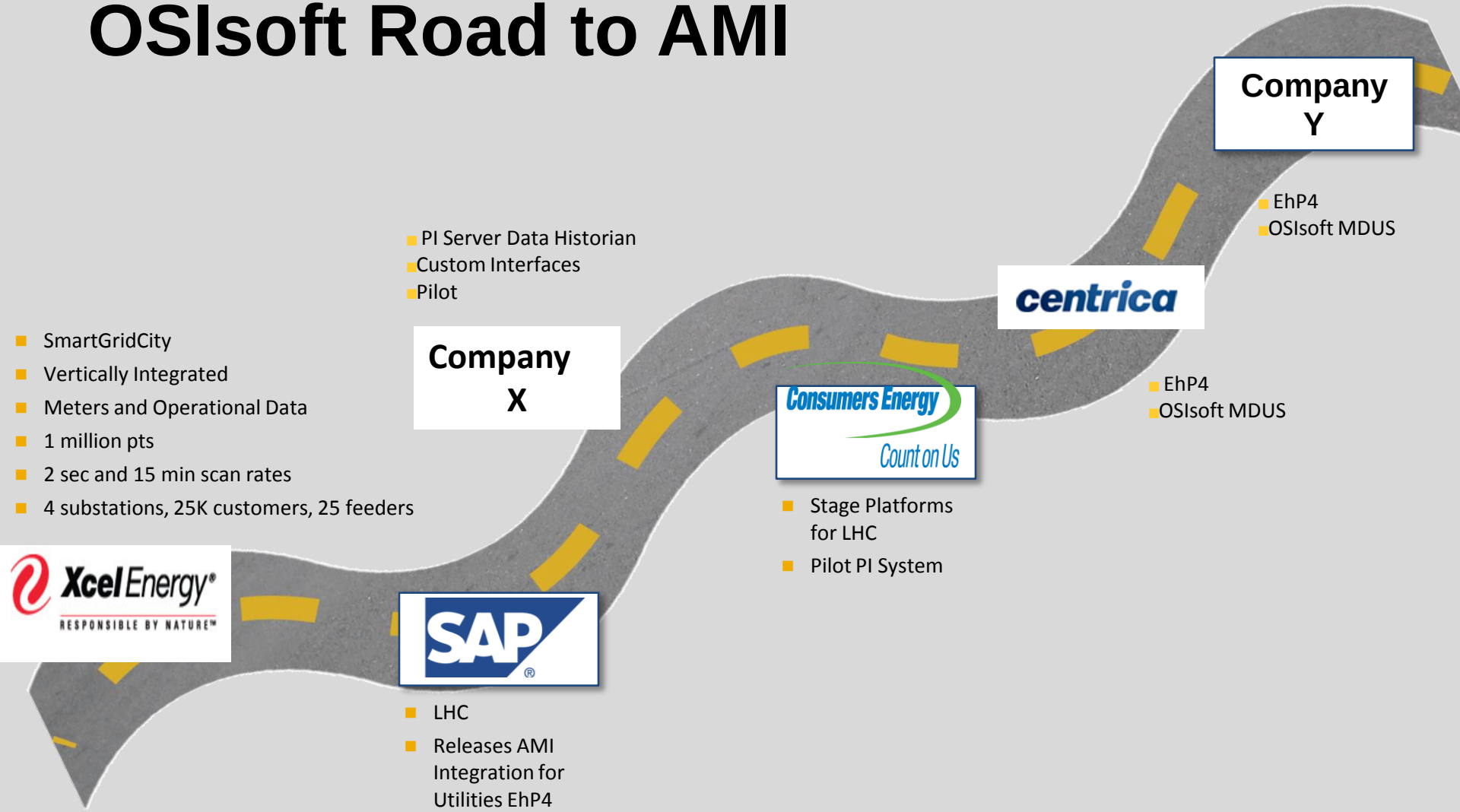
Enables new functions

- Meter data from meter to cash
  - Increase accuracy
  - Less estimated bills
  - Reduce time usage and billing
  - Reduce Bill Complaints
  - Better Detection of Fraud
  - Simplified Meter Disconnection
- New Enterprise functions
  - Asset management
  - Load Profile & Forecasting
  - CRM (variable pricing)
- Utility Company Reasons for MDM
  - Mergers and Acquisitions unifying layer for multiple metering systems
  - Implement Demand Response
  - Overall Smart Grid Initiatives
  - Competitive Service
  - Unifying Platform for Market Participants

Meter-to-Back Office Value Chain

In-Home Devices		Multi-vendor Communication Architecture					MDM	Back-Office	Customer Interaction
									
Endpoint Devices	**Home Area Network**	**Smart Meter**	**Local Area Network (LAN)**	**Collector**	**Wide Area Network (WAN)**	**AMI Head End**	**Data collection & storing**	**CRM / Billing / Asset Mgmt**	**Internet / IVR / Call Center**
Devices in the home that can be remotely updated and controlled by the utility.	Network connecting consumer products and endpoint devices	Measures, collects, transmits and stores energy and event data. Configured remotely.	Transmits data between meters and a collector.	Collects, stores and transmits messages to and from multiple meter points.	Transmits data between collector and AMI head end.	Controls meters & comms network.	Central repository for meter & event data collected from all AMI Head Ends. Dispatches AMI Head Ends.	System of record for all customer and commercial data and the related processes that leverage AMI.	Most processes are directly or indirectly initiated by the customer and are the consequence of or result in customer services and have an impact on the customers bill.

