



PI System for AMI

Presented by

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Senior Customer Support Engineer

OSIsoft

In the beginning...



Early Adoption

- UFL Interface
- Custom Applications
 - ETL
 - Aggregation
 - Business Processes
 - Visualization

Profile Viewer - Statistics Data

Untitled report save save as

Home PROFILES ANALYSIS Forecast Billing Report Cos Phi

Chart Data Statistics Monotonous Load Duration Dispersion Exceedings Impact

☒ Data ☐ Max power peak/off-peak ☐ Daily consumptions ☐ Average day

+ Add profiles to report

Selected Profiles: ☒ [541449010000000118 C-](#) ☐ [541449010000000118 A+](#) ☒ [541449010000000118 I](#)

☐ [Behind the stock house, cabin A34](#)

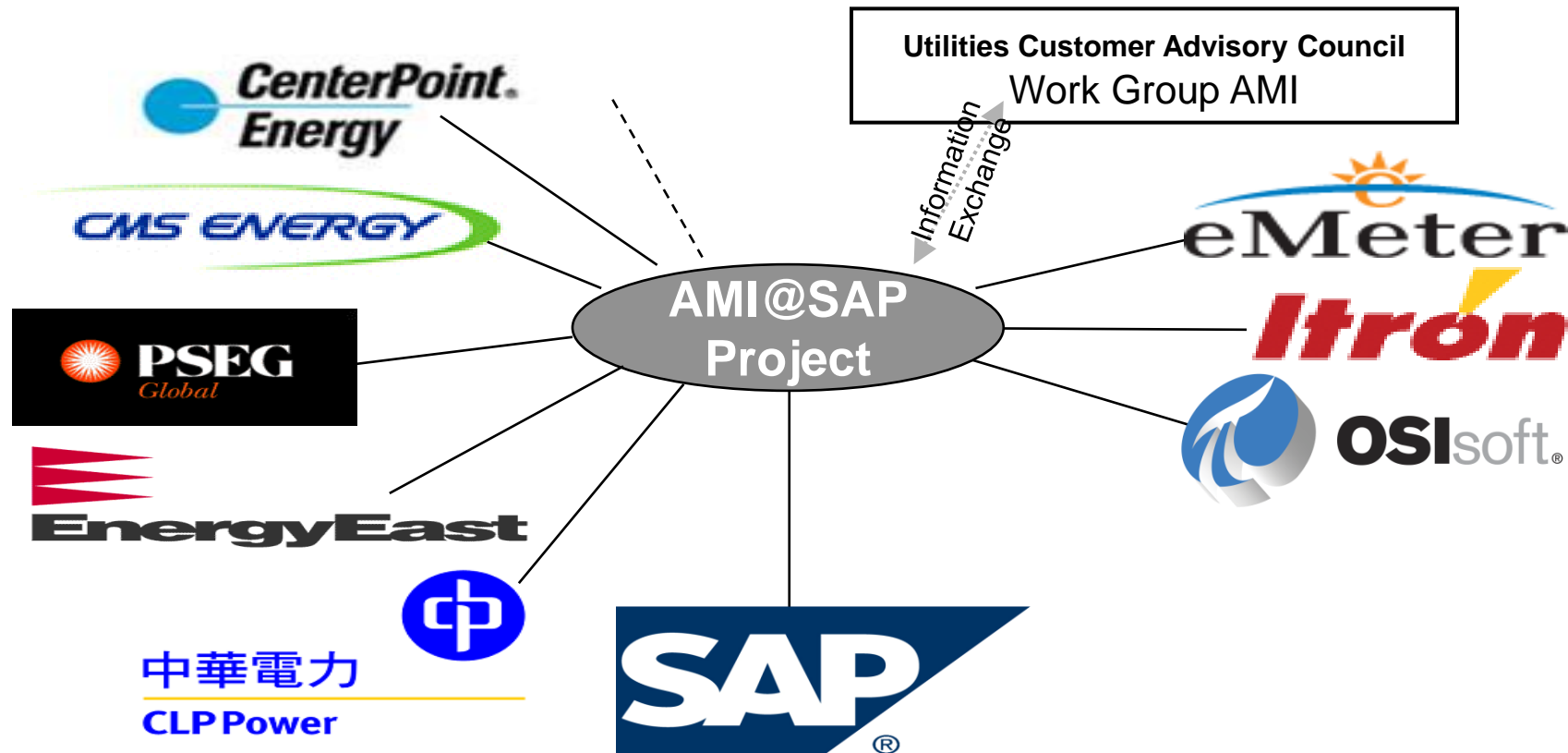
<< Selected period: last week (from 28/05/2004 to 04/06/2004) Change... >>

Profile 1: 541449010000000118 C-	Measure	Unit	Time
Minimum Value Peak Hours	0.00	kvar	7/13/2005 7:45:00 AM
Minimum Value Off-Peak	369.00	kvar	7/13/2005 7:45:00 AM
Maximum Value Peak Hours	108.17	kvar	7/13/2005 7:45:00 AM
Maximum Value Off-Peak	15 576.5	kvar	7/13/2005 7:45:00 AM
Average Peak Hours	15 576.5	kvar	From 7/13/2005 to 12/05/2006
Average Off-Hours	15 576.5	kvar	From 7/13/2005 to 12/05/2006
Total:	15 576.5	kvarh	From 7/13/2005 to 12/05/2006

