

# Combining Real-time and Spatial Decision Making with the PI Integrator for Esri ArcGIS

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# Agenda

- Introduction
- Offshore wind power & DONG Energy
- PI System & PI Integrator at DONG Energy
- Condition Monitoring with PI System and Esri ArcGIS
- Utilizing PI Integrator for performance reporting and monitoring
- From architectural vision to business applications
- Business impact

# Combining Real-time and Spatial Decision Making with the PI Integrator for Esri ArcGIS

“Working offshore can be a challenging environment and 15 times more expensive than working onshore,”

“Asset integrity improvements through remote monitoring will safeguard high health and safety standards and reduce OPEX costs.”



## Business Challenge

- Accessing an offshore wind turbine can be a challenging environment
- Working in an offshore wind turbine can potentially be 15 times more expensive compared to an onshore turbine

## Solution

- Better insights & logistical planning through access to production, control and spatial data on a map
- Frontloading Line of Business with best available information at hand

## Results and Benefits

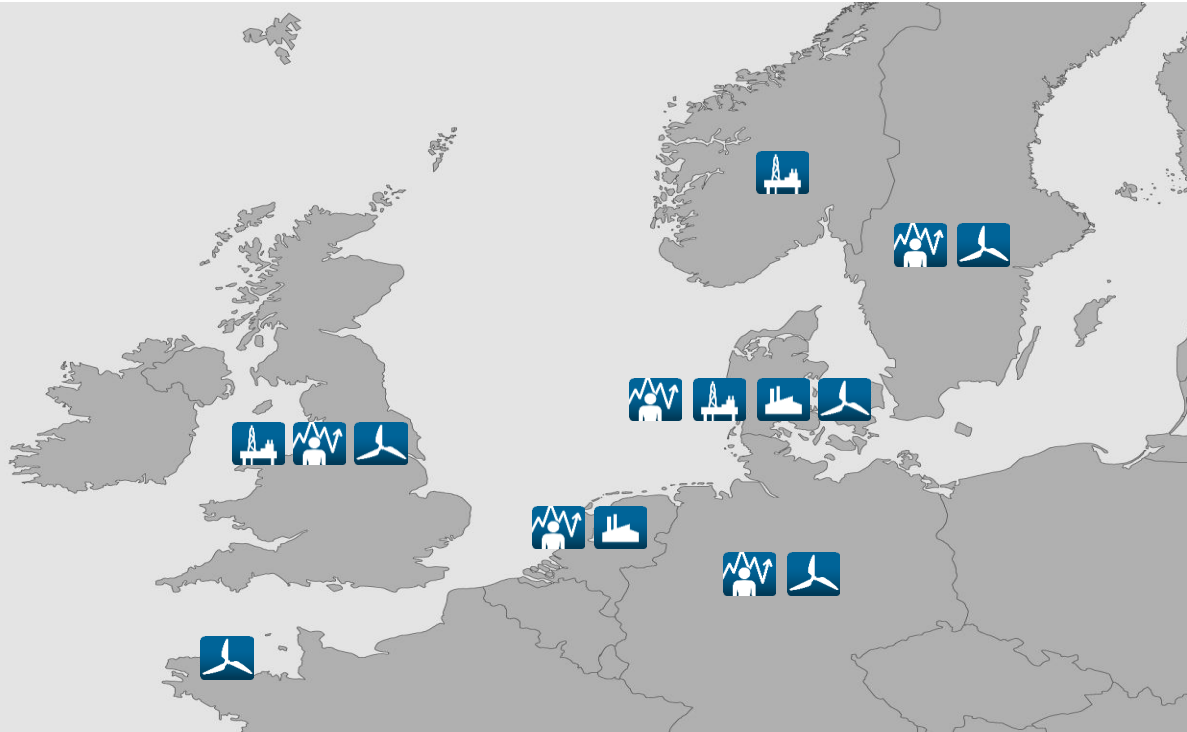
- Asset integrity improvements will potentially reduce unscheduled visits to 1.500 offshore wind turbines and reduce OPEX cost with up to ~20 EURm / year <sup>(NPV)</sup>

# DONG Energy is one of the leading energy groups in Northern Europe

Our business is based on procuring, producing, distributing and trading in energy and related products in Northern Europe.

DONG Energy has 6,500 employees and is headquartered in Denmark.

