

Impacts across the Organization – Uniper's Digital Journey with OSIsoft EA Deployment



Lingli Zheng, Nadia Beleno

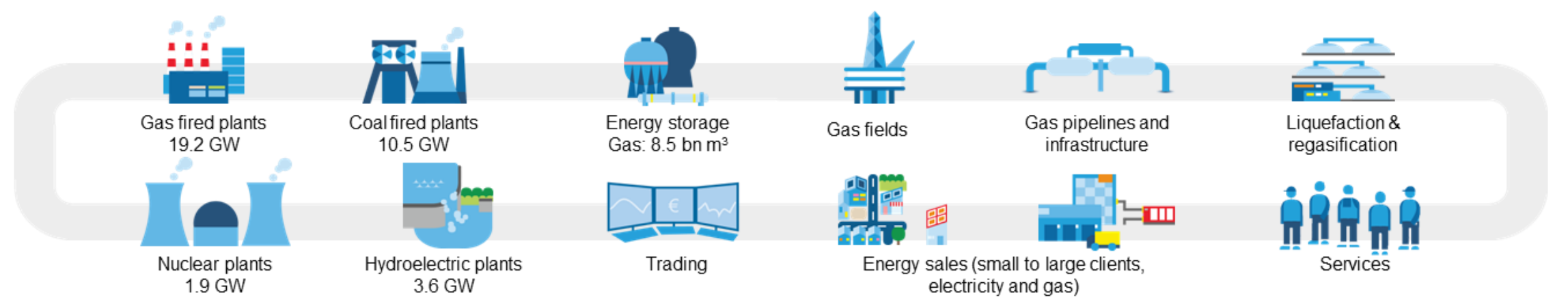
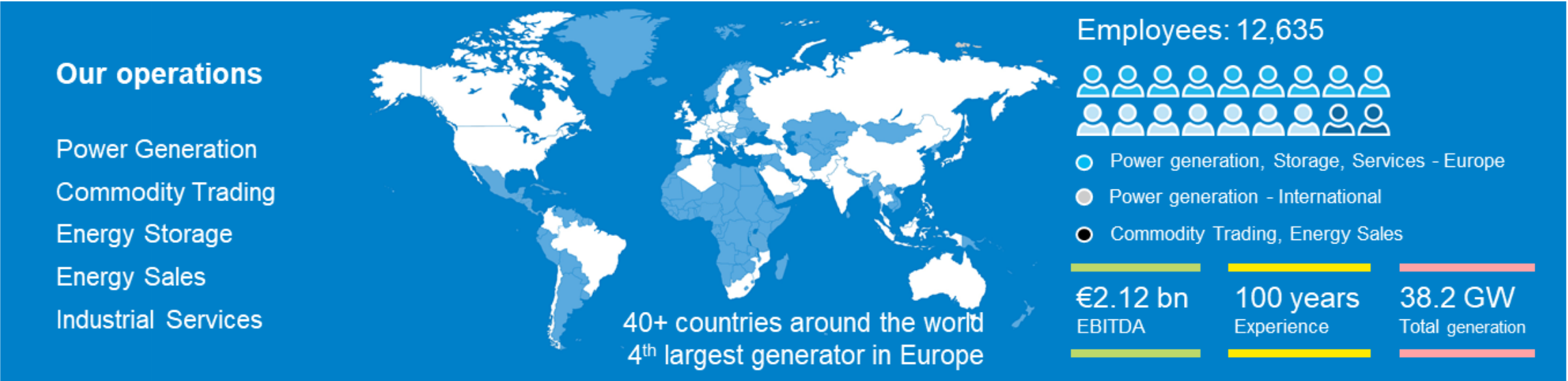
Agenda

- We are Uniper
- Approach to digital Transformation at Generation
- Case Study – Reliability Management
- Infrastructure
- Summary
- Questions



Uniper at a glance

International energy company with more than 11,000 employees



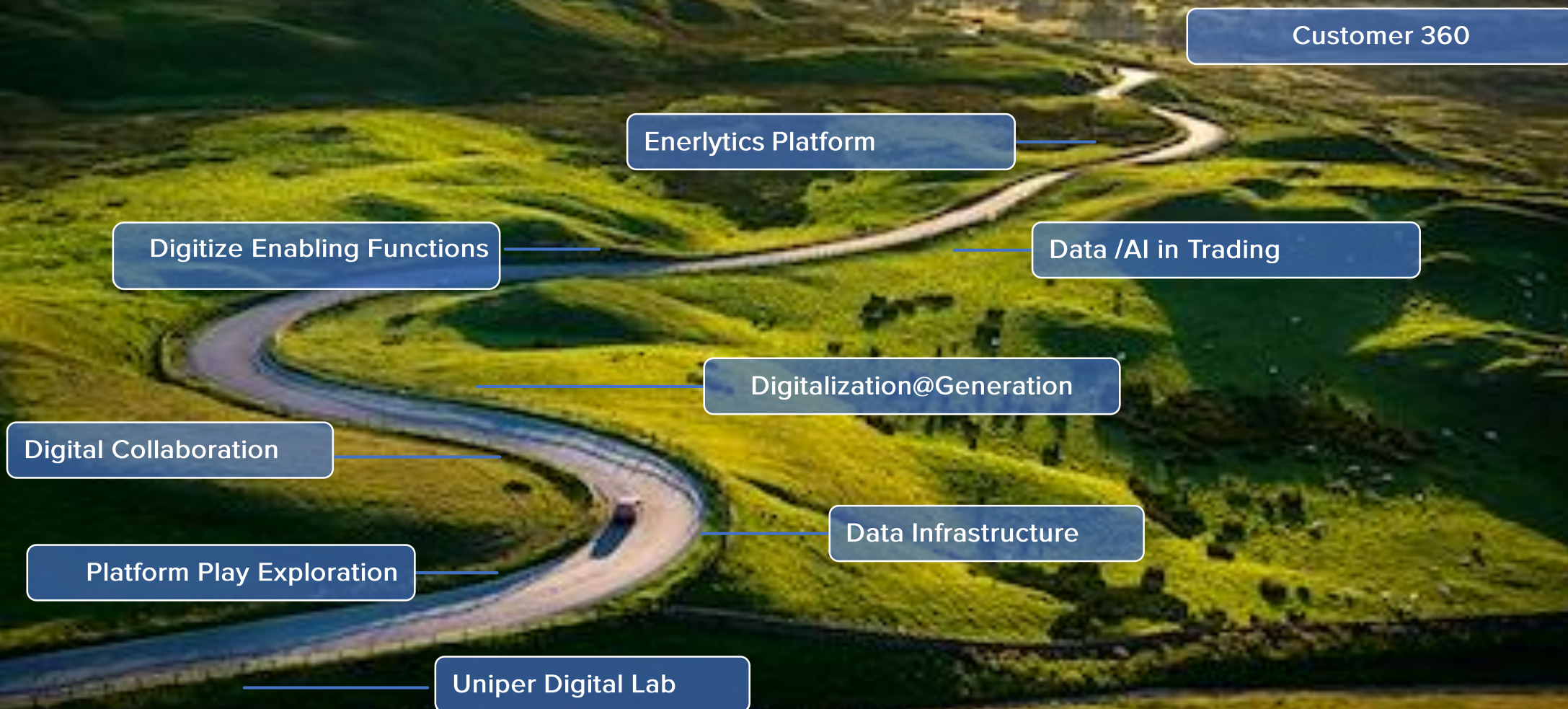
Data: Uniper Annual and Sustainability Reports 2016

Agenda

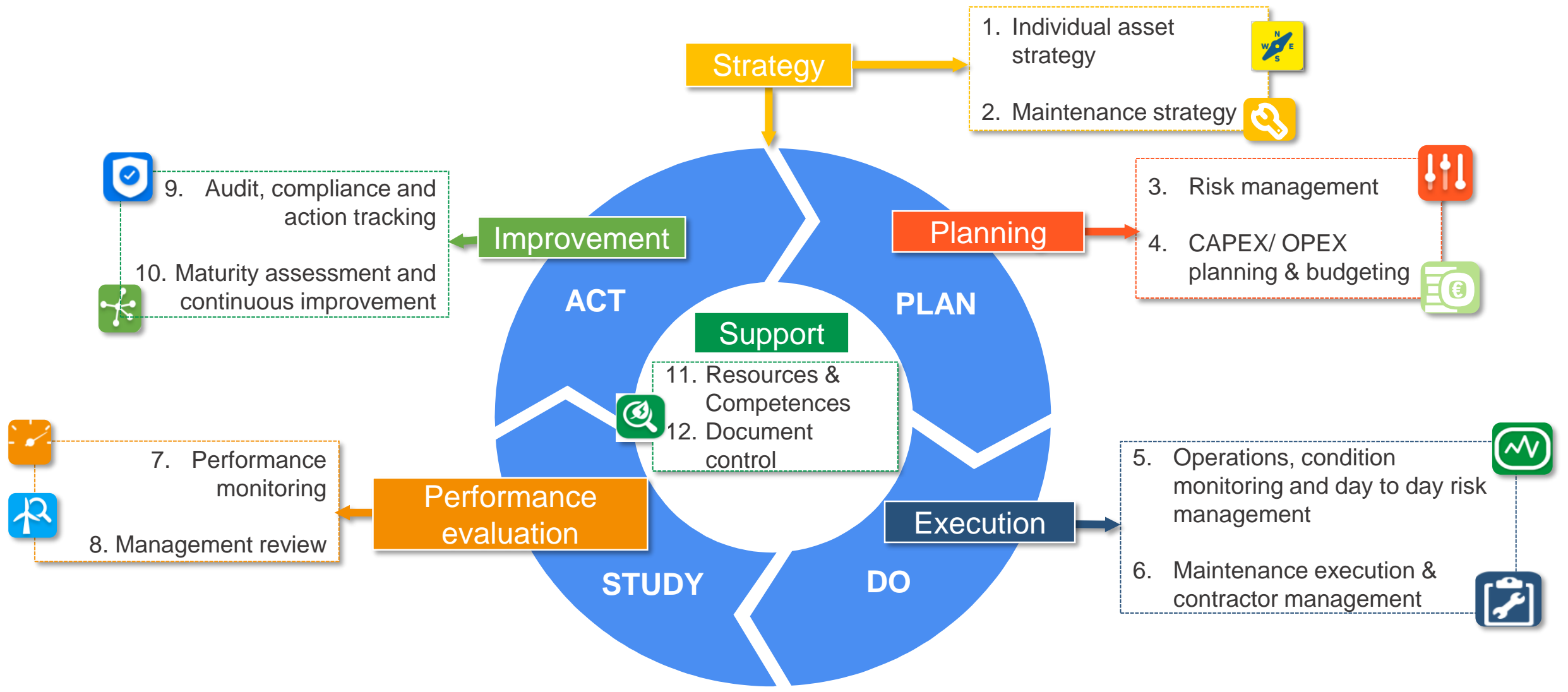
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Uniper's Strategic Digital Initiatives

