# Catalyzing Profitable Digitalization in Chemical Industries

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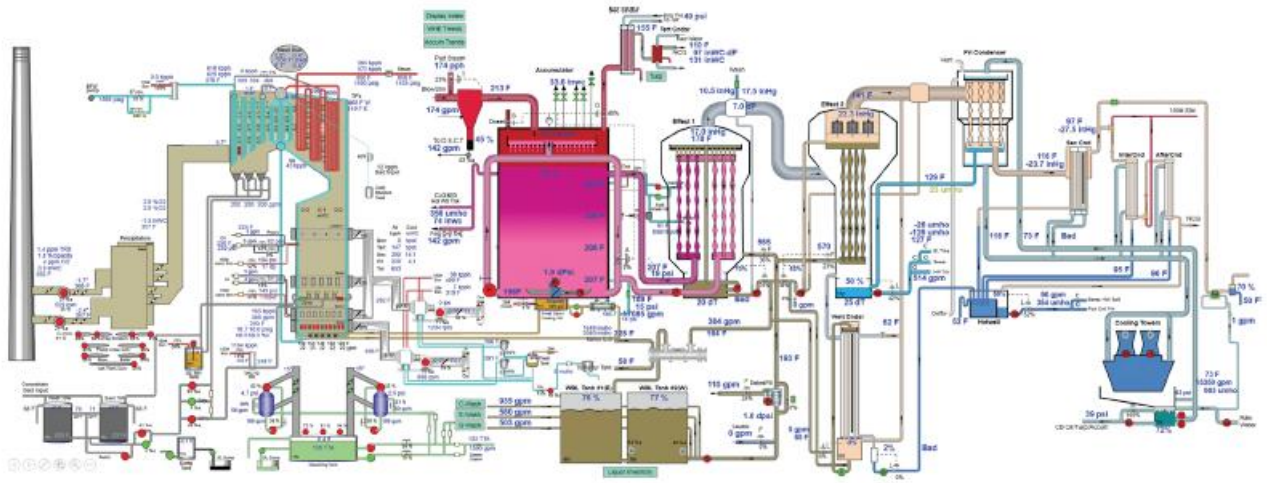
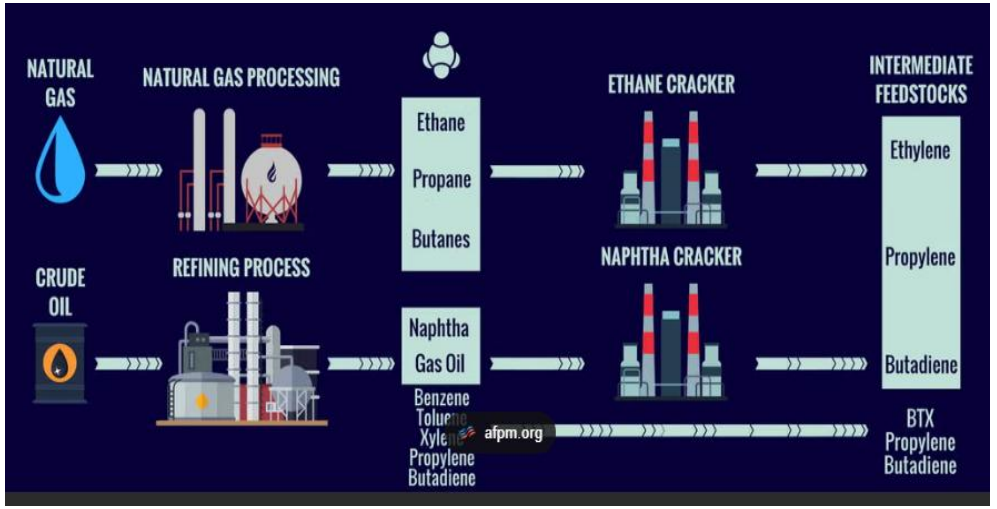
Indian Chemical News Event – 18th June 2025, Mumbai