-  Exploration & Production
-  Wind Power
-  Thermal Power
-  Customers & Markets



# DONG Energy has a Strategic Focus on Offshore Wind

DONG Energy will have 6.5 GW installed capacity corresponding to approx. 1.500 offshore wind turbines in 2020

## Offshore Wind

Market leadership; growth and value creation

### Priorities

- Mature and construct project pipeline
- Reduce cost of energy
- Further develop industrial and financial partnerships
- Standardise and increase operational efficiency

### Targets

- Installed gross capacity of 6.5GW in 2020
- Offshore cost-of-energy below €100/MWh in 2020<sup>1</sup>
- ROCE of 6-8% by 2016; 12-14% by 2020



## Strategic focus

### OFFSHORE WIND

DONG Energy capacity<sup>1</sup>  
GW



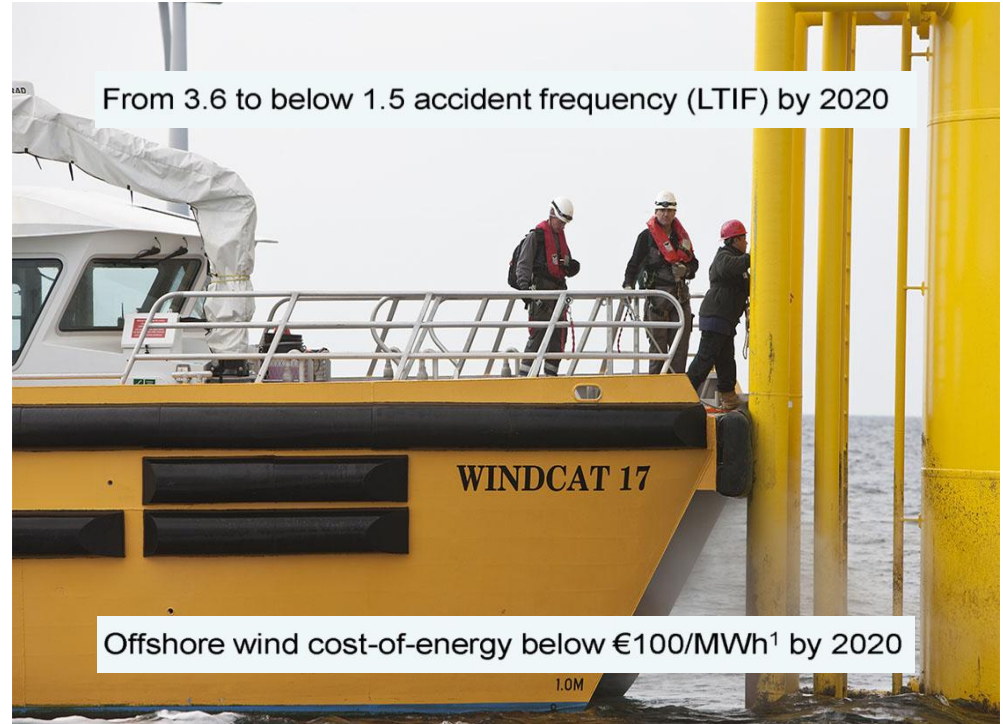
- Fastest growing renewable
- Market leader
- High share of regulated income
- Solid returns