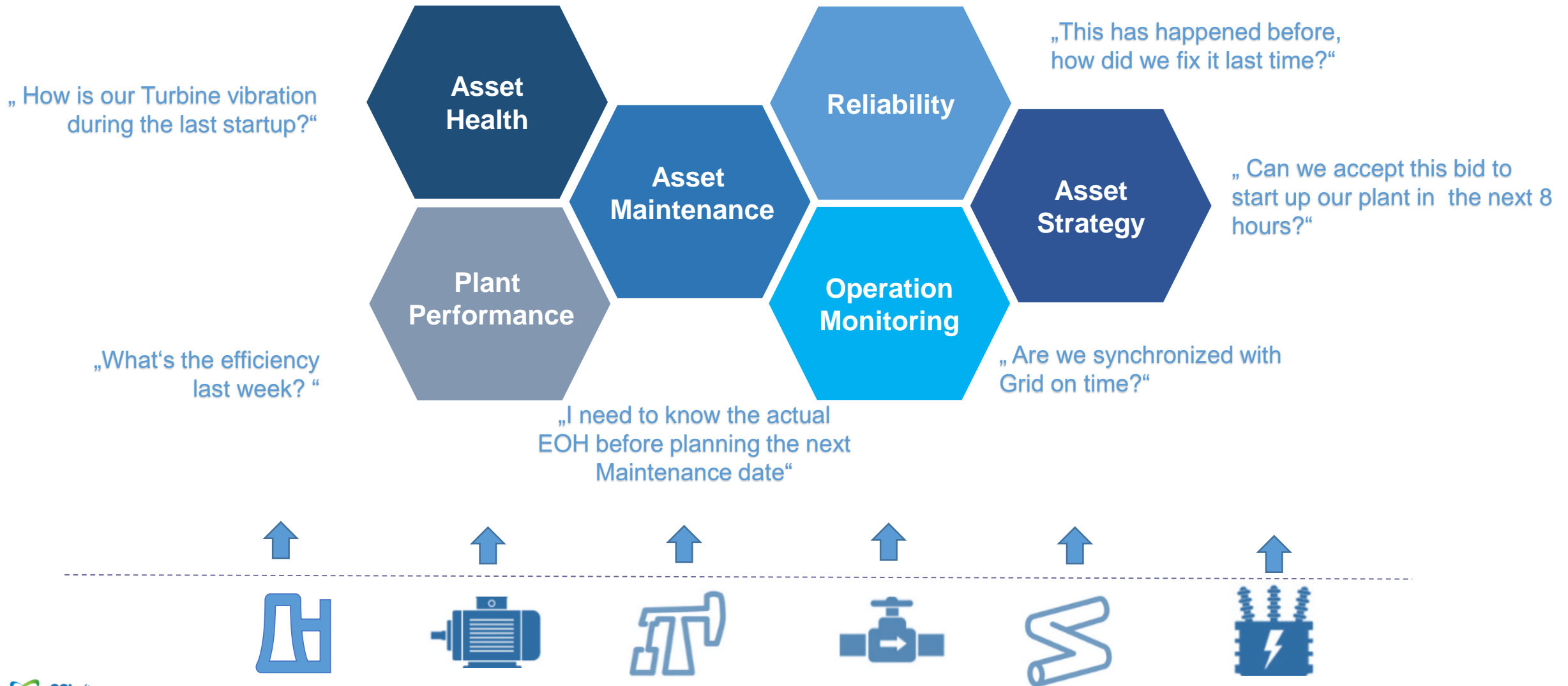


Digitalization@Generation - Framework

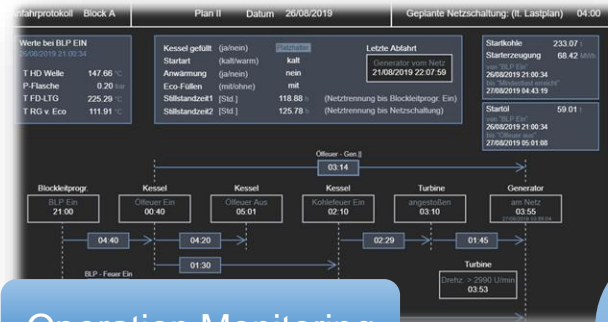


Derived from **ISO 55001** Asset management – Management systems – Requirements

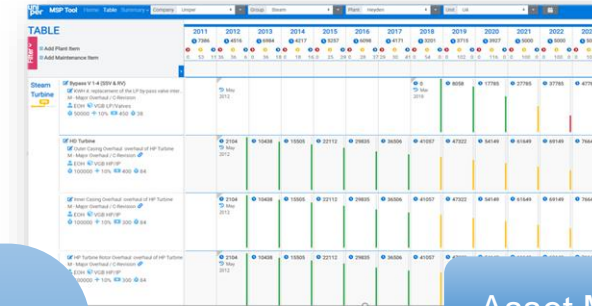
Digitalization@Generation - Focus and Challenges



Digitalization@Generation - Key Solutions:



Operation Monitoring



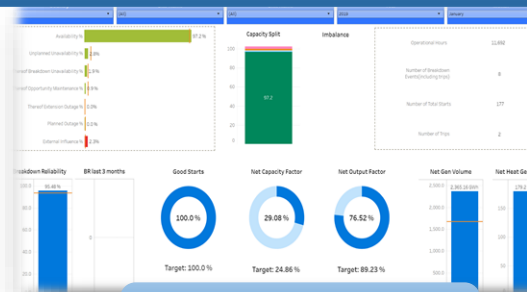
Asset Maintenance

Daily Summary

Daily Power Sent Out	10.3 cWh		
Daily CHP Thermal Export	0.00 cWh		
Daily Total Plant Efficiency (inc CHP)	102.4 %		
UE Efficiency inc CHP	57.3 %		
BaseLoad Gross Efficiency (indicative only)	Unit 6	Unit 7	Unit 8
	57.3 %	57.9 %	57.8 %
Breakdown Rate	95.3 %	5.0 %	5.5 %
Starts	0	0	0
Last Starts Performance			
Positive Imbalance	0.0 %	15.5 %	0.0 %
Negative Imbalance	0.0 %	-0.4 %	-40.5 %
Daily NOx Average	0.0 mg/Nm3	0.6 mg/Nm3	0.5 mg/Nm3
Daily CO Average	0.0 mg/Nm3	0.0 mg/Nm3	0.0 mg/Nm3
CO Consumption	2.1 Nm3	12.8 Nm3	8.8 Nm3
Condensate Differential (Max last 24hrs)	0.01 bar	0.58 bar	0.45 bar
Making-up Water consumption	0 m3	202 m3	65 m3
F & A Flow	0 m3	0 m3	0 m3
	64	6,646 m3	21

Plant Performance

Standardized Architecture
Standard Central Reports
Local Site Specific Reports
Daily-Yearly Reports
Data Governance



Production



Plant Reliability

Werte bei BLP EIN

26/08/2019 21:00:34

T HD Welle 147.66 °C
P-Flasche 0.20 bar
T FD-LTG 225.29 °C
T RG v. Eco 111.91 °C

Kessel gefüllt (ja/nein)

Platzhalter

Letzte Abfahrt

Startart (kalt/warm)

kalt

Generator vom Netz
21/08/2019 22:07:59

Anwärmung (ja/nein)

nein

Eco-Füllen (mit/ohne)

mit

Stillstandzeit1 [Std.]

118.88 h

(Netztrennung bis Blockleitprogr. Ein)

Stillstandzeit2 [Std.]

125.78 h

(Netztrennung bis Netzschtaltung)

Startkohle 233.07 t

Starterzeugung 68.42 MWh

von "BLP Ein"
26/08/2019 21:00:34
bis "Mindestlast erreicht"
27/08/2019 04:43:19

Startöl 59.01 t

von "BLP Ein"
26/08/2019 21:00:34
bis "Ölfeuer aus"
27/08/2019 05:01:08

Ölfeuer - Gen. II

03:14

Blockleitprogr.

BLP Ein
21:00

Kessel

Ölfeuer Ein
00:40

Kessel

Ölfeuer Aus
05:01

Kessel

Kohlefeuer Ein
02:10

Turbine

angestoßen
03:10

Generator

am Netz
03:55
27/08/2019 03:55:04

04:40

04:20

02:29

01:45

BLP - Feuer Ein

05:10

BLP - Gen. II

07:54


Turbine

Drehz. > 2990 U/min
03:53

Events

☐ Automatically refresh the list

- UK_RAT_Unit1_Startup_2019-01-19 06:54:23.041
1/19/2019 6:54:23 AM - 1/19/2019 8:26:23 AM
- UK_RAT_Unit1_Startup_2019-01-17 06:25:25.099
- UK_RAT_Unit1_Startup_2019-01-16 05:57:10.083
- UK_RAT_Unit1_Startup_2019-01-15 06:20:30.077
- UK_RAT_Unit1_Startup_2019-01-14 07:25:00.036
- UK_RAT_Unit1_Startup_2019-01-13 05:15:22.069
- UK_RAT_Unit1_Startup_2019-01-11 05:55:15.023
- UK_RAT_Unit1_Startup_2019-01-10 05:25:45.034
- UK_RAT_Unit1_Startup_2019-01-09 04:46:05.048

 Edit Search Criteria

Attributes

UK_RAT_Unit1_Startup_2019-01-19 06:54:23.041

Configuration

Display: *Click Save Icon* (read-only)*

Edit Search Criteria

► Database Asset Management

► Time Range Custom Time Range

► Event Severity

► Event Name

▼ Event Type and Attribute Value Selected

Event Type

UK_RAT_Unit Start ▼

Event Attribute

Startup Type ▼

= ▼

Hot



► Asset Name \\Defruni0902\Asset Management...