OSIsoft Road to AMI



- SmartGridCity
- Vertically Integrated
- Meters and Operational Data
- 1 million pts
- 2 sec and 15 min scan rates
- 4 substations, 25K customers, 25 feeders

Xcel Energy® RESPONSIBLE BY NATURE™

- PI Server Data Historian
- Custom Interfaces
- Pilot

Company X

SAP®

- LHC
- Releases AMI Integration for Utilities EhP4
- EhP5under development

Consumers Energy Count on Us

- Stage Platforms for LHC
- Pilot PI System

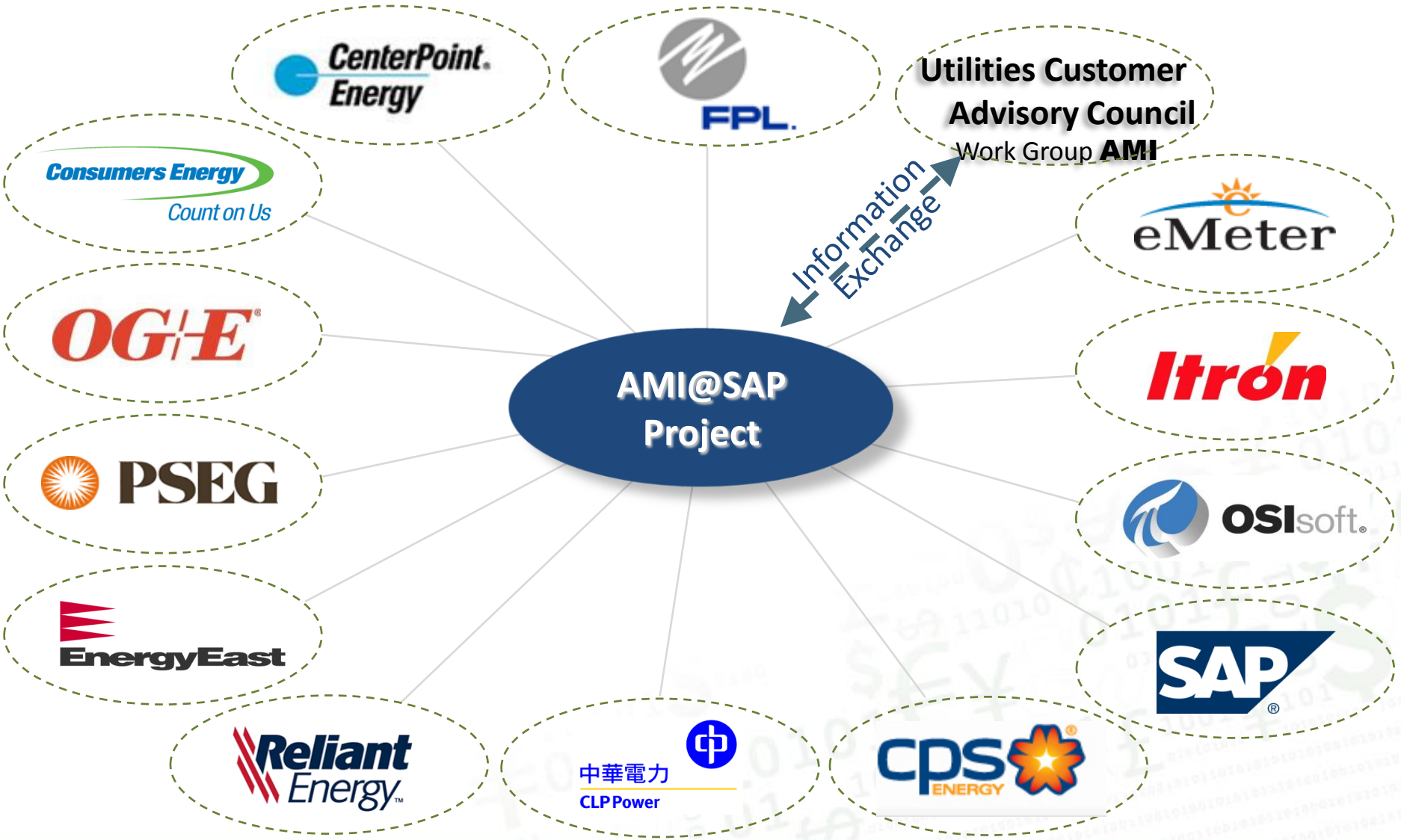
centrica

- EhP4
- OSIsoft MDUS

Company Y

- EhP4
- OSIsoft MDUS

The AMI@SAP Lighthouse Council

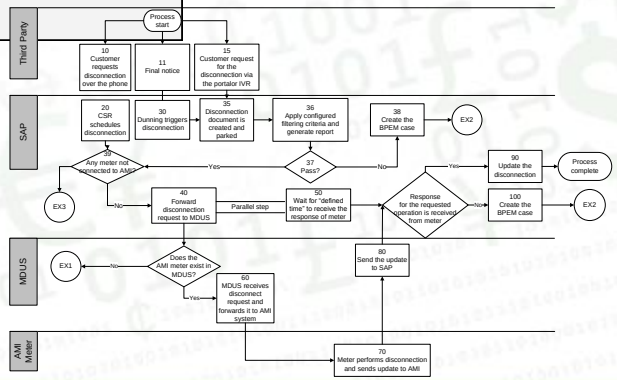


AMI Use Cases – Equal Upgraded SAP Business Processes

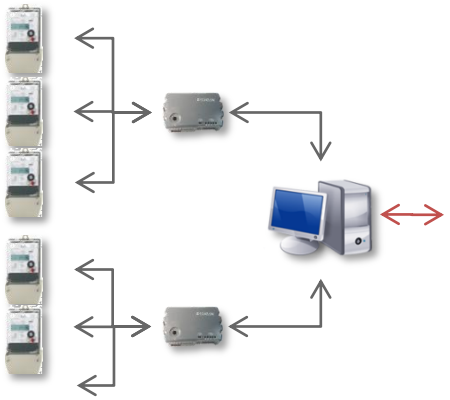
Billing & Customer Service	Customer Interface	Delivery	Energy Procurement	Field Services & System Recovery	Installation & Maintenance
B1 Multiple clients read demand and energy data	**C1** Customer reduces demand in response to pricing and/or grid event	**D1** Distribution operator curtails/limits customer load for grid management	**E1** Real-time operations curtails/limits load for economic dispatch	**S1** AMI system recovers after power outage, communications or equipment failure	**I1** Utility installs, provisions and configures AMI system
B2 Utility remotely limits or connects / disconnects customer	**C2** Customer has access to and reads recent energy usage and cost at his or her site	**D2** Distribution operators optimize network based on data collected by the AMI system	**E2** Utility procures energy and settles wholesale transactions using AMI system data		**I2** Utility manages end-to-end life-cycle of the meter system
B3 Utility detects tampering or theft at customer site	**C3** Customer uses prepayment services	**D3** Customer provides distributed generation			**I3** Utility upgrades AMI system to address future requirements
B4 Contract meter reading for other utilities	**C4** External clients use the AMI system to interact with customer devices	**D4** Distribution operator locates outage using AMI data and restores service			

