

# Professional Service for Profitability Improvement

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# Contents

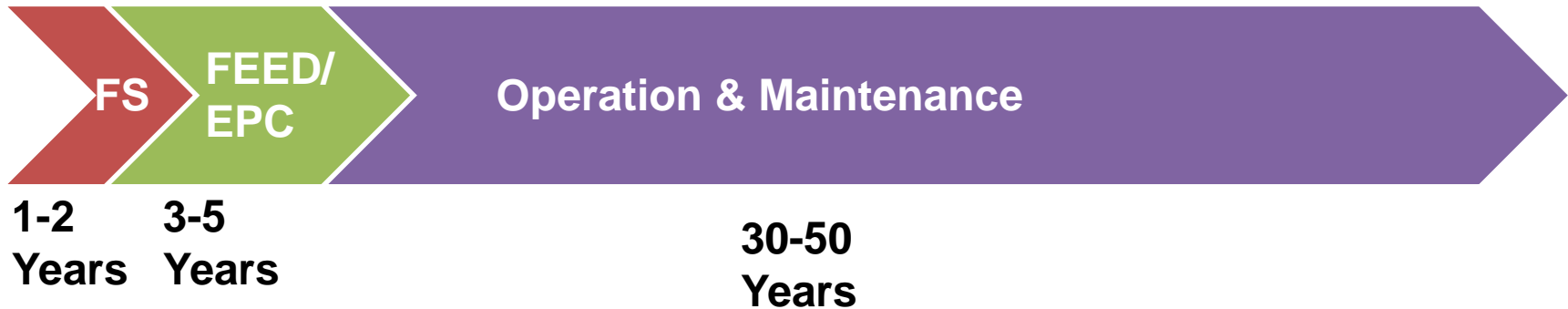
## 1. Introduction

## 2. Example our Professional Services

- **Big Data Solutions**
- **Plant Life Extension Program**
- **CFD Analysis**

## 3. Summary & Conclusion

# Challenges for Profitability Improvement

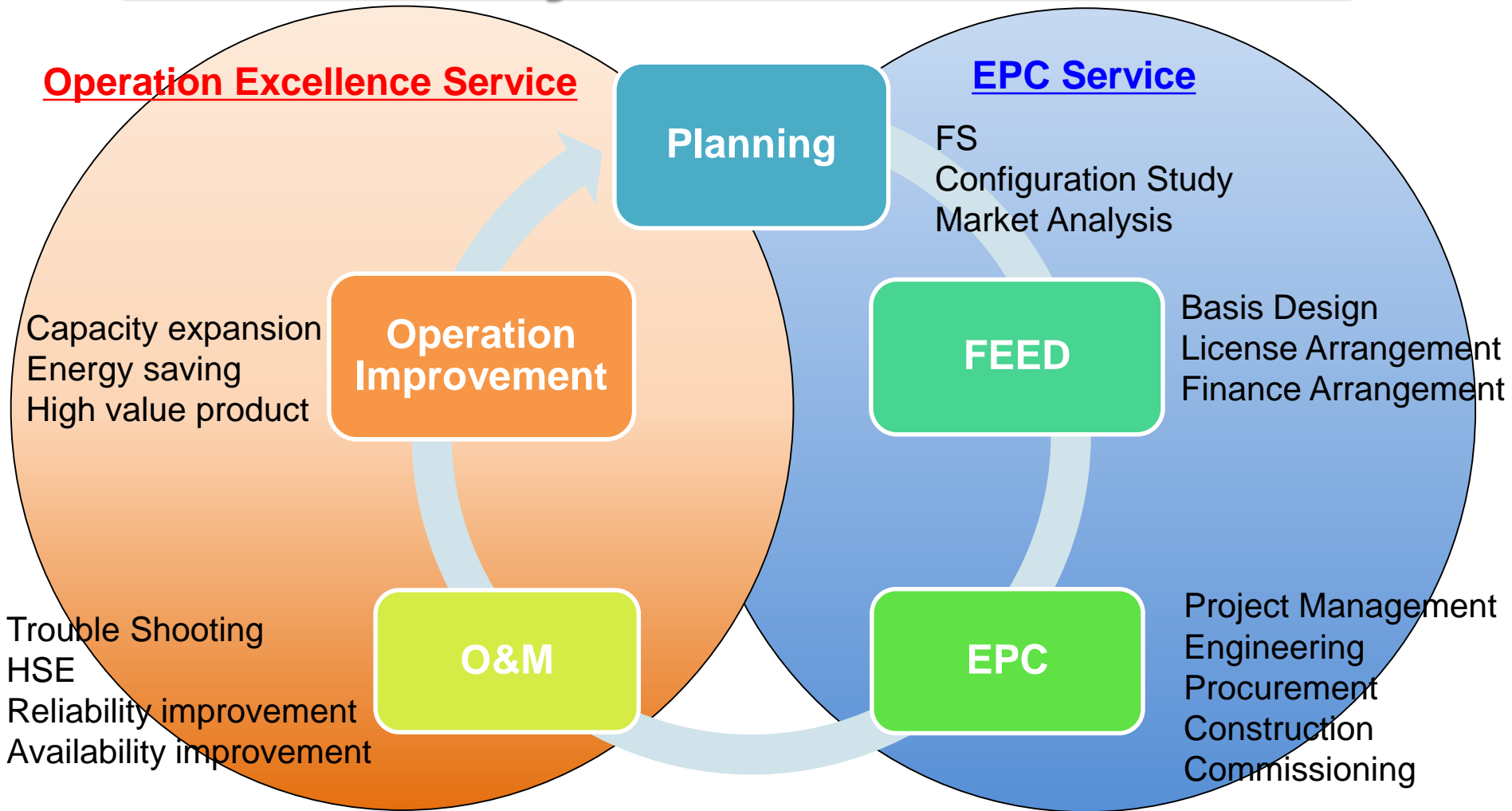


**Total OPEX for Plant life cycle may be over 200% of CAPEX!**

## **Profitability Improvement during operation phase**

- ✓ **Improve plant availability**
- ✓ **Enhance reliability and safety**
- ✓ **Minimize maintenance cost**
- ✓ **Save energy cost**
- ✓ **Minimize catalyst & chemical cost**