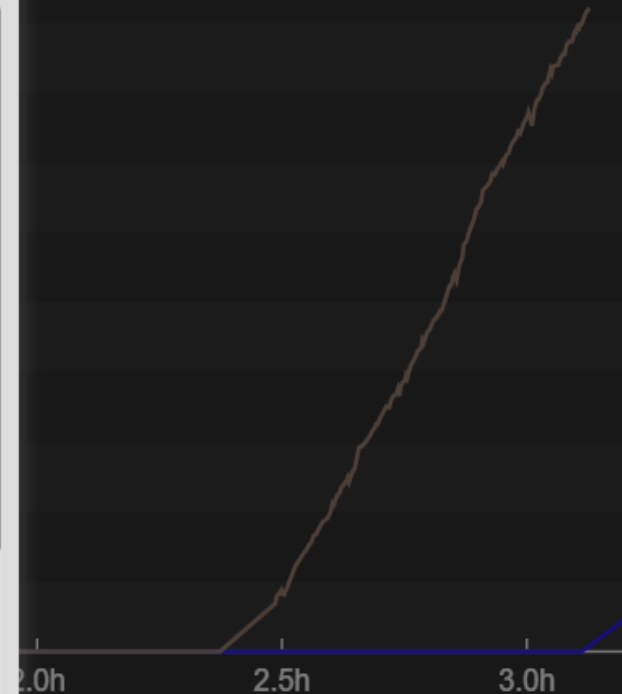
► Asset Type

☐ Return All Descendants

Apply

Reset

Cancel



☐ Automatically refresh the list

- UK_RAT_Unit1_Startup_2019-01-19 06:54:23.041
1/19/2019 6:54:23 AM - 1/19/2019 8:26:23 AM
- ◆ UK_RAT_Unit1_Startup_2019-01-17 06:25:25.099
- UK_RAT_Unit1_Startup_2019-01-16 05:57:10.083
- ▲ UK_RAT_Unit1_Startup_2019-01-15 06:20:30.077
- ▼ UK_RAT_Unit1_Startup_2019-01-14 07:25:00.036
- UK_RAT_Unit1_Startup_2019-01-11 05:55:15.023
- ◇ UK_RAT_Unit1_Startup_2019-01-10 05:25:45.034
- UK_RAT_Unit1_Startup_2019-01-06 08:49:25.024
- △ UK_RAT_Unit1_Startup_2019-01-05 08:16:03.024

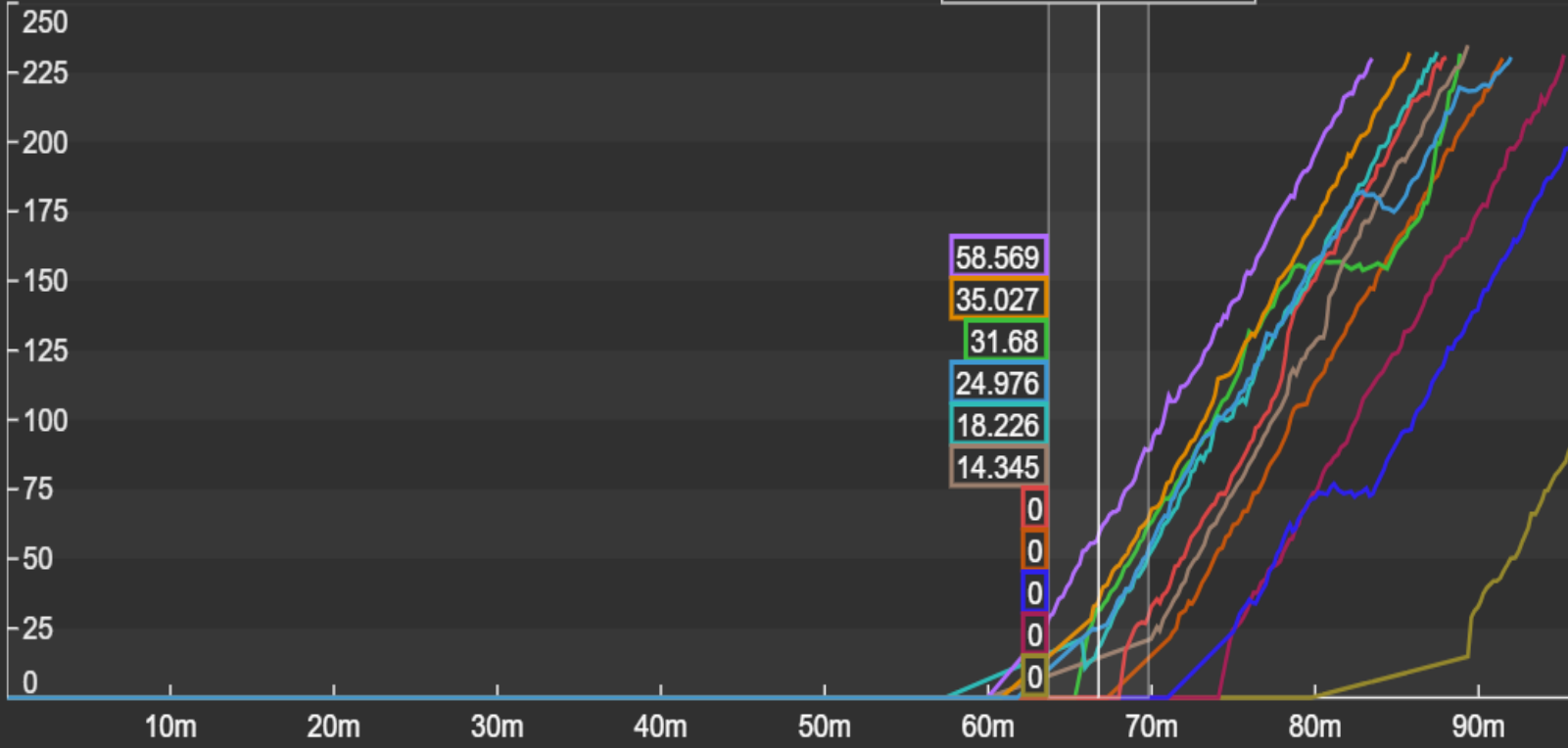
 Edit Search Criteria

Attributes

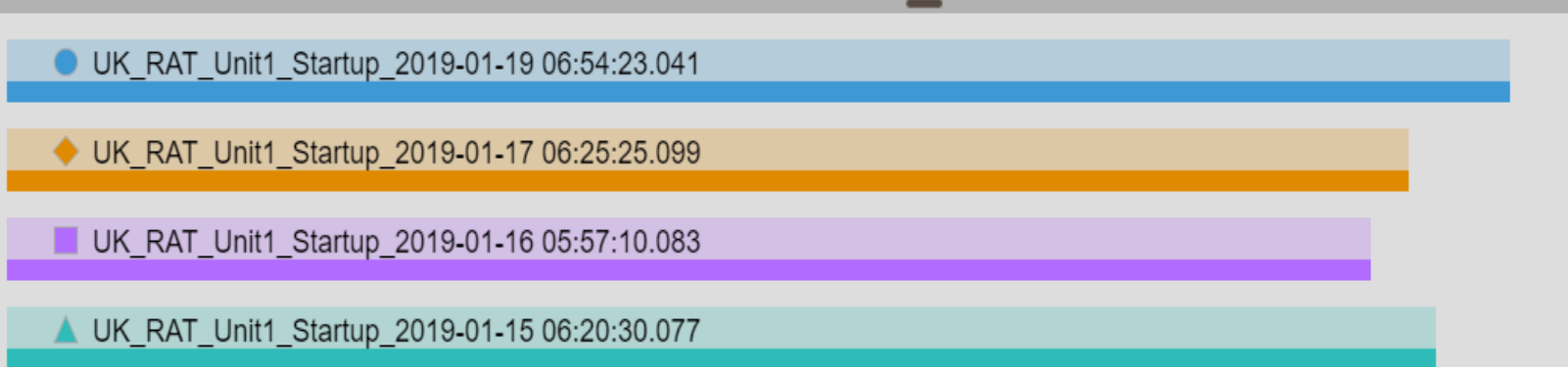
UK_RAT_Unit1_Startup_2019-01-19 06:54:23.041

Configuration

● Generation Gross (MW) X



● Generation Net (MW) X



Country

(All)

Site Name

(All)