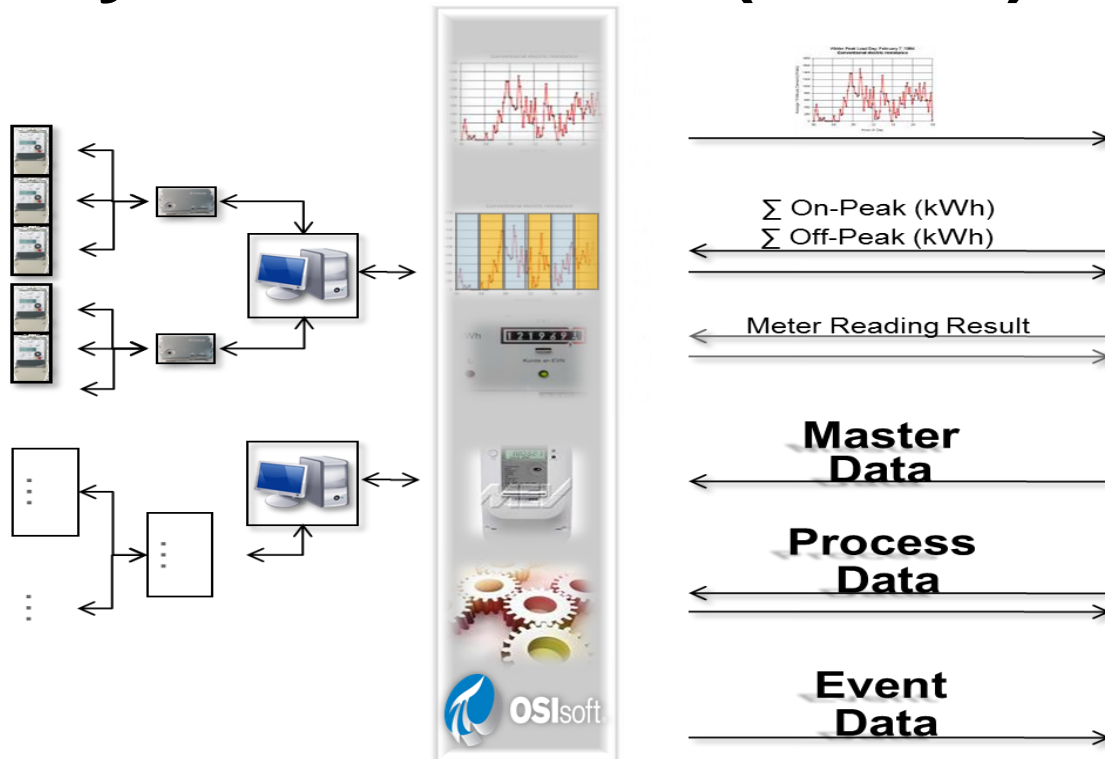
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Export Data

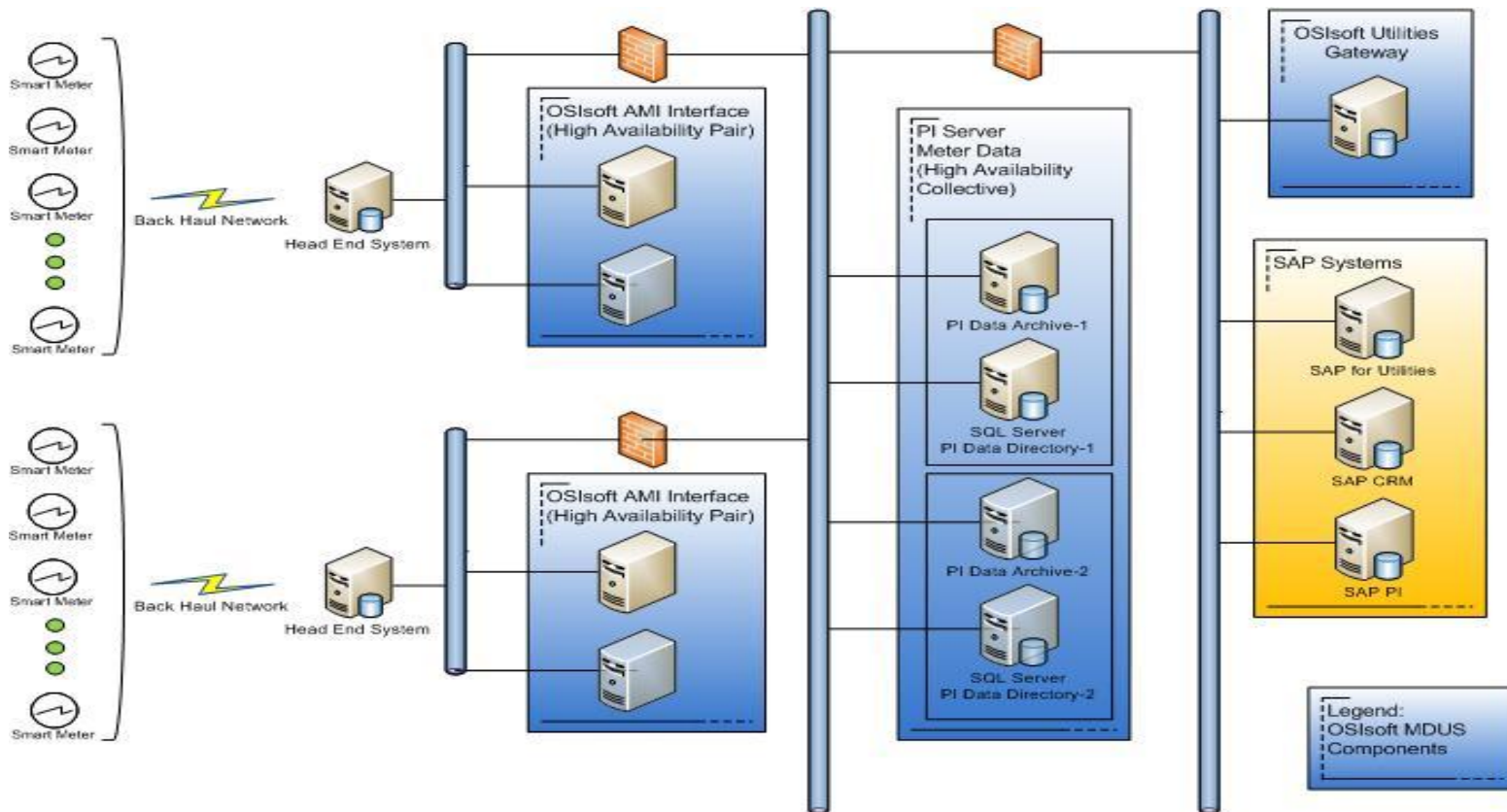
SAP AMI Lighthouse Council (circa 2008)



