



# BOI and Thailand 4.0 Transformation



01

02

03

**Thailand at a glance, BOI and  
Investment Promotion**

Efficiency Enhancement Measures  
the new Thailand 4.0 Measure

Measures for system integrators or  
solution providers



# Thailand at a Glance

## Thailand in the World's Ranking

Largest Agricultural Output



12<sup>th</sup>

Largest Manufacturing Output



18<sup>th</sup>

Biggest Economies by Purchasing Power



19<sup>th</sup>

Largest Industrial Output



21<sup>st</sup>

Biggest Economies



24<sup>th</sup>

ASEAN's top biodiesel producer

1<sup>st</sup>

3<sup>rd</sup> World's exporter of bioplastics

World's top biodiesel producer

5<sup>th</sup>



4<sup>th</sup> World's top sugar producer

ASEAN's top automotive exporter

1<sup>st</sup>

1<sup>st</sup> Asia's top Global Health Security (GHS)

World's top hard disk drive exporter

2<sup>nd</sup>

5<sup>th</sup> World's biggest medical tourism market

Note: Exchange Rate 1 USD = 34.568 THB (As of 10 May 2022, Bank of Thailand)

Sources: BOI, NESDC, BOT, MOC, Johns Hopkins Center for Health Security, Pocket World in Figures 2022

66.19

Million population

37.71

Million workforce  
(2% unemployment rate)

313-336 Baht  
(9.05-9.72 USD)  
Minimum wage

Thailand's GDP  
15,698.30 billion baht  
(454.13 billion USD)



GDP Growth  
1.6% (2021), 3.4% (2022f)



# Strategic Location: Right in the Heart of Southeast Asia



**CLMVT**  
**300 mn. Consumers**  
Within 1,000 KM

**ASEAN**  
**670 mn. Consumers**  
Within 3,000 KM

## Regional Comprehensive Economic Partnership (RCEP)



The world's largest trade bloc  
**15 countries** into free-trade agreement partners.

**\$ 26.2 Trillion**

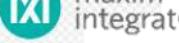
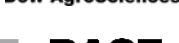
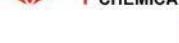
**30%**  
of Global GDP

**2.2 Billion People**

**30%**  
of world's population



# Second Home of International Companies

Automotive	Auto Parts	Smart Electronics	Petro-chemical	Oil & Gas	Bio-Based
 <b>TOYOTA</b>  <b>HONDA</b>  <b>BMW</b>  <b>HARLEY-DAVIDSON COMPANY</b>  <b>Ford</b>  <b>MITSUBISHI</b>  <b>Mercedes-Benz</b>  <b>VOLVO</b>  <b>ISUZU</b>  <b>SUZUKI</b>  <b>CHEVROLET</b>  <b>NISSAN</b>  <b>SCANIA</b>  <b>TATA</b>  <b>HINO</b>  <b>FOMM</b> <small>First One Mile Mobility</small>  <b>MG</b>  <b>TRIUMPH</b>	 <b>MICHELIN</b> <small>A better way forward</small>  <b>BRIDGESTONE</b>         <small>The Future in Motion</small>         	 <b>SAMSUNG</b>  <b>Canon</b>  <b>Haier</b>  <b>Carrier</b>  <b>PHILIPS</b>    <small>Leading Innovation &gt;&gt;&gt;</small>          <b>Quanta Computer</b>  <b>FUJITSU</b>  <b>SONY</b>  <b>LG</b>          	 <b>Dow</b>  <b>Dow AgroSciences</b>   <small>The Chemical Company</small>  <small>Energy lives here™</small>         <small>SIAM CEMENT GROUP CHEMICALS</small>   	 <b>Chevron</b>  <b>ExxonMobil</b>              	 <b>BAG</b> <small>BAGS AND GLOVES CO., LTD.</small>  <b>Corbion</b> <small>PURAC</small>  <small>A Most Admired Company</small> <small>An associate of PTTGC &amp; LyondellBasell</small>       <small>Polymer</small> <small>UNIC TECHNOLOGY CORP.</small>  



# Introduction to Thailand Board of Investment (BOI)



**Information and advice on**  
establishing operations in Thailand



**Coordinate** between the foreign  
business community and other  
public agencies



**Incentives and Business Support**  
**Services for Investors:**  
Tax & Non-tax incentives, sourcing,  
and SMEs development

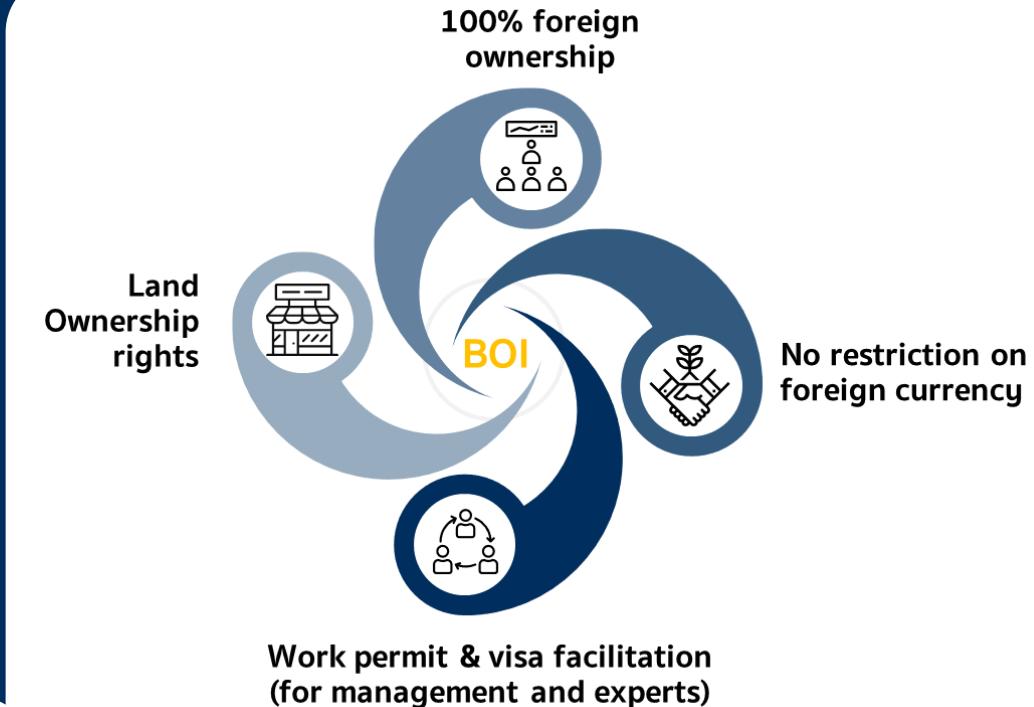
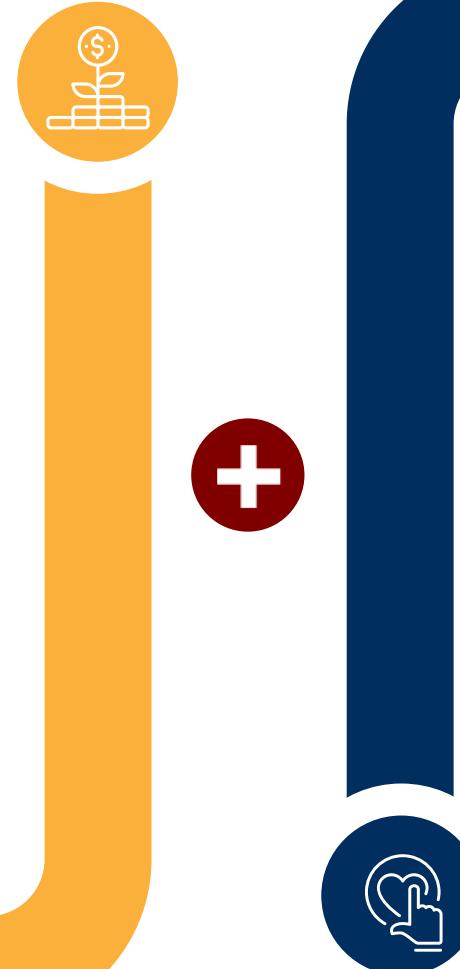
## OVERSEAS OFFICES



# Investment Promotion Incentives

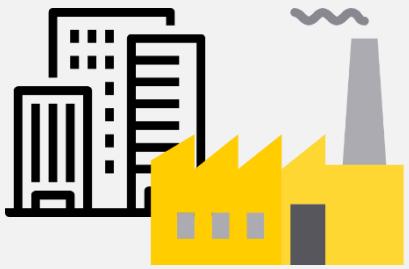
## Tax & Financial Incentives

- Corporate income tax (CIT) exemption or reduction
- Exemption of import duty on machinery
- Exemption of import duty on raw materials (used in the manufacture of exports and for R&D purposes)
- Advanced Technology Training Grant



## Non-Tax Incentives

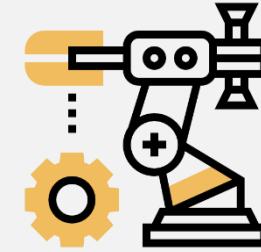
# General requirements



Company Limited,  
Foundation, Cooperative



Activity-based Incentives



New Project  
(Using new machines)



Minimum Investment  
 $\geq 1$  mTHB  
Or 500 kTHB (SMEs)