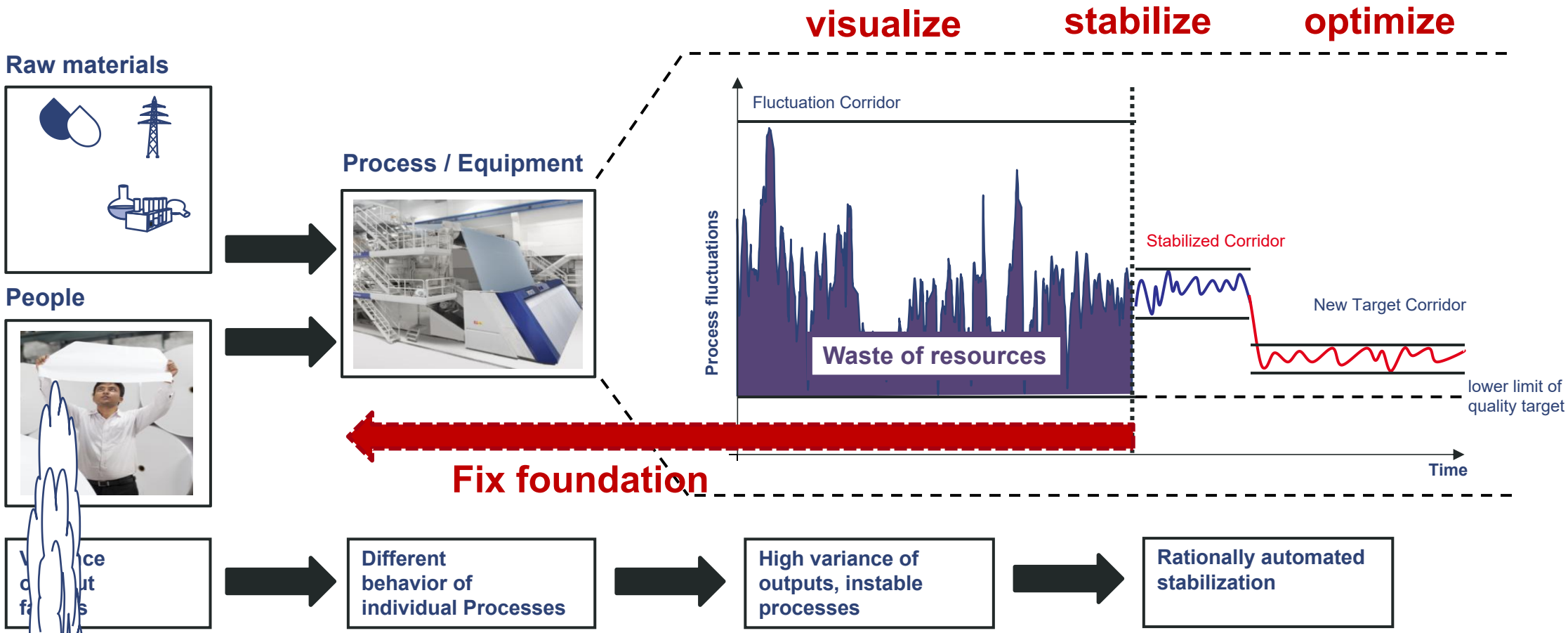
# Chemical Manufacturing



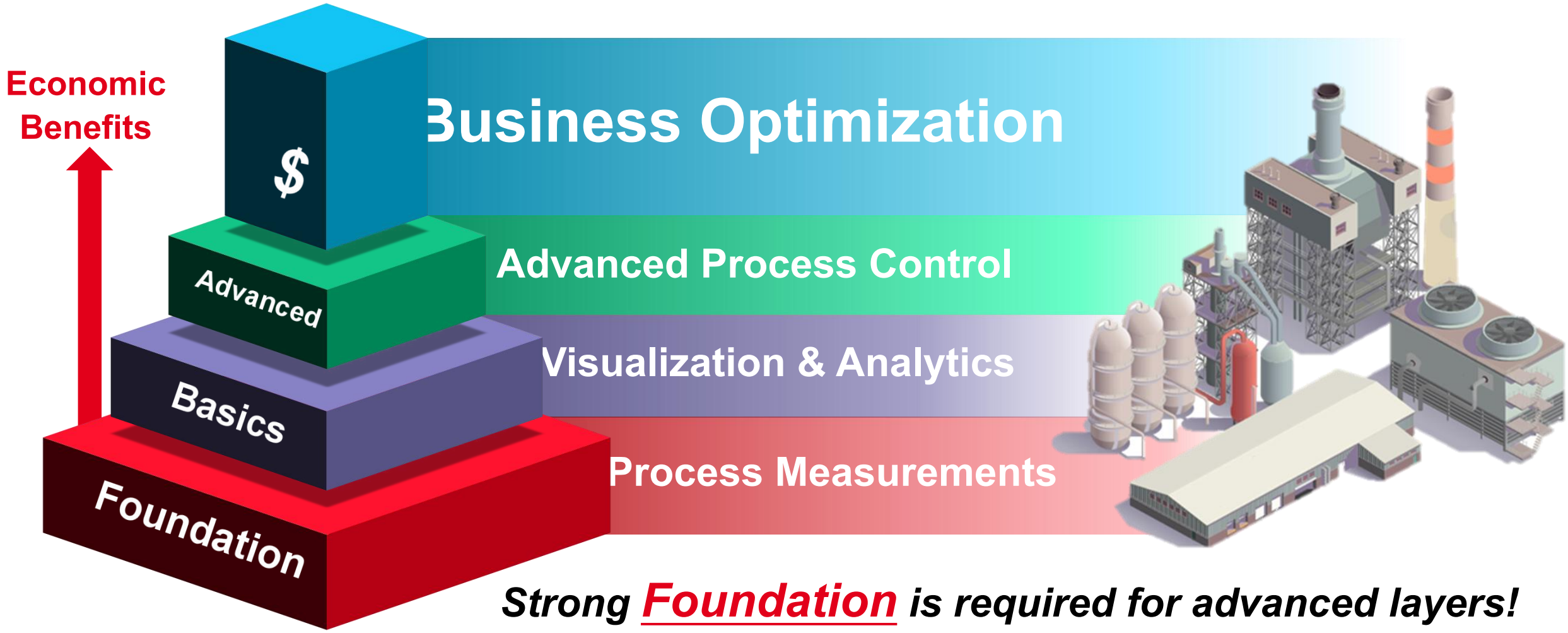



- Combination of unit operations – batch or continuous or combination
- Designed for certain capacities, quality and efficiencies
- Over time, changes in process, equipment, utilization, quality is inevitable
- Opens up opportunity to optimize

# Optimization Fundamentals:
## Fix Foundation - Visualize – Stabilize – Optimize



# Optimization Approach
## The Control Hierarchy

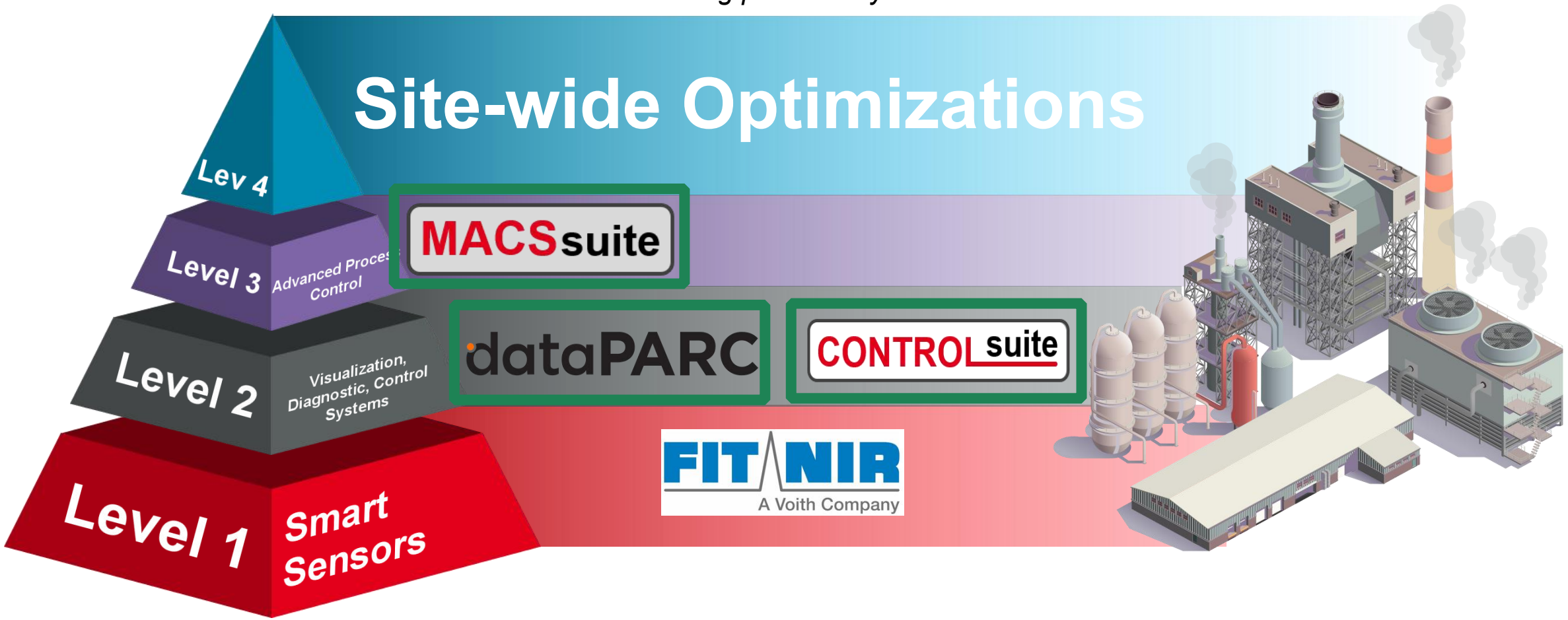



***Strong Foundation is required for advanced layers!***

# Available Tools

## An integrated digitalization framework

***Objective:*** *To improve* ***profitability*** *by* ***reducing process*** *and* ***quality variability*** *and maximizing productivity at* ***lowest cost***