Meter Data Unification & Synchronization (MDUS)



OSIsoft MDUS Architecture





OSIsoft views on AMI

- Real-time challenge
- Keep everything
- Make data available to the experts

PI AMI Interfaces

INPUT
ELECTRICITY



Registers

Cumulative Demand TOURateA
Max Demand kW TOURateA
Instantaneous Vrms
Instantaneous Var
Etc.

Smart Meter

Intervals/Channels over time

Interval kWh
Interval kVarh
Interval Vrms(A-N)



Meter State

Connected

Event

Tamper Event



Question:

What data do you throw away?

INPUT
ELECTRICITY



Smart Meter

Registers

Cumulative Demand TOURateA
Max Demand kW TOURateA
Summation TOURateB kWh
Instantaneous Instantaneous Var
PF
Frequency

Intervals/Channels over time

Interval kWh	
Interval kVarh	
Interval Vrms(A-N)	

Meter State

Connected

Event

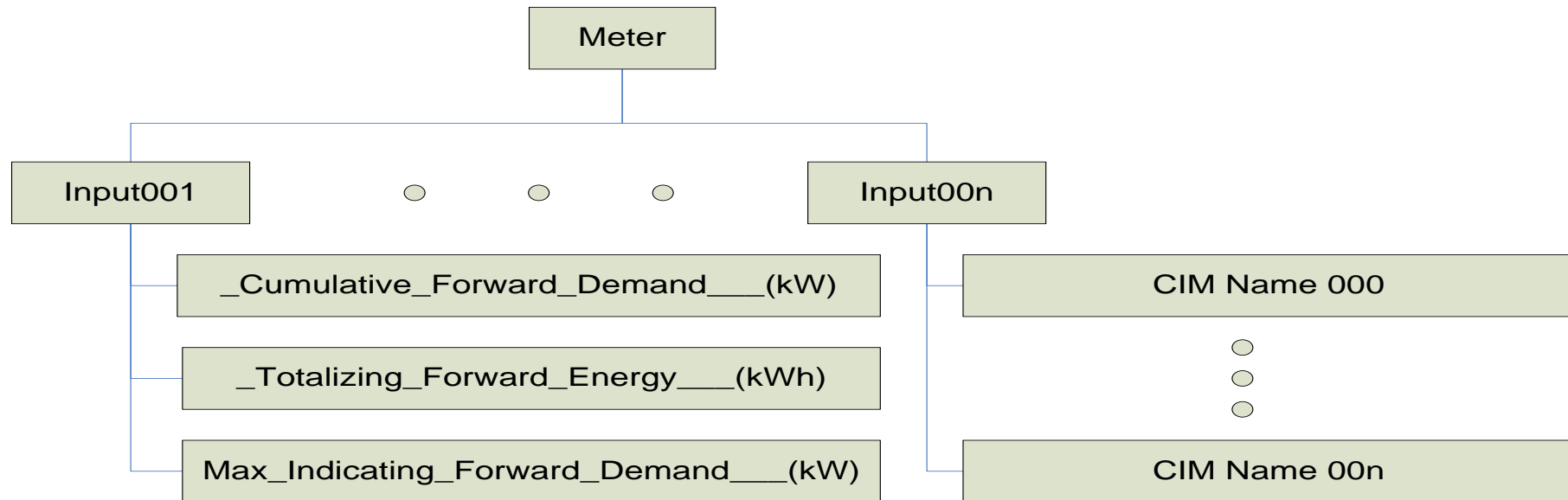
Power Restore

Billing says this is
what we need

Engineering
says this is what
we need

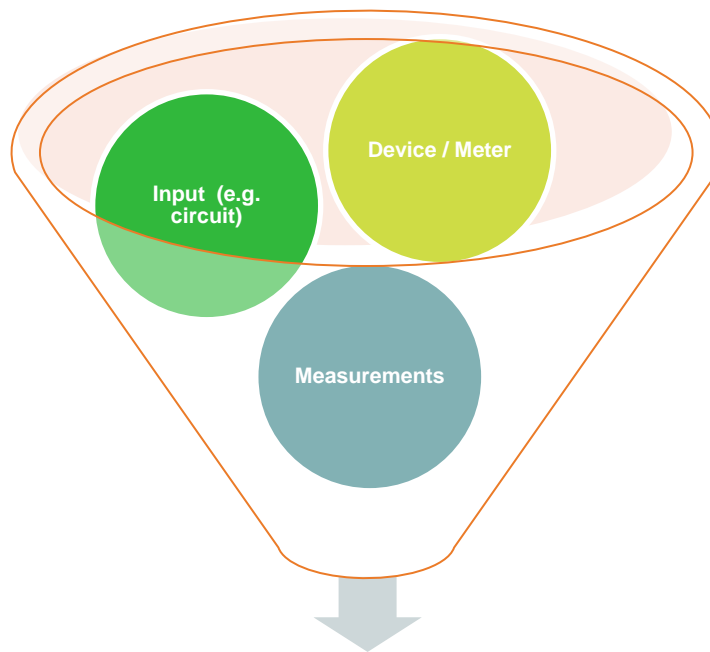
Outage
Management says
this is what we need

Asset Parent Child Relationship



Design principle on AMI Interfaces

Bi-directional
Command/Control
Secure
Asset based
And above all...