# HSE and OPEX cost are top of mind in DONG Energy

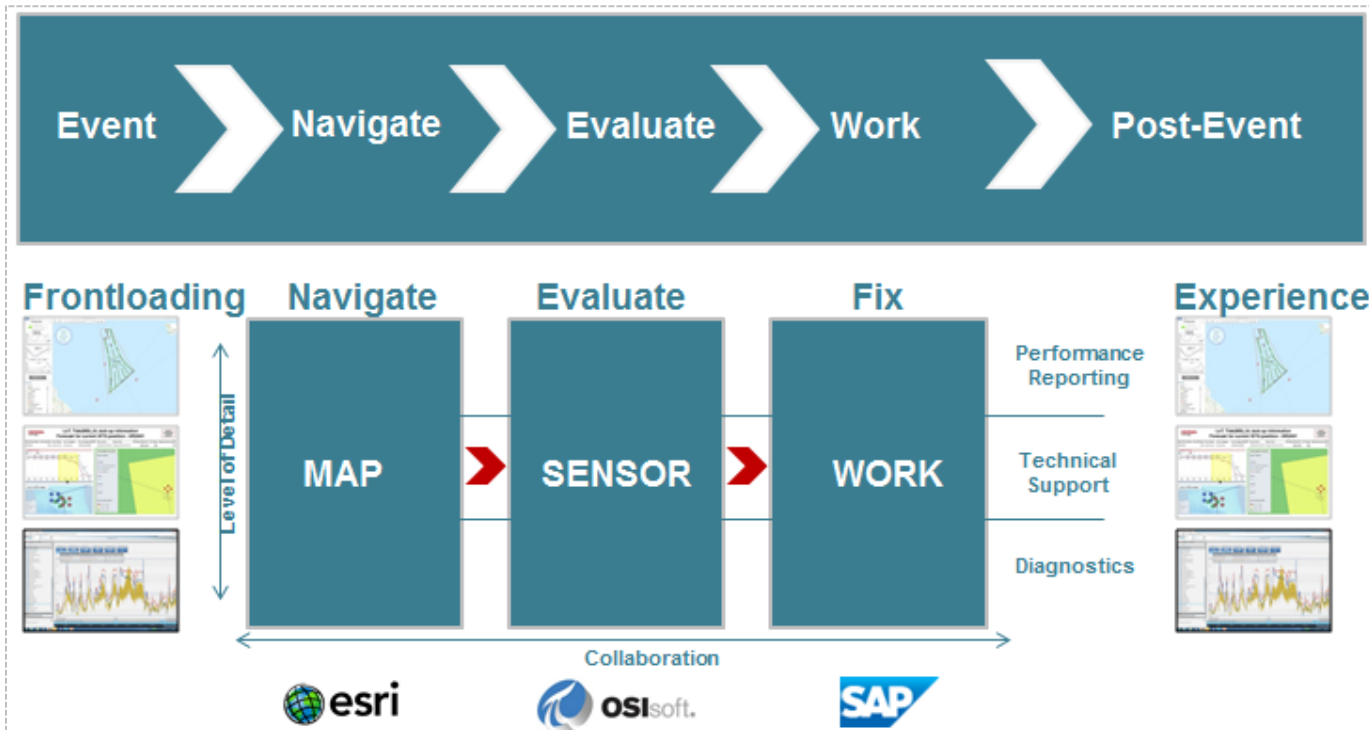
Transfer from crew vessels to wind turbine boat landings is one of the most challenging operations in offshore wind  
Working offshore can be 15 times more expensive compared to similar work onshore

- Working offshore is one of the most challenging workplaces in the world and any offshore organization must have a strong focus on HSE
- Offshore activities are up to 15 times more costly than similar onshore activities and should be avoided if possible
- Lost production can be avoided by better logistical planning through access to production and spatial data on a map



# Generic Workflow in Offshore Wind Power Operations

Reduced lead time and improved quality in decision making in index 1500 repair planning through frontloading



## Key benefits

- Improved quality in reporting
- Fast decision making in Technical Support
- Improved data quality for Diagnostics

# Supporting Line of Business in leveraging knowledge

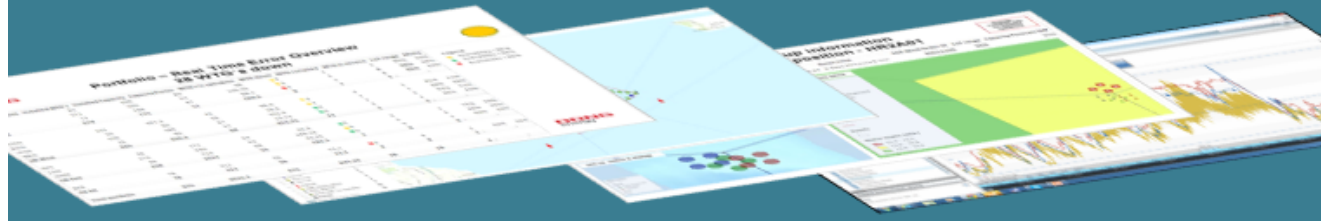
Reduced lead time and improved quality in decision making in index 1500 repair planning through frontloading

## Line of Business – Value creation through improved Business Processes



- INDEX 1500 OFFSHORE
- SAFETY
- LEADING EDGE

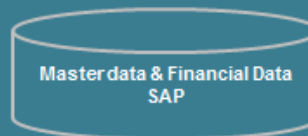
## Business Process Support through data access



## Key benefits

- Collaboration across platforms and data sources
- Transparent data flow
- Improved data accessibility for LoB