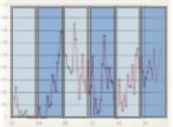
Source: Southern California Edison

Diagram: Utility disconnects or load-limits customer



AMI System Architecture



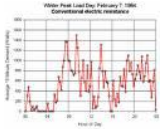


MDUS

C&I Customers

Smaller Customers

Metered Data



∑ On-Peak (kWh)

∑ Off-Peak (kWh)

Meter Reading Result

Master Data

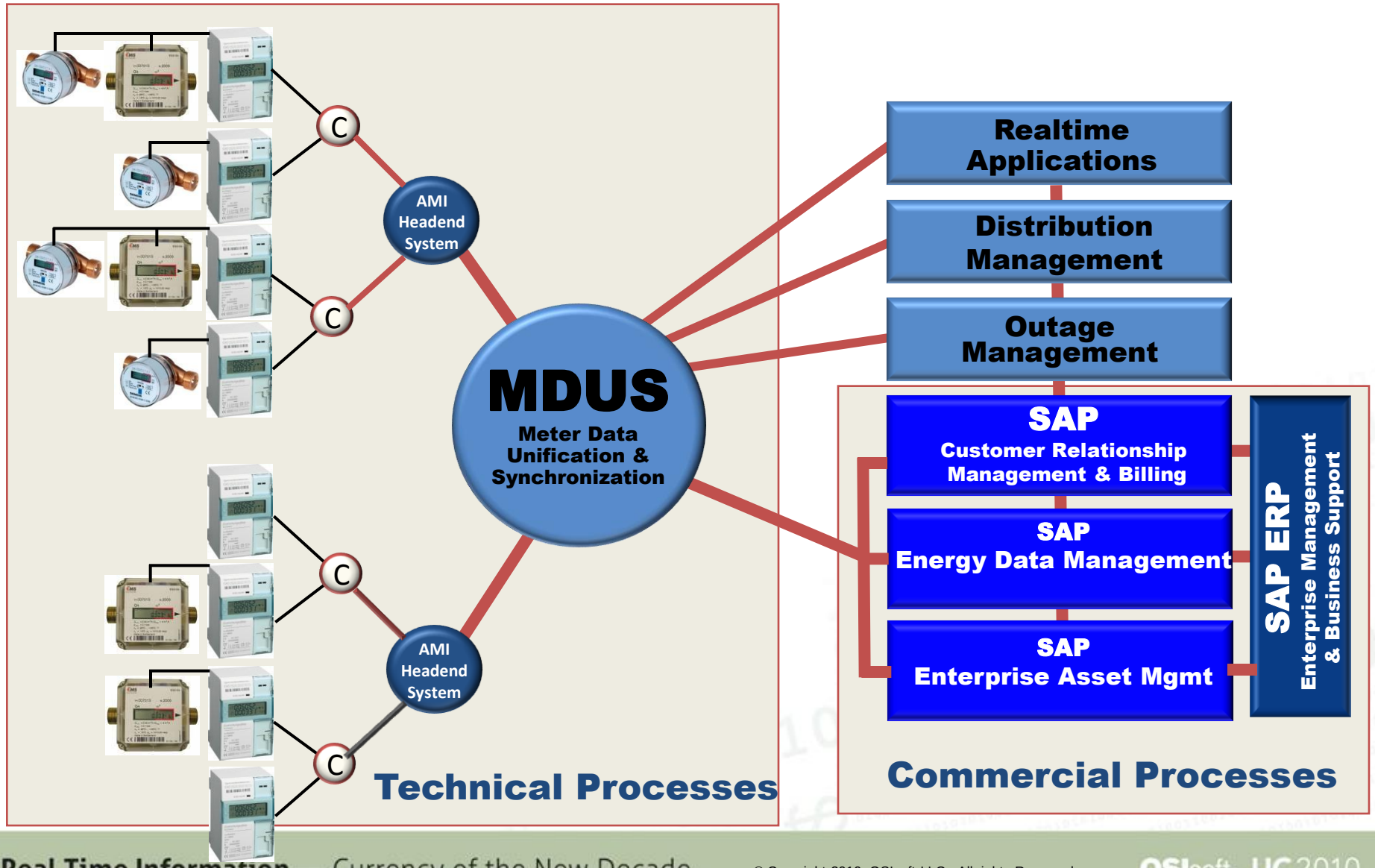
Process Data

Event Data

- SAP Energy Data Management for Utilities
- SAP Customer Relationship Management and Billing for Utilities
- SAP AMI Integration for Utilities
- SAP Customer Financials Management for Utilities
- SAP Collaborative Service Management for Utilities
- SAP Resource and Supplier Management for Utilities
- SAP ERP