# Availability of data

## Integrated Solution

dataPARC

A Simple Goal – One data analysis system for all types of data within the business

**MES**
Manufacturing execution systems

**ERP**
Enterprise Management Software

**LIMS**
Laboratory Information Management System

**Shift Logs**

**Data Historian**
DCS, PLC's etc.

OSIsoft. aspentech Honeywell dataPARC


Plant Factory

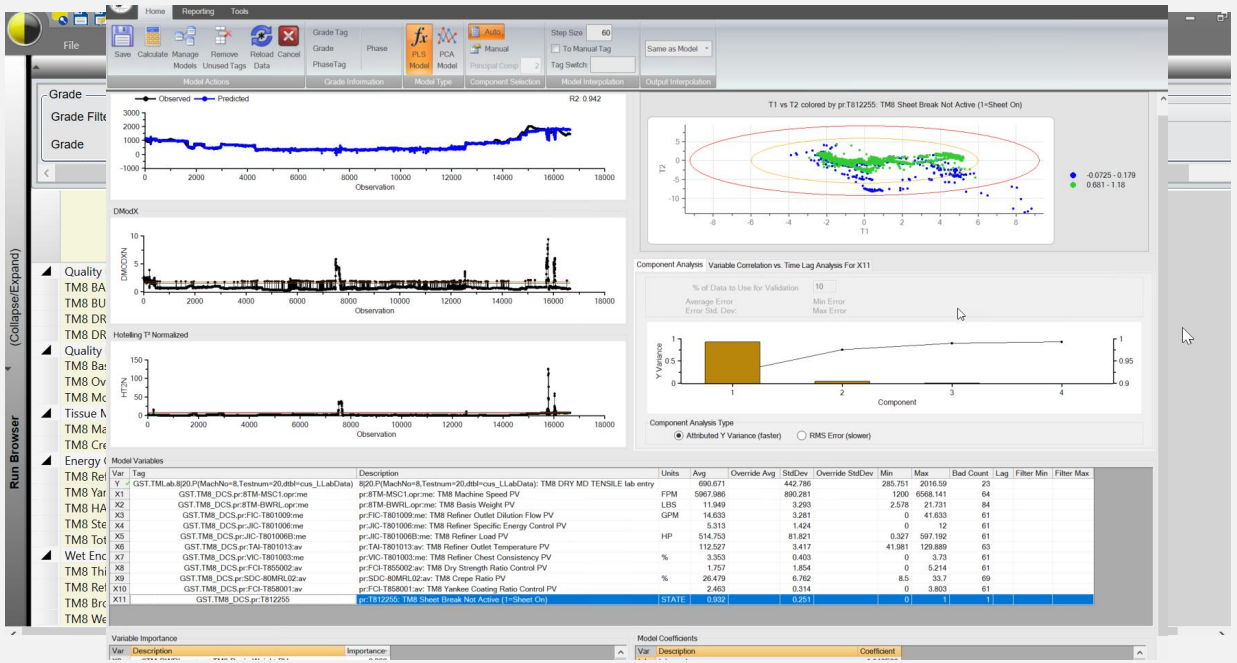
**Other Sources**

# dataPARC

## Adding to the top and bottom line of your business

| Business Need | Strategy | Tactics – Use cases | Tools & Applications | Results |
|---|---|---|---|---|
| Increase operational efficiency | Speed, context, integration and automation of data flows | Predictive models | KPI Dashboards, Reporting, Trending, Centerlining, SPC/SQC, Smart Alarms, Troubleshooting, Statistics, Downtime analysis, Profile analysis, Logbook, Loop performance, Asset monitoring, Process modelling, Grade Analysis | Increased Production (1 - 6 %)<br>Increased Human Capital Efficiency (25%)<br>Savings in rawmaterial cost (0.5 to 3 %)<br>Energy Savings (0.4 to 1.6 %)<br>Chemical Savings (0.3 to 1.9 %)<br>Reduced Operating Costs (1 - 5 %) |

### Some tools in details:



# dataPARC Case Study#1

## Specialty Chemical Corporation

**Eliminated Excel for Data Entry**

**Seamless Data Integration**

**Concurrent Data Access**

- dataPARC replaced Excel for data entry, enabling real-time analysis and swift trend identification. This shift led to rapid process optimization and enhanced operational efficiency.
- dataPARC eliminated data silos by integrating process control data from the SCADA system and replacing the Excel spreadsheets with data entry. This unified platform allows users to trend and create dashboards in one place, improving data accessibility and informed decision-making.
- The ability for multiple users to access and interact with data simultaneously has enhanced collaboration and ensures that everyone has the most up-to-date information. SCC did not have this ability previously as data was siloed and in spreadsheets.

**"Using dataPARC's MDE function, data sharing is no longer an issue, and physical property data can be trended with process control data in the historian."**

