Meeting New Regulatory & Financial Challenges Through Asset Framework with Sigmafine

Presented by

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Conference Theme and Keywords

Digital Transformation
Agenda

• About Uniper
• Business Challenge
• Solution
• Product Capabilities vs. Business Requirements
• Business Impact
• Summary & Lessons Learned
About the company
About Uniper

- Public Company  Formerly E.ON / IPO Q3-2016
- Uniper Benelux (UBX)
  - Power & Heat generation
  - Sales B2C & B2B
  - Netherlands and Belgium
- 2 900 MW Installed capacity (UBX)
  - 2 100 MW Coal,
  - 800 MW Gas
- Dusseldorf  →  Short & Long term planning & optimization
- Rotterdam  →  Operations, Local power & heat dispatch, Sales
Uniper Benelux Generation

Leiden 82 MW
The Hague 114 MW
Maasvlakte
MPP1 535 MW
MPP2 535 MW
MPP3 1065 MW
UCML 70 MW
RoCa
RoCa 1 25 MW
RoCa 2 25 MW
RoCa 3 220 MW
Vilvoorde 250 MW
Combined Heat & Power business

- Long term heat contracts
  - Delivery of heat
  - Operation of networks
- Single Heat Customer
- Multiple Heat Producers
- UBX Heat capacity
  - 500 MW CHP
  - 500 MW Heat Boilers
- Maasvlakte Co-siting
Changing position in Heat market

Uniper:
Heat production and network operation (transmission)

Heat Customer (Sales and distribution)

District Heating Rotterdam before 2014
- UBX had delivery commitment
- UBX was single producer
Changing position in Heat market

Producer
AVR

Uniper: Heat production and transmission

WBR

Heat pipe North

Heat pipe South

Heat Customer 1

Heat Customer 2
Operational & Business Challenges
UBX Business Environment

Hourly Validation

Gas Fuels → Power
Coal → Heat
Liquid Fuels → Steam

Multiple Generation Units & Scenarios

Multiple suppliers → Many buyers
Uniper Operational Data Requirements

• UBX needs to validate (accountable, compliancy) process measurements:
  – 11 power transactions
  – 36 heat transactions
  – 10 validated emissions to air for city production sites
  – 3 validated heat loss to aqueous streams
• Approximate 150-250 internal measurements per site
### Current way of validating generation data

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<th>Heat</th>
<th>Steam</th>
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<td>Many</td>
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<td>Generation Units &amp; Scenarios</td>
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Business Challenges

1. Improve response time (to market changes) / in validation process
2. Profit maximization based on balance of heat, power and steam
3. Timely provision of verified and auditable data to all trading partners
4. Operate within environmental permit limits
Solution
Technical Solution: PI System & Sigmafine

- PI AF - Structure the asset to meet business needs
- PI DataLink - Extract data to Excel
- PI Notification - Automate email notification for meters operating outside their validity
- PI ProcessBook: visualization of the asset based model

- SF Server
  - Energy Balance Calculation
  - Automatic Unit of Measure conversion
- SF Scheduler – Automation based validation & reconciliation periods (hourly, daily, monthly)
Uniper-Benelux Energy Balance
Power and Heat Market: Data quality needs

F1 = 100±2
F2 = 80±4
F3 = 20±0.2
F4 = 150±1.5
F5 = 40±0.8

Measured Imbalance = +10

F1 = 98.3±1.8
F2 = 73.0±2.2
F3 = 20.0±0.2
F4 = 151.0±1.4
F5 = 40.3±0.8

Reconciled Imbalance = 0
Energy Balance: Combined Power & Heat site

Energy Balance
Reconciled data
Publish validated data
 Improve business and operational decisions
AF Structure - Input

1. PI AF attributes covers multiple measurements
2. PI AF attributes captures data scientist standard checks (delta violation, freezing, no data)
3. Uses OSIsoft PI Notifications sends alarm emails for important measurements errors (including emissions)
AF Structure - Output

1. Sigmafine calculates reconciled energy and associated tolerance
2. Sigmafine produces measurement data quality KPI for data scientist
3. Sigmafine produces balance point quality KPI for Operations manager
Making data trustable: The Sigmafine way
Energy balance

Before

- Balances are calculated in excel using PI DataLink
- Separate boundary balance (gas or power or heat)
- Manual repairs or alternative meter selection for missing values/errors
- Process monthly interval

Now

- Sigmafine integrates natively to PI System
- Single energy balance model with data reconciliation containing all process units (gas, power, heat)
- All data sources (PI Server & external) considered in model
- (Near-) real time balance
Business Impact

• **Operations Benefits**
  – Monthly → Daily (intraday) Balancing
  – Timely validated operations data with financial impact
  – Daily maximization of heat dispatching
  – Faster Billing & Reporting to customers

• **Financial Benefits**
  – Power/heat optimization valued to approx. 4%-6% of heat contract value
  – Expected €300-500 k annually

*Optimize the heat optimization and dispatch also depending on other parallel projects*
## Life of the Data Custodians

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<th>After</th>
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<tr>
<td>Manual and Time consuming monthly data validation process</td>
<td>Daily automatic data validation and reconciliation</td>
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<td>Manual data import from different sources (PI Server, TSO, Gas grid)</td>
<td>Automatic import into Sigmfine from all the data sources</td>
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<td>Manual identification and resolution of data gaps, meter defects</td>
<td>Automatic data correction</td>
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<td>Manual selection of the “best” redundant measurements points</td>
<td>Automatic filtering and selection of the best measured data</td>
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<td>Time spent to resolve “Ambiguities” related to Compliance and Billing (consumption &amp; production)</td>
<td>Faster, validated view on financial impact of operations</td>
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Improve integrity of Business Process by delivering timely & accurate information

COMPANY and GOAL
UBX performance engineering department is responsible for processing, validating, correcting and releasing unambiguous generation data

CHALLENGE
Current manual work processes limits the data availability to monthly intervals
- Time consuming data processing with manual corrections
- Lack of focus on data and metering quality

SOLUTION
Combining PI AF and Sigmafine to automate data validation and reconciliation
- Hourly intervals combining different data sources
- Pre programmed model runs to match delays of availability

RESULTS
Single source of truth for generation data, available at shorter intervals/delays
- Data version capture made available company wide for reporting, invoicing, business analyses
- Increasing data quality over versions
Tangible Improvement of the outcome of Business Process & Decisions

COMPANY and GOAL
UBX Heat business under stress of declining margins. Unambiguous generation data increasingly important for steering business dispatch/operations

CHALLENGE
Suboptimal heat operation/dispatch due to lack in clear view of financial impact decisions
- Ambiguous data availability
- 1 month delay of validated ‘fiscal’ data
- No link between operation decisions and finance

SOLUTION
Implementing automated data validation and reconciliation system
- Single source of truth available within 1 day
- Automatic reports with actual financial impact of operations/dispatch

RESULTS
Improvement opportunity (300-500 k€ annually)
- Improve short term operations/dispatch
- Faster invoicing, limiting amounts outstanding
- Linking operational decisions to financial results
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