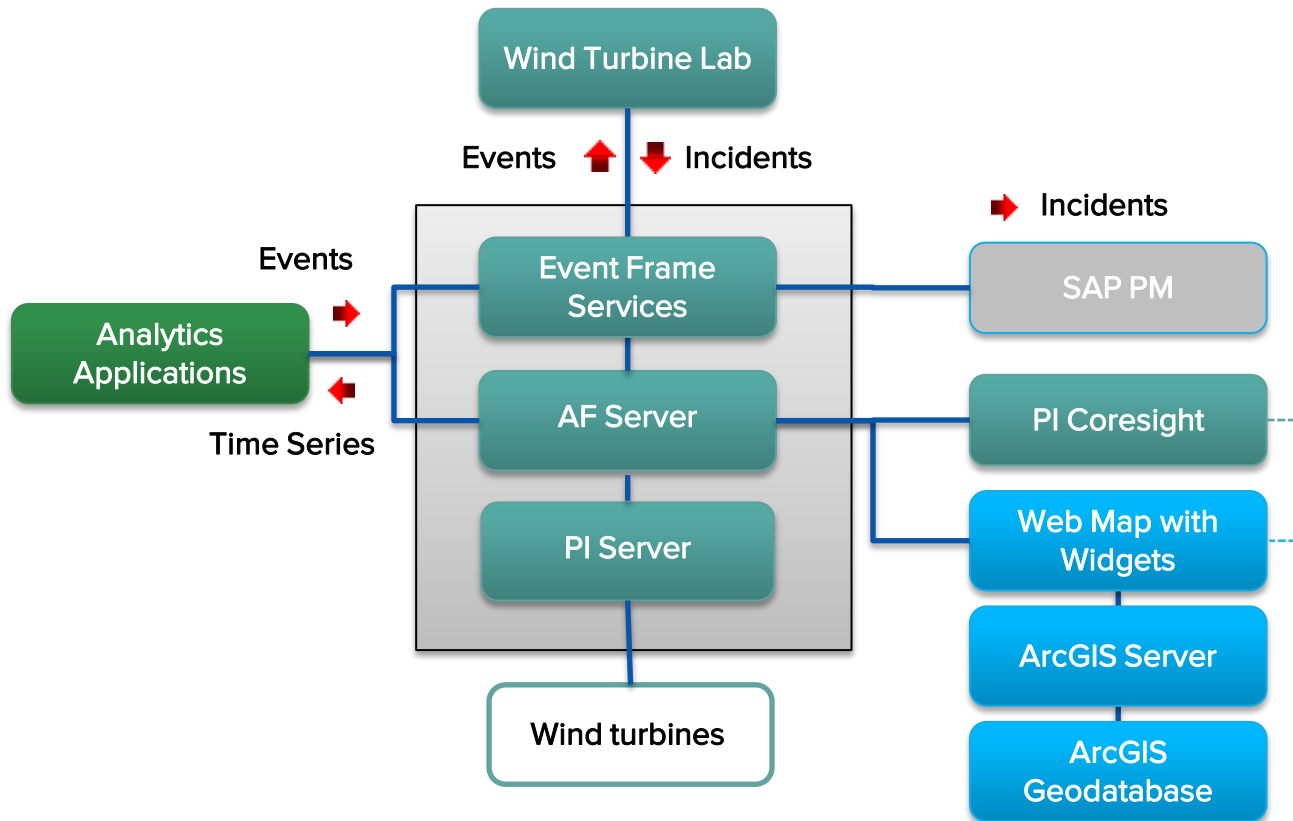
## Data - Real time & Historic





# OSIsoft solution at DONG Energy

## Scope & Architectural Vision

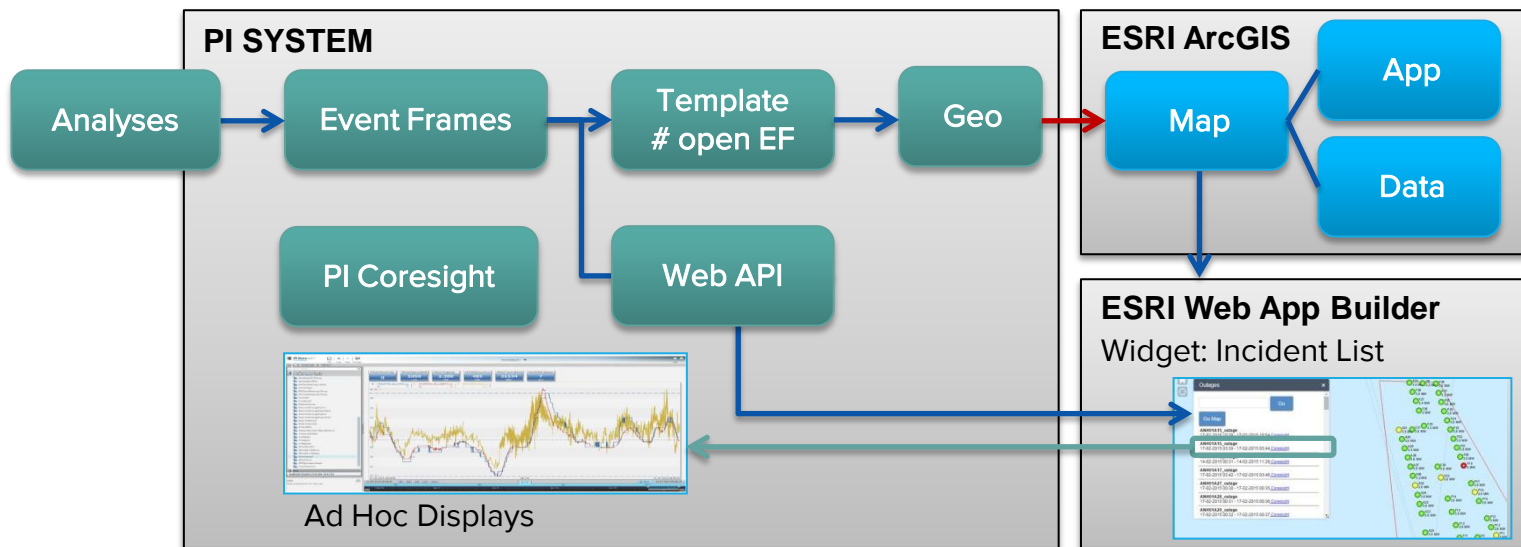


### Key benefits

- PI System as reliable and scalable data collection platform
- Standardized data(IEC, RDSPP) and improved data quality
- Leverage data through PI Coresight, PI ProcessBook, and PI Datalink for Excel
- Integration of PI System data with spatial data from Esri ArcGIS platform
- SAP Integration to support work dispatching