Self Configuring/Maintaining

And the end result is...

Demo - PI System Explorer

File Edit View Go Tools Help

Database Query Date Back Check In New Element New Attribute Search

Elements

- VendorX_NP_ab00dd100000
 - Input001
 - _IntervalData_Forward_Energy__(kWh)
 - _Totalizing_Energy_TOURateA__(V)
 - _Totalizing_Forward_Energy_TOURateA__(kWh)
 - VendorX_NP_ab00dd100001
 - VendorX_NP_ab00dd100002
 - VendorX_NP_ab00dd100003
 - VendorX_NP_ab00dd100004
 - VendorX_NP_ab00dd100005
 - VendorX_NP_ab00dd100006
 - VendorX_NP_ab00dd100007
 - VendorX_NP_ab00dd100008
 - VendorX_NP_ab00dd100009
 - VendorX_NP_ab00dd10000a
 - VendorX_NP_ab00dd10000b
 - Input001
 - _Cumulative_Total_Demand_TOURateA__(kW)
 - _Cumulative_Total_Demand_TOURateB__(kW)
 - _Cumulative_Total_Demand_TOURateC__(kW)
 - _IntervalData_Forward_Energy__(kWh)
 - _Totalizing_Forward_Energy_TOURateA__(kWh)
 - _Totalizing_Forward_Energy_TOURateB__(kWh)
 - _Totalizing_Forward_Energy_TOURateC__(kWh)
 - Max_Indicating_Total_Demand_TOURateA__(kW)
 - Max_Indicating_Total_Demand_TOURateB__(kW)
 - Max_Indicating_Total_Demand_TOURateC__(kW)
 - VendorX_NP_ab00dd10000c
 - VendorX_NP_ab00dd10000d
 - VendorX_NP_ab00dd10000e
 - VendorX_NP_ab00dd10000f
 - VendorX_NP_ab00dd100010
 - VendorX_NP_ab00dd100011
 - VendorX_NP_ab00dd100012
 - VendorX_NP_ab00dd100013

VendorX_NP_ab00dd100000

General Child Elements Attributes Ports Version

Filter

Name	Value
CATALOG_NUMBER	<simul>
DEVICE_HW_PATCH_NO	<simul>
DEVICE_HW_REV_NO	<simul>
DEVICE_HW_VER_NO	<simul>
DEVICE_MFG	<simul>
DEVICE_MFG_MODEL	<simul>
DEVICE_NETWORK_STATUS	Active
DEVICE_STATUS	Active
DEVICE_SW_PATCH_NO	<simul>
DEVICE_SW_REV_NO	<simul>
DEVICE_SW_VER_NO	<simul>
DEVICE_UTIL_ID	NP_ab00dd100000
DeviceDescription	<simul>
DeviceName	<simul>
DeviceSerialNumber	DSN_ab00dd100000
DeviceType	METER
DID_SUB_TYPE	I-210-RD
Event	Cannot retrieve PI Point 'VendorX_NP_ab00dd100000.Event' for attribute 'VendorX_NP_ab00dd100000Event'.
HeadEndID	SilverSpring
Log	Cannot retrieve PI Point 'VendorX_NP_ab00dd100000.Log' for attribute 'VendorX_NP_ab00dd100000Log'.
METER_MODE	<simul>
NIC_HW_PATCH_NO	<simul>
NIC_HW_REV_NO	<simul>
NIC_HW_VER_NO	<simul>
NIC_MAC_ADDRESS	ab:00:dd:10:00:00
NIC_MFG	<simul>
NIC_MODEL	<simul>
NIC_NETWORK_IDENTIFIER	<simul>
NIC_RF_CHANNEL	<simul>
NIC_SERIAL_NO	<simul>
NIC_SW_PATCH_NO	<simul>
NIC_SW_REV_NO	<simul>

Group by: Category

Elements

Event Frames

Library

Unit of Measure

VendorX_NP_ab00dd100000 Modified: 4/21/2010 3:34:51 PM. Version: 1/1/1970 12:00:00 AM, Revision 1

Capability of PI AMI Interfaces in Production

Feature	Silver Spring	Grid Net	Trilliant	Elster	MultiSpeak	NEM (AEMO)	Echelon NES	L+G CC
Synchronize Meter Asset	✓	✓	✓	✓	✓	✓	(s)	(s)
Interval Reads	✓	✓	✓	✓	✓	✓	(s)	(s)
Register Reads	✓	✓	✓	✓	✓	✓	(s)	(s)
Event Data	✓	✓	TBD	✓	✓	✓	(s)	(s)
Remote Ping	✓			✓	✓		TBD	TBD
Remote Connect/Disconnect	✓	✓	✓	✓	✓		(s)	(s)
On-Demand Read	✓	✓	✓	✓	✓		(s)	(s)
Outage Notification	✓	✓	(s)	✓	✓		(s)	(s)
Meter Health	✓	✓	TBD	✓	✓		(s)	(s)
Demand Response	TBD	TBD		TBD	TBD			
HAN (Home Area Network)	(s)	TBD	TBD	(s)	TBD		TBD	TBD
Text Message				(s)				