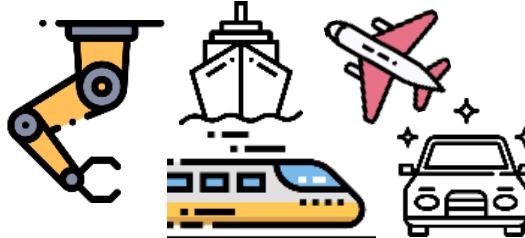
Debt/Equity  
Ratio  $\leq 3:1$

# BOI Eligible Business Activities



## Investment Promotion Division 1

Agricultural and Food Processing, Bio-based and Medical Industries and Medical Services



## Investment Promotion Division 2

Machinery, Automotive, Electrical Appliance and Electronics, Defense Industries



## Investment Promotion Division 3

Basic Metals, Chemical and Petrochemical, Paper, Utilities, Energy, Environmental Industries, Industrial Area Development



## Investment Promotion Division 4

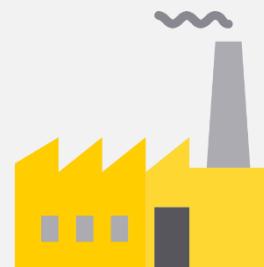
Logistics, High Value-added Services, Tourism, Other Services, Creative Industries, Digital Industries, Smart Cities



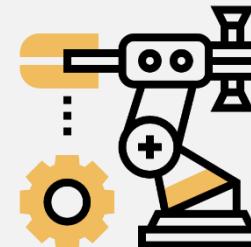
# Measures toward Efficiency Enhancement, Robotics, Digitalization, Energy Reduction and Alternative Energy Utilization



Promotion for Efficiency Enhancement, Robotics, Digitalization,  
Energy Reduction and Alternative Energy Utilization



Demand-Side



Supply-Side



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02

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**Efficiency Enhancement Measures  
and the new Thailand 4.0 Measure**

Measures for system integrators or  
solution providers

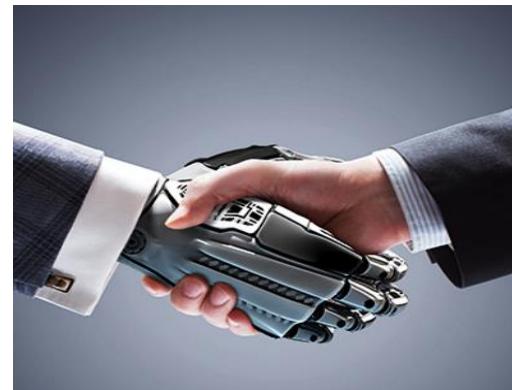


# Demand-Side: Efficiency Enhancement Measures

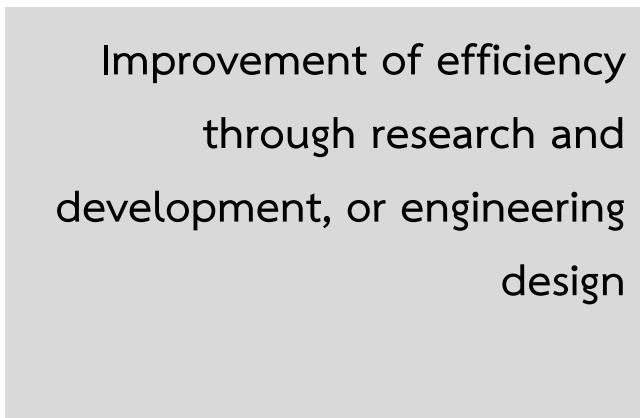
## (Improvement of existing manufacturing facilities)



Energy conservation,  
alternative energy utilization  
or environmental impact  
reduction



Upgrading machinery,  
Automation System or  
Digital Transformation and  
Thailand 4.0 Measure



Improvement of efficiency  
through research and  
development, or engineering  
design



Upgrading production line to  
acquire international  
sustainability certification, for  
example GAP, FSC, PEFCs, ISO  
22000, ISO 14061 (SFM)

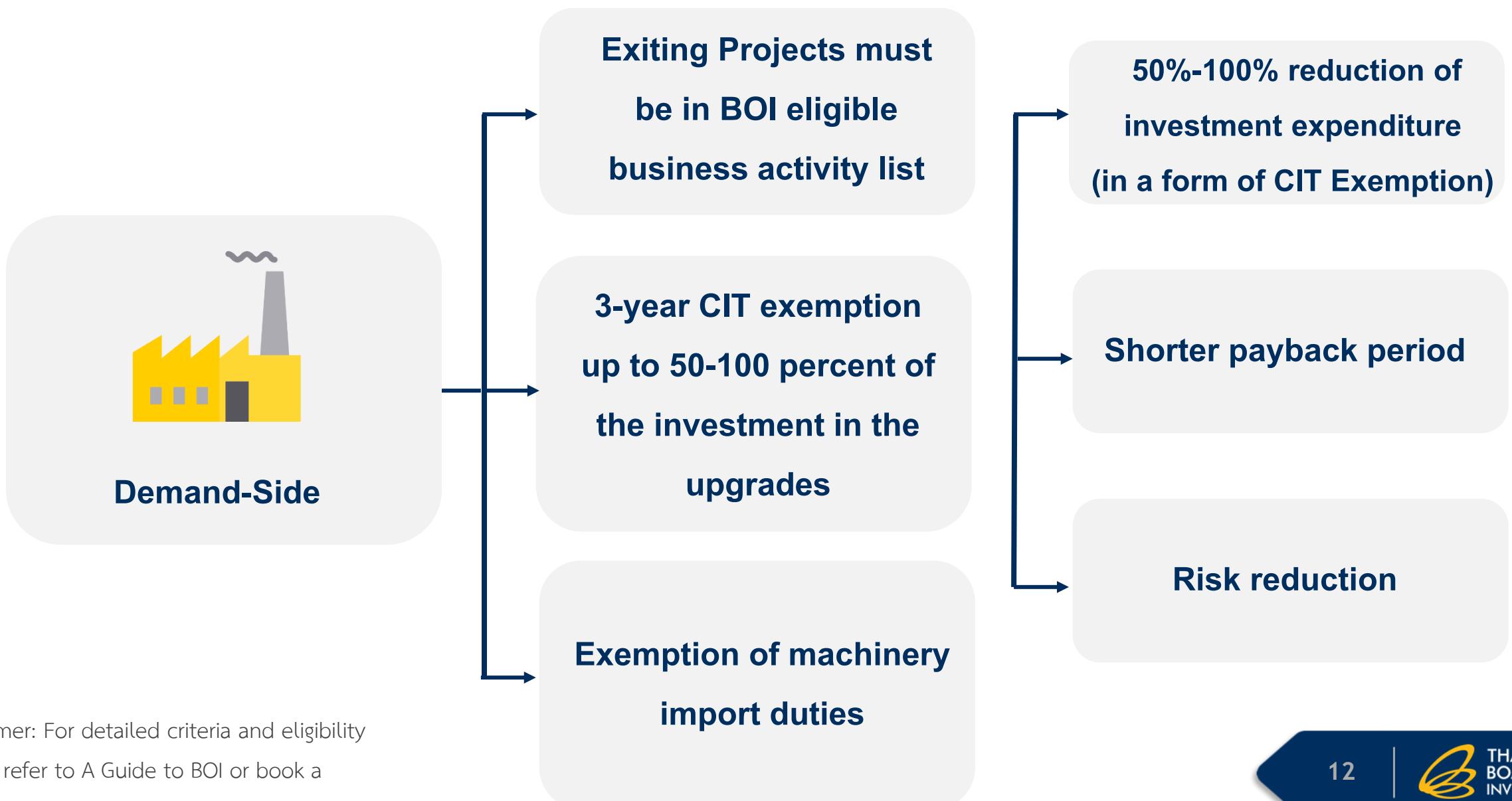


### Benefits :

- 3-year corporate income tax exemption up to 50-100 percent of the investment capital (excluding cost of land and working capital on the enhancement) on revenue of the existing project
- Exemption of machinery import duties

\*\*\*Application must be submitted by 2022

# Demand-side Incentives: the Summary



Disclaimer: For detailed criteria and eligibility please refer to A Guide to BOI or book a consultative zoom session via [booking.boi.go.th](http://booking.boi.go.th)



# Efficiency Enhancement: Machine Upgrades or Automation/Robotics



The business must not be indicated as not eligible for this measure by BOI's negative list.



## Benefits

- Exemption of machinery import duties
- 3-year CIT exemption up to 50% of the investment capital or up to 100% of the investment capital in case of the utilization of automation systems or robotics using more than 30% of the system from Thai suppliers.

**Criteria:** The performance must comply with the BOI's specified indicator.



## Criteria

- Existing projects applying for this measure must be in BOI's eligible business activity list and are not currently enjoying tax exemption/reduction by BOI.
- For a non-automation/robotic projects, the existing project must be in BOI's A1-4 categories.
- **1mTHB minimum investment** (excluding cost of land and working capital on the enhancement)

**Applications must be submitted by the end of 2022**



# Efficiency Enhancement: Digitalization



The business must not be indicated as not eligible for this measure by BOI's negative list.