# Plant Life Cycle Solution Provider



***Maximizing Client's Asset Value***

# Professional Services



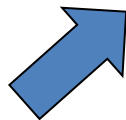
IoT, AI



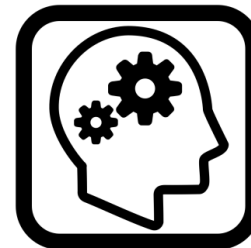
Digitalization  
Data centric



**Profitability  
Improvement**



Engineering  
Expertise



Analysis/  
Simulation

# Big Data Solutions



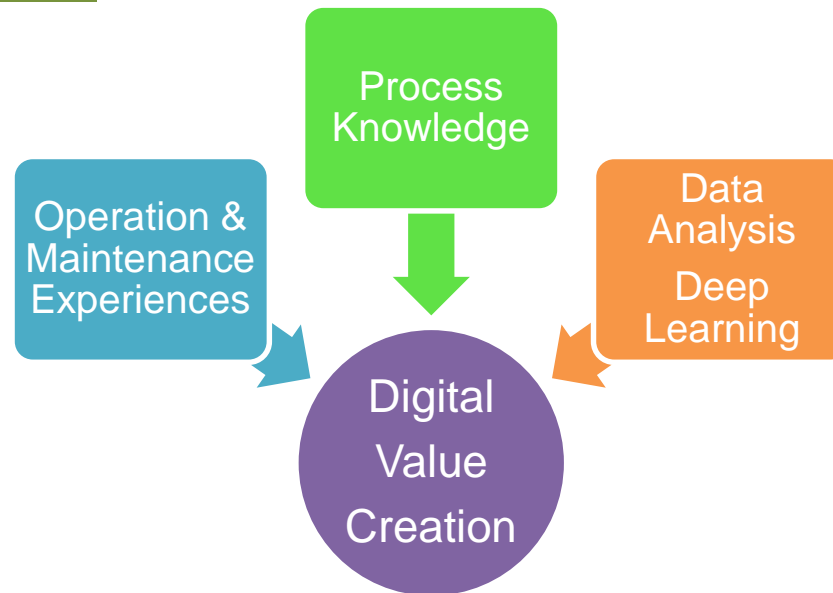
# Approach for Big Data Analysis

Anomaly  
Detection

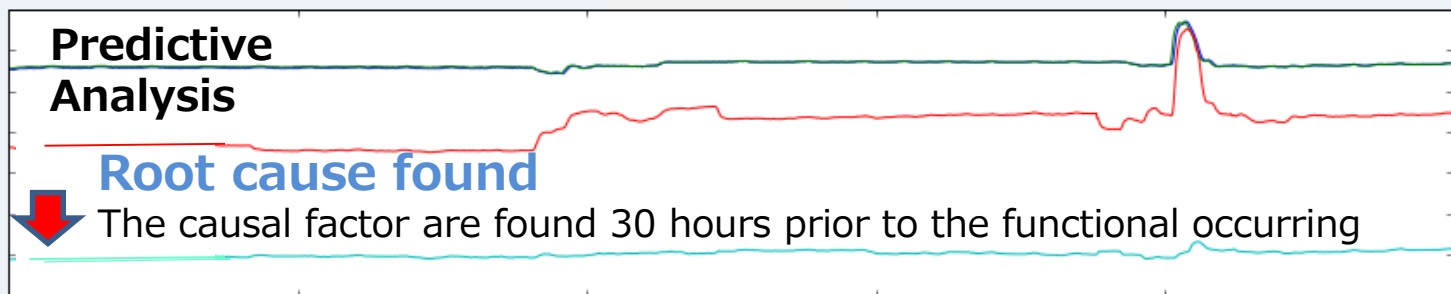
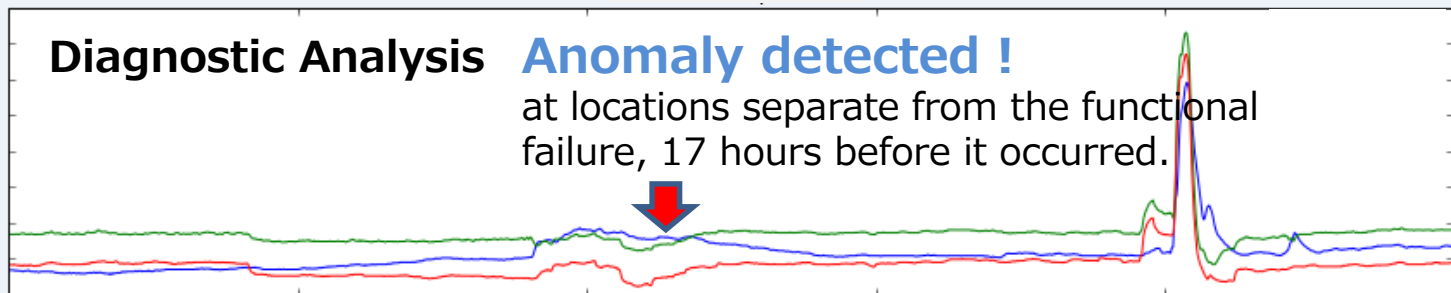
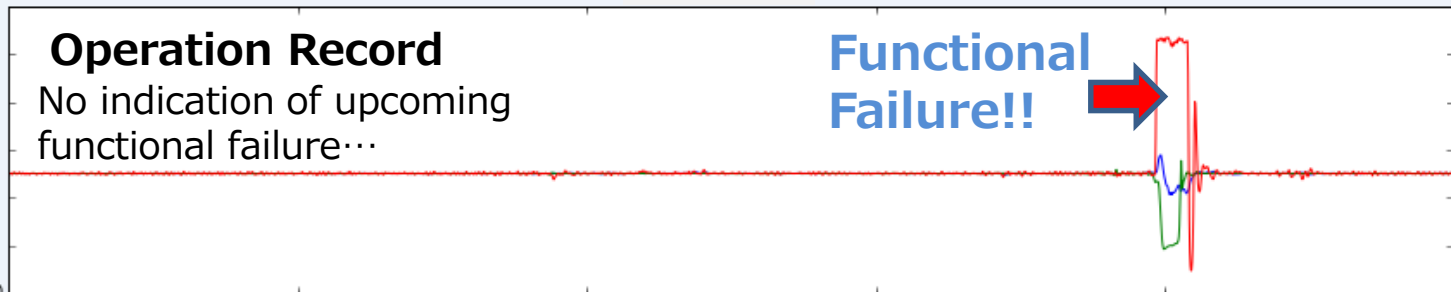
- Downtime reduction
- Smooth start-up
- Enhance safety