# dataPARC Case Study#2

## S-Oil Corporation

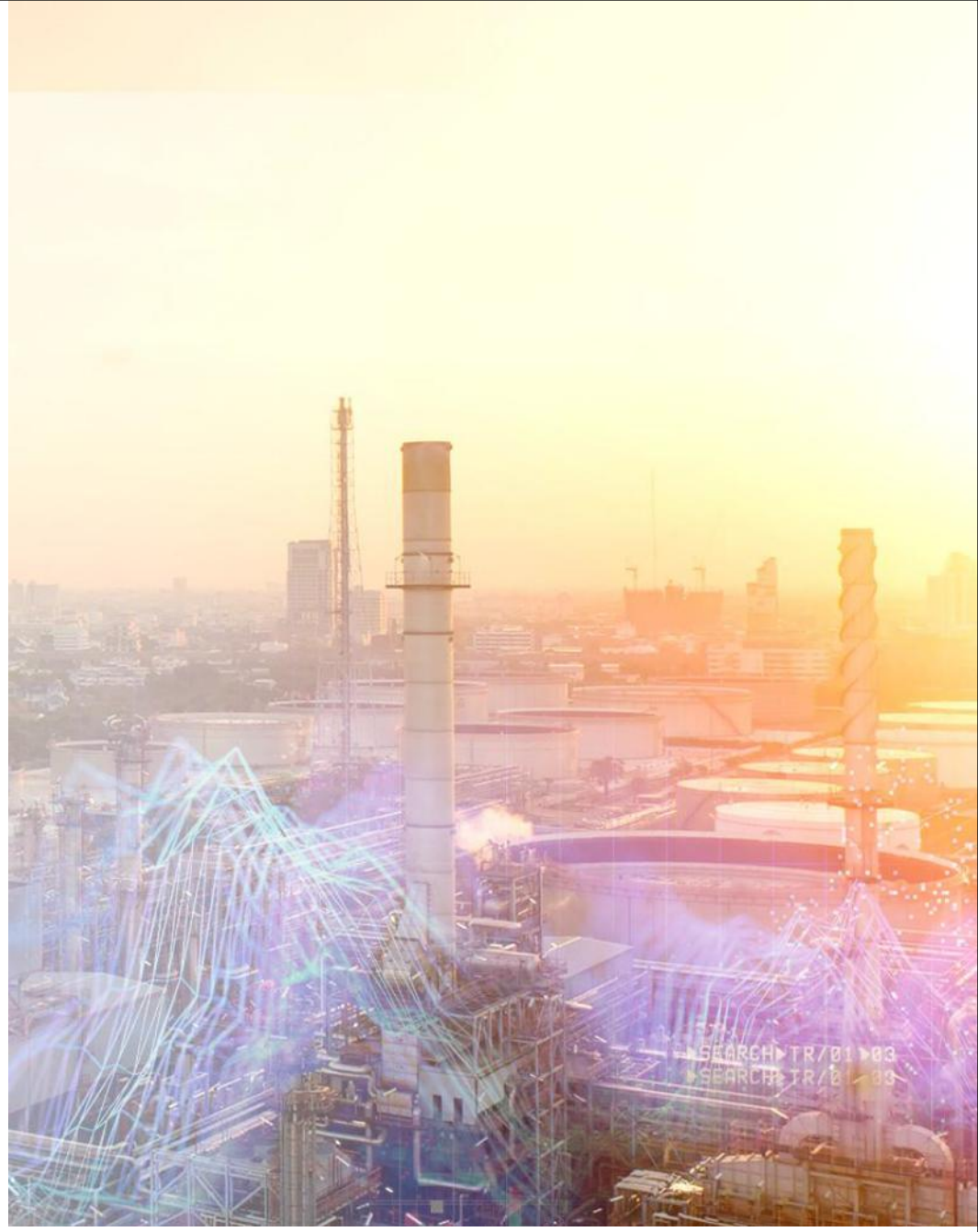
**PI Migration After 20+ Years**

**Upgrade Analytics**

**Energy Management**

- After relying on a legacy PI system for over 20 years, the company successfully migrated to dataPARC, ensuring data continuity and enhanced functionality. This transition included converting over 800 ProcessBook displays, 100+ PI DataLink Reports, 400 PI Active View Displays, and 150K tags.
- dataPARC's advanced analytics capabilities provided deeper insights into operational data, enabling more accurate forecasting and better decision-making. This upgrade significantly improved S-oil's ability to analyze trends and optimize performance.
- S-oil utilized dashboards to optimize energy management consumption by providing real-time monitoring. This improvement led to more efficient energy consumption and substantial cost savings, contributing to overall operational efficiency.

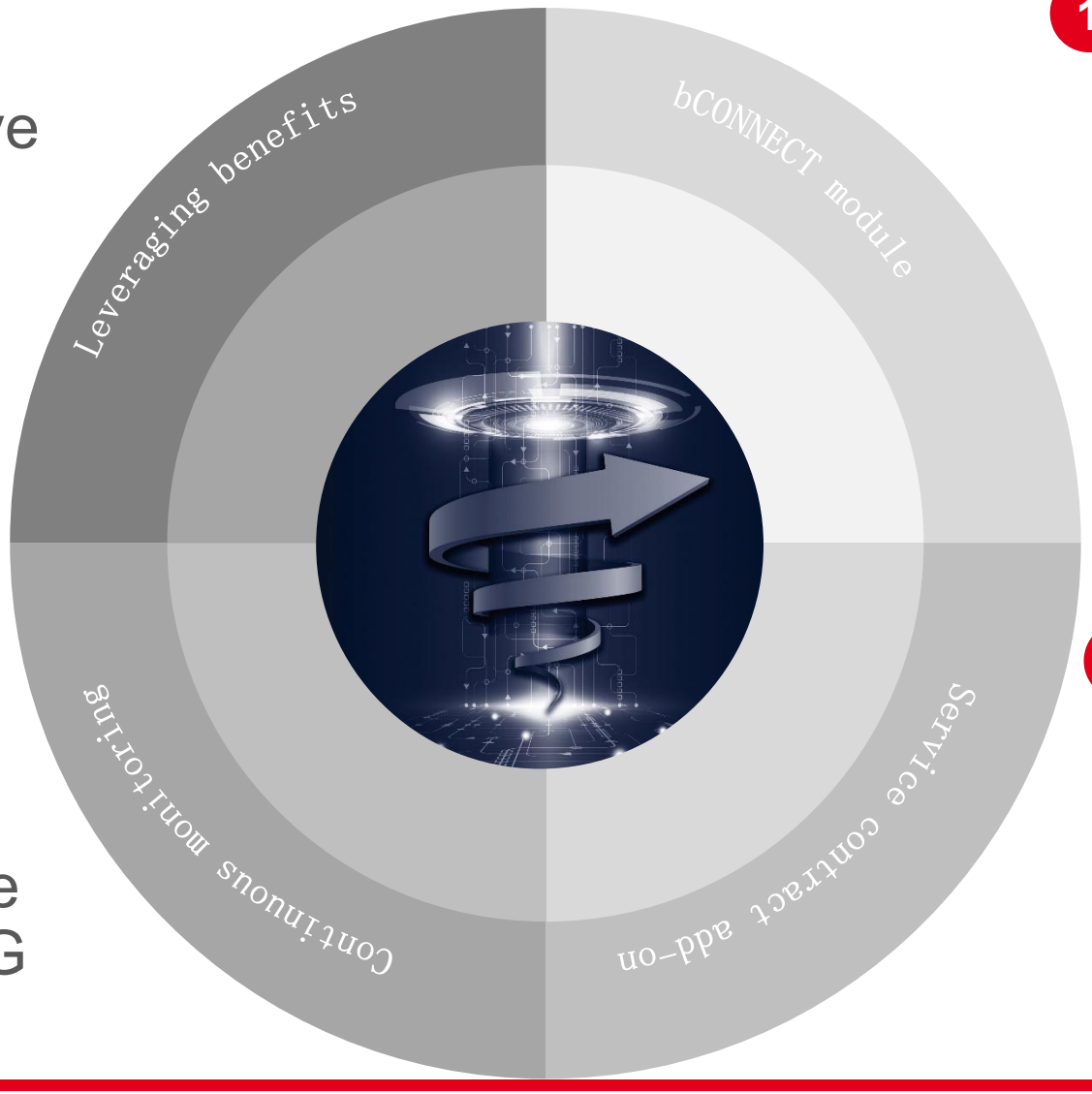
**"One of dataPARC's advantages is that it can quickly and easily connect to our existing data sources"**