## Benefits

- 3-year CIT exemption up to 50% of the investment capital for the alternative energy system

## Types of Digitalization:

- Adoption of digital technologies, linking at least 3 work functions within their organizations or with other organizations
- Adoption of AI, Machine Learning or Big Data Analytics
- Adoption of digital technologies that link with government online system such as National e-Payment System



## Criteria

- The project must invest in new machines
- Existing projects applying for this measure must be in BOI's eligible business activity list and are not currently enjoying tax exemption/reduction by BOI.
- 1mTHB minimum investment (excluding cost of land and working capital on the enhancement)



# Efficiency Enhancement: Energy Conservation



The business must not be indicated as not eligible for this measure by BOI's negative list.



## Benefits

- Exemption of machinery import duties
- 3-year CIT exemption up to 50% of the investment capital for the energy conservation system

**Criteria:** The project must save more energy cost (within 5 years) more than CIT exemption received (50% of the investment)



## Criteria

- Investment in new machines to replace existing machines to improve energy efficiency
- Existing projects applying for this measure must be in BOI's eligible business activity list and are not currently enjoying tax exemption/reduction by BOI.
- **1mTHB minimum investment** (excluding cost of land and working capital on the enhancement)

**Applications must be submitted by the end of 2022**



# Efficiency Enhancement: Alternative Energy



The business must not be indicated as not eligible for this measure by BOI's negative list.



## Benefits

- Exemption of machinery import duties
- 3-year CIT exemption up to 50% of the investment capital for the alternative energy system

**Criteria:** The project must use alternative energy such as solar etc.

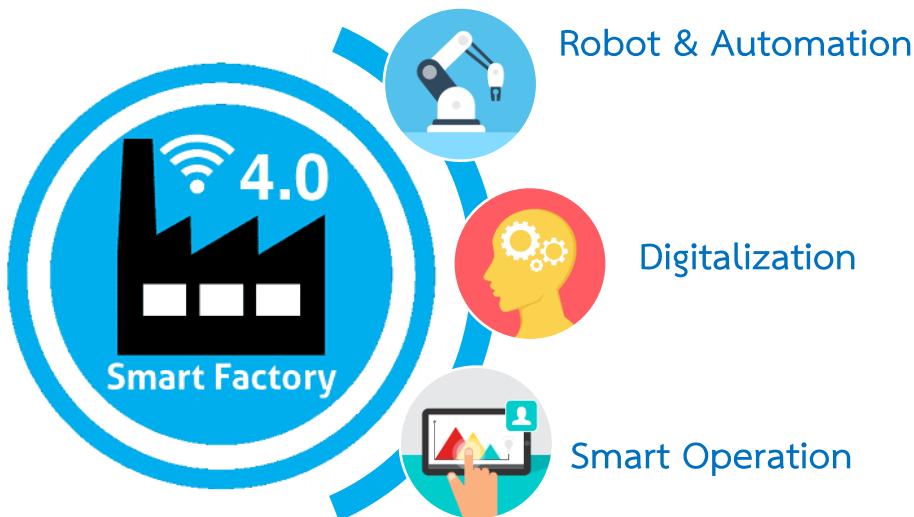


## Criteria

- The project must invest in new machines
- The project applying for this measure must be in BOI's eligible business activity list and are not currently enjoying tax exemption/reduction by BOI.
- 1mTHB minimum investment (excluding cost of land and working capital on the enhancement)

**Applications must be submitted by the end of 2022**

# The New Industry 4.0 Measure



## Incentives

- Import duty exemption for machinery
- 3-year corporate income tax exemption covering 100% of the investment capital in upgrading to industry 4.0

## requirements



- submit an investment in transformation to Industry 4.0 plan approved by The National Science and Technology Development and fully implement the plan accordingly.
- invest in machinery to upgrade to industry 4.0 standards in line with the prescribed criteria including uses of automation and network technology, data analytics and smart operation, or introducing digital technology in production process.



# BOI and Thailand 4.0 Transformation



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02

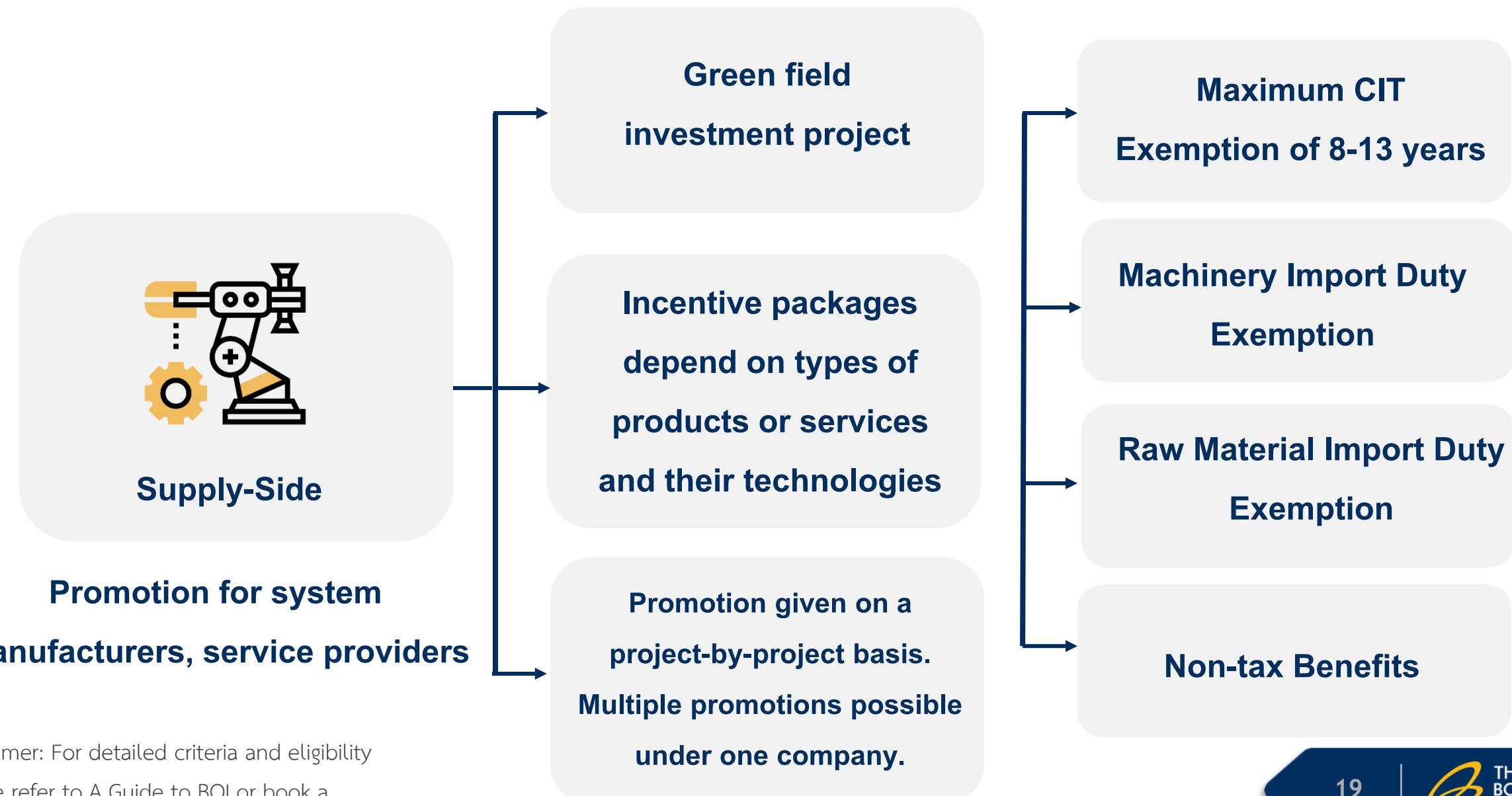
03

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Investment Promotion

Efficiency Enhancement Measure  
the new Thailand 4.0 Measure

**Measures for system integrators or  
solution providers**

# Investment Promotion for Supply Side



Disclaimer: For detailed criteria and eligibility  
please refer to A Guide to BOI or book a  
consultative zoom session via [booking.boi.go.th](http://booking.boi.go.th)



# Investment Incentives relevant to Efficiency Enhancement Product/Service Providers

Activities	Group	CIT exemption	Exemption of import duties on machinery	Exemption of import duties on raw materials used in production for export	Non-tax incentives
<b>4.5.1 Automation machinery and/or automation equipment with engineering design</b>					
4.5.1.1 Automation machinery and/or automation equipment with engineering design, including automation system integration and control system configuration	A1	8 years No cap	✓	✓	✓
4.5.1.2 Automation machinery and/or automation equipment with engineering design, including control system configuration	A2	8 years	✓	✓	✓
4.5.2 Machinery, equipment and parts and/or repair of mould and die	A3	5 years	✓	✓	✓
4.5.3 Assembling of machinery and machinery equipment	A4	3 years	✓	✓	✓

Please see additional conditions in the attached link below: [https://www.boi.go.th/upload/content/BOI-%20Guide\\_EN.pdf](https://www.boi.go.th/upload/content/BOI-%20Guide_EN.pdf)

Source: Thailand Board of Investment \*No designated maximum exemptible CIT



# Investment Incentives relevant to Efficiency Enhancement Product/Service Providers

Activities	Group	CIT Exemption	Exemption of import duties on machinery	Exemption of import duties on raw materials used in production for export	Non-tax incentives
5.6.1 Microelectronics design	A1	8 years No cap	✓	✓	✓
5.6.2 Embedded system design	A1	8 years No cap	✓	✓	✓
7.13 Engineering design	A1	8 years No cap	✓	✓	✓
5.10 development of software, digital service platform, digital content	A2	8 years*	✓	✓	✓
7.11 Research and development	A1	8 years No cap	✓	✓	✓
7.8 Energy Service Company (ESCO)	A1	8 years No cap	✓	✓	✓