# Leverage PI Web API & PI Integrator

## PI Integrator for Geo Event Extension



# How to integrate Esri & OSIsoft platforms

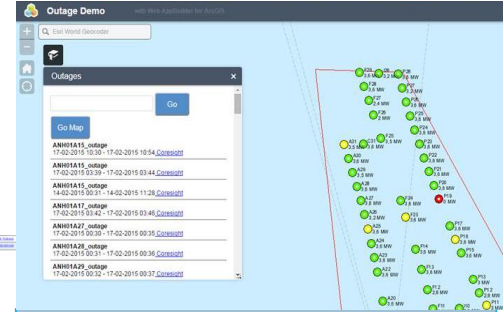
Mapping and setting up the click by click service

Asset data & templates

Adding Status & Time

Adding Geographical Location

Dashboards & Applications



ArcGIS Online

- Mapping & configuration

ArcGIS Server

- Service

GeoEvent Processor

- Transport & Monitor

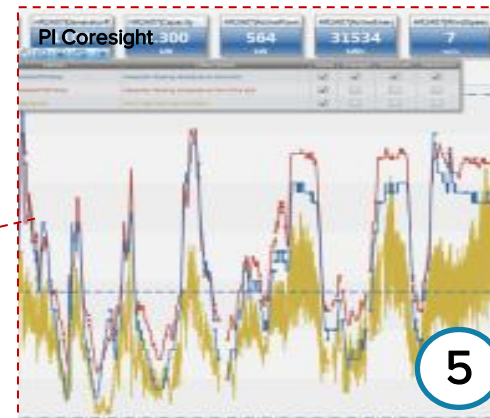
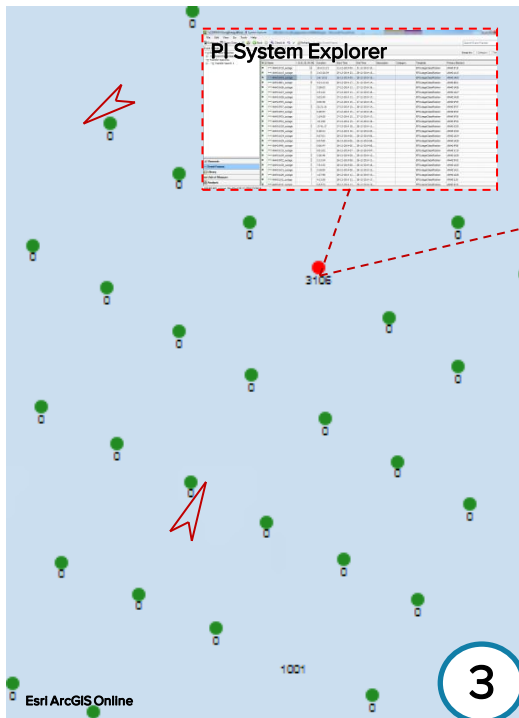
PI Geo

