



# Real Time remote operations at Shell

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A digital impression of Shell's floating liquefied natural gas facility design.

[Link to Video](#)

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**Reserves:** Our use of the term “reserves” in this presentation means SEC proved oil and gas reserves.

**Resources:** Our use of the term “resources” in this presentation includes quantities of oil and gas not yet classified as SEC proved oil and gas reserves. Resources are consistent with the Society of Petroleum Engineers 2P and 2C definitions.

**Organic:** Our use of the term Organic includes SEC proved oil and gas reserves excluding changes resulting from acquisitions, divestments and year-average pricing impact.

**Resources plays:** Our use of the term ‘resources plays’ refers to tight, shale and coal bed methane oil and gas acreage.

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# COMPANY PROFILE

- Shell is an innovation-driven global group of energy and petrochemical companies
- We are active in more than 70 countries
- Worldwide, we employ 93,000 full-time employees
- Our fuel retail network has around 43,000 service stations
- On average, we produce 3 million barrels of oil equivalent per day (crude oil and natural gas).
- In 2015, we:
  - generated earnings\* of \$3.8 billion
  - had \$28.9 billion of capital investment
  - spent \$1.1 billion on R&D
- Royal Dutch Shell plc is a UK company, with its headquarters in the Netherlands
- We are listed on the stock exchanges of Amsterdam, London and New York

\*On a current cost of supplies basis attributable to Royal Dutch Shell plc shareholders

Source: 2015 Annual Report and Form 20-F

# The PI Center of Excellence within Shell



 <b>15,000+</b> Number of users	 <b>7.5 Million</b> Instruments connected	 <b>20+ Years</b> Process data available real-time
 <b>30,000</b> Reports being used daily to make the right decisions	 <b>40,000</b> Displays available and being used by the business everyday	 <b>100,000</b> Calculations running every minute



Acknowledged benefits by supporting Shell applications

**\$200 Million**

## ALL SHELL BUSINESSES ARE CONNECTED TO PI

- ✓ Downstream
- ✓ Upstream
- ✓ Projects & Technology
- ✓ Integrated Gas
- ✓ Unconventional Resources
- ✓ Shell Trading
- ✓ Pipeline