# What is CONTROLsuite?

CONTROL suite

4 Benefits by providing qualitative and quantitative indicators




1 CONTROLtrac monitors loops on a predefined schedule, providing actionable information to the customer

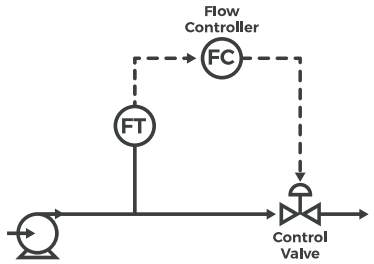
2 CONTROLtune models each loop and provides tuning constants to maximize performance

3 The continuous monitoring takes place in the plant system with remote capabilities for BTG

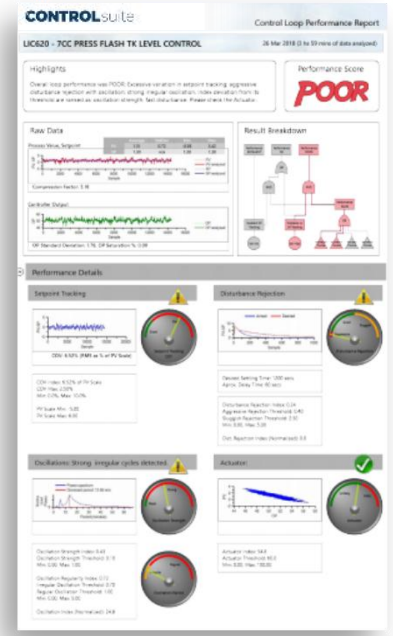
# CONTROLsuite

## Maximize the return on your loop investment

## PERFORMANCE DATA AGGREGATION




Individual Loop



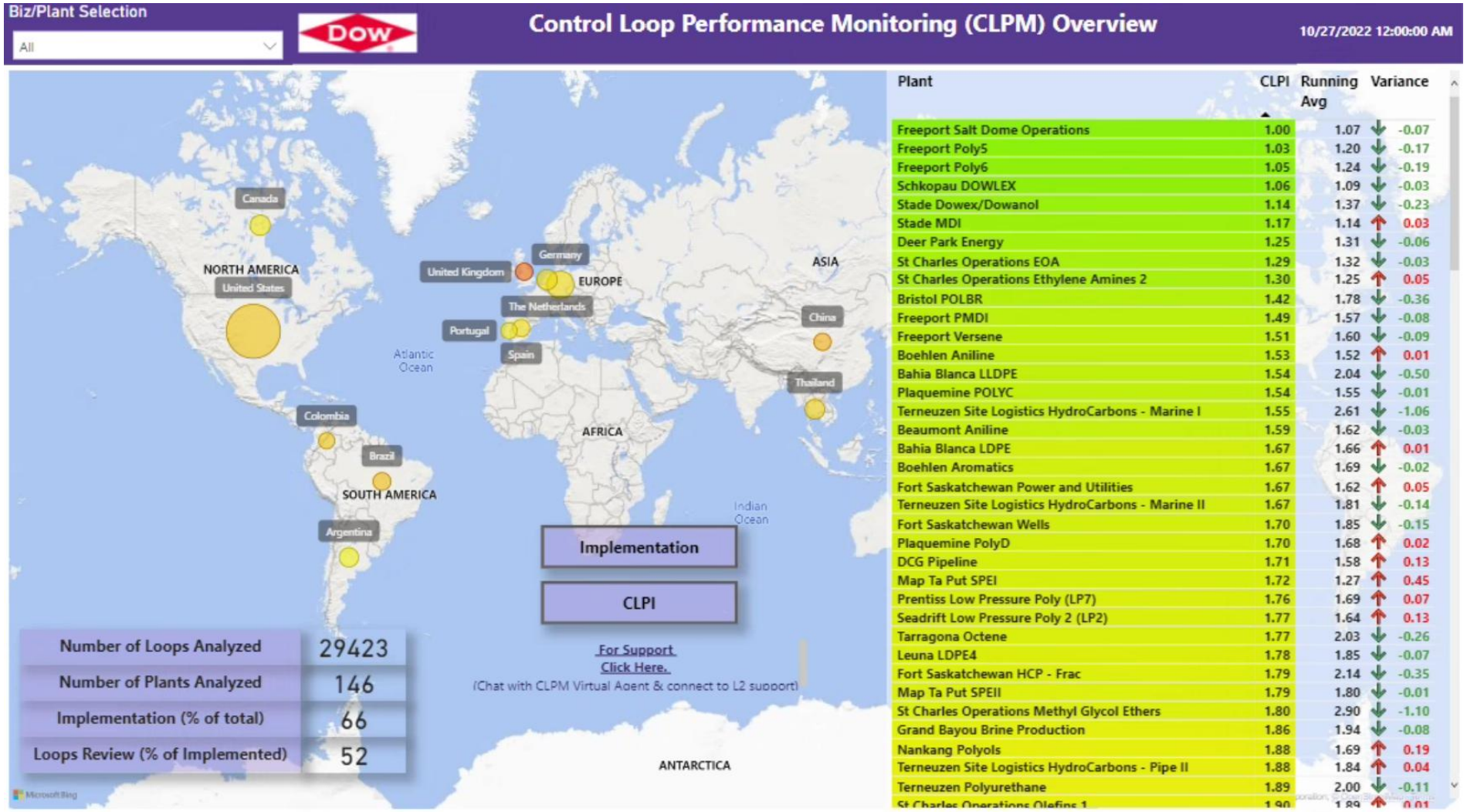

Individual Loop Performance Assessment Report

CONTROLsuite Performance Overview Chart


Plant Performance Severity KPI

# ControlSUITE Case Study#3

## Dow Chemical



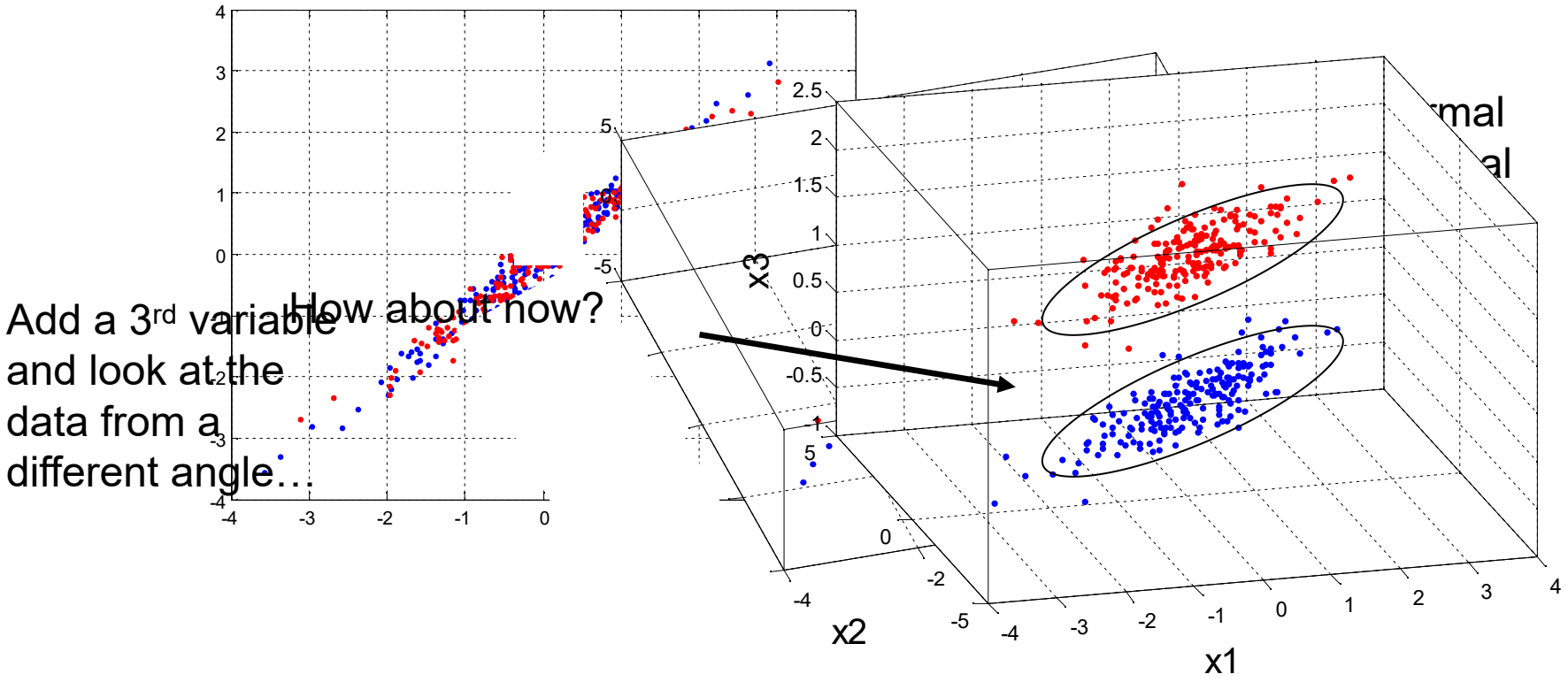

| Plant | CLPI | Running Avg | Variance |
|---|---|---|---|
| Freeport Salt Dome Operations | 1.00 | 1.07 | -0.07 |
| Freeport Poly5 | 1.03 | 1.20 | -0.17 |
| Freeport Poly6 | 1.05 | 1.24 | -0.19 |
| Schkopau DOWLEX | 1.06 | 1.09 | -0.03 |
| Stade Dowex/Dowanol | 1.14 | 1.37 | -0.23 |
| Stade MDI | 1.17 | 1.14 | 0.03 |
| Deer Park Energy | 1.25 | 1.31 | -0.06 |
| St Charles Operations EOA | 1.29 | 1.32 | -0.03 |
| St Charles Operations Ethylene Amines 2 | 1.30 | 1.25 | 0.05 |
| Bristol POLBR | 1.42 | 1.78 | -0.36 |