(s) = scheduled TBD – To be Defined



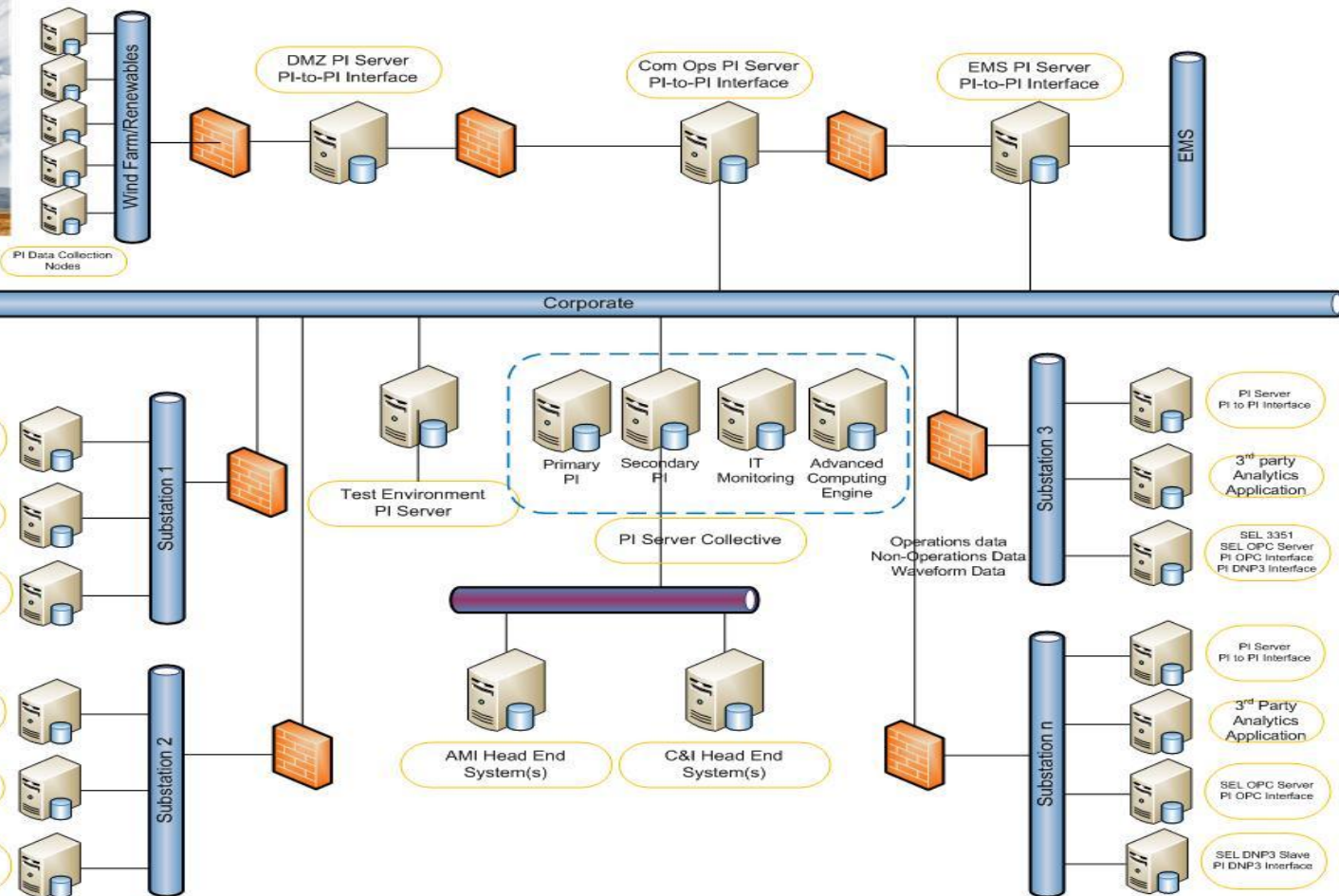
OSIsoft views on AMI (redux)