Please see additional conditions in the attached link below: [https://www.boi.go.th/upload/content/BOI-%20Guide\\_EN.pdf](https://www.boi.go.th/upload/content/BOI-%20Guide_EN.pdf)

Source: Thailand Board of Investment \*No designated maximum exemptible CIT



# Activity-Based Incentive Packages

		Exemption CIT	Exemption Import duties on machinery	Exemption Import duties on raw materials	Non-tax incentives
<b>8 years</b>	<b>A1</b> Knowledge-based activities focusing on R&D and design to enhance the country's competitiveness	<b>8+ Merit* years</b>	✓	✓	✓
	<b>A2</b> Infrastructure activities for the country's development, activities using technology to create value-added, with no or very existing investments in Thailand	<b>8+ Merit years</b>	✓	✓	✓
	<b>A3</b> High technology activities which are important to the development of the country, with a few investments already existing in Thailand	<b>5+ Merit years</b>	✓	✓	✓
	<b>A4</b> Activities with lower technology than A1-A3 but which add value to domestic resources and strengthen the supply chain	<b>3+ Merit years</b>	✓	✓	✓
<b>0 year</b>	<b>B1</b> Supporting industry that does not use high technology, but is still important to the value chain	<b>- + Merit years</b>	✓	✓	✓
	<b>B2</b> Supporting industry that does not use high technology, but is still important to the value chain	<b>- years</b>	—	✓	✓

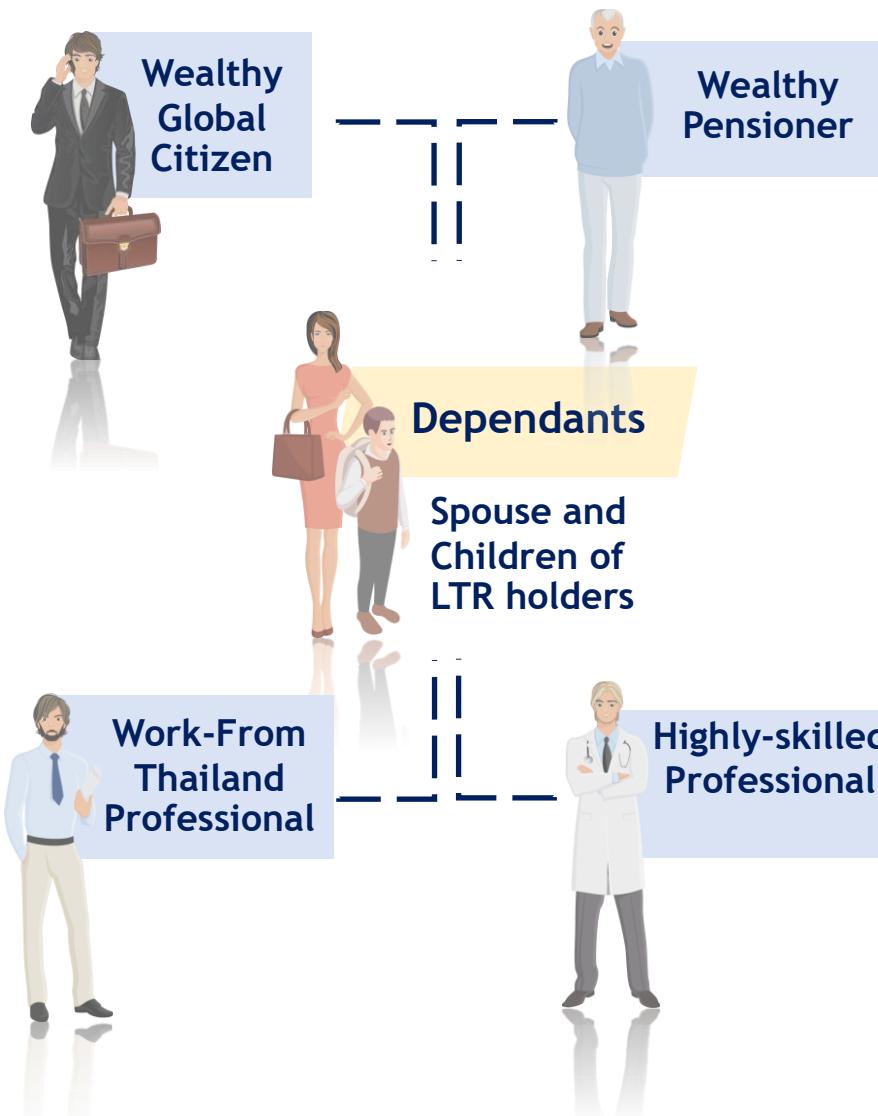
Incentives are based on several key factors including level of technology, role in supply chain, and location.



# Soon to be Launched: Long-Term Resident Visa (LTR)



## Long - Term Resident Visa Privileges



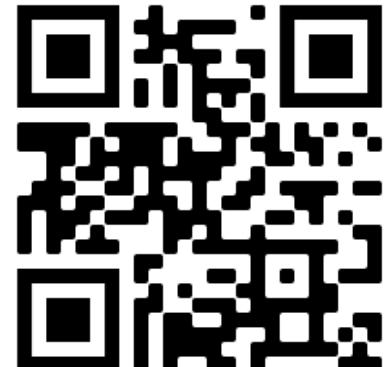


For the presentation, handouts and other information, please download via



For one-on-one BOI Online Clinic

Consultation via Zoom



THERE ARE COUNTLESS REASONS TO  
**INVEST IN  
THAILAND**

**Thailand (Head Office)**

555 Vibhavadi-Rangsit Road.,  
Chatuchak, Bangkok 10900, Thailand

Tel. +66 2553 8111

Email. [head@boi.go.th](mailto:head@boi.go.th)

<https://www.boi.go.th>



A photograph of industrial port cranes silhouetted against a warm, orange and yellow sunset sky. The cranes are positioned on the left side of the frame, with one prominent crane in the foreground and others receding into the distance. The water of a harbor is visible at the bottom.

# Towards Industrial Reliability 4.0

Patrice Pischedda



**Creating environments  
of possibility**

► play the video

Human progress is all about  
finding the right balance  
between developing human  
activity and preserving planet  
resources