| Freeport PMDI | 1.49 | 1.57 | -0.08 |
| Freeport Versene | 1.51 | 1.60 | -0.09 |
| Boehlen Aniline | 1.53 | 1.52 | 0.01 |
| Bahia Blanca LLDPE | 1.54 | 2.04 | -0.50 |
| Plaquemine POLYC | 1.54 | 1.55 | -0.01 |
| Terneuzen Site Logistics HydroCarbons - Marine I | 1.55 | 2.61 | -1.06 |
| Beaumont Aniline | 1.59 | 1.62 | -0.03 |
| Bahia Blanca LDPE | 1.67 | 1.66 | 0.01 |
| Boehlen Aromatics | 1.67 | 1.69 | -0.02 |
| Fort Saskatchewan Power and Utilities | 1.67 | 1.62 | 0.05 |
| Terneuzen Site Logistics HydroCarbons - Marine II | 1.67 | 1.81 | -0.14 |
| Fort Saskatchewan Wells | 1.70 | 1.85 | -0.15 |
| Plaquemine PolyD | 1.70 | 1.68 | 0.02 |
| DCG Pipeline | 1.71 | 1.58 | 0.13 |
| Map Ta Put SPEI | 1.72 | 1.27 | 0.45 |
| Prentiss Low Pressure Poly (LP7) | 1.76 | 1.69 | 0.07 |
| Seadrift Low Pressure Poly 2 (LP2) | 1.77 | 1.64 | 0.13 |
| Tarragona Octene | 1.77 | 2.03 | -0.26 |
| Leuna LDPE4 | 1.78 | 1.85 | -0.07 |
| Fort Saskatchewan HCP - Frac | 1.79 | 2.14 | -0.35 |
| Map Ta Put SPEII | 1.79 | 1.80 | -0.01 |
| St Charles Operations Methyl Glycol Ethers | 1.80 | 2.90 | -1.10 |
| Grand Bayou Brine Production | 1.86 | 1.94 | -0.08 |
| Nankang Polyols | 1.88 | 1.69 | 0.19 |
| Terneuzen Site Logistics HydroCarbons - Pipe II | 1.88 | 1.84 | 0.04 |
| Terneuzen Polyurethane | 1.89 | 2.00 | -0.11 |
| St Charles Operations Olefins 1 | 1.90 | 1.89 | 0.01 |