Longevity  
Prediction

- Right time maintenance
- Maintenance cost reduction



# Anomaly Detection



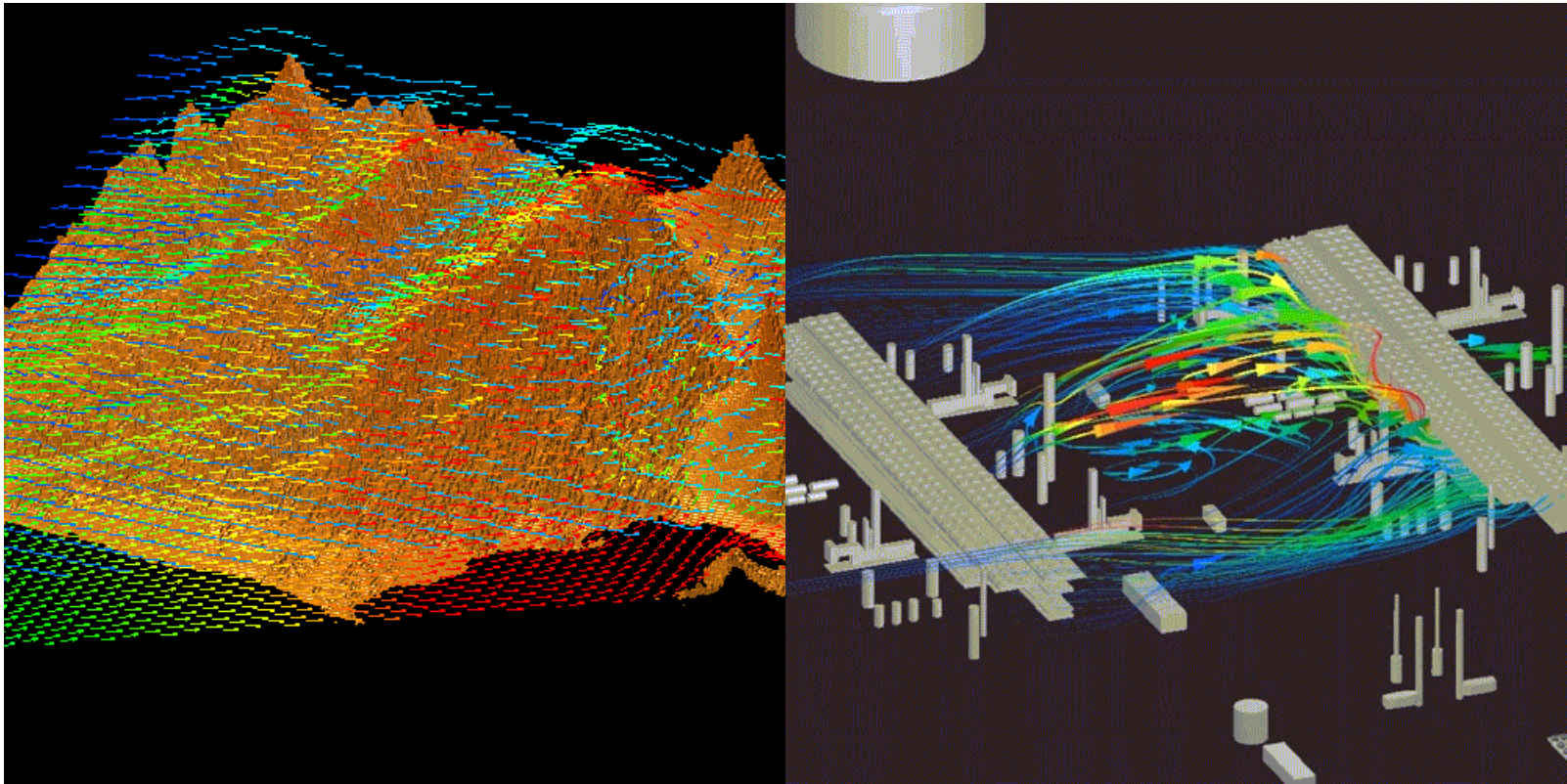
Time >>

Studied for 5 Refineries, 1 LNG, 1 Chemical Plant



# AIRLIZE LNG

- Increased annual LNG production at existing plants for two clients
- Studied over 10 FEED/EPC Projects