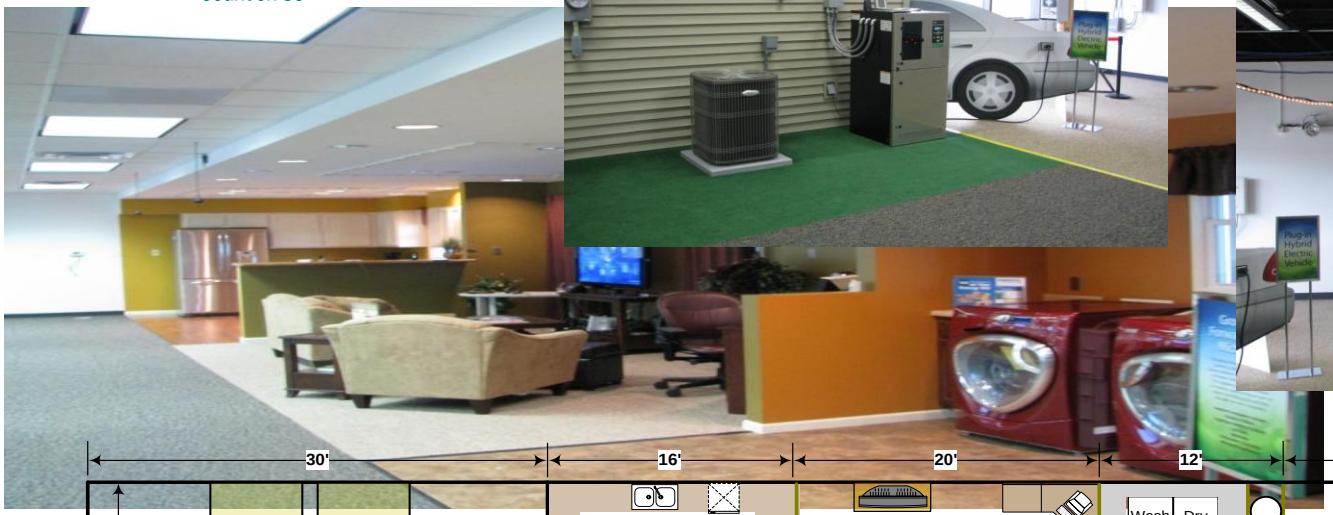
SAP for Utilities

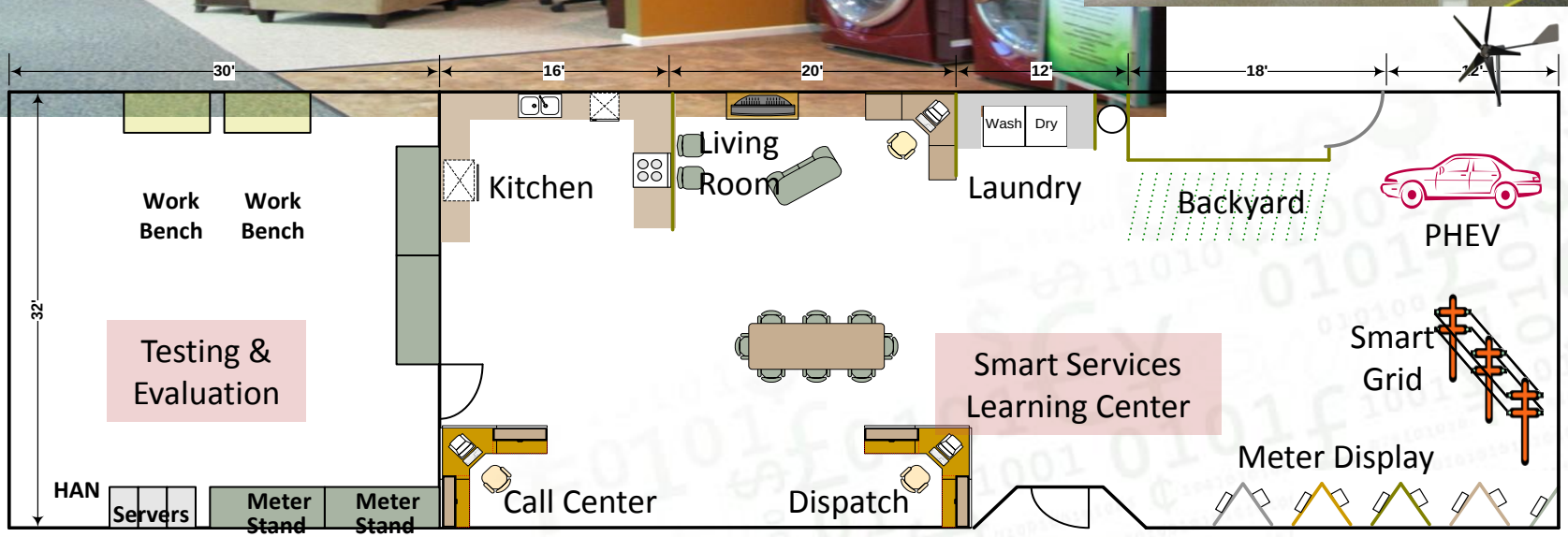
Reference System Architecture



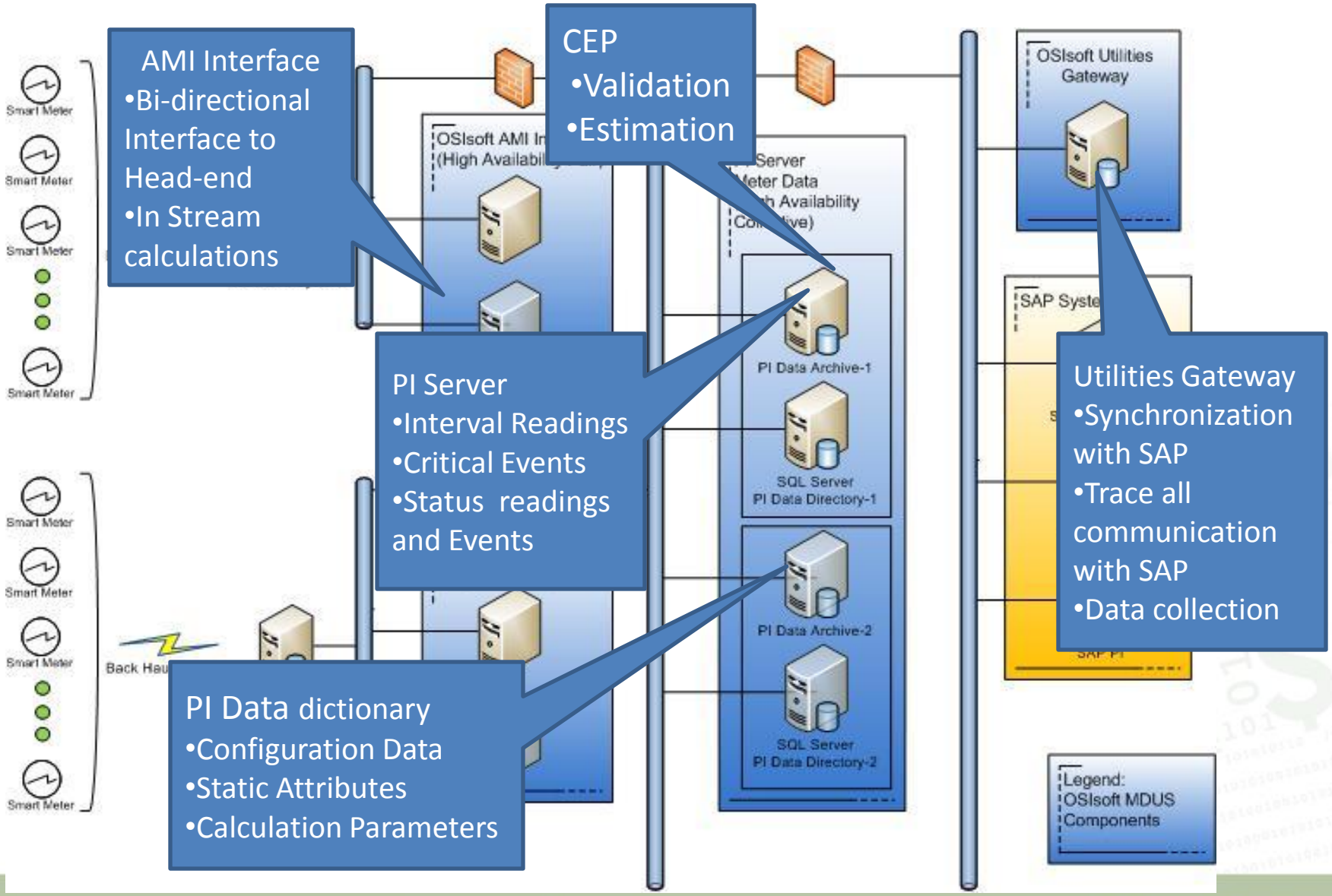
Smart Service Learning Center

Consumers Energy
Count on Us

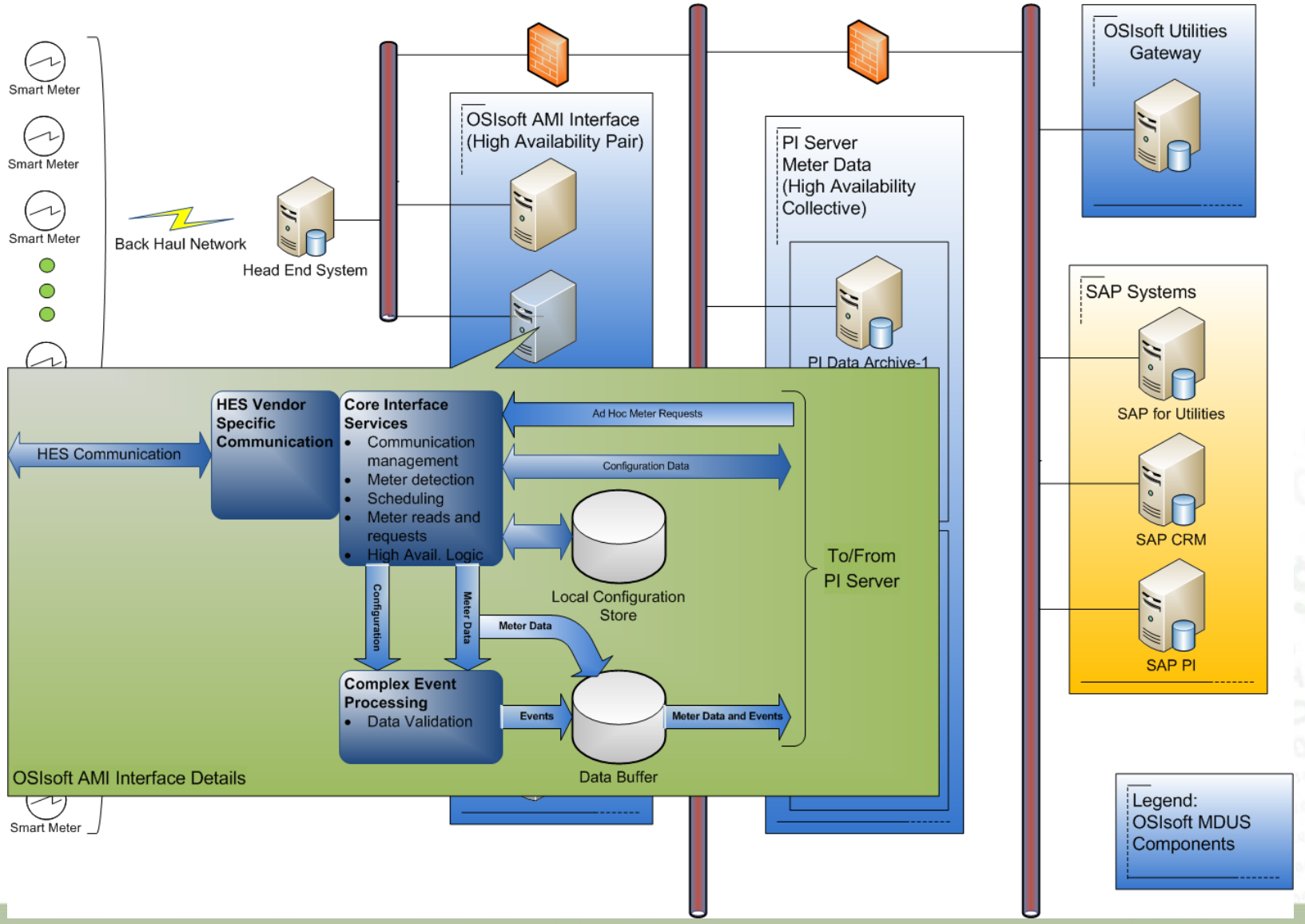




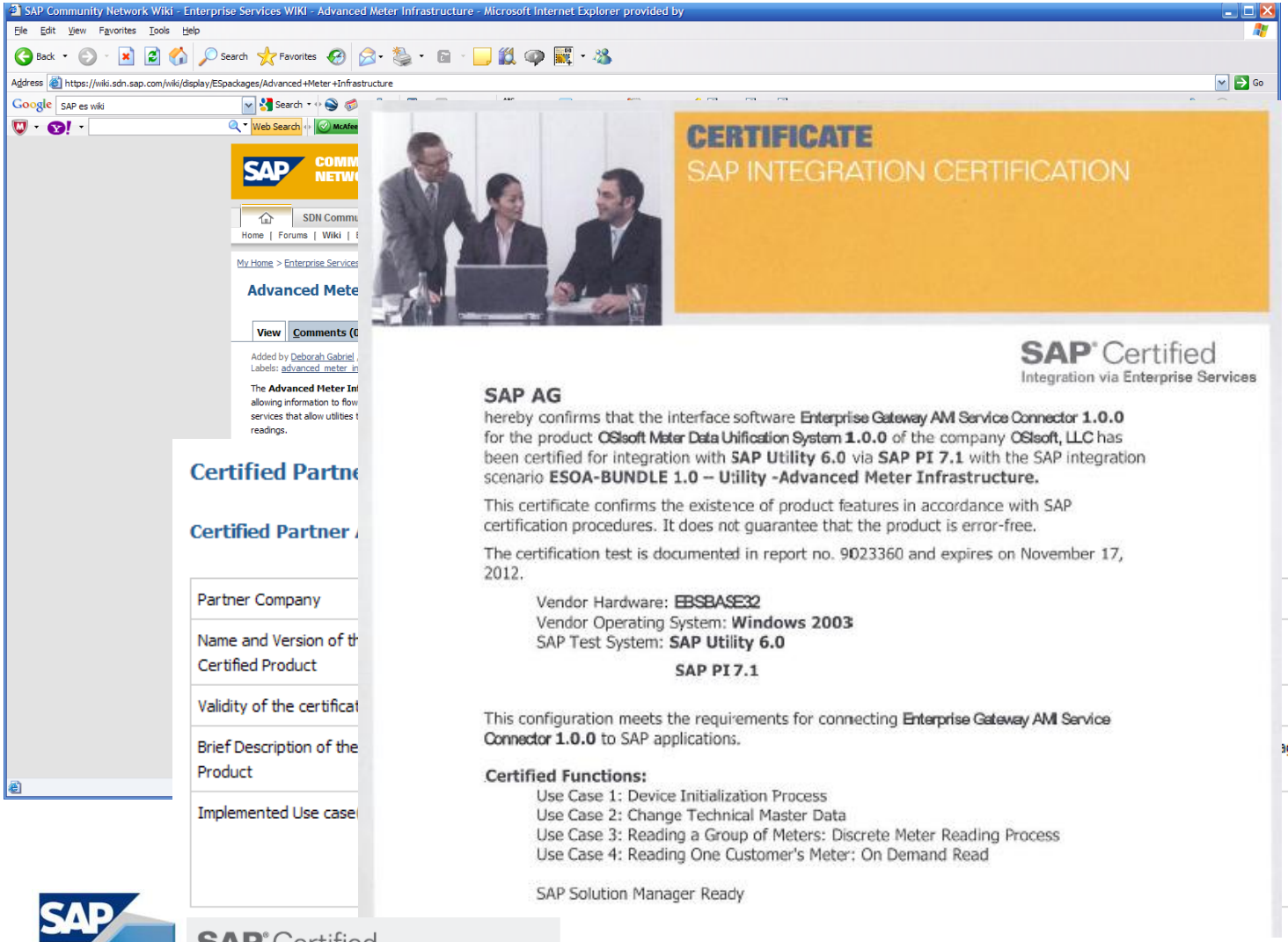