- Broad casting

PI Geo

- Setup

- OSIssoft PI System integration with Esri GeoEvent Extension
- Display production and spatial asset location on maps

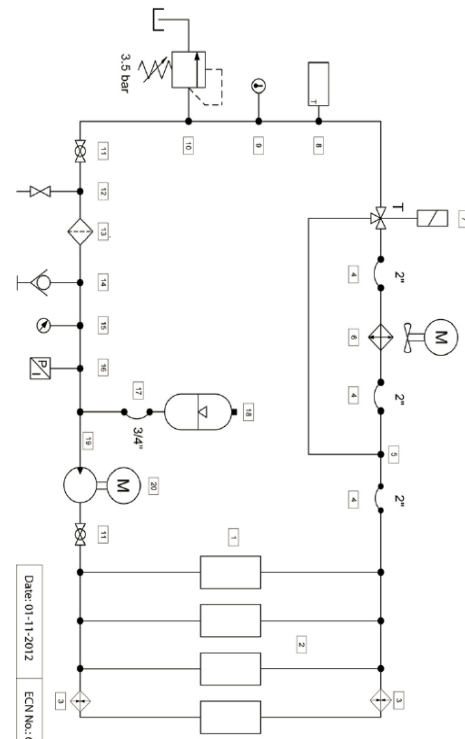
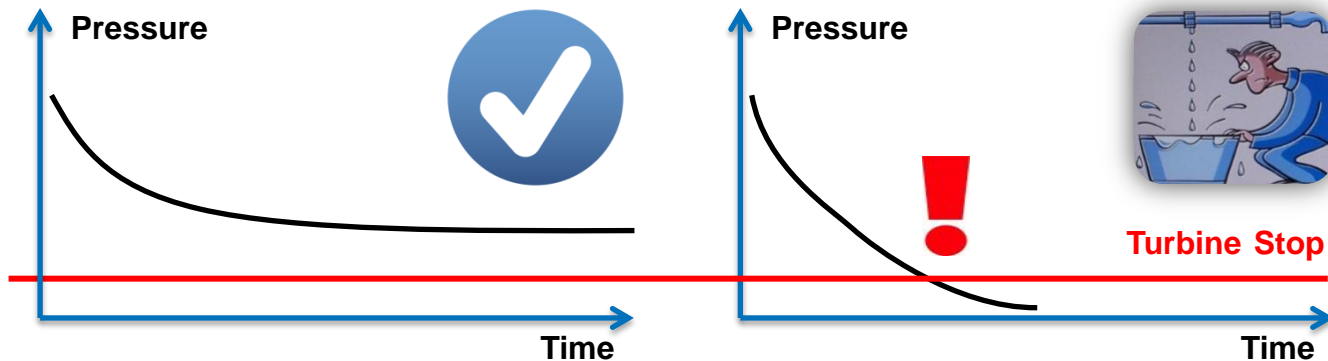


# Case: Condition monitoring of pressure in converter cooling system

Abnormal behavior of the pressure leads to turbine stops resulting in lost production and costly unscheduled visit to the turbine.