# Why Advance Process Control?

MACSsuite

Human brain can think in 2 axis

Normal condition
Fault condition

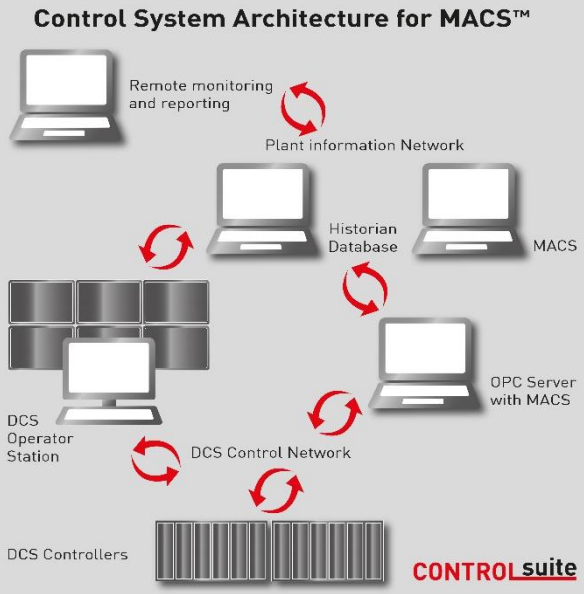


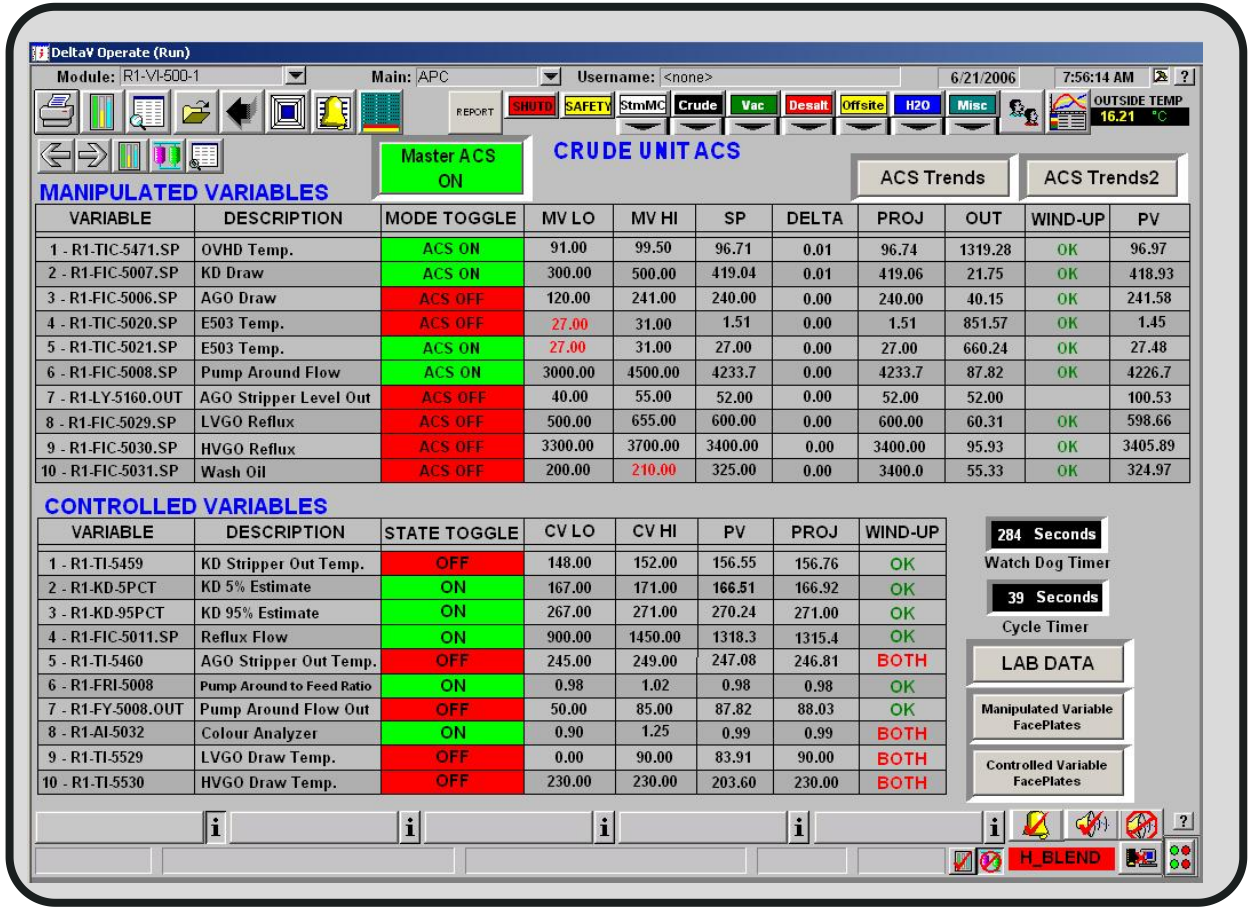

Add a 3rd variable and look at the data from a different angle…

# An Overview of the MACS suite

MACSsuite

- Industry-leading user-friendly visualization
- Open architecture windows-based system
- Proven model predictive control
- DCS-independent
- Unique combination of process knowledge and software advances

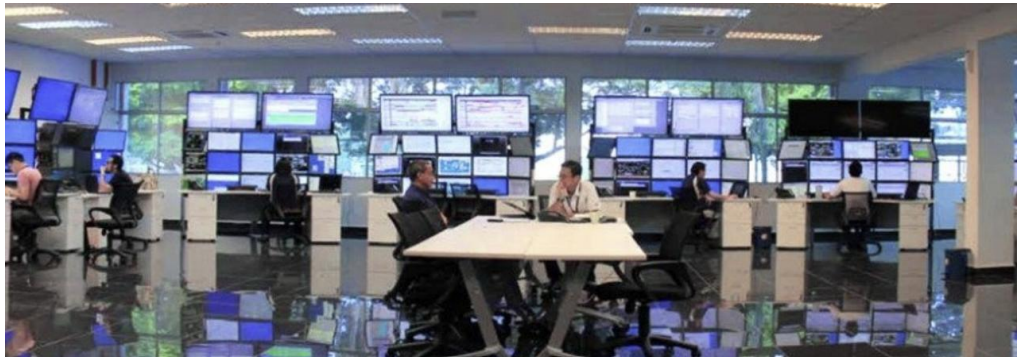


# MACS Case Study#4

## Linde Global Partnership


Linde's ROC in Kuala Lumpur



- 25 years of collaboration
- 200+ applications deployed globally
- 250+ users trained by BTG

- MACS is a key technology enabler of Linde's Regional Operating Center(ROC) business strategy

- Business relationship has evolved over time as in-house skills have increased

Turnkey -> Joint Deployment -> Remote 1º Support -> Expert Support

MACSsuite

# Example Installations Chemicals and Refining

Linde (Corporate License)
*Air Separation & HyCO (worldwide)*

Consumer's Co-Op Refineries
*Fluid Catalytic Cracker*

Cytec
*Sulfuric Acid Plant*

Husky Oil (Site License)
*Crude Unit*
*H-Oil Reactors*
*Hydrogen Plant*

Koch Hydrocarbons
*Gas Fractionation*

Ascend (Corporate License)
*Polymer Films*
*Thermal Oxidizer*
*Refining*

North Atlantic Refining
*Platformer and Stabilizer*
*Rate or Octane Maximizer*

*Williams Energy*
*Propane/Propylene Splitter*
*De-ethanizer*

# Industry Leaders: Our Key Customers


**Paper & Pulp**
April
Bahia Special Cellulose
Cascades
Catalyst Paper
Clearwater Paper
Columbia Pulp
Cominter
Cosmo Specialty Fibers
Crane Currency
Domtar
Double Tree Paper
DS Smith
Dunn Paper
Essity
Expera Specialty
Flambeau River Paper
Fripa
Georgia Pacific
Graphic Packaging
Green Bay Packaging
Greif
Hansol Paper
Harmac Pacific
HengFeng
Hollingsworth & Vose
ICT Iberica
International Paper
Irving Forest Products
J K Paper
Kan Paper
Kartogroup
KOMSCO Paper
Kruger
Kuantum Paper
Mercer International
Monadnock Paper
ND Paper
Neenah Paper
Nippon Industries
NORPAC
Nuqul
Oji Fibre
Onyx Specialty Paper
Packaging Corp
Palm Group
Paper Excellence
Port Hawkesbury Paper
Port Townsend Paper
Rand Whitney
Rayonier
Resolute Forest Prod.
Schweitzer-Mauduit
Soundview Paper
Sonoco
Thai Cane Paper
Unipak Tissue
Verso Paper
West Fraser
WestRock
Willamette Falls Paper
Whakatane Limited