OSIsoft MDUS – SAP Endorsed Business Solution



AMI Interfaces



SAP Certification of OSIsoft MDUS



SAP Partner

SAP Certified
Integration via Enterprise Services

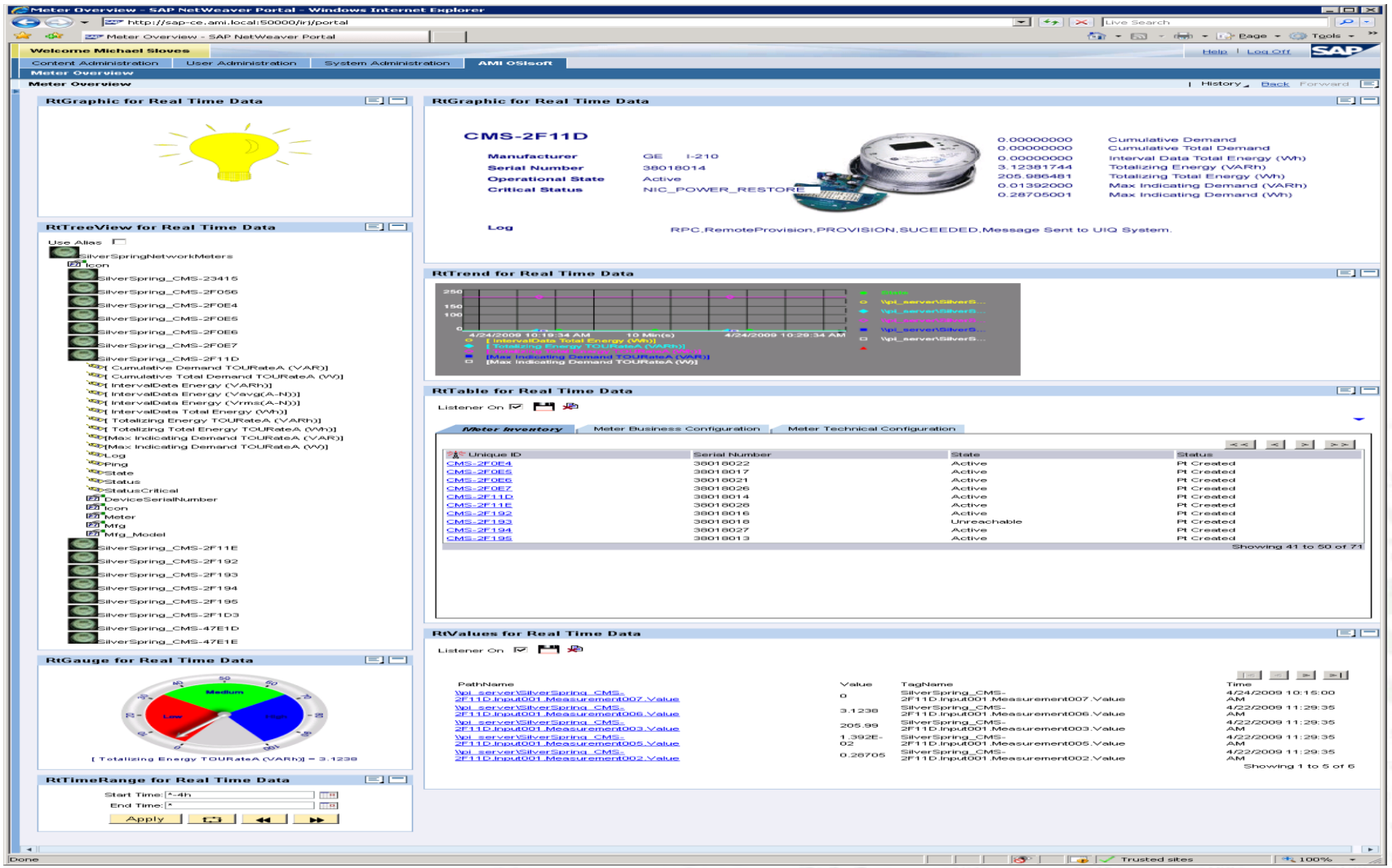
OSIsoft MDUS SAP Endorsed Business Solution

"By endorsing solutions such as the OSIsoft MDUS system, SAP continues to build its ecosystem, drive new levels of collaboration, and provide additional choices and flexibility to our customers. Use of the OSIsoft MDUS system with SAP solutions will enable our customers to improve efficiencies and employee productivity, thus accelerating delivery of innovative products to market while lowering total cost of ownership."