Unit Name

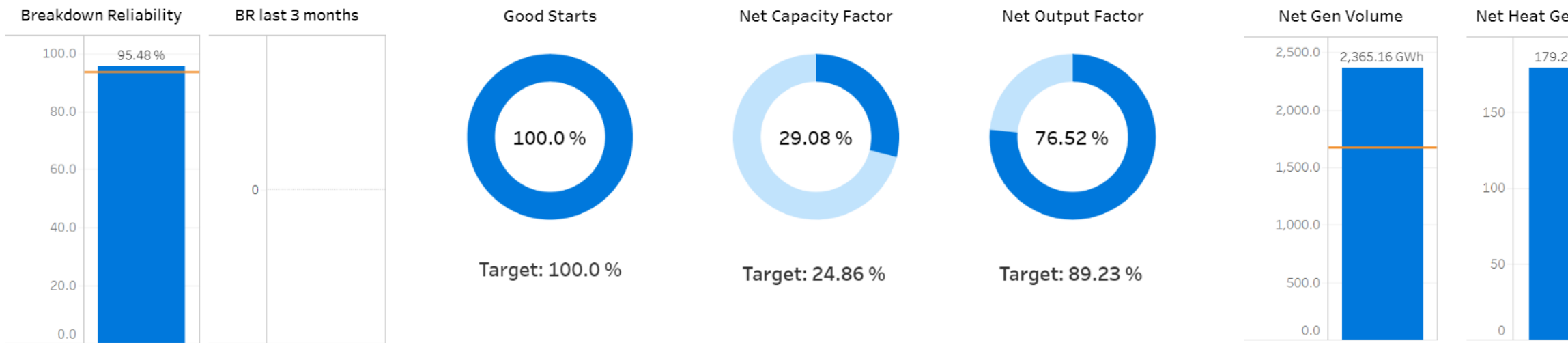
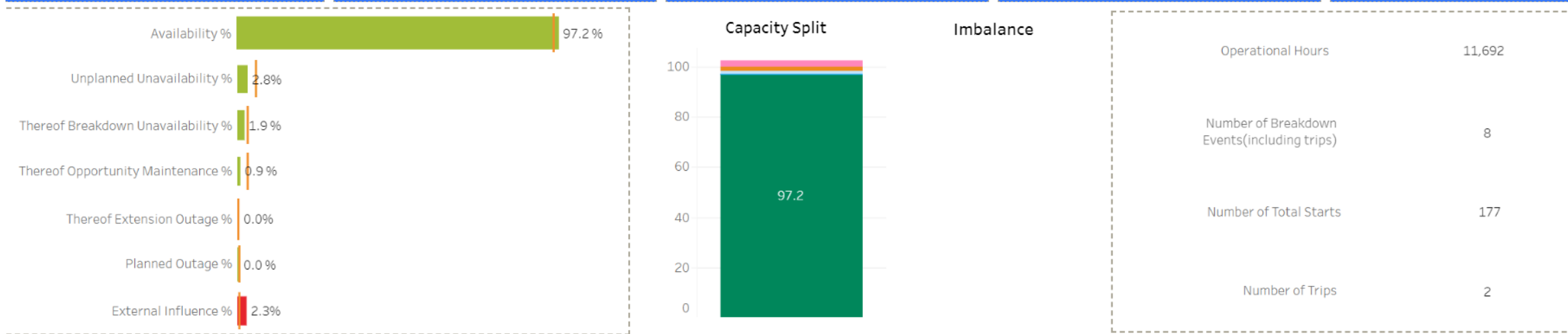
(All)

Year

2019

Month

January



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Grain Power Station Reliability Management

Reliability Engineer provides the expertise and technical support to **Identify, Maintain, and Improve** the reliability of the plant and its individual components

Figures and Facts

Assets = ~**31680**

Critical Assets = ~**2661**

Investigations = **38/year**

Support the Engineering teams with the

Develop engineering test programmes

Participate in the development of criteria

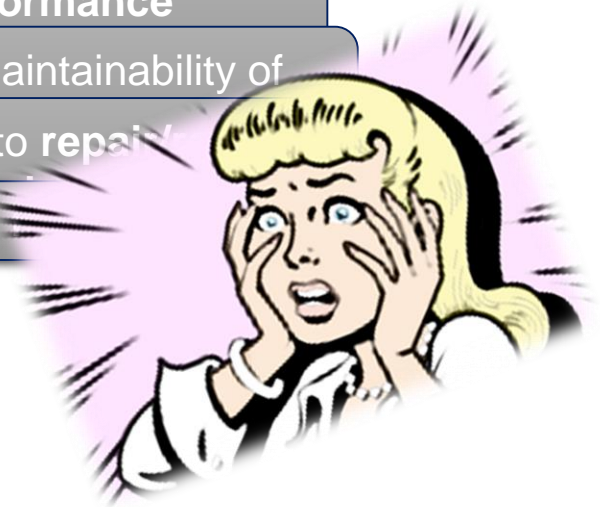
Lead site wide improvement activities to

Carry out **reliability performance**

Ensure reliability and maintainability of

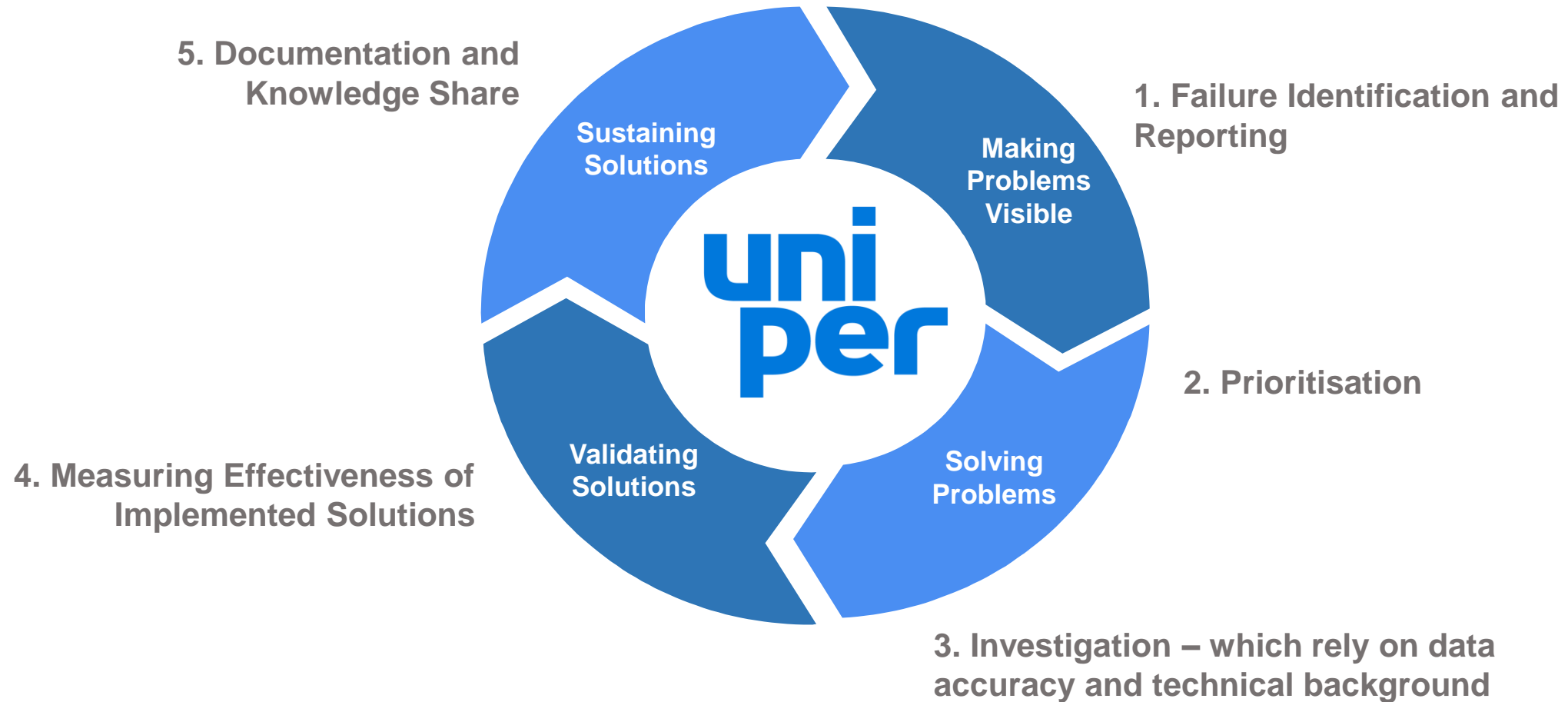
Apply value analysis to repair

Lead **failure**



Grain Power Station Reliability Management

Failure Reporting and Corrective Action System – Powered by OSIsoft PI, SAP and Tableau



Failure Identification and Reporting

File Search View Go Tools Help

Database Query Date Back Check In Refresh New Element New Attribute

Elements

- Elements
 - Maintenance Strategy Planning
 - Reference
 - Sandbox
 - Technology
 - Uniper
 - Benelux
 - France
 - Germany
 - Hungary
 - Russia
 - Sweden
 - UK
 - CDC
 - CQ
 - ENF
 - GRA
 - Unit0
 - Unit6**
 - Unit7
 - Unit8
 - HGS
 - HOL
 - KIL
 - RAT
- Element Searches

- Elements
- Event Frames
- Library
- Unit of Measure
- Contacts

Unit6

General Child Elements Attributes Ports Analyses Notification Rules Version

Filter

	Name	Value
	Target Load	0 MW
Category: Generation		
	Calculated MEL	437,96 MW
	Full Load	0 MW
	Load	-0,5 MW
	Target Load	0 MW
Category: IDs		
Category: KPI_Availability		
	Actual Gen	0 MW
	Actual MEL	0 MW
	Actual SEL	230 MW
	Ambient Humidity	72,476 %
	Ambient Percentage	0 %
	Ambient Pressure	1021,4 bar
	Ambient Temperature	15,231 °C
	Ambient Volume	0 MWh
	Anti Icing Valve Position	0,37842
	Availability Loss	439,13 MW
	Availability Loss Hours_Daily	0

icn_downl

Failure Identification and Reporting

GeneralChild ElementsAttributesPortsAnalysesNotification RulesVersion

		Name	Backfilling
✓	fx	Monthly	
✓	H	Operational Incident	
✓	fx	Operational Incident Forced-End-Trigger Reset	✓
✓	fx	Running Hour	
✓	fx	Starts Monitor 1 - Plant Status	✓
✓	fx	Starts Monitor 1.1 - Actual Sync Time and Desync...	✓
✓	fx	Starts Monitor 1.2- Duration	✓

Name:Operational Incident

Description:

Categories:CCGTUnit_1h

Analysis Type:☐ Expression☐ Rollup☒ Event Frame Generation☐ SQC

[Create a new notification rule for Operational Incident](#)

Generation Mode:Explicit TriggerEvent Frame Template:Loss Event

Add...