**Acoem is committed to  
constantly improving this  
balance**



# Our mission is to provide organisations with better opportunities through focused data and technology.

## Industrial Reliability

Increasing the productivity of industrials



## Emission & process

Achieving environmental compliance



## Ambient Monitoring

Preventing & controlling environmental pollution

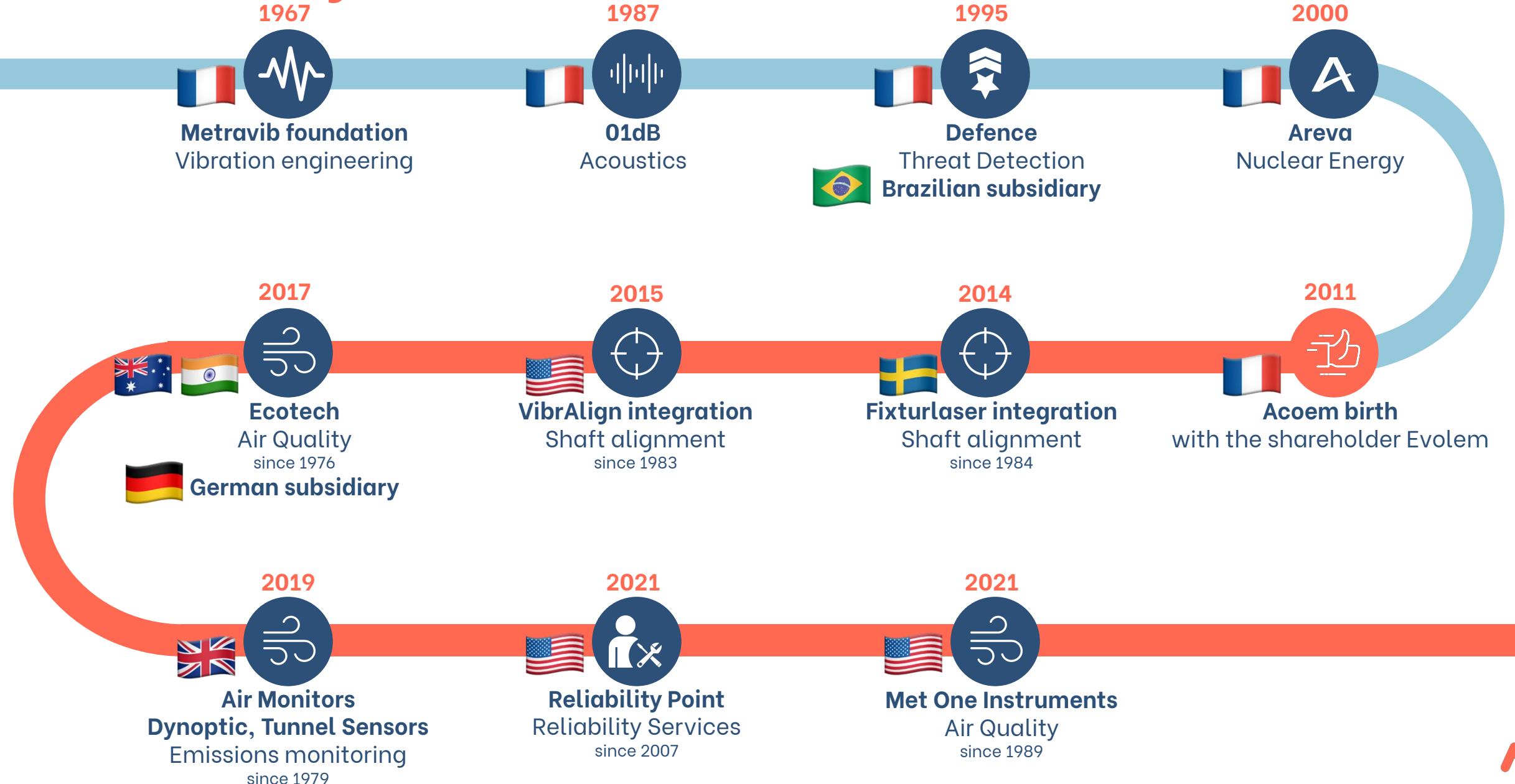


## Design

Contributing to effective, robust & noiseless products



# Our Journey



# International footprint

**130 M€**  
turnover

**850+**  
employees

**220**  
partners



**9 location, 28 offices**

**America:** Brazil, USA

**Asia-Pacific:** Australia, India, Thailand

**Europe :** France, Germany, Sweden, UK

**6 plants**

Australia, India

France, Sweden

UK, USA

**5 R&D centres**

Australia

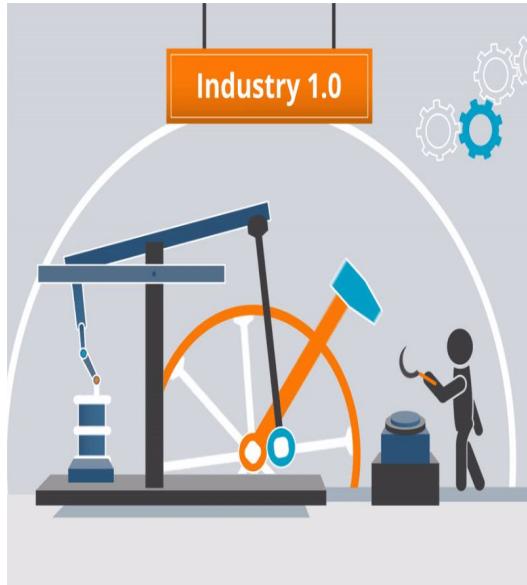
France, Sweden

UK, USA

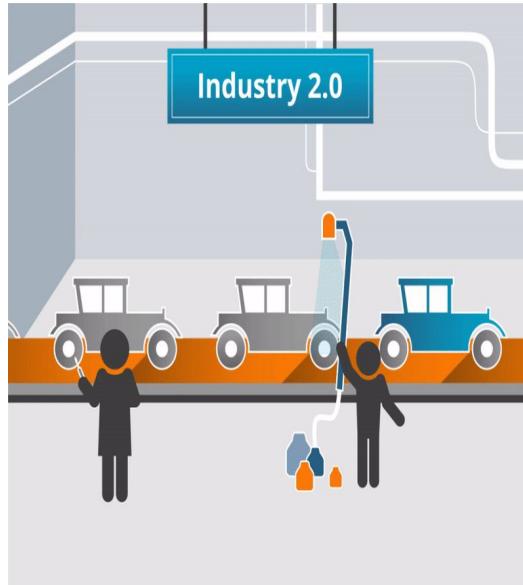
What is behind  
**Industries 4.0**



# The 4th Industrial Revolution



1765  
Steam and water power



1890s  
Mass production, Assembly lines  
Electricity



1970  
Automation  
Computers



Now  
Digital revolution  
CPS (Cyber physical systems)

# Industry 4.0

## Introduction

Generally-speaking, Industry 4.0 describes the growing trend towards automation and data **exchange** in technology and processes within the manufacturing industry, including:

- The internet of things (IoT)
- The industrial internet of things (IIoT)
- Cyber-physical systems (CPS)
- Smart manufacture
- Smart factories
- Cloud computing
- Cognitive computing / Artificial intelligence



# Manufacturing but not only...

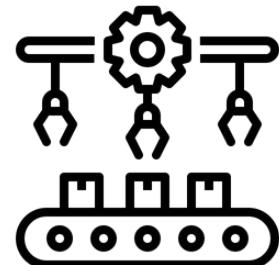
Design

Network collaboration  
Next generation product



Manufacturing

Advanced Automation  
and flexibility



Supply Chain

Integration and  
end-to-end traceability



Commercialization

Scope, intelligence and  
new delivery formats.



# The Four Pillars of Industry 4.0



## Interconnection

The Systems need to connect people, machines, sensors, devices, and software through the Internet of Things (IOT) and allow them to communicate with one another.



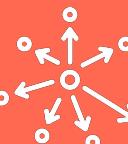
## Information transparency

The data collected through interconnection needs to be made available to operators for decision-making



## Technical Assistance

To shift low value tasks from people to cyber-physical systems. For systems to provide people with analysis and information to make timely and effective decisions.



## Decentralized Decisions

The systems need to be able to make their own decisions and take autonomous action.



# What happened to your personal devices?



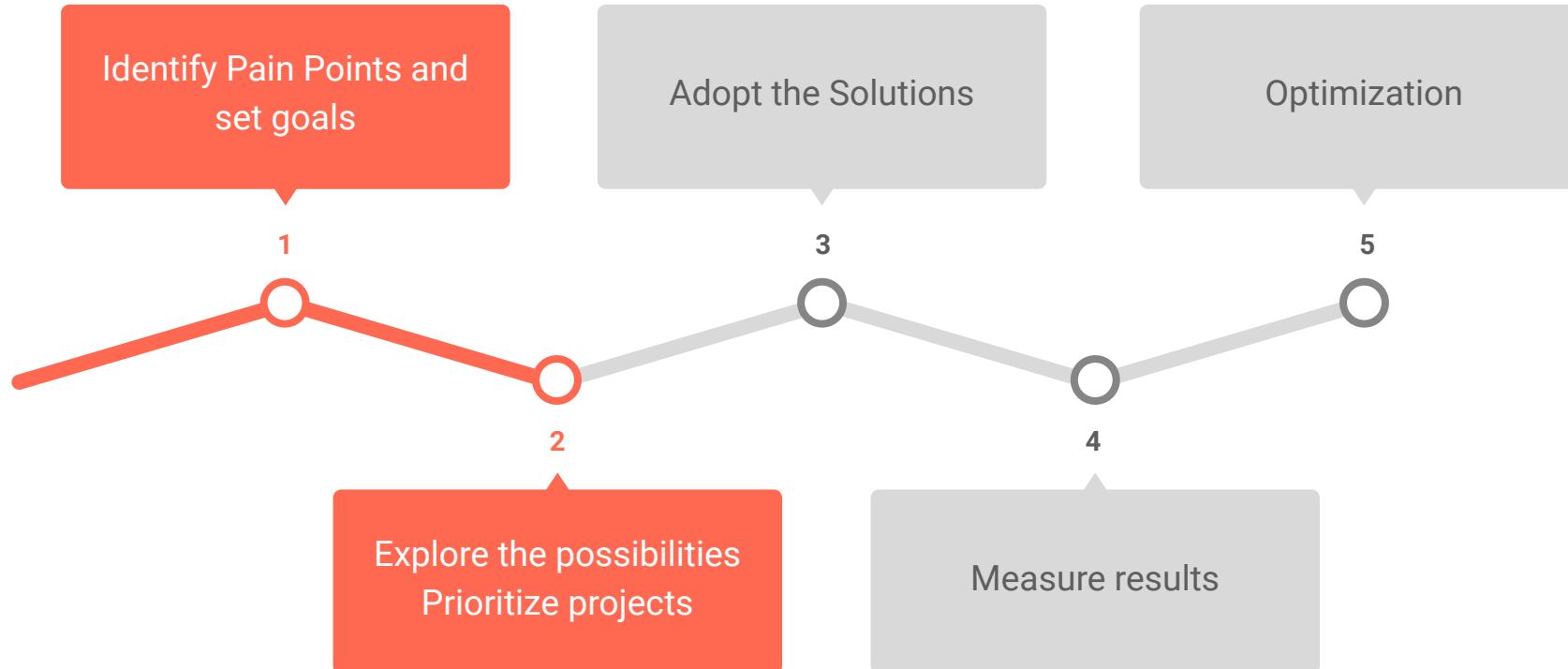
OPEN OPERATING  
SYSTEM



# Steps To Bring Industry 4.0 Into Your Factory



# Steps To Bring Industry 4.0 Into Your Factory



# Overcoming the Challenges



# Why 61% of Industry 4.0 projects fail

## Focus

A lack of process focus  
Recorded data is only valuable and reliable if it reflects real processes.

## Involvement

Insufficient involvement of employees on the production floor

## Follow-up

No continuous improvement

85%  
Data science projects fail



# Keys to success

Collect relevant and high quality data

Knowledge of the process, domain or application to leverage efficiently new technology (AI, ML, etc.)

Lots of Data # Insights

# Data

“Recorded data is only valuable and reliable if it reflects real processes.”