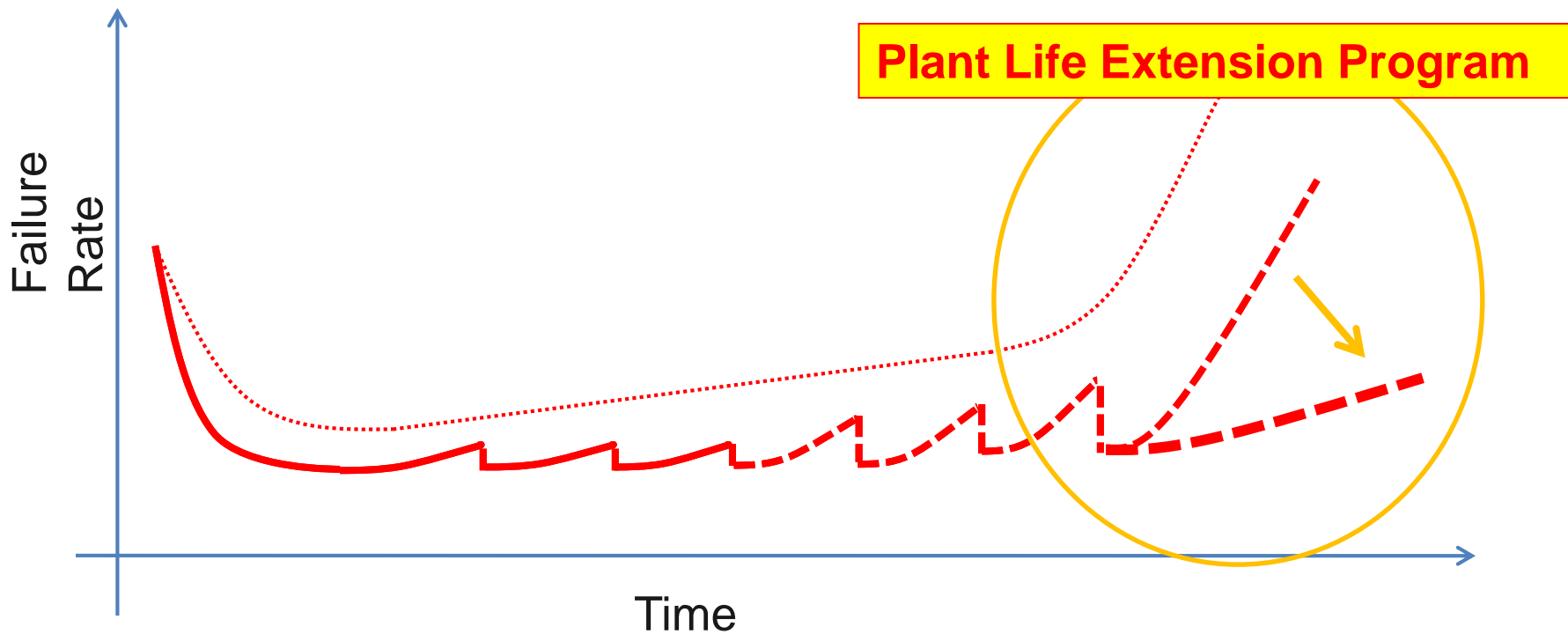


# Plant Life Extension Program



# Plant Life Extension Program

- Normal inspection and repairs cannot extend plant life
- Substantial Integrity issues happen at the end of plant life
- Plant life extension can be achieved if **appropriate equipment replacement and material upgrading are carried out**



# Assessment Steps

## Plant Integrity Assessment (PIA)

- Kick Off Meeting
- Data Review
- Site Survey
- Assessment
- Recommendation

## Integrity Improvement Initiative (III)

- Action Plan Workshop
- On-stream Inspection
- Turnaround Inspection
- Data Evaluation
- Remaining Life Evaluation