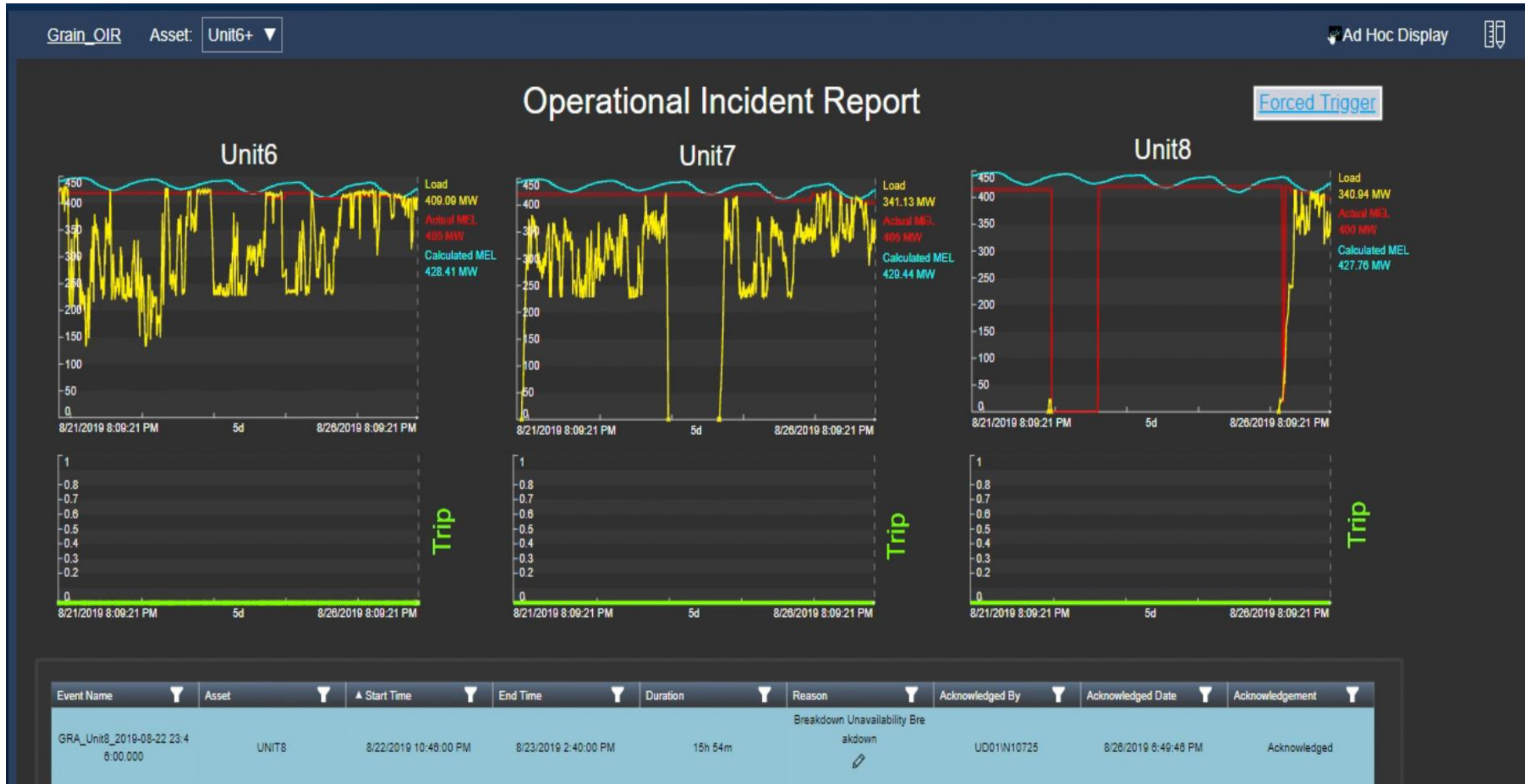
Name	Expression	True for	Severity
Start triggers			
StartTrigger1	(TagVal('Calculated MEL')-TagVal('Actual MEL')>45) or 'Trip' > 0	Not Set	None
End trigger			
EndTrigger	TagVal('Calculated MEL')-TagVal('Actual MEL')<45 and 'Trip' = 0 or 'Forced End Trigger' = 1		

Evaluate

Scheduling:☒ Event-Triggered☐ Periodic

icn_downloaded

Failure Identification and Reporting



Failure Identification and Reporting

Database Query Date Back Check In Refresh New Template New Attribute Template

Library

- Element Templates
 - Event Frame Templates
 - CCGT Unit Startup
 - DEU SCHK Anfahrt Kohle
 - DEU SCHK Anfahrt Ölfeld
 - DEU SCHK Anfahrt Turb
 - DEU SCHK Zeitraum Abf
 - DEU SCHK Zeitraum Anf
 - DEU SCHK Zeitraum Anf
 - DEU SCHK Zeitraum Ger
 - DEU SCHK Zeitraum Sau
 - DEU SCHK Zeitraum Still
 - DEU_FRA_Monatsberich
 - FRA_PROV_Unit Shutdo
 - FRA_PROV_Unit Start
 - Heat Unit Start
 - Loss Event
 - Pipelines Daily Report Pe
 - Pipelines Monthly Report
 - ST Starts
 - Steam Unit Run
 - Steam Unit Startup_CB
 - Steam Unit Startup_ID F
 - UK_RAT_Unit Start
 - Unit Trip

Elements

Event Frames

Library

Unit of Measure

Contacts

Loss Event

General Attribute Templates

Filter

Name	Description	Default Value
Actual MEL	Actual MEL at Start of the Event	0 MW
Actual MEL Total		0 MW
Asset Name		0
Availability Loss		0 MWh
Calculated MEL		0 MW
Calculated MEL Total		0 MW
Duration		0 h
Duration Seconds		0 s
EOH		0 h
EOH_ET		0 h
EOH_ST	Difference of the Unit Operating ...	0 h
InstrumentID		0
Load	Load at Start of the Event	0 MW
Reason		
Site Name		0

Enumeration Sets

- AdroitStateSet1
- BINARY_STATE
- Closed_Feedback
- DEU Anfahrt Temperaturbere
- DEU Aus/Ein
- DEU Block Betriebsart
- DEU Falsch/Wahr
- DEU Kalt/Warm
- DEU Mit/Ohne
- DEU Nein/Ja
- Good Bad
- Health Status
- Heat Type
- Loss Code
- MSPT Calcmode1
- MSPT CompOP1

General

Name: Loss Code

Description:

☐ Hexadecimal [Security](#)

Value	Name
0	Breakdown Unavailability Derate
1	Opportunity Maintenance Case A
2	Opportunity Maintenance Case B
3	Planned Outage
4	Extension Outage
5	Ambient Loss due to Weather Conditions
6	Non Station Constraint
7	No Loss
8	Breakdown Unavailability Breakdown
9	Breakdown Unavailability Trip

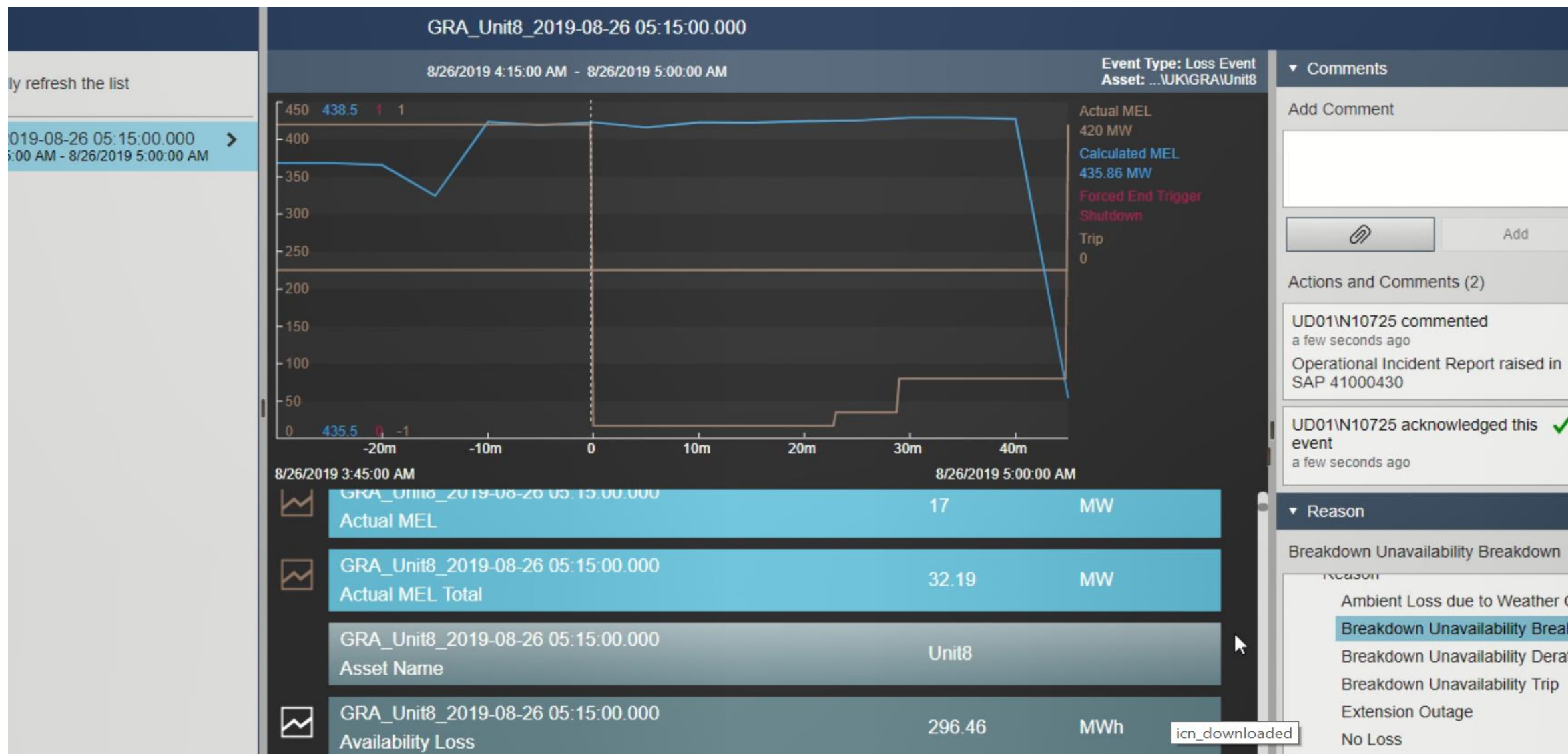
Failure Identification and Reporting

The screenshot shows a software interface with a 'Reason Code Editor' dialog box open. The dialog box has a title bar 'Reason Code Editor' and a close button. Below the title bar, the text 'GRA_Unit8_2019-08-26 05:15:00.000' is displayed. A list of reasons is shown, with 'Extension Outage' highlighted and a mouse cursor pointing at it. The list includes: Reason, Ambient Loss due to Weather Conditions, Breakdown Unavailability Breakdown, Breakdown Unavailability Derate, Breakdown Unavailability Trip, Extension Outage, No Loss, Non Station Constraint, Opportunity Maintenance Case A, Opportunity Maintenance Case B, and Planned Outage. At the bottom of the dialog are 'Clear', 'Apply', and 'Cancel' buttons. In the background, a table with columns 'Event Name', 'Asset', and 'Status' is visible, showing two rows of data. To the right of the dialog, another table with columns 'Acknowledged Date' and 'Acknowledgement' is visible, showing a row with the date '8/26/2019 6:49:46 PM' and the status 'Acknowledged'. A green 'Acknowledge' button is also visible.