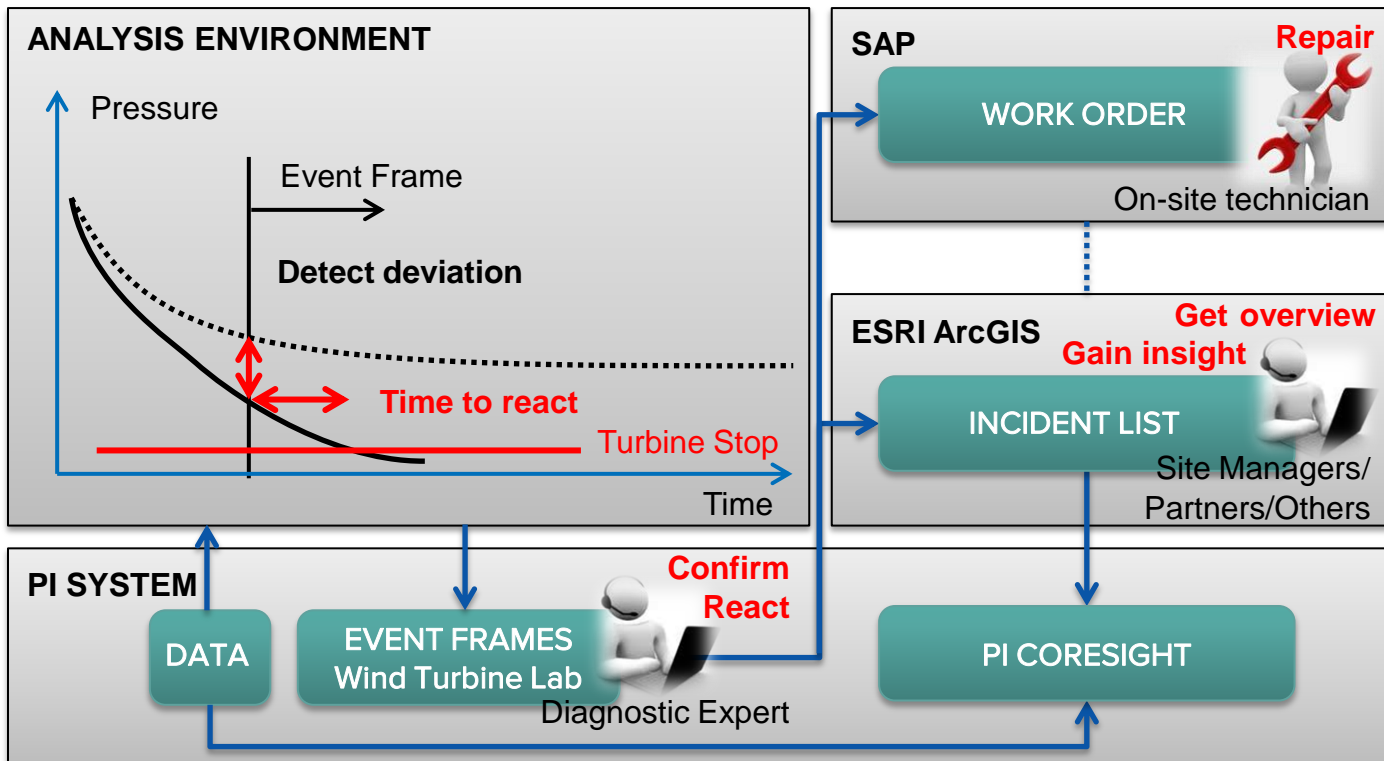
## The condition monitoring approach:

Save money and safeguard HSE performance by detecting abnormal behavior of the pressure in time to perform scheduled repair work before the turbine stops, thereby minimizing lost production and reducing cost of the visit dramatically.





# Creating awareness with the PI System and ESRI ArcGIS



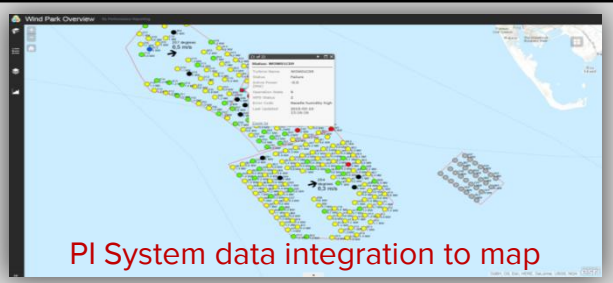
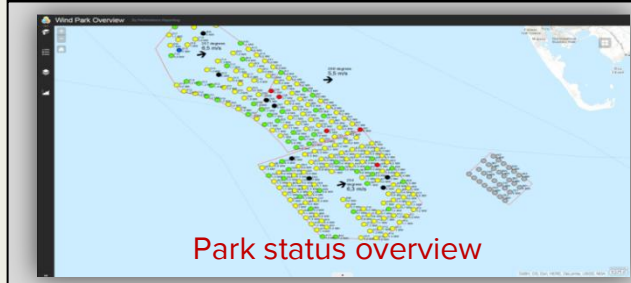
## Key benefits

- Supporting on-site technicians in connection with repair work
- Supporting back office specialists in improving asset integrity
- Supporting site managers in optimizing offshore logistics