# Interconnected but specialized



What does it mean for  
**Machine  
reliability**



# We deliver meaningful data, to take the right decision

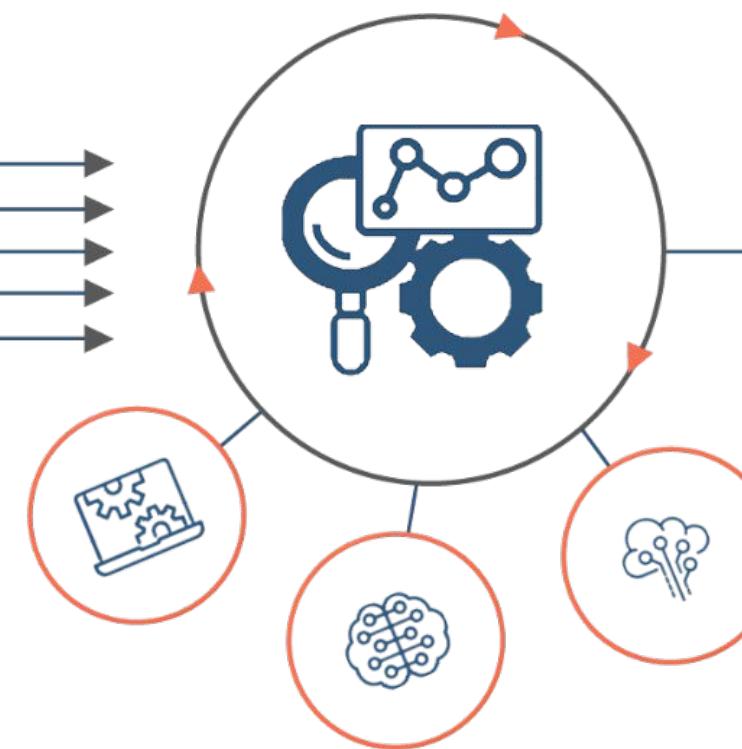
## Data capture



Acoustics  
Air & Particles  
Emissions & Gas  
Vibration  
Alignment  
& more...

## Industry data

## Turning data into insights



## To reach balance

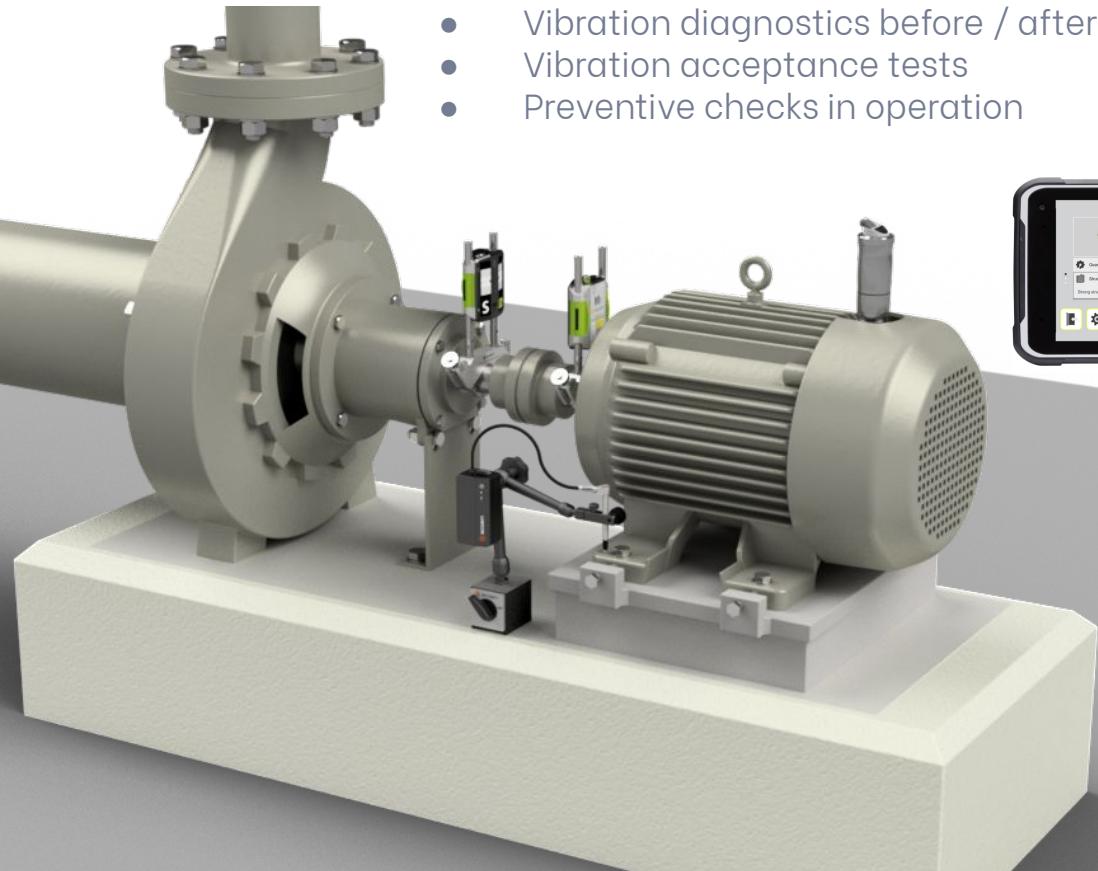


Actionable insights

# Data Capture

## Pro-active & Preventive maintenance

- Precision laser shaft alignment
- Vibration diagnostics before / after repair
- Vibration acceptance tests
- Preventive checks in operation



## Predictive maintenance

Early fault detection and scheduling capabilities with :

- Periodic portable monitoring
- Automatic wireless monitoring
- Automatic real time monitoring



On demand measurement

1 / year

1 / month

1 / day

1 / hour

1 / min 100 ms

# More Than data: Insights

## Qualified DATA

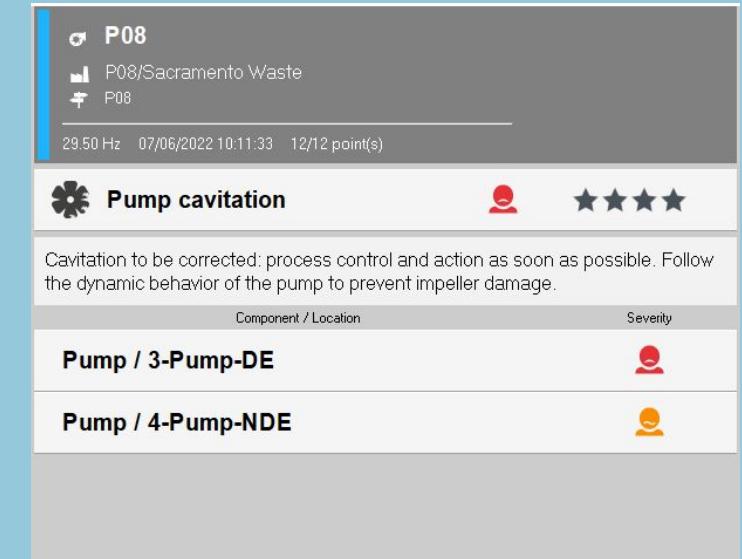
High quality Data  
Relevant values, alarms

## Machine Diagnostics

what is the problem?

## Recommendations

What should be done?