- Real-time challenge
- Keep everything
- Make data available to the experts

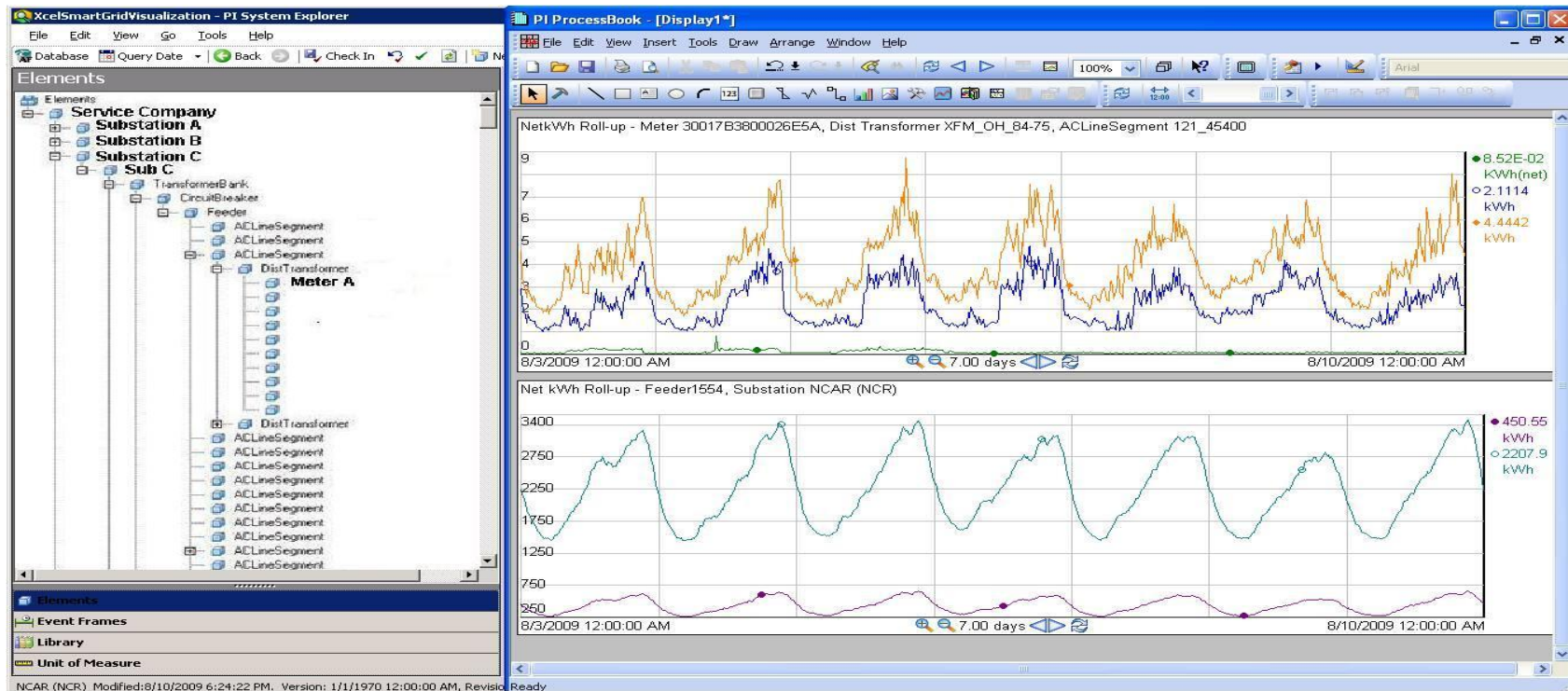


Operational Data Management System (ODMS)

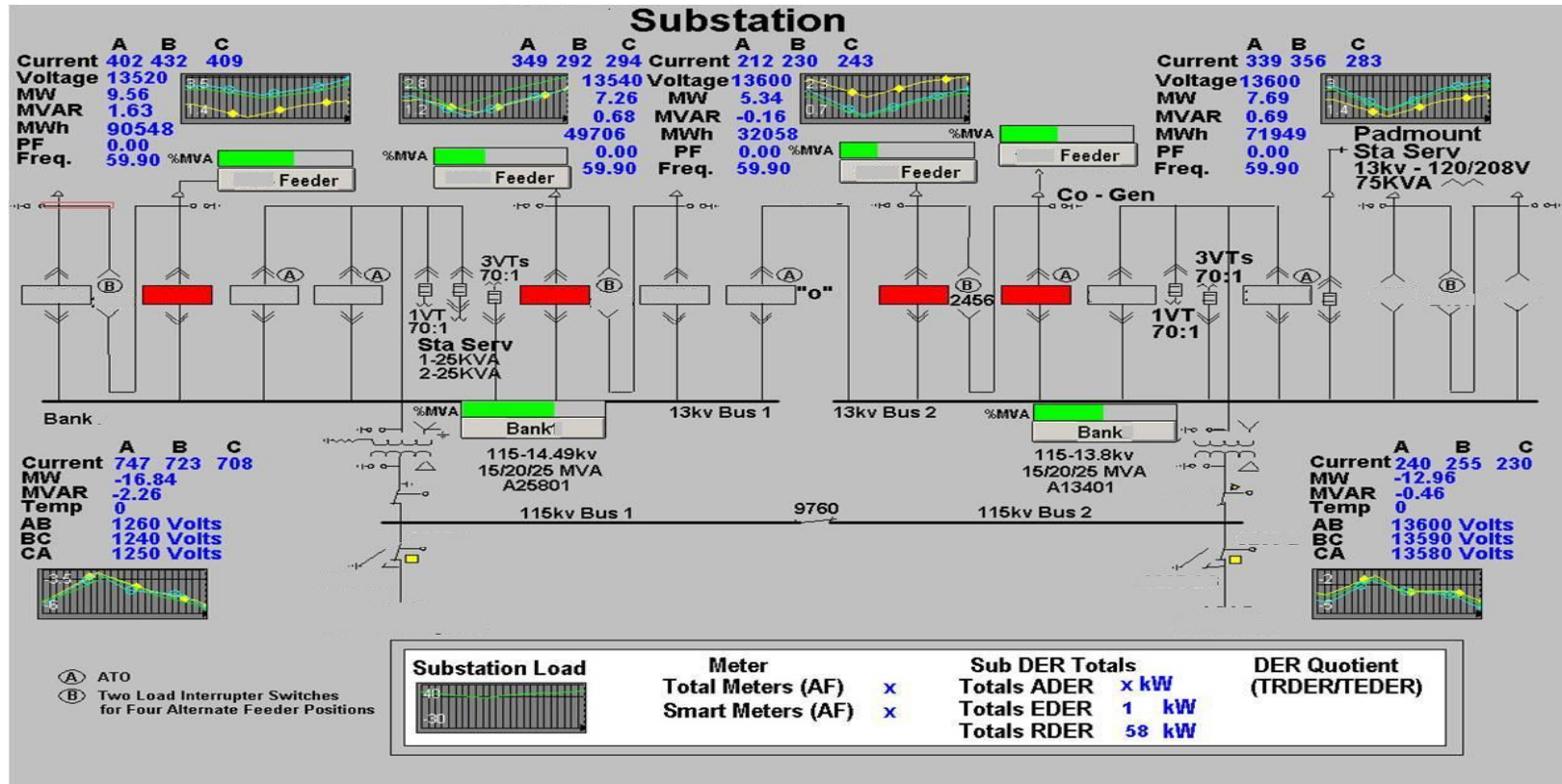
- Extremely large volumes of data
- Disparate data sources
- Multiple data frequencies and latency
- Timely reconciliation of
 - SCADA
 - Distribution Automation Systems
 - Metering