-Stefan Engelhardt, Head of Utilities Industry Business Unit, SAP

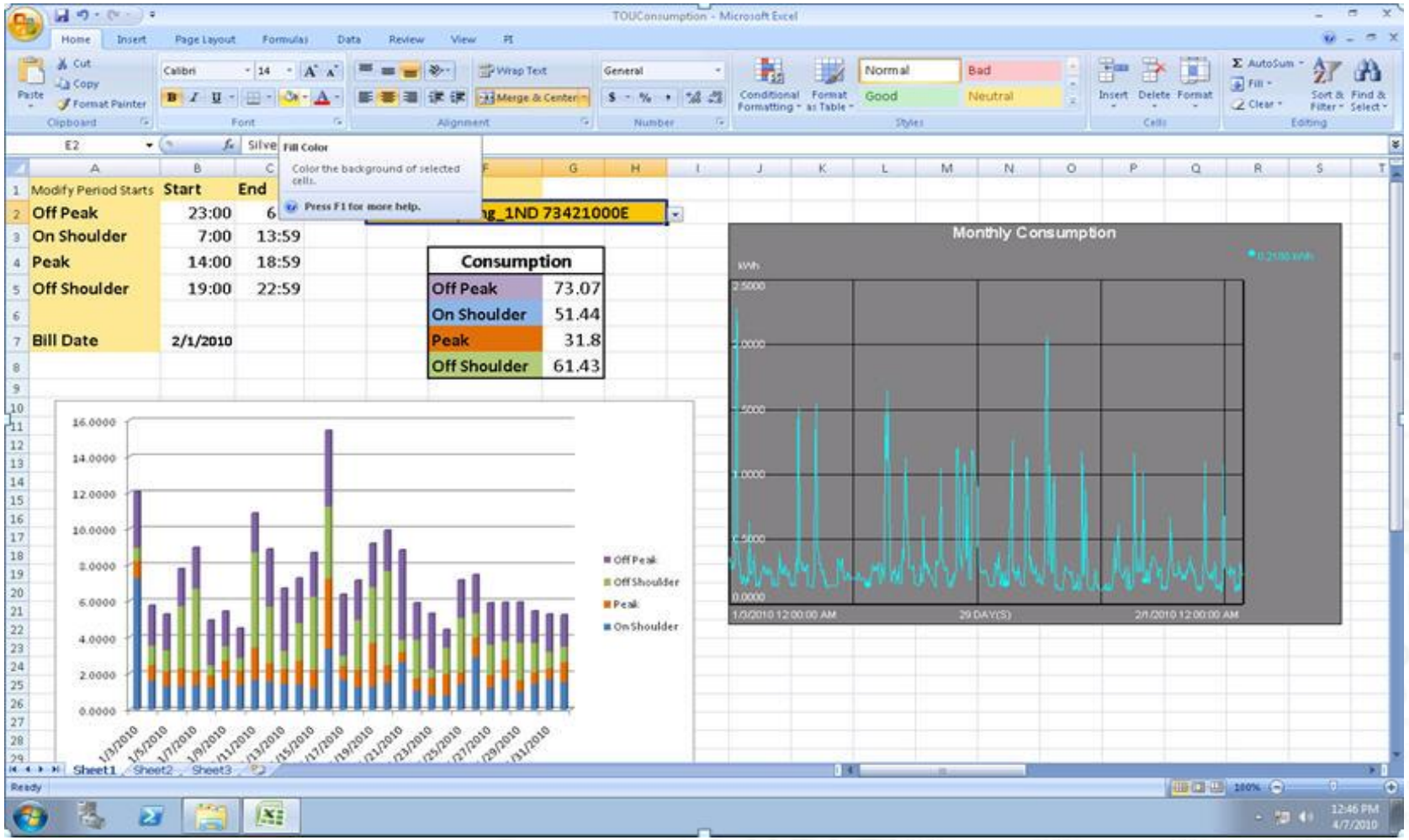
- ❑Certification Required
- ❑Extensive Testing by SAP
- ❑Support of SAP Solution Manager
- ❑Unified Support for Customer
- ❑Commitment to follow SAP Road-map for product enhancements