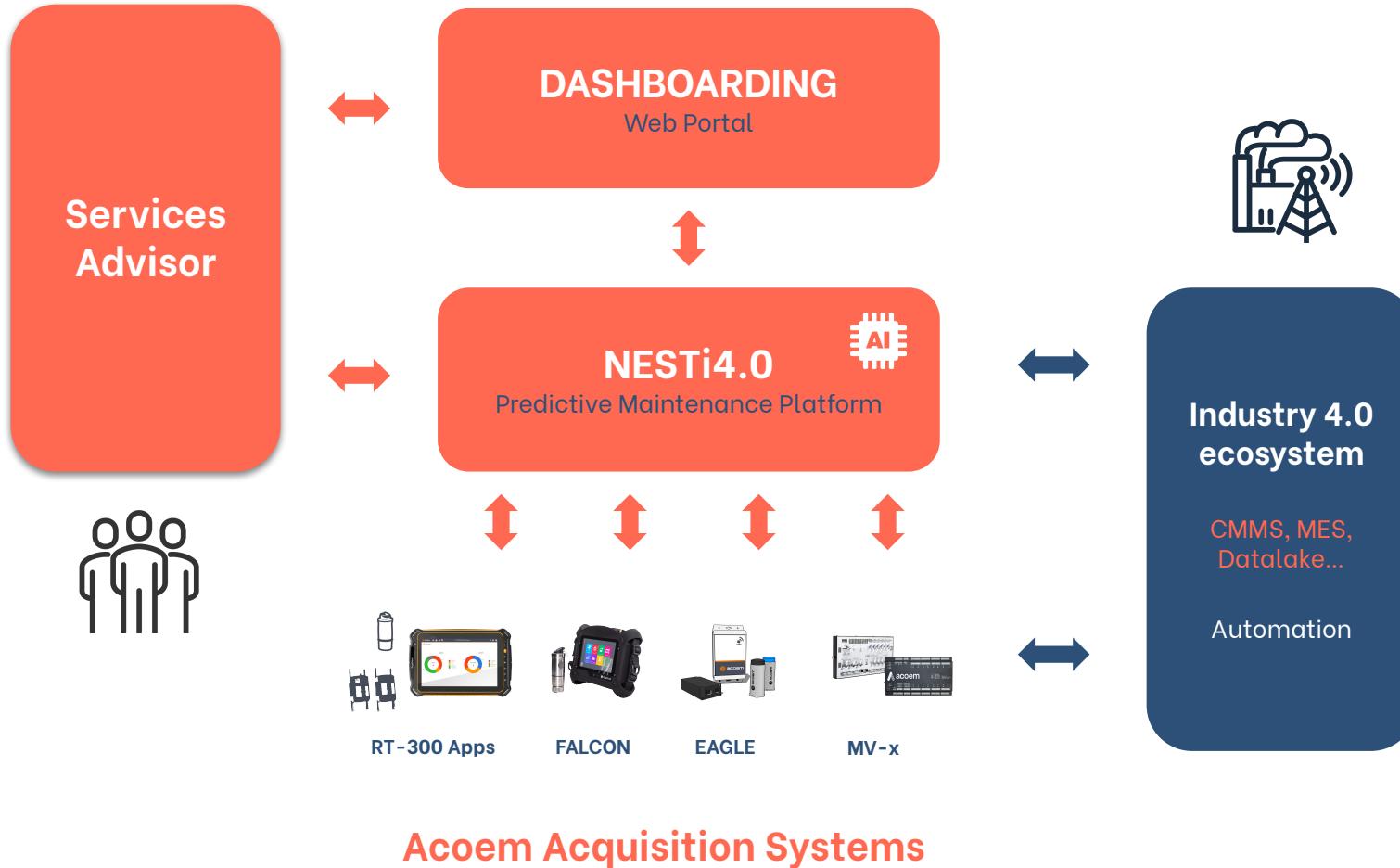


The screenshot shows a diagnostic interface for a pump. At the top, it displays 'P08' and 'P08/Sacramento Waste'. Below that, it shows '29.50 Hz 07/06/2022 10:11:33 12/12 point(s)'. The main alert is 'Pump cavitation' with a severity of 'red' and a rating of '★★★'. The alert text reads: 'Cavitation to be corrected: process control and action as soon as possible. Follow the dynamic behavior of the pump to prevent impeller damage.' Below the alert, there are two more entries: 'Pump / 3-Pump-DE' and 'Pump / 4-Pump-NDE', both with severity 'red'.

Example of diagnosis and  
recommendation



# Industry 4.0 ACOEM Ecosystem



**One core Platform**  
to connect all acoem devices

**Open & secure**  
data platform

**Accurex enabled**  
for all devices

**Remotely supported**  
by our community of  
reliability experts

# The Four Pillars of Industry 4.0



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The Systems need to connect people, machines, sensors, devices, and software through the Internet of Things (IOT) and allow them to communicate with one another.



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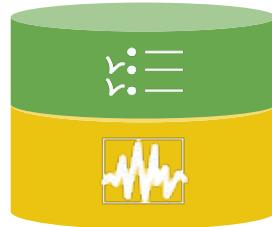


# AI: Supervised learning: Accurex™

## Model knowledge based

Symptom Weights /  
contribution, thresholds...  
Neural Network

Input Data

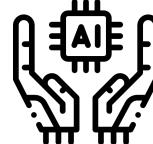


Accurex™

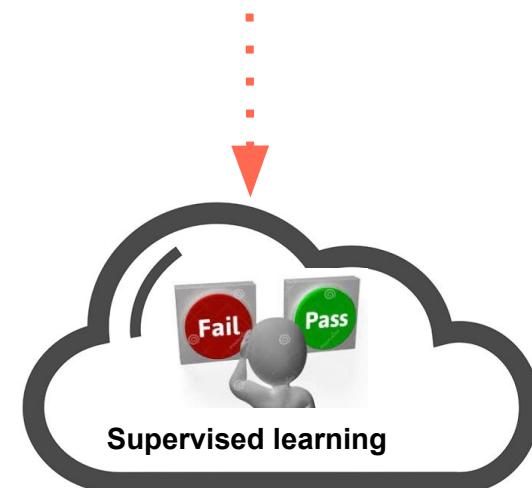


Example of display in FALCON

Improvement  
Machine Learning



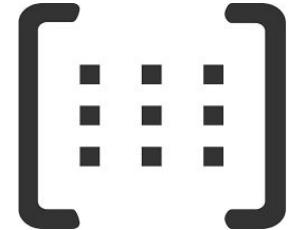
Patent pending



# ACOEM Smart anomaly detection

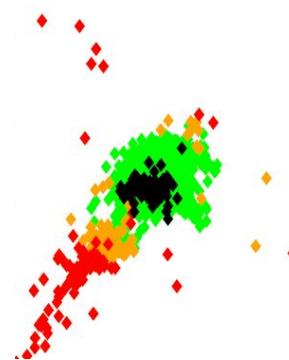
Automatic modelization of the reference behavior according to:

- Process data
- Vibration data



Alarm triggered according to:

- Detection of an **abnormal deviations** of the global behavior compared to the learning phase
- No alarm threshold required...



Statistical representation of the global asset behavior compared to the reference behavior (black)

Green: acceptable evolution

Orange / red: evolution of behavior triggering a notification

# ACOEM: Holistic Industry 4.0 offer

## Acquisition systems:

- Portable data loggers
- Automatic data loggers (online monitoring systems)
  - Wired sensors
  - Wireless sensors

## ACCUREX™ Diagnostic AI for all our product range

## Machine learning infrastructure

- Big data reliability applications

## Digital twins

- Health Usage Monitoring Systems (HUMS)
- Smart Structural Health Monitoring (SHM)

Expert in Machine reliability since 1967



# We deliver

**Reliability, driver of industrial performance**

## **24/7 availability**

Keep production under control, aiming at 0 unexpected breakdown

## **30% savings on maintenance,**

by reducing the number & types of actions needed and better  
spare parts management

## **Operational efficiency**

speeding up decision making process, saving time, assets,  
and money.

## **Improved Safety**

avoiding people / environmental safety incidents and  
reducing human presence in hazardous environments



# Conclusion



# Digital Singularity

## Get ready for the Imagination Age!

“Less focus on the machines, less focus on the processes, less focus on the hardware, but more focus on the ideas,”



# Conclusion

**Industry 4.0 comes with both challenges and new opportunities**

- Know your processes and organisation
- Find the best, adapted solutions to your pains
- Bring all of your organisation onboard
- Quantify and report



**WIN BIG**

# Thank you

[acoem.com](http://acoem.com)



@Acoemgroup



Acoem Group



# Digital Twins for Maintenance

Thailand 4.0  
Practical Solutions

June 10, 2022



## ■ Who and why?



### **Bruno Lhopiteau**

**Managing Director - Siveco China and subsidiaries**  
**Chairman, Industry of the Future workgroup - French Chamber in China**  
**Steering Committee member - French-China Eco City Club**  
**Guest lecturer on industrial risk management - Shanghai University**

# INDUSTRY OF THE FUTURE

Modernise our production base

Support use of digital technologies  
to transform our companies' business models

## THE INDUSTRY OF THE FUTURE PROJECT IS BUILT ON FIVE PILLARS



DEVELOP  
CUTTING-EDGE  
TECHNOLOGIES



HELP COMPANIES  
ADAPT TO THE NEW  
PARADIGM



EMPLOYEE  
TRAINING

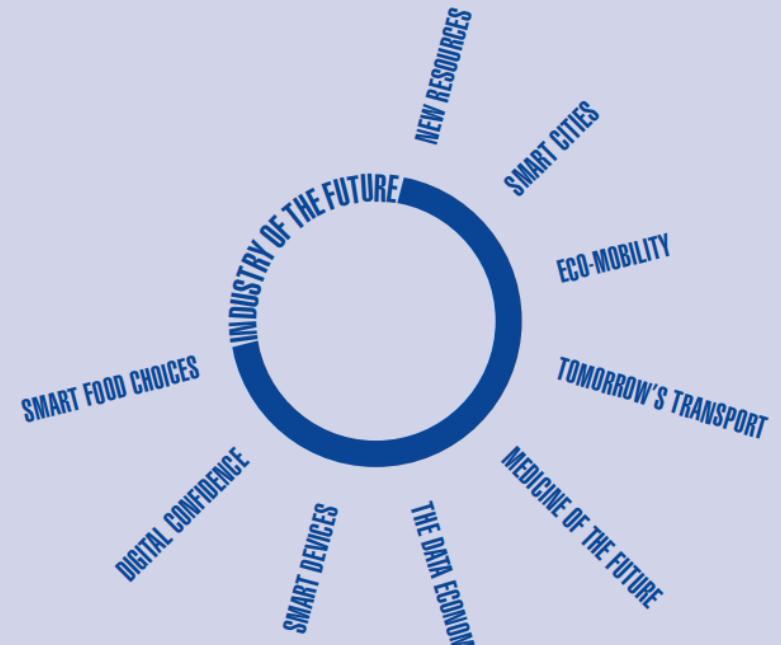


STRENGTHEN  
INTERNATIONAL  
COOPERATION  
AROUND  
STANDARDS



PROMOTE  
THE FRENCH  
INDUSTRY  
OF THE FUTURE

Develop industrial solutions  
for nine priority markets



### Supported by Strategic Sector Committees

New resources → Eco-industries, Chemicals-Materials, Extractive industries and primary processing