Event Name	Asset	Status
GRA_Unit8_2019-08-22 23:46:00.000	UNIT8	8/26/2019 6:49:46 PM
GRA_Unit8_2019-08-26 05:15:00.000	UNIT8	8/26/2019 6:49:46 PM

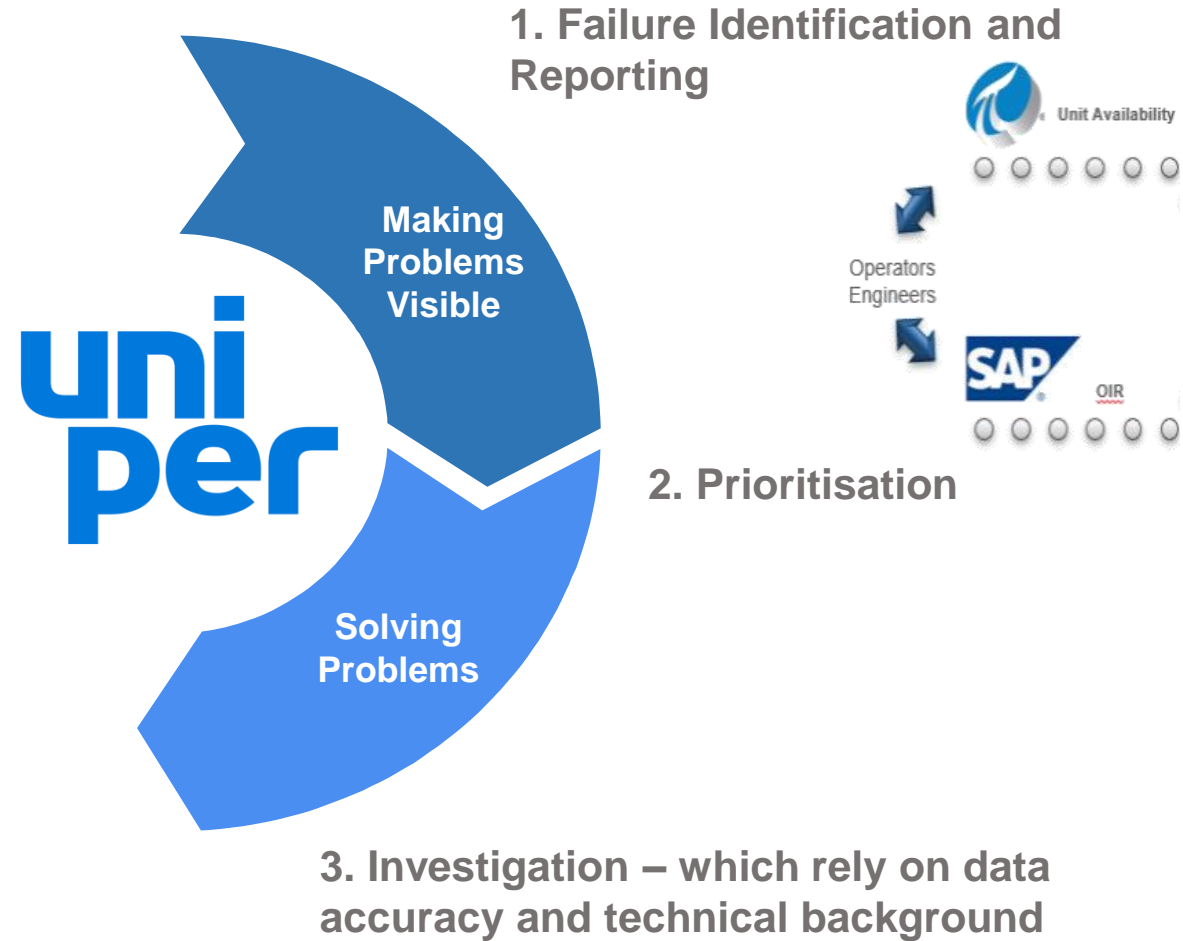
Acknowledged Date	Acknowledgement
8/26/2019 6:49:46 PM	Acknowledged

Failure Identification and Reporting



Grain Power Station Reliability Management

Failure Reporting and Corrective Action System – Powered by OSIsoft, SAP and Tableau



Prioritization

My Views

UD01\L16539

Create Asset View

Build a data view starting with your asset hierarchy

Create Event View

Build a data view starting with your event frame hierarchy

Create Streaming View

Build a streaming view with a custom output shape

Modify View

Modify existing data view

Remove View

Remove selected view

Name	Run Status↑	Type	Run Mode	Start Time	End Time	Last Run Time	Destination
UK_GRA_OIR	Scheduled	Event	Continuous	t-7d	t	Sep 6, 2019 7:00:00 AM	PI View
UK_RAT_Startup	Scheduled	Asset	Continuous	Y+5h	T+5h	Sep 5, 2019 5:27:36 PM	DEV_ASSET_DB

Overview

Log

Security

View Configuration

Statistics

Run Status

View Name

PI AF Database

Publish Target

View Type

Run Mode

Run Frequency

Last Run Time

Your Start Time is

UK_GRA_OIR

Asset Management

PI View

Event

Continuous

1 Days

Sep 6, 2019 7:00:00 AM

t-7d

Publish Actions

Resume

Stop

Update Data

Event Shape

GRA* | Loss Ev...

Actual MEL

Actual MEL ...

Asset Name

Availability ...

Calculated ...

Calculated ...


Duration

Duration Se...