Getting to Value: Understanding the “Roll-up” Mechanism: Net KWh Roll-Up

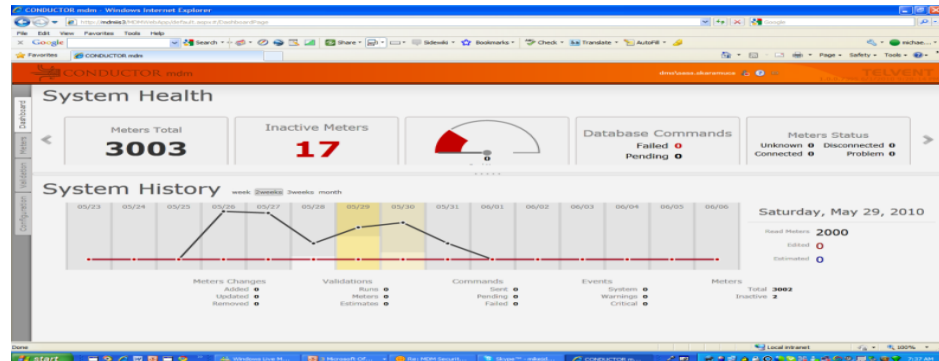
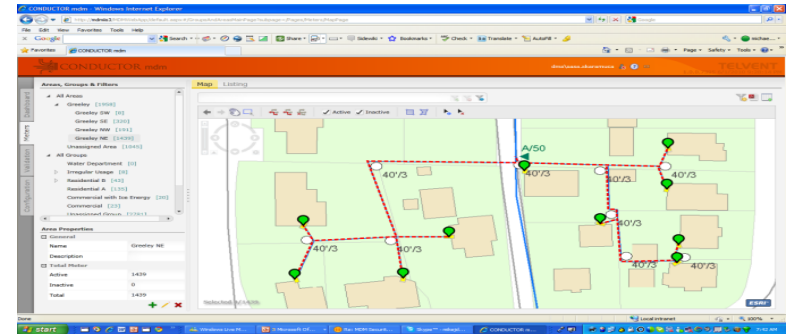


Substation One Line: The “Roll Up” Report Card



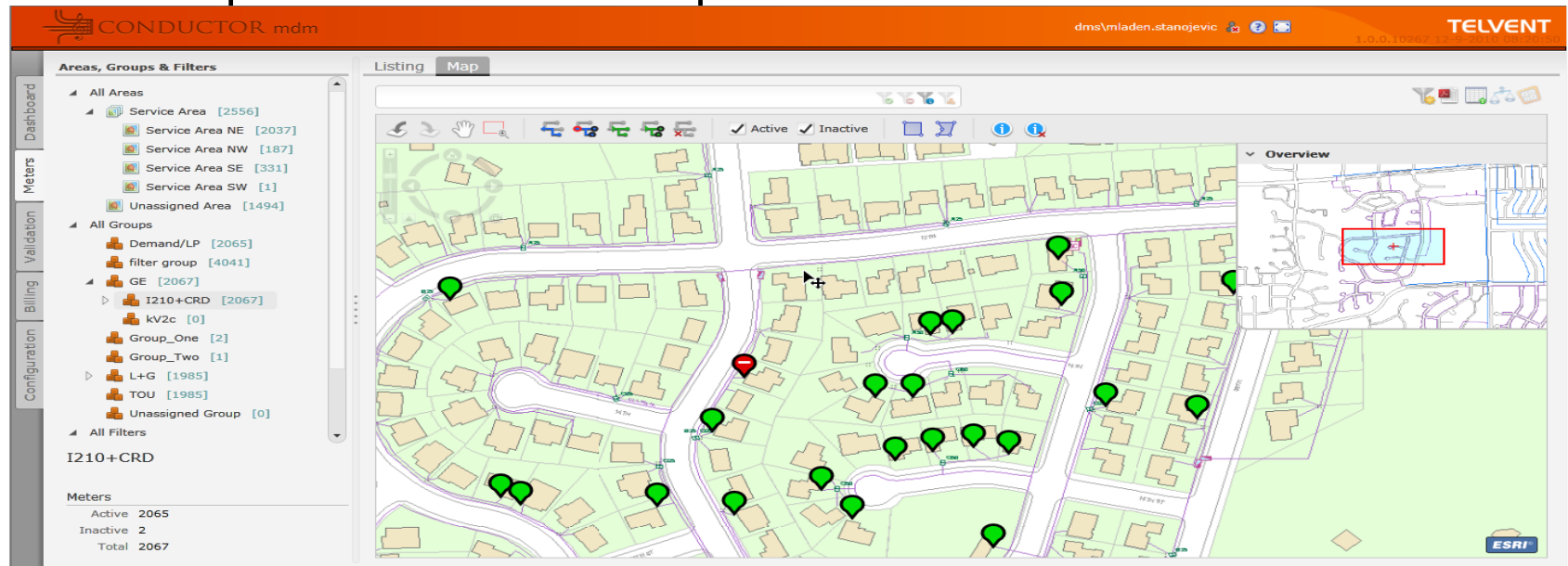
Conductor MDM Overview

- Validation, estimation, query, analysis, visualization, and reporting
 - Integration:
 - GIS
 - CIS and CRM
 - DMS and OMS
 - SCADA
 - AMI
 - Analytics engine