# Strategic response



**DATA as an ASSET**

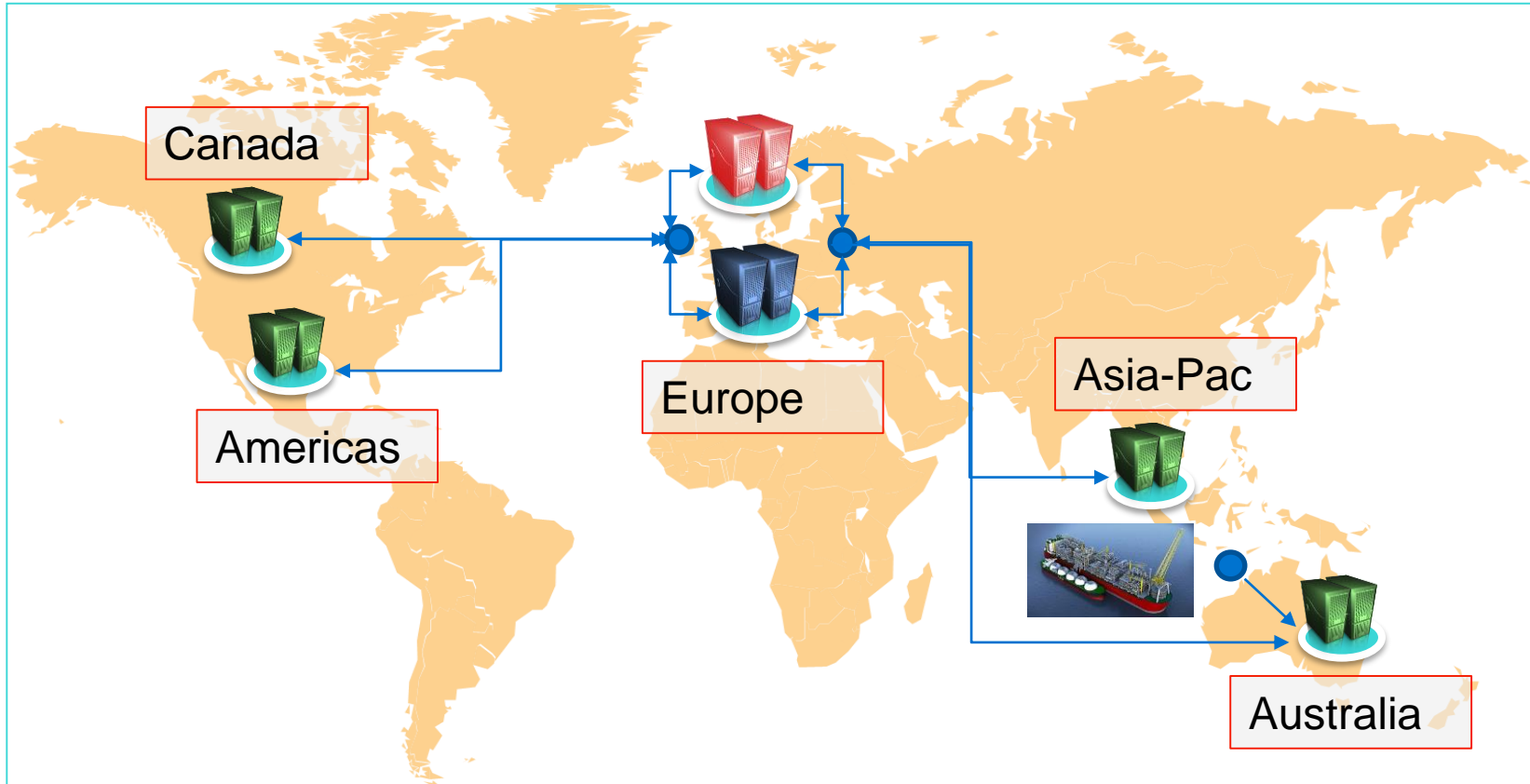
**One-Stop-Shop for Data**

**SMART SOLUTIONS**

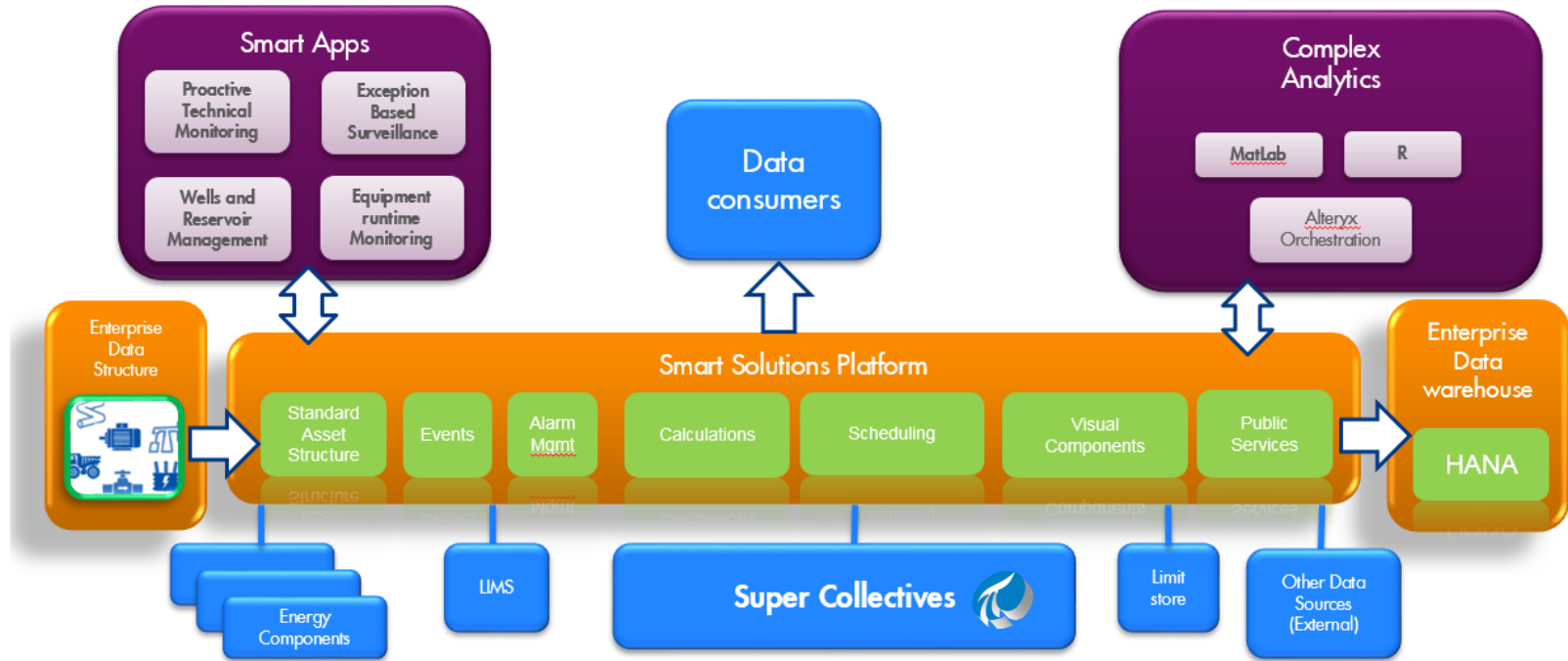
**Advanced Analytics**

**BUILD ONCE – DEPLOY GLOBAL**

# RealTime Architecture within Shell

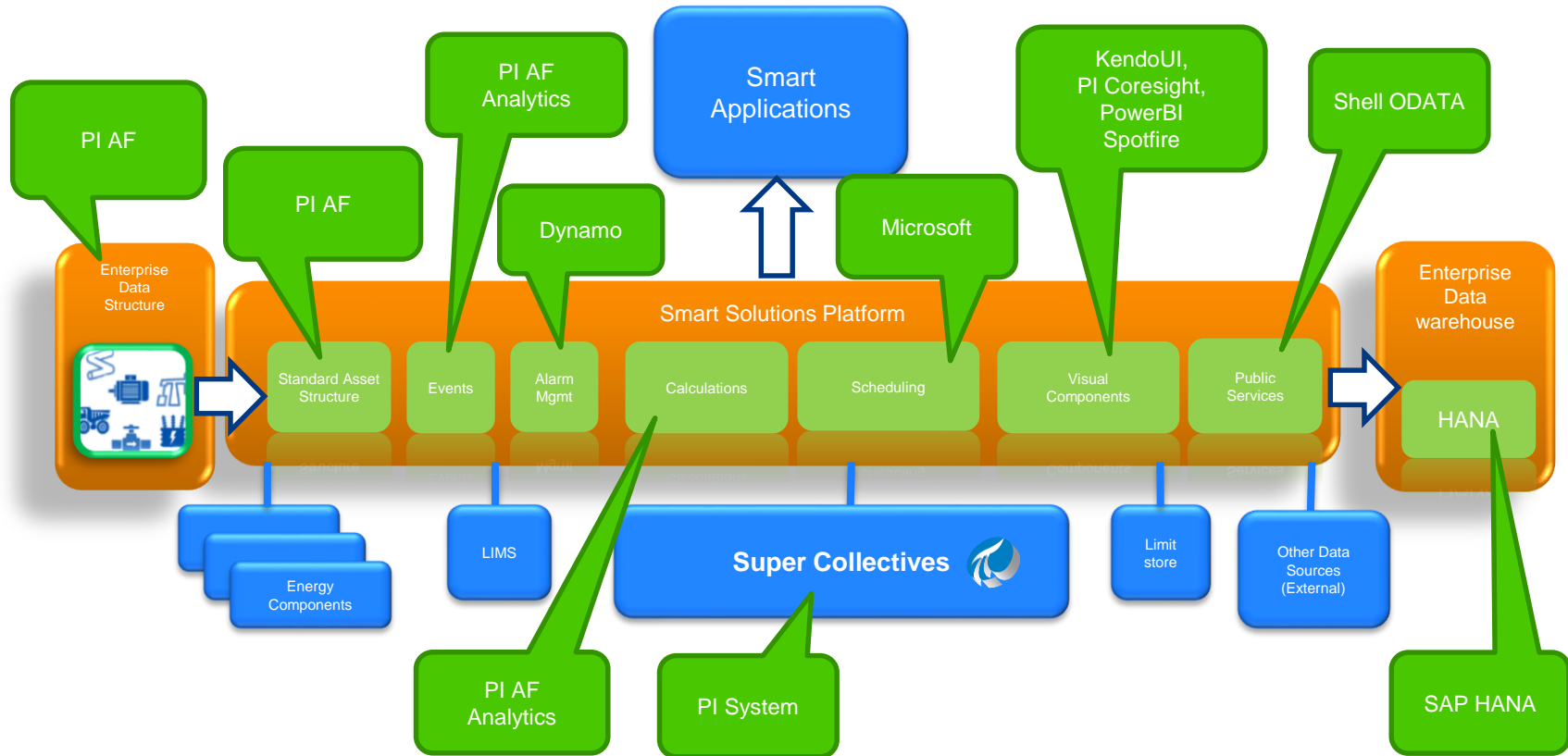


# RealTime Architecture within Shell

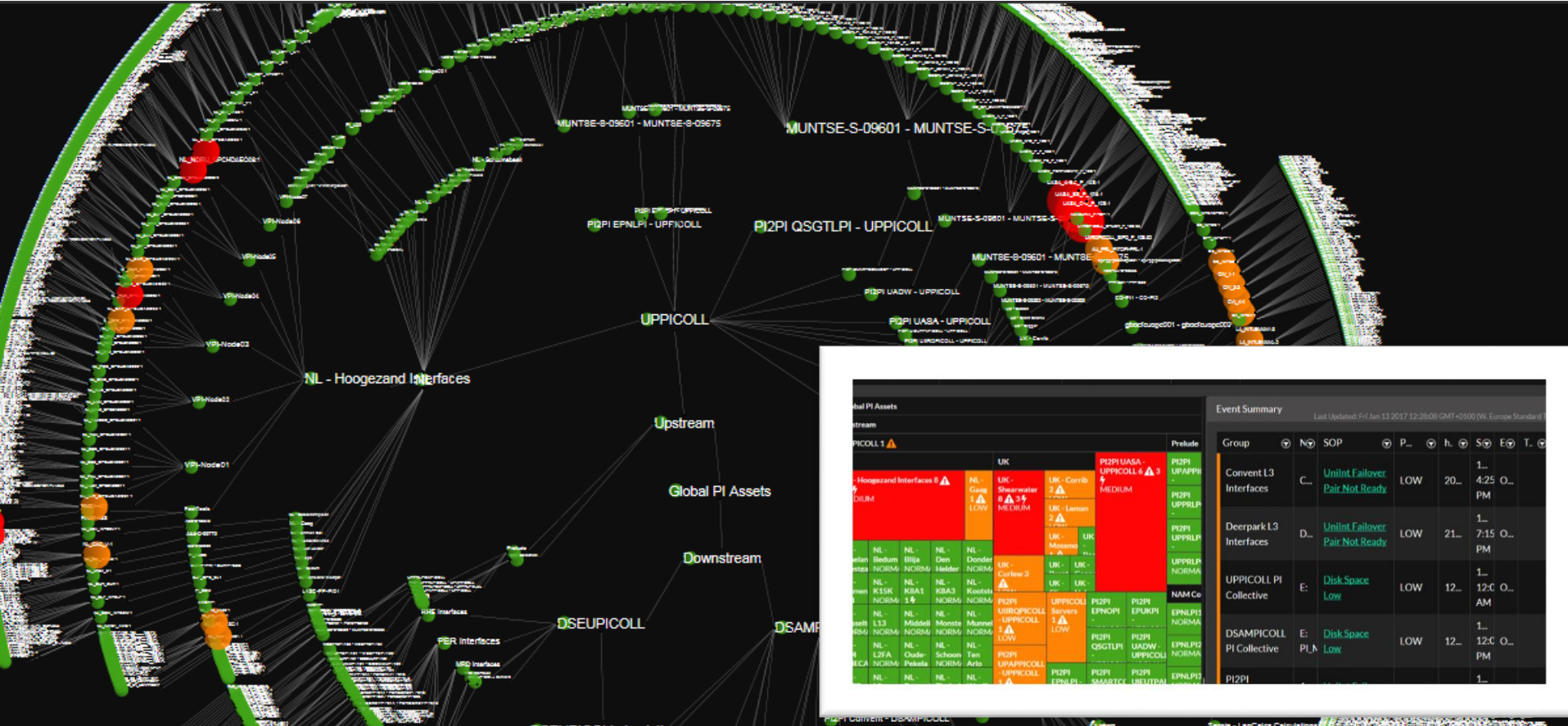