EOH

Asset Shape

icn_downloaded

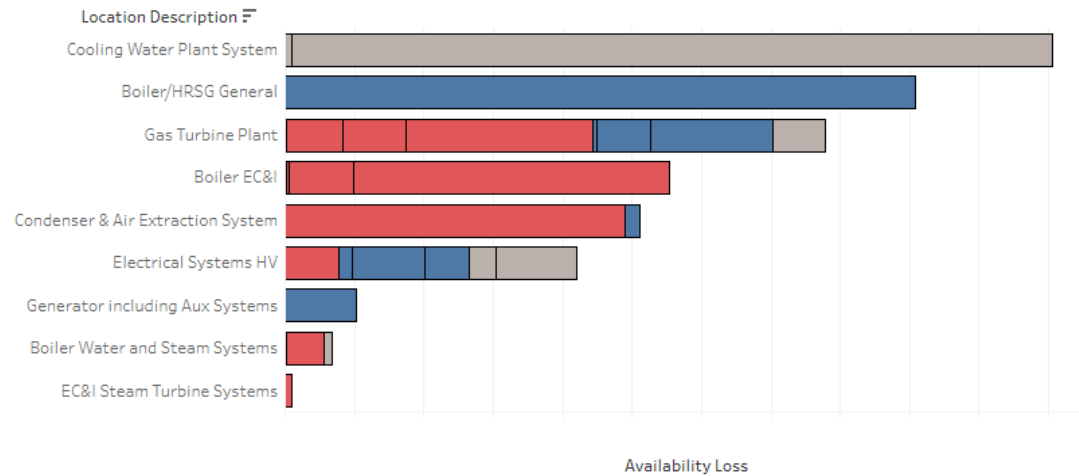
 OSIsoft
PIWorld GOTHENBURG 2019

#PIWorld ©2019 OSIsoft, LLC

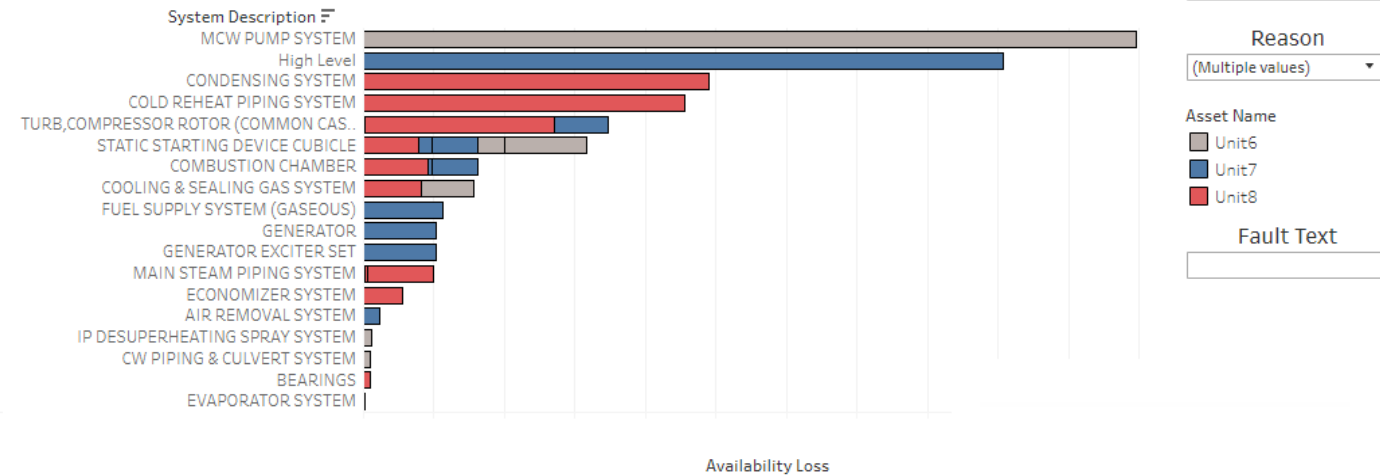
24

Prioritization

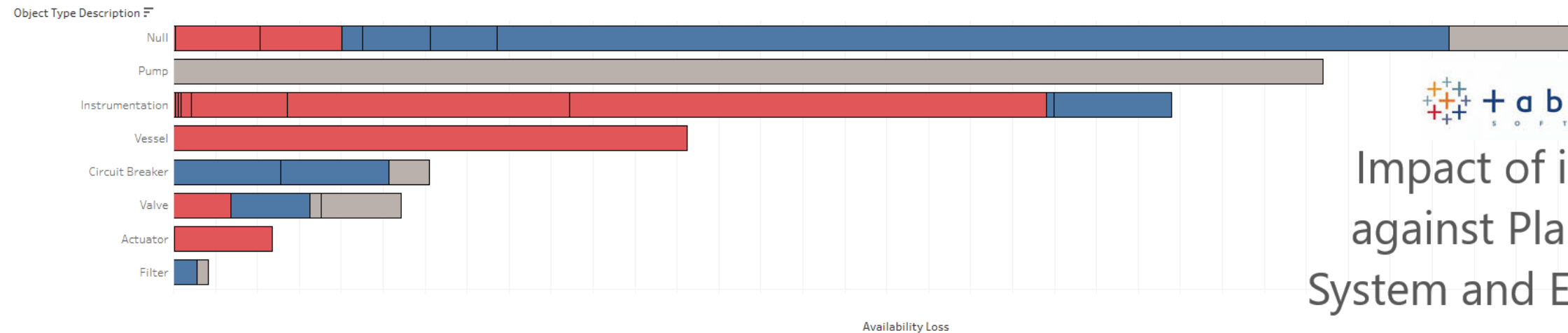
Availability Loss (Plant)



Availability Loss (System)



Availability Loss (Equipment)



Impact of incident
against Plant Area,
System and Equipment

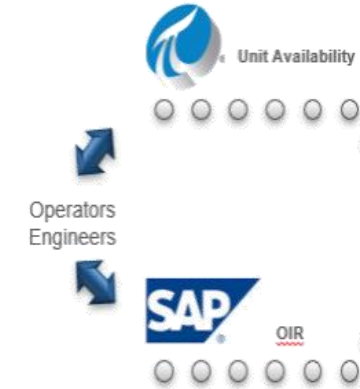
Grain Power Station Reliability Management

Failure Reporting and Corrective Action System – Powered by OSIsoft, SAP and Tableau

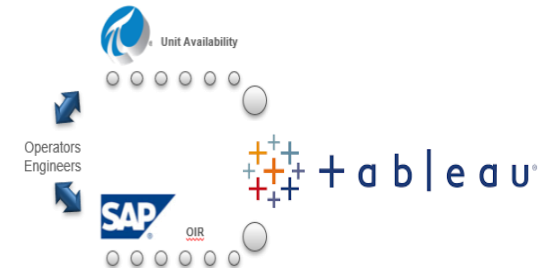
5. Documentation and Knowledge Sharing



1. Failure Identification and Reporting



2. Prioritisation



3. Investigation – which rely on data accuracy and technical background

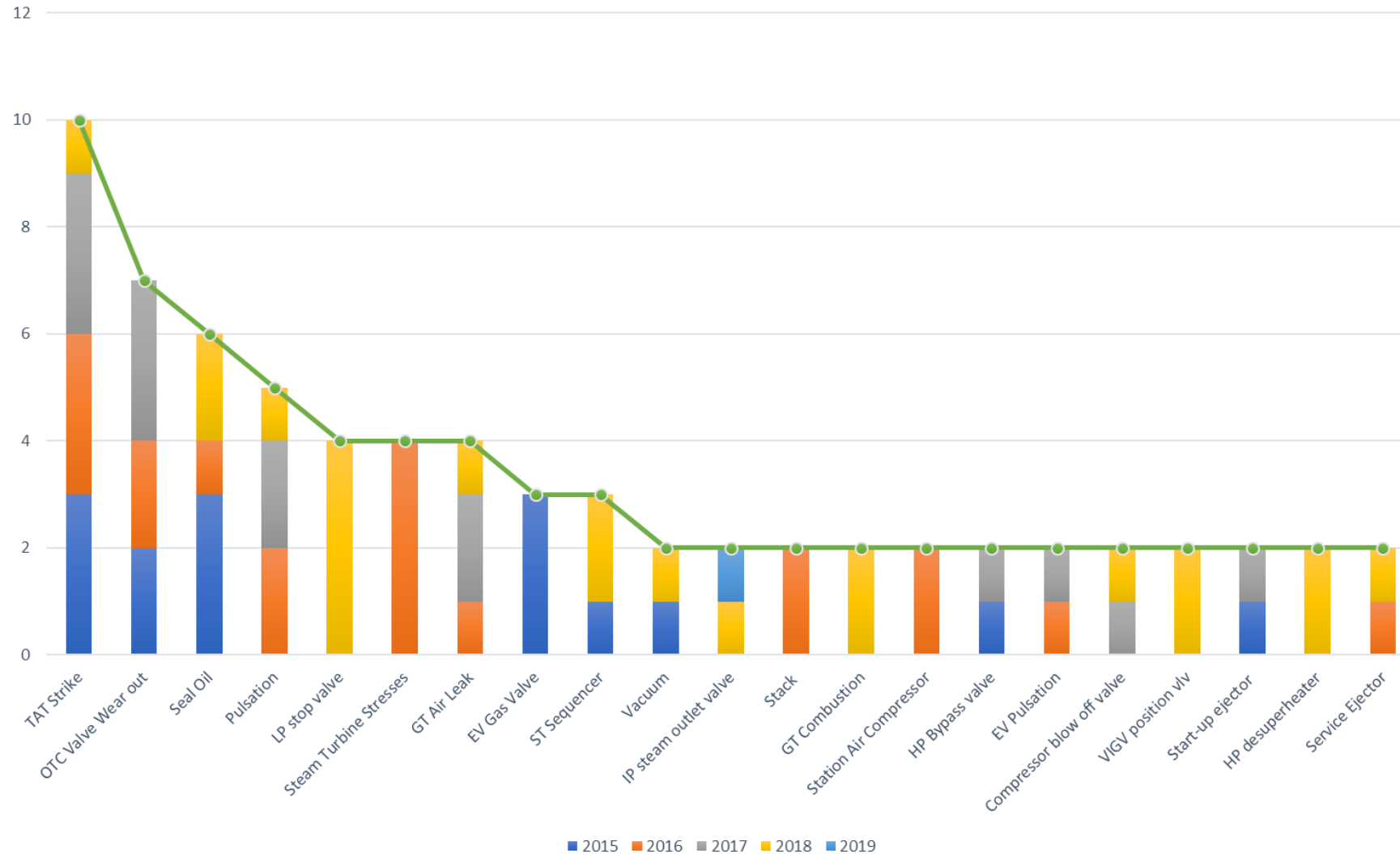
4. Measuring Effectiveness of Implemented Solutions

Daily Summary			
Daily Power Sent Out	10.3 cwh		
Daily CHP Thermal Export	0.00 cwh		
Daily Total Plant Efficiency (inc CHP)	102.4 %		
U6 Efficiency inc CHP	57.3 %		
	Unit 6	Unit 7	Unit 8
Baseline Gross Efficiency (indicative only)	57.3 %	57.9 %	57.8 %
Breakdown Rate	95.3 %	5.0 %	5.5 %
Starts	0	0	0
Lead Starts Performance			
Positive Imbalance	0.0 %	15.5 %	0.0 %
Negative Imbalance	0.0 %	-0.4 %	-40.5 %
Daily NOx Average	0.0 mg/hm3	0.0 mg/hm3	0.5 mg/hm3
Daily CO Average	0.0 mg/hm3	0.0 mg/hm3	0.0 mg/hm3
H2 Consumption	2.1 Nm3	12.8 Nm3	6.6 Nm3
Condenser Differential (Max last 24hrs)	0.01 bar	0.58 bar	0.45 bar
Make-up Water consumption	0 m3	202 m3	65 m3
Fill & Flush Flow	0 m3	0 m3	0 m3
Water Stock Level Change (see meters box)	64		
Water Stock Remaining	6,648 m3		
Days of Stock Remaining	21		