## Life Extension Program (LEP)

- Long Term Strategy Development
- Budgeting for Rejuvenation
- FEED
- EPC

# Data Digitalizing Service

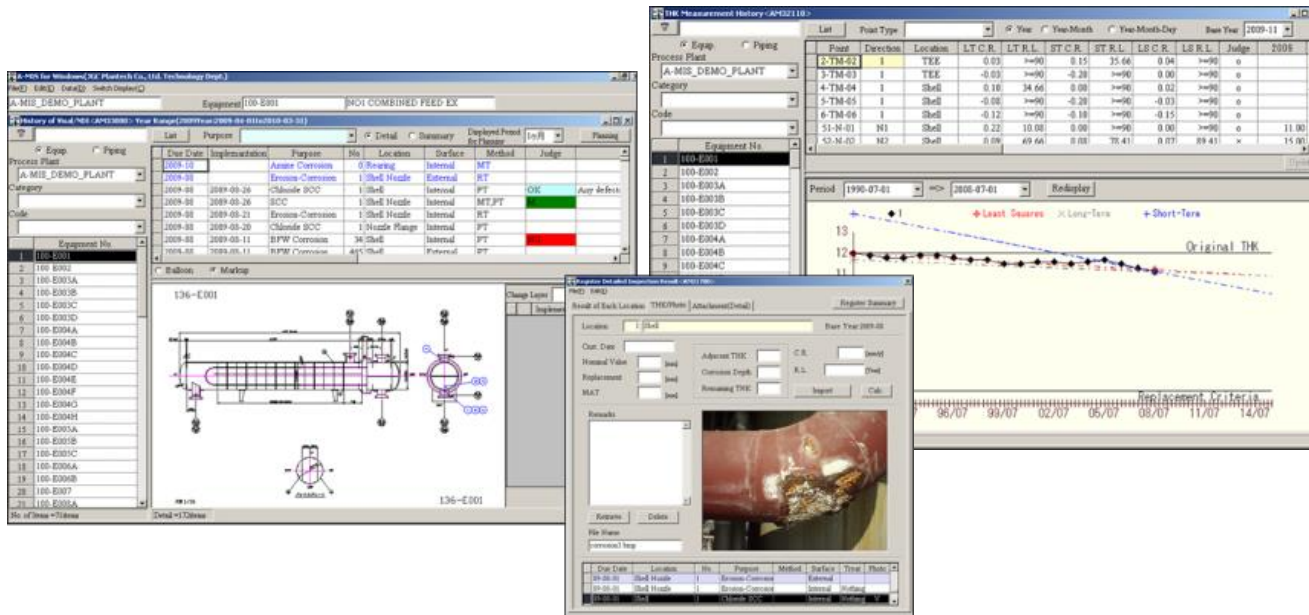
Helps inspection engineers  
in every phase of maintenance activities

- ✓ Precise estimation of corrosion rate
- ✓ Cost and time efficient maintenance planning