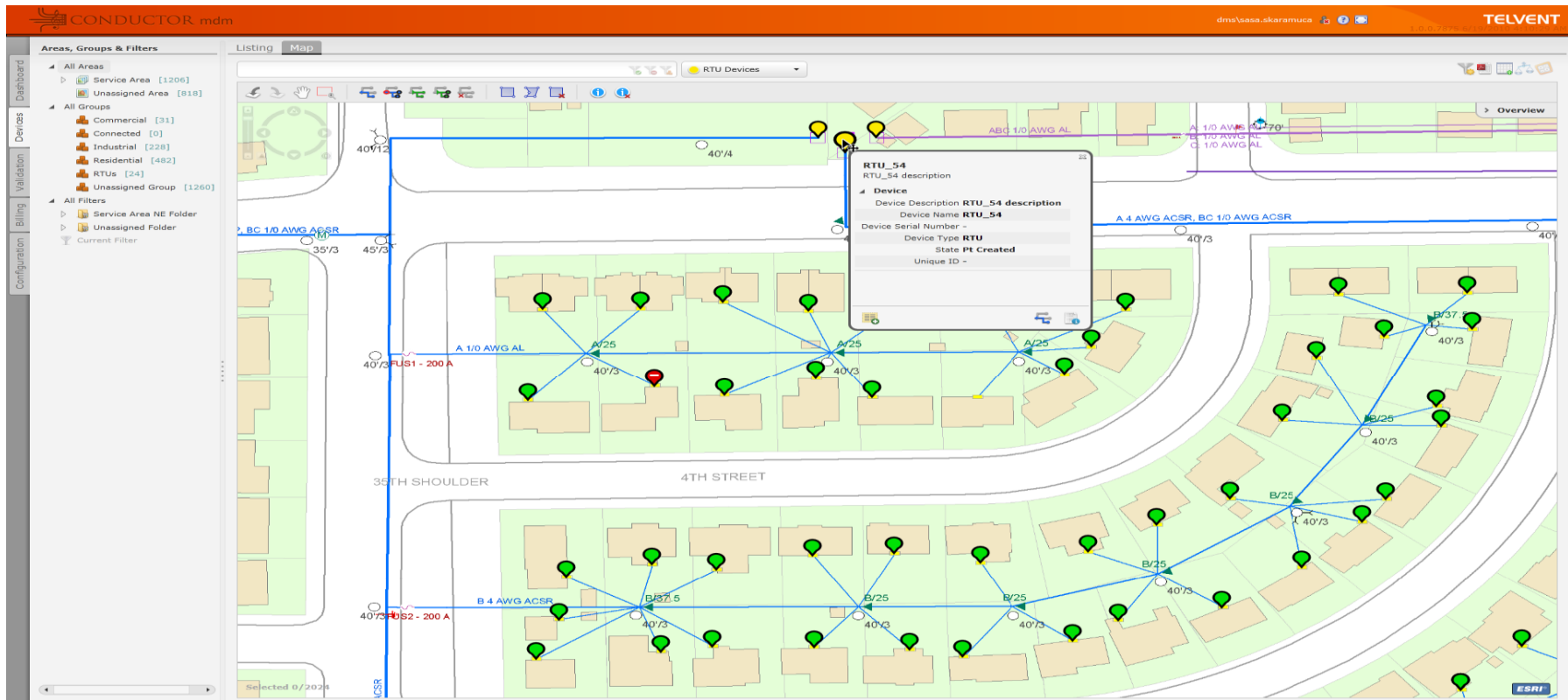


Conductor MDM UI – Map View

- Integration with GIS. Provides info about location of a meter together with its electric connectivity. Way to analyze and compare consumption in a real-time is provided...



Visualize and Manage RTU's + Meters





Summary

- Metering has gone beyond a single consumption value provided infrequently
- Very large, flexible MDUS systems installed with “automagic” capability
- AMI meter data used to extend value outside of billing and customer care
 - Traditional methods
 - New seamless/transparent methods becoming available



Alles

Bilder

Videos

News

Shopping

Mehr

Frankfurt am Main
Standort ändern

Das Web

Seiten auf Deutsch

Seiten aus
Deutschland

Übersetzte Seiten

Alle Ergebnisse

Websites mit Bildern

Mehr Optionen

Etwas anderes

stromzähl|

Suche

stromzähler
stromzähler manipulieren
stromzähler magnet
stromzähler ablesen
stromzählernummer
stromzähler eichung
stromzähler defekt
stromzähler eichen
stromzähler anhalten
stromzähler prüfen

Erweiterte Suche

Anzeigen

[Weitere Informationen](#)

[Stromzähler](#) – wikipedia

Der **Stromzähler** (auch Elektrozähler) ist ein integrierendes Messgerät zur Erfassung gelieferter und genutzter elektrischer Energie, also elektrischer Arbeit ...

[Allgemeines](#) - [Abrechnung](#) - [Tarifumschaltung](#) - [Umstellung auf elektronische ...](#)
de.wikipedia.org/wiki/Stromzähler - [Im Cache](#) - [Ähnliche Seiten](#)

[Amazon.de: Stromzähler](#) - Reiheneinbaugeräte: Baumarkt

digitaler **Stromzähler** Drehstromzähler für Hutschiene 3x20(80)A LCD S0 -DRT728D- ...

Stromzähler Drehstromzähler für DIN Hutschiene , Energiemessgerät 400V ...

[www.amazon.de/Stromzähler.../s?ie...1](#) - [Im Cache](#) - [Ähnliche Seiten](#)

[Shopping-Ergebnisse für stromzähler](#)



[Wechsel Stromzähler 10/40A 230V Klasse 2/Schaltung 1000 geeicht reg.](#)



More Information

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Thank you