# RealTime Architecture within Shell



# Global Monitoring PI System

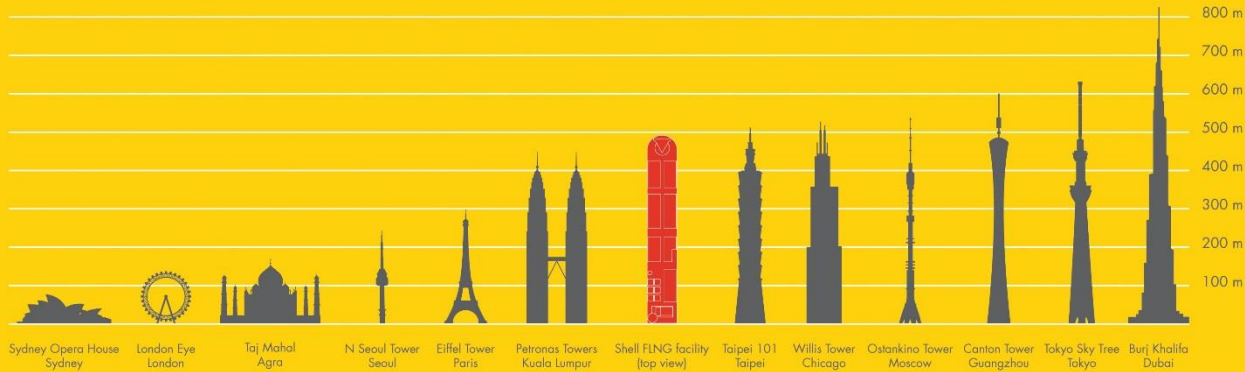
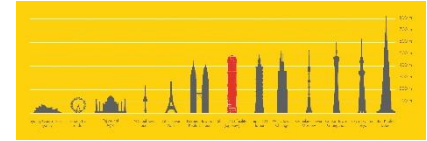


Event Summary

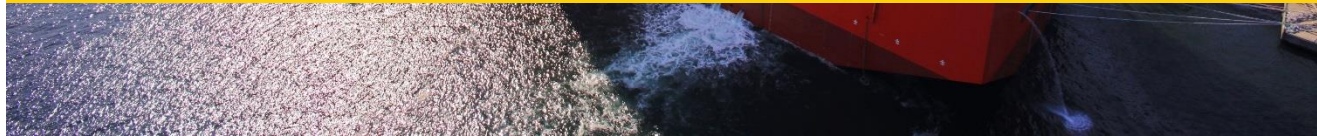
Last Updated: Fri Jan 13 2017 12:28:08 GMT+0100 (W. Europe Standard)

Group	NO	SOP	P...	h...	S...	E...	T...
Convent L3 Interfaces	C...	Unint Failover Pair Not Ready	LOW	20...	4:25 PM	O...	1...
Deerpark L3 Interfaces	D...	Unint Failover Pair Not Ready	LOW	21...	7:15 PM	O...	1...
UPPICOLL PI Collective	E...	Disk Space Low	LOW	12...	12:0 AM	O...	1...
DSAMPICOLL PI Collective	E...	Disk Space Low	LOW	12...	12:0 PM	O...	1...
PI2PI							1...

# Prelude FLNG



Length: 488 m (1601 ft)  
Wide: 74 m (243 ft)  
Height: 105 m (344 ft)  
Displacement: 600,000 t



# Building the biggest ship in the world



# Shell's Smart Landscape

Proactive  
Technical  
Monitoring

Next  
Generation  
Toolkit

Smart  
Connect

Asset  
Analytics

PI Coresight



PI System

A digital impression of Shell's floating liquefied natural gas facility design.