Facility Diagnosis Support System

# A-MIS

Advanced Maintenance Inspection Support System



Used by **80%** of petrochemical  
and refining companies in Japan

# Intelligent O&M Service

**Plant Life Extension  
Program**

Supported by our specialists  
and engineering knowhow



Facility Diagnosis Support System

**A-MIS**

Advanced Maintenance Inspection Support System

***Visualize Information***

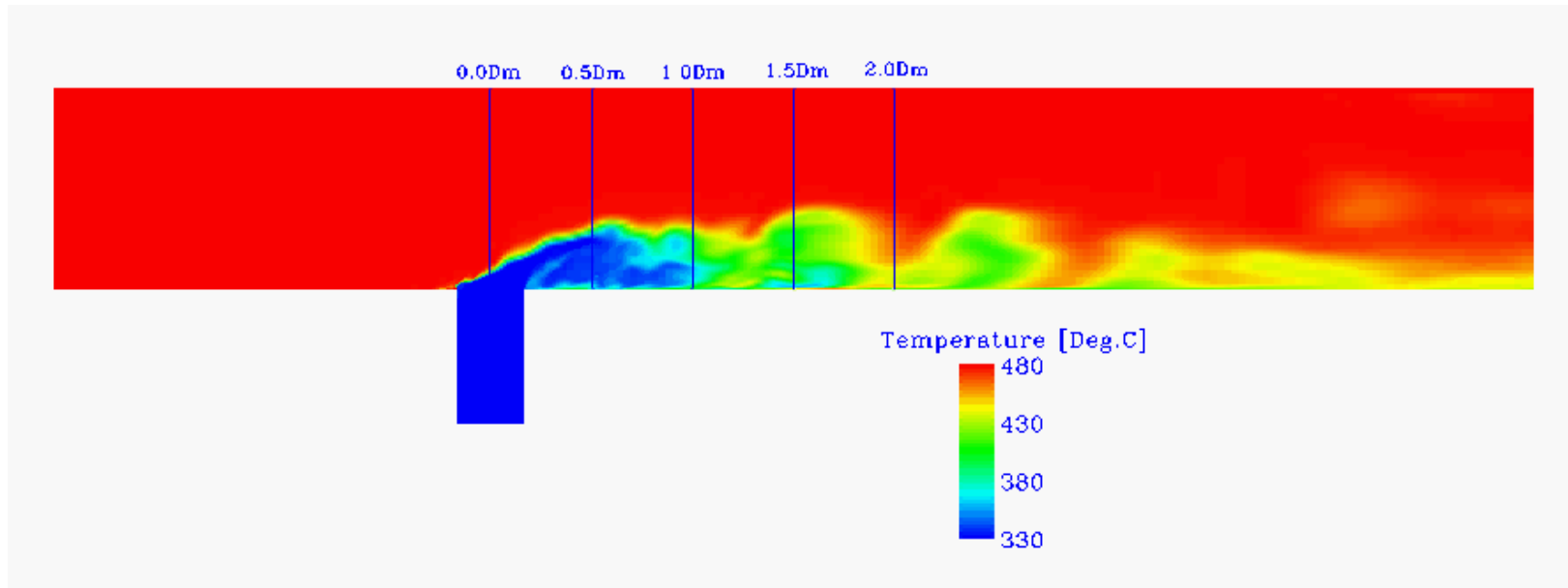
# CFD Analysis



# CFD (Computational Flow Dynamics)

Strong tool for engineering and trouble shooting to demonstrate fluid dynamic behavior

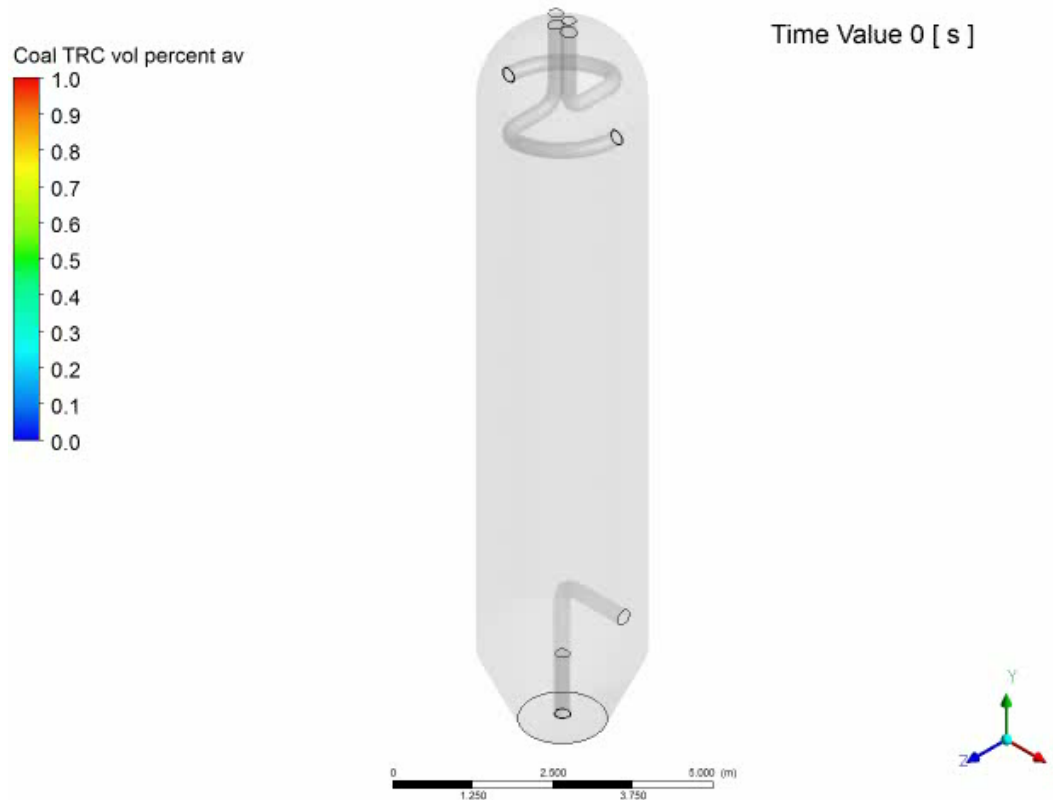
## Example : Mixing of Hot and Cold Fluids