Extending the System: Portal Page

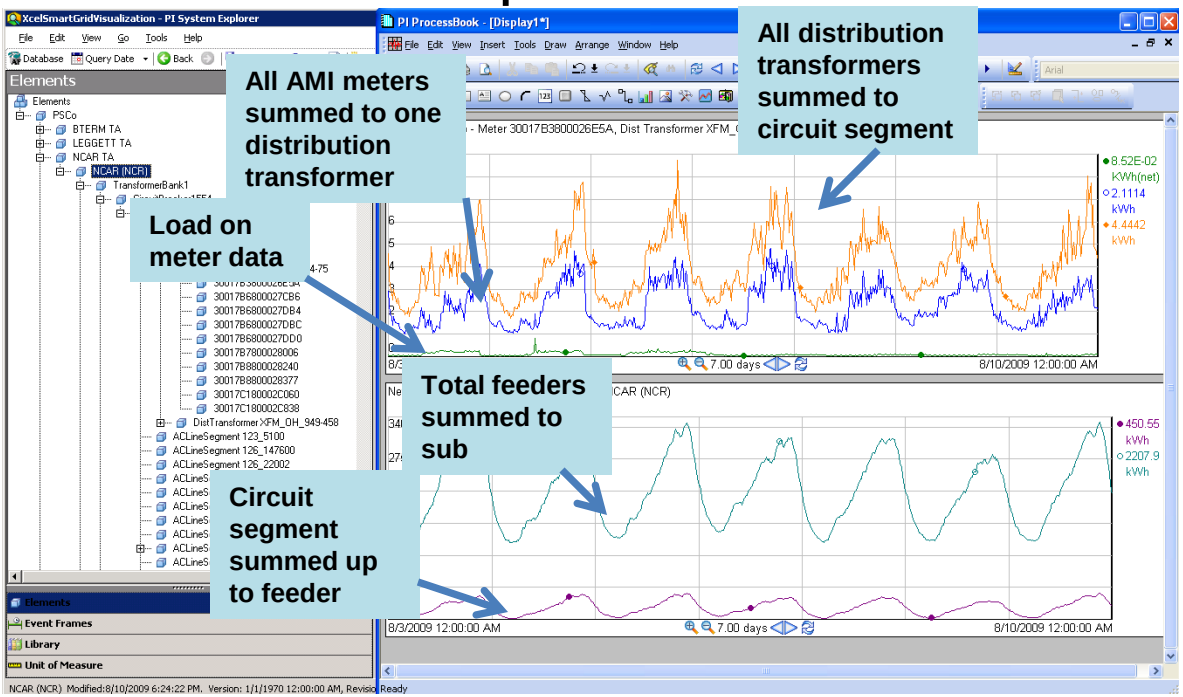


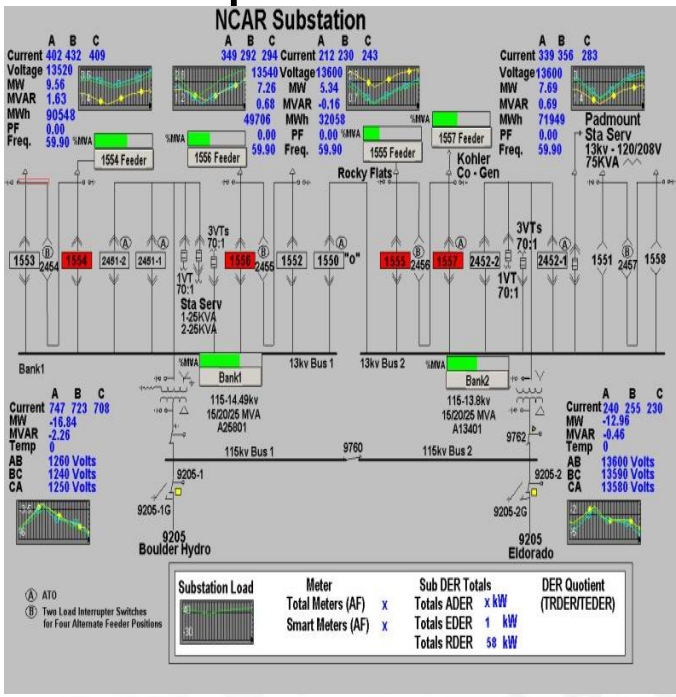
Extending the System: Visualization

Analysis – TOU Consumption



The End-to-End Visibility: "Roll-up" Mechanism: Net KWh Roll-Up





- **Key Points**
  - Successive aggregated load(kWh) from individual meter, transformer, line segment, breaker and substation.
  - Overlay Distribution SCADA load, delta indicates losses or leakage, or theft.
  - The physical model (CIM) allows aggregation/roll-up of individual loads.
  - End to end visibility – integrating meter and distribution systems' operational data.

AMI@SAP Roadmap – Planned Product Release Cycle

SAP AMI Integration for Utilities

AMI 1.0 (EHP4)

Business Suite 7

Available

- Meter Reading
  - Support of regular and on-demand reading
  - Monitoring
  - Status Administration
- Device Management
  - Exchange of Master Data
  - Business Warehouse Content
  - Integration to all Data Objects (e.g. Grid)
- Customer Service
  - Disconnection / Reconnection (also ERP)
  - AMI Capabilities for Product Value Help
  - Device Information in the Interaction Center
- Broad Number of Enterprise Services

AMI 2.0 (EHP5)

Future Scope

- Joint Energy Data Management (MDUS Integration)
  - Tight integration of MDUS with SAP for Utilities
  - Transfer aggregation rules dynamically to the MDUS
  - Support of the various billing scenarios
- Monitoring
- Disconnection / Reconnection
  - Scheduling, Monitoring of entire Process
  - Support of Approval and Reversal Process
- Device Management
  - On-Demand Request for AMI-Meter/Device status
  - Master Data Exchange

AMI 2.0 (EHP5E)

Future Scope

- Sending of Text Messages to the Meter
  - Possibility to send text message from CRM or ERP to specific meter
- Management of non-Energy Data (Event Management)
  - Receiving, prioritization and dispatching of event messages from MDUS
  - BI Content
- Performance improvements (concept)
- Support Meter Mass Rollout (concept)

AMI 3.0 (EHP6)

Future Scope

- Load limitation incl. CRM
- Market communication for AMI processes
- Joint Energy Data Management (MDUS Integration) pt.II
- AMI Analytics
- Customer Feedback from first implementation projects
- Demand Response / Demand Side Management
- Integration to Outage Management Systems
- Integration to external forecasting system

OSIsoft AMI Roadmap

- Q3 2010
  - CEP Analytics
  - EhP5 Services
  - Testing and Release
- Q4 2010 Release
  - Pre-payment services
- 2011
  - EhP6 preparation
  - PI Server Performance Enhancements
  - PI AMI Interface Release
- On going
  - Meter/Meter Head end interfaces in development to meet opportunity driven demand
  - Support of Additional SAP Enhancement Packages

AMI Differentiators for OSIsoft MDUS

- No overlap with SAP functionality
- Ability to make data available and useful as soon as the head end system provides the data
  - MDMs are designed to process data daily
- Feature Highlights
  - SAP Certified Content
  - PI Server performance
  - CEP analytics
  - Self configuring interfaces
- Meter and Network neutral – support of multi-vendor environment
- OSIsoft has huge presence in utilities across the smart grid
  - Generation
  - Renewable generation
  - Transmission
  - Distribution
- End to end visibility of the data

OSIsoft® UC 2010

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Thank you