# Asset Analytics

Shell central structure

Template based calculations per equipment

calculations visible via standard clients

Elements

- CC2
- CD5
- CD6
- CDS - HD4
- COD EMIS
- CWZ
- DEMIN
- DIPA
  - DIPA-900
    - Calculations
      - C-902 DIPA OPLADING
      - E-901A FAT DIPA
      - FAT DIPA > E901 B/C
      - Heatexchanger E-901A (E-901A OHTC)
      - Heatexchanger E-901B/C (E-901B/C OHTC)
      - Heatexchanger E-902A (E-902A OHTC)
      - Heatexchanger E-902B/C (E-902B/C OHTC)
      - Tot.ener.verbr.U900
    - DIPA-950
    - DIPA-970
  - ELEK
  - FURF1
  - FURF2
  - GEFAC
  - GIRB
    - GIRB-3200
    - GIRB-3300
    - GIRB-3400
    - GIRB-3500
    - GIRB-3900

Heatexchanger E-901A (E-901A OHTC)

General | Child Elements | Attributes | Ports | Analyses | Version

Filter

Name	Value
Category: Calculated Variables	
CLMTD	21.008952741719426
E-Factor	0.70936263513308473
OHTC	91.761400739499749
Power Capacity Heatexchanger	722.929099368798 kW
Category: Input CMN.CLMTD	
Input Temperature Cold Flow	59.3944473266602 °C
Input Temperature Hot Flow	89.0111083984375 °C
Output Temperature Cold Flow	67.4651947021484 °C
Output Temperature Hot Flow	80.9417724609375 °C
Shells/Passes	1
Type Heatexchanger	Sandtype
Category: Input CMN.OHTC	
Surface	375 m2
Category: Input PER.HTXDIPA	
Debiet DIPA	22.7689799556026 kg/s
High temperature	89.0111083984375 °C
Low temperature	80.9417724609375 °C

Output Parameters on Facility Element Level

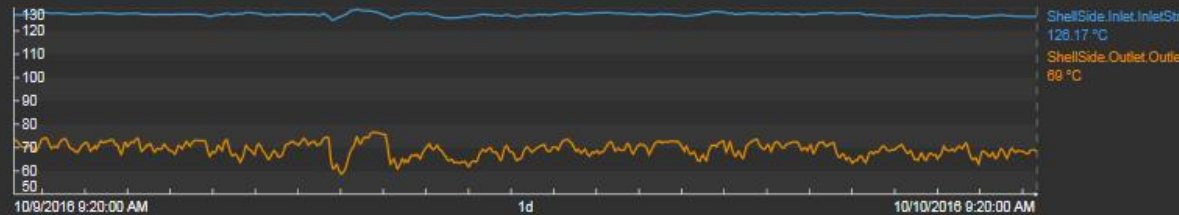
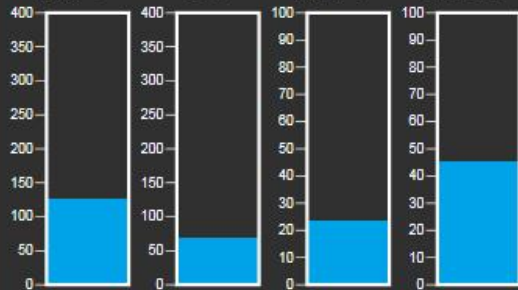
Input Parameters on Facility Element Level