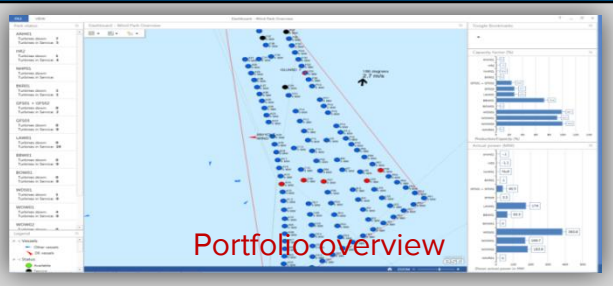
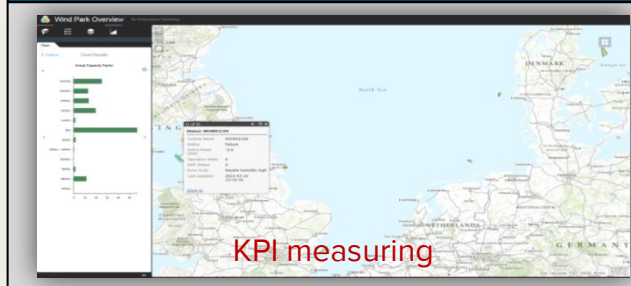
Overall awareness and responsiveness reduces the time spent offshore!

OSIsoft is used for monitoring park status and accessing critical park information on park and portfolio level

### Site Management



### Portfolio Management



### Challenges

- Standardization
- Stability
- Scalability

### Solution

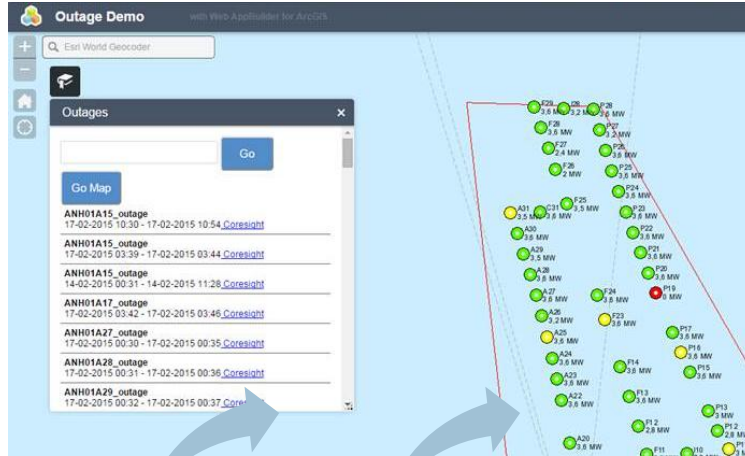
- OSIsoft PI System and Esri ArcGIS integration

### Key benefits

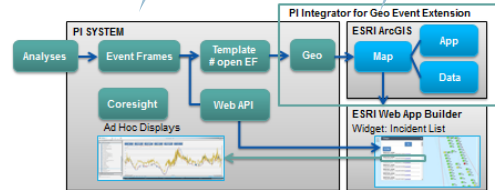
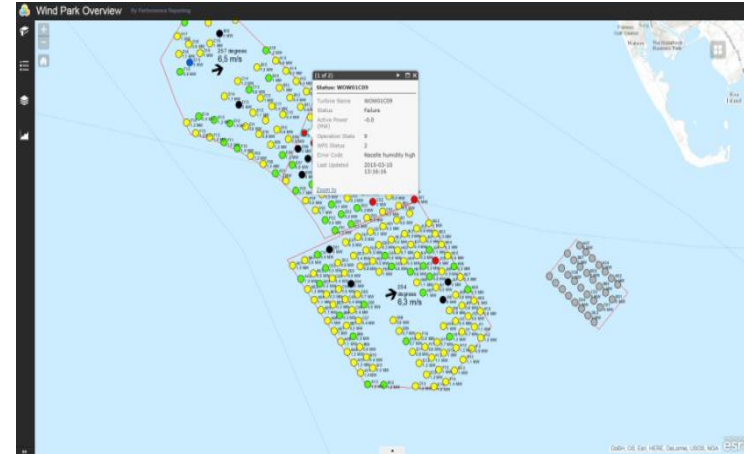
- Visualization of performance
- Awareness and Responsiveness
- System stability
- One point for entry (Simplicity)

# From architectural vision to business applications

In development...



In production...



Events through WebAPI

Deep links to PI Coresight

PI Integrator for PI data in Esri maps

Weather info

Vessel locations

Near real time production KPI's

# Improved planning through spatial overview

4 unscheduled visits lowered to 2 per turbine / year will safeguard HSE performance in offshore activities and can potentially reduce OPEX cost with up to ~20 EURm / year (NPV)

- Asset integrity improvements will reduce the total number of unscheduled visits to the 1.500 offshore wind turbines in 2020
- Avoiding offshore maintenance visits due to better asset integrity and operational transparency will reduce HSE risk





# Presentation Team

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# Questions

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

State your  
**name & company**





THANK  
YOU