Grain Reliability Management: Return of Investment

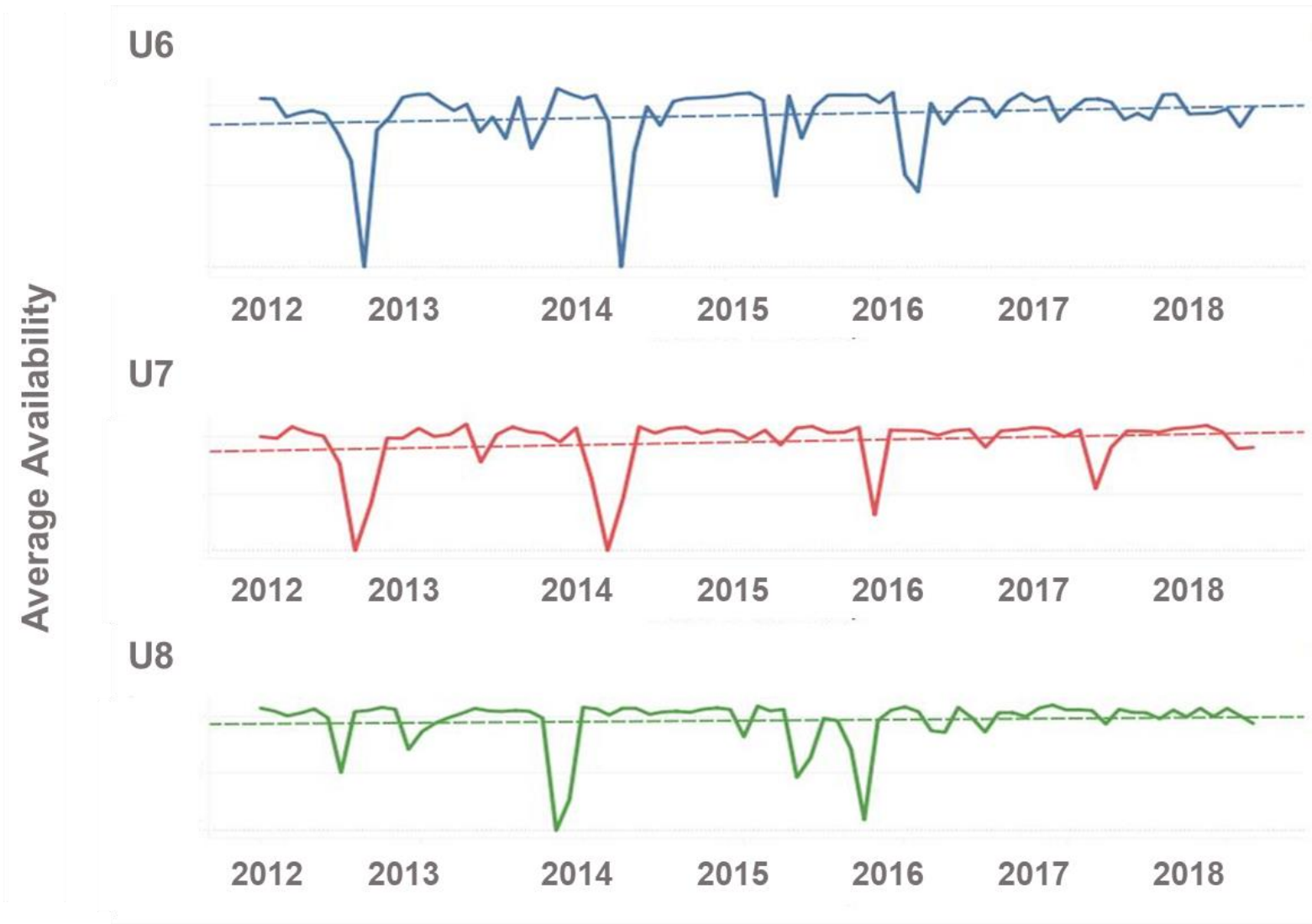
Reduction of Recurrent Incidents

Solutions Includes: Redesign and Improvement of Maintenance Strategy



Grain Reliability Management: Return of Investment

Reduction of Force Outages

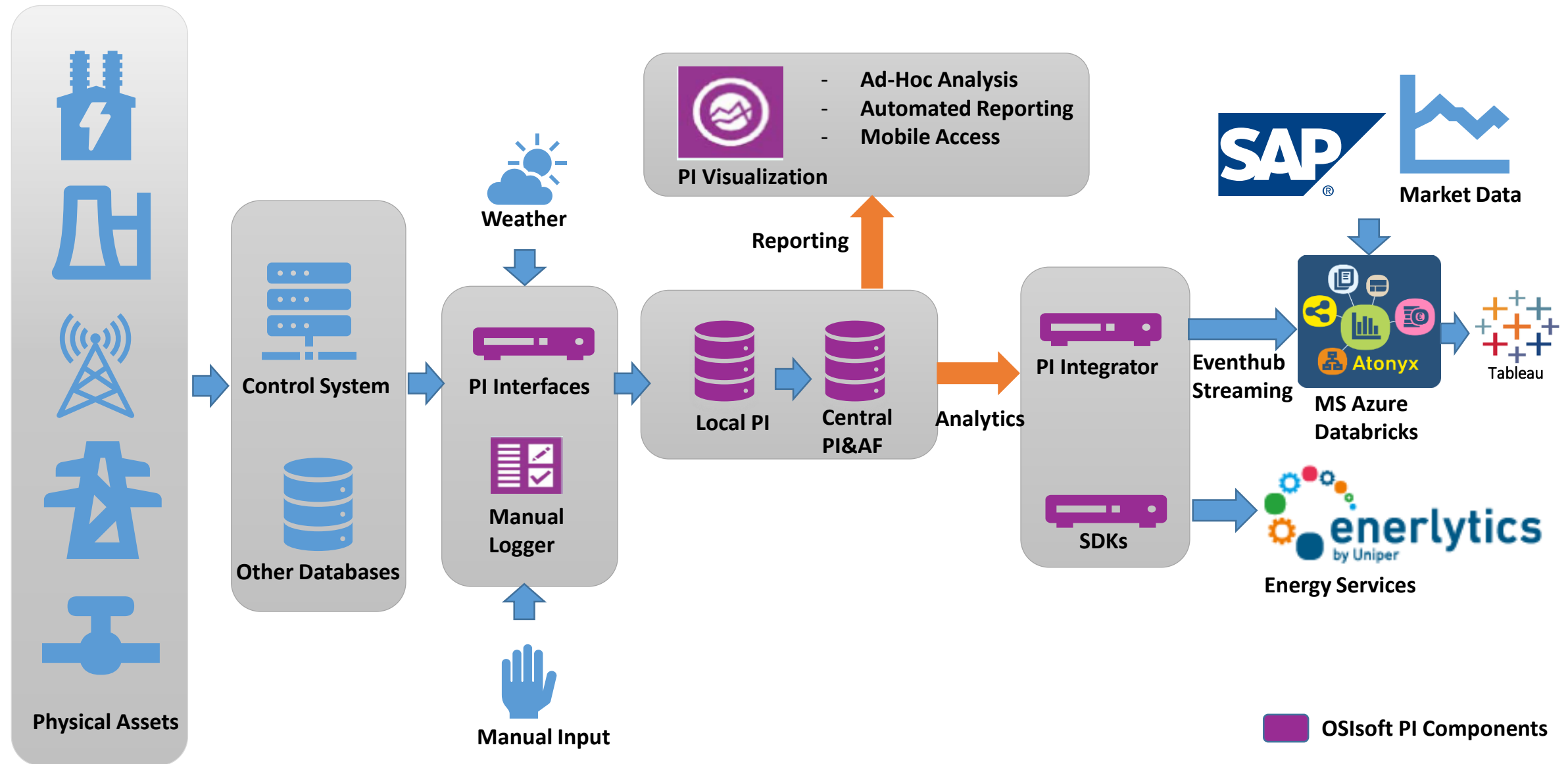


Agenda

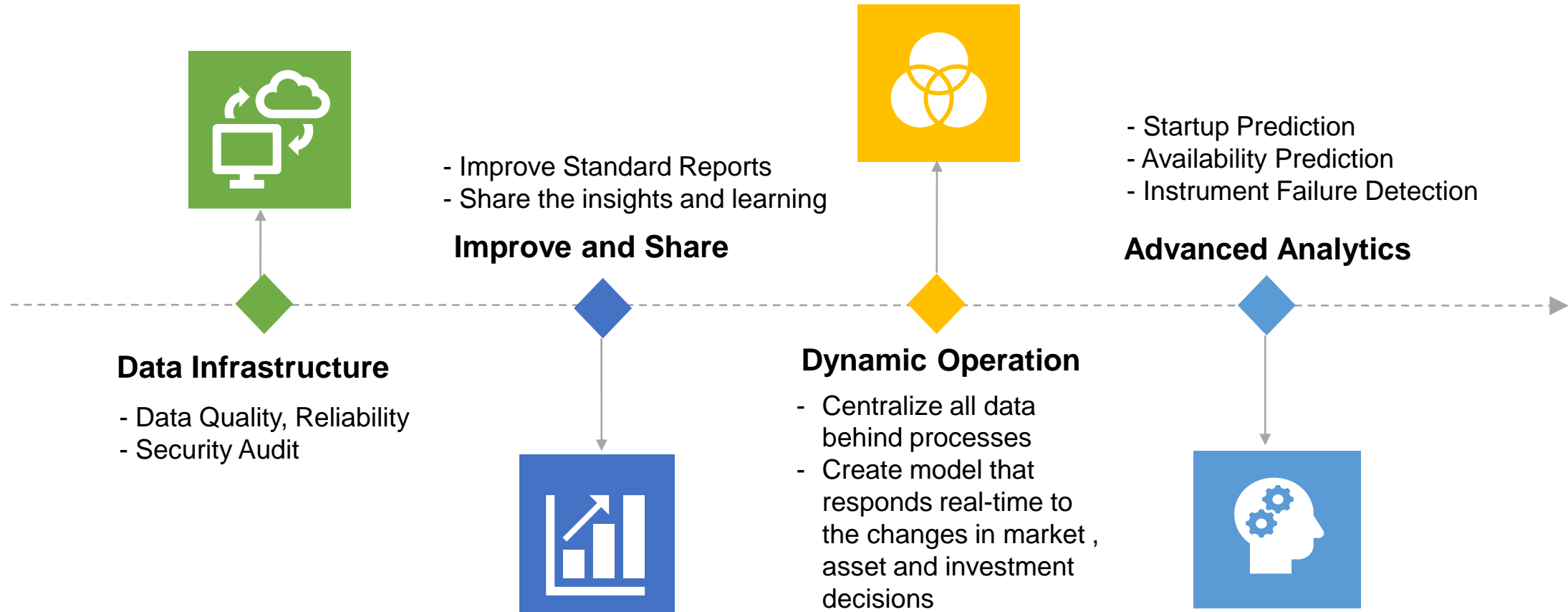
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- Case Study – Reliability Management
- **Infrastructure**
- Summary
- Questions



Digitalization @ Generation - Infrastructure



Digitalization @ Generation – Next Steps



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Summary - Uniper's Digitalization Journey with OSIsoft PI

CHALLENGES

- Data quality and reliability
- Lacking Standard and transparency
- Heterogeneous PI Maturity at sites
- Data accessibility

SOLUTION

- PI System as backbone for Data Infrastructure
- Lighthouse Project
- Standardizing KPI and Automated Reporting Framework

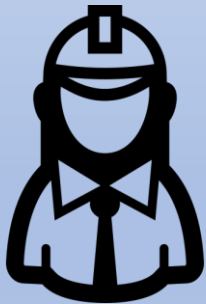
BENEFITS

- Improved plant reliability and efficiency
- Reduced OPEX and CAPEX
- Simplified processes
- **Empower Our People!**



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Nadia Beleno
Lead Reliability Engineer
Nadia.beleno@uniper.energy



“We would like our people to think for themselves, make decisions, take risks, to be open minded, technically experienced and Curious.”



Questions?

Please wait for
the **microphone**

State your
name & company



Please remember to...

Complete Survey!

Navigate to this session in
mobile agenda for survey