# PI Coresight at Prelude

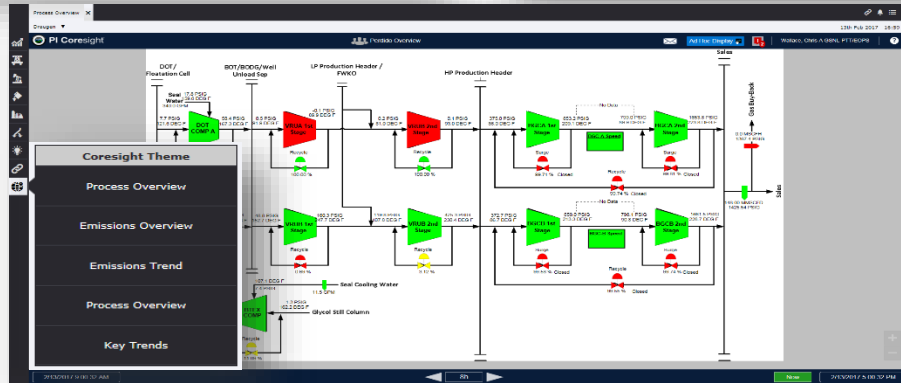
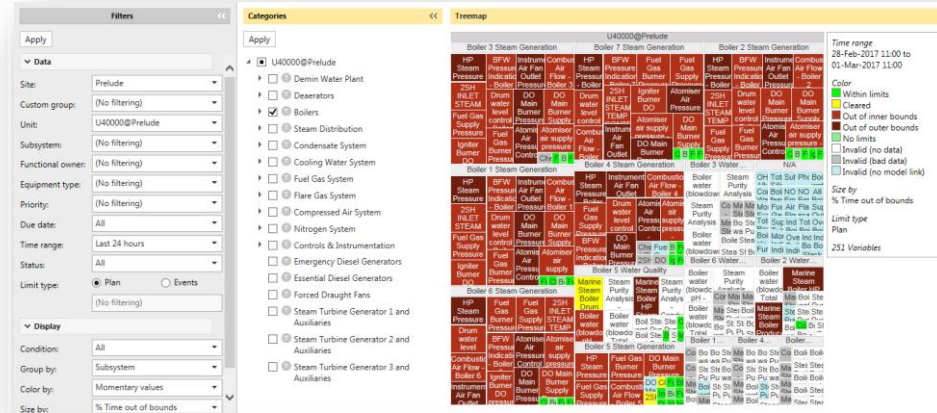
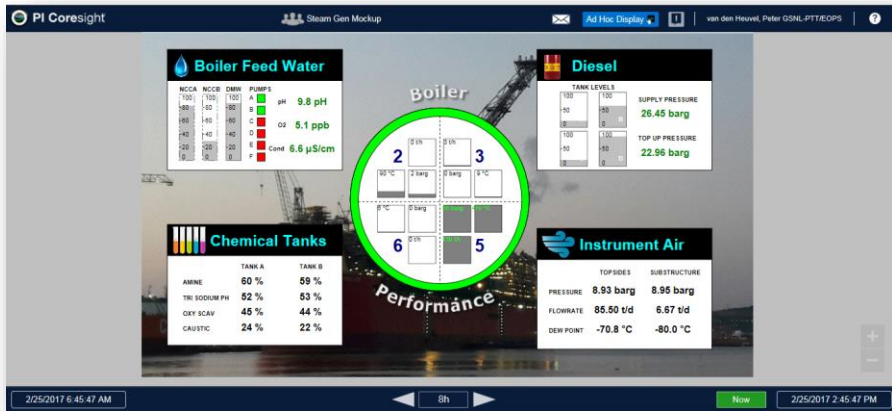
Display: [Example with Prelude](#)

E201A|LifecycleState    E201A|TubeSide.Inlet.InletStream.MassFlowRate  
**Operational**                    **25743 t/d**

E201A|ShellSid    E201A|ShellSid    E201A|TubeSid    E201A|TubeSid  
126.17 °C        69 °C            23.711 °C        45.356 °C



# Smart RealTime applications at Shell





# Smart Applications from remote location



# PI System at Prelude



# What has been changed?

- Increased remote support from central locations;
- Improved Collaboration between Subject Matter Experts;
- Faster access to data because of thin clients;
- High frequent data available everywhere;
- PI System is used by the technology department during the whole commissioning process;
- From data for operations into Advanced Analytics, Maintenance, Well integrity.



## Contact Information

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Shell Global Solutions B.V.



## Questions

Please wait for the **microphone** before asking your questions



State your **name & company**

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A digital impression of Shell's floating liquefied natural gas facility design.

[Link to Video](#)

감사합니다

谢谢

Danke

Merci

Gracias

**Thank You**

ありがとう

Спасибо

Obrigado