Smart cities → Eco-industries

Eco-mobility → Automobile industry

Tomorrow's transport → Aerospace, Rail and Naval

Smart food choices → Agribusiness

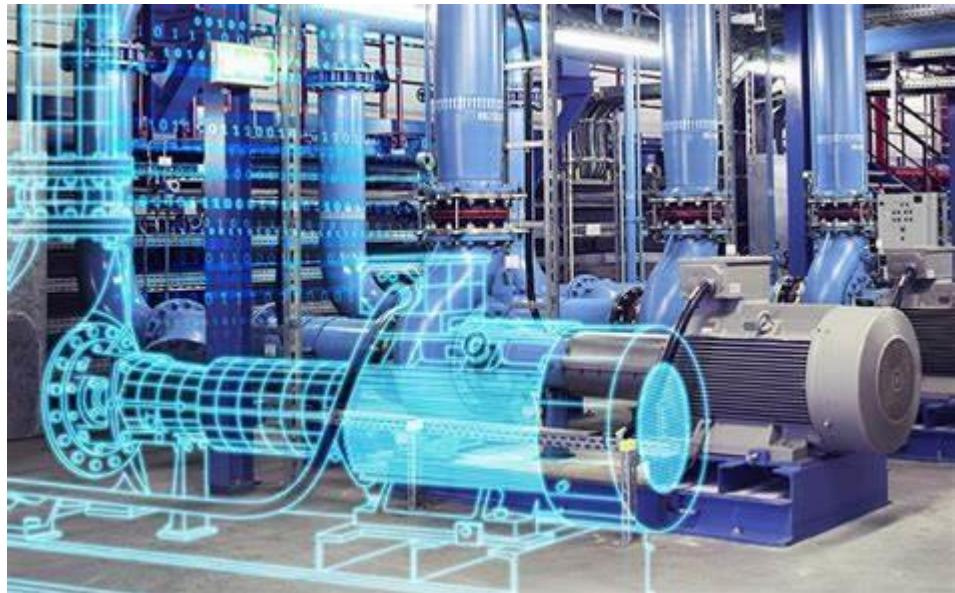
The data economy → Digital

Smart devices → Digital and Consumer goods

Digital confidence → Digital

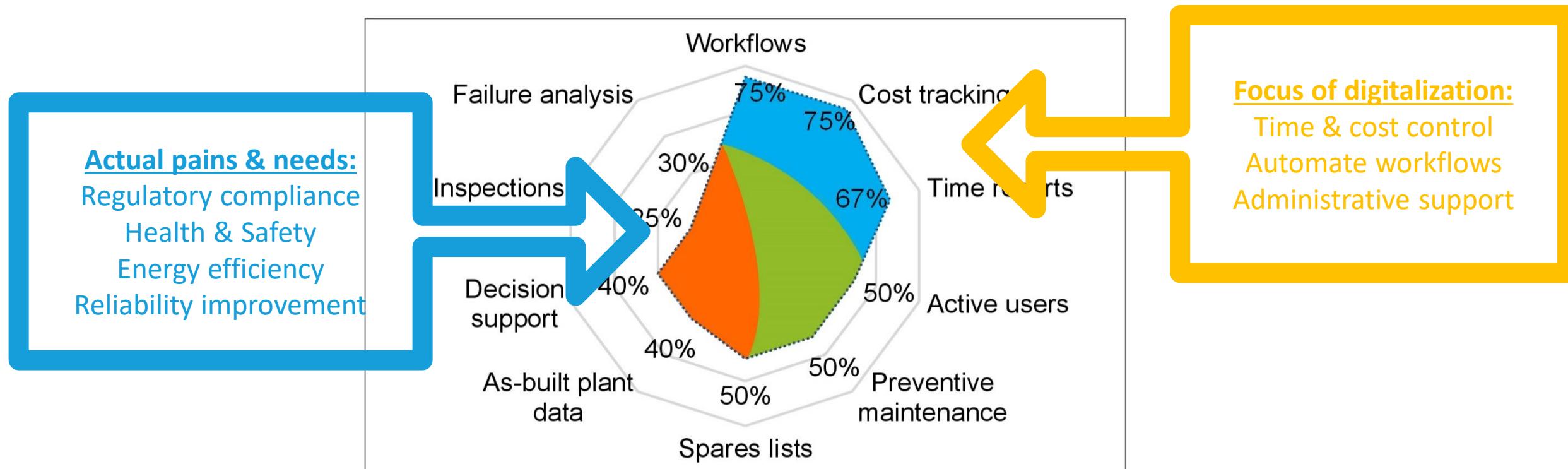
Medicine of the Future → Health

## ■ Why do 4.0 projects for maintenance so often disappoint?



## ■ The problem you need to address vs. what your 4.0 system does

Systematic surveys and in-depth audits (Shanghai University, Siveco China) of maintenance digitalization projects show major gaps between strategic needs (as per ISO 55000) and the actual coverage achieved.



# Welcome to Smart O&M !

Siveco China helps **Infrastructures & Industrial** projects

in **China, Asia & on the “Belt & Road”**

to **optimize their assets lifecycle, to control their technical risks and to ensure regulatory compliance**

by implementing **Smart Operation & Maintenance solutions**

in line with the **ISO 55000** standard

1,000+ client sites in Asia



## ■ Our Ecosystem in Thailand

### Government



### Industry associations



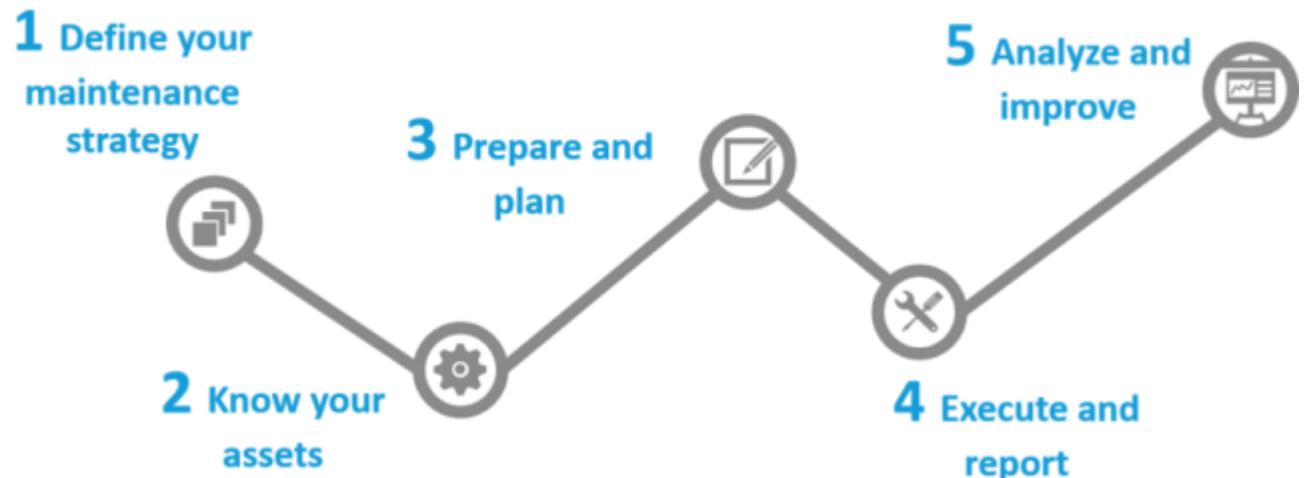
### Education



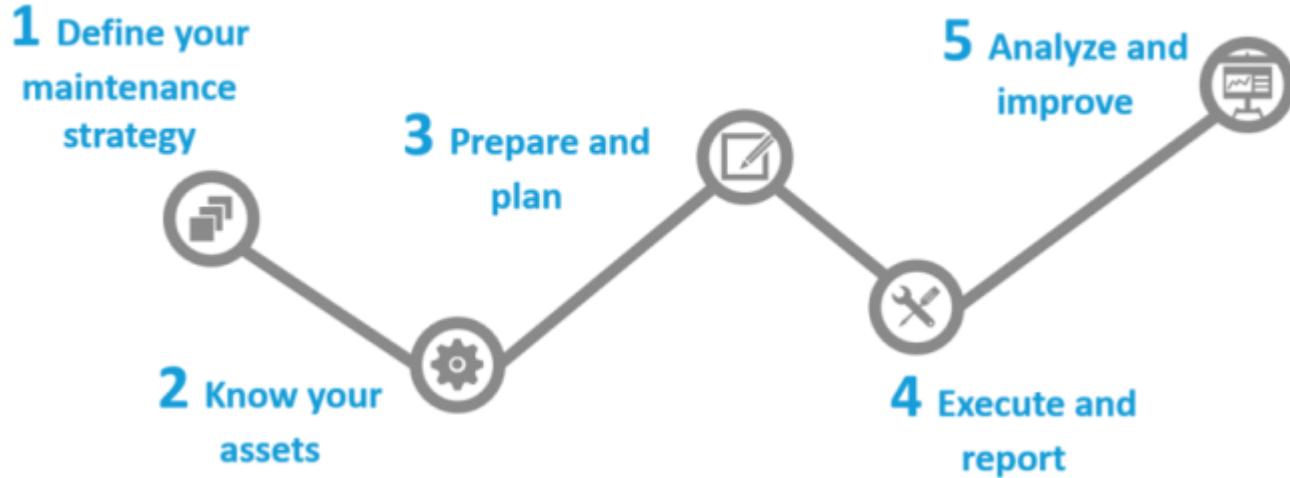
### Customers