**Chemical**
Afton Chemical
Arclin
Ashland Chemicals
Atul Ltd
Baker Hughes
BASF
BP Amoco
Buckman
Capco
Daelim Industries
DanChem
Dow Chemical
Dupont
Formosa
Fort Amanda Chemical
Galata Chemicals
Hansol Chemical
Hanwha Chemical
Huntsman Chemical
Hyundai Chemical
Incitec Pivot/Dyno Nobel
Int. Flavors & Fragrances
Iowa Fertilizer
Korea Kumho Petrochem
KR Copolymer
Kumho Mitsui Chemical
Lanxess
Lotte BP
Messer
Omya
Optima Chemical
Peroxychem
PT BP Indonesia
Shintech
SK Air Gas
SKC
Symrise
Samsung SDI
WR Grace
Yeochun NCC

**Ethanol**
Advanced Bio Energy
Chief Ethanol
Corn LP
Front Range Energy
Glacial Lakes Energy
Husker Ag
IGPC Ethanol
Kawartha Ethanol
Marquis Energy
PSC Starch
Show Me Ethanol
Sterling Ethanol
Trenton Agri-
Products Western
Plains Energy

**Mining & Minerals**
Alcoa
An Mining
Columbia River Carbonates
Coeur Mining
Dongbu Steel
Gibraltar Mines
Hyundai Steel
Imperial Metals
ItaFos
Korea Zinc
New Gold
Nutrien
Pretium Exploration
Rio Tinto
Taseko Mines
TeckCominco

**Power**
Boralex
Covanta
Conifex
China General Nuclear Power
Chiyoda
Chunceon Energy
Combined Heat & Power
Dynegy
GS Power
GS Pocheon Green Energy
Hanwha Energy
Hanju Utility
Hurem Wind Power
INNOX
Korea Nuclear Hydro Power
Korea District Heating
Korea Electric Power
Korea Midland Power
Korea Southeast Power
Korea Southern Power
Korea Western Power
Novo Power
Poseung Green Power
Salem Electric
Seoul Energy
Taiwan Power

**Oil & Gas**
Athabasca Oil Corp.
Atlantic LNG
Blackpearl Resources
Calcasieu Refining
Cenovus Energy
Centrica PLC
CNRL
Cosmo Oil
Countrymark Refining
Enbridge Pipeline
Energy Transfer
Greenfire Oil & Gas
GS Caltex/Chevron
Harvest Energy
Husky Energy
Keyera
Marathon Petroleum
MEG Energy
Philadelphia Energy
Placid Refining
Quattro Exploration
Seven Generations
Sinopec
S-Oil
Steel Reef
Sunshine Oil Sands
Quicksilver Resources
Whitecap Resources

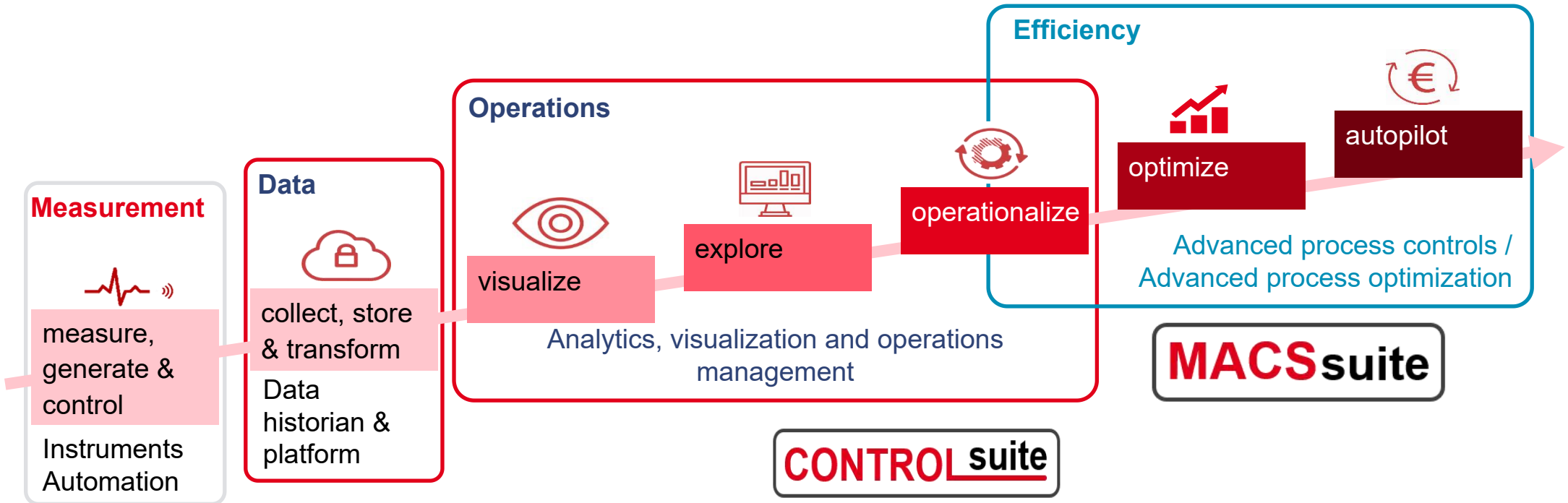
**Food & Bev**
Amalgamated Sugar
Campbell's Soup
Cardinal Nutrition
Minn-Dak Farmers
Coop Neil Jones Foods
Korea Yakult
Premier Foods
Western Sugar
Ynsect

**Manufacturing**
Arconic
Axis Pipe & Tube
Boise Wood Products
BP Lubricants
CertainTeed
Duracell
Energizer
Jinhap Manufacturing
Samsung
Siam Fibre Cement
Smile Direct

**Other**
California Port. Cement
Lockhead Martin
NE Ohio Regional Sewer
Ostara
Toray Adv. Materials
Zilkha Biomass

# Conclusion – Take the “Next” Step on the Digital Journey

- Many “next steps” on the Digital Journey
- Digital technology available today can generate excellent ROI
- R&D underway to significantly extend the journey



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