# CFD (Computational Flow Dynamics)

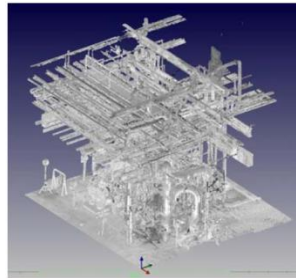
## Example : Distribution of Fluid Density in Reactor



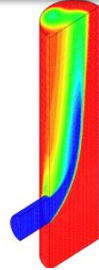
# Summary and Conclusions

- ◆ JGC can provide the optimum solutions to enhance client's business value.
- ◆ Build a strong partnership with Client to realize a business innovation for petroleum industry

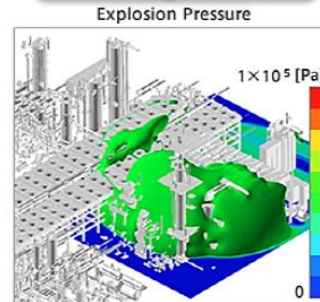
3D Laser Scan



CFD Analysis



HSE and Risk Management



IoT / Big Data Solution



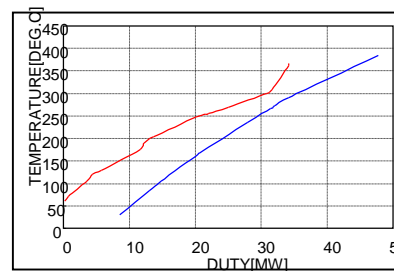
4D Model



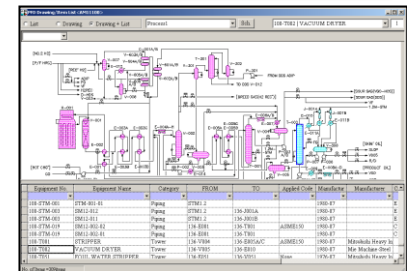
Plant Life Extension Program



Energy Saving / Pinch Study

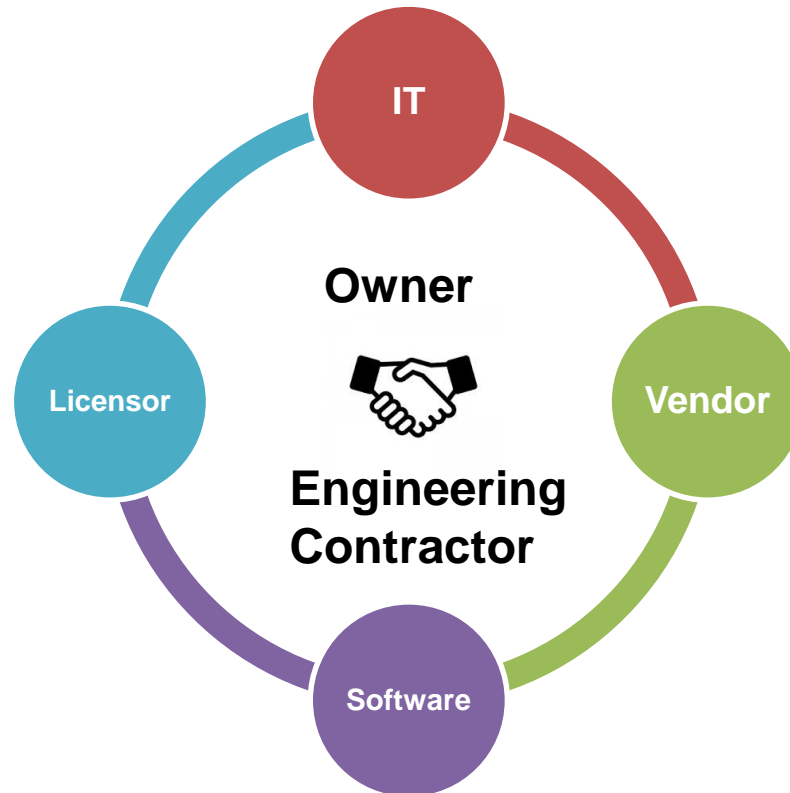


Asset Management System



# Summary and Conclusions

- Development of IT will bring a lot of possibility for petroleum industry
- However, the most important thing is the integration of various industries based on deep engineering expertise





# ***The JGC Way*** ***Engineering the Future***

**Please contact us:**

**JGC Webpage :**

**<http://www.jgc.com/en/index.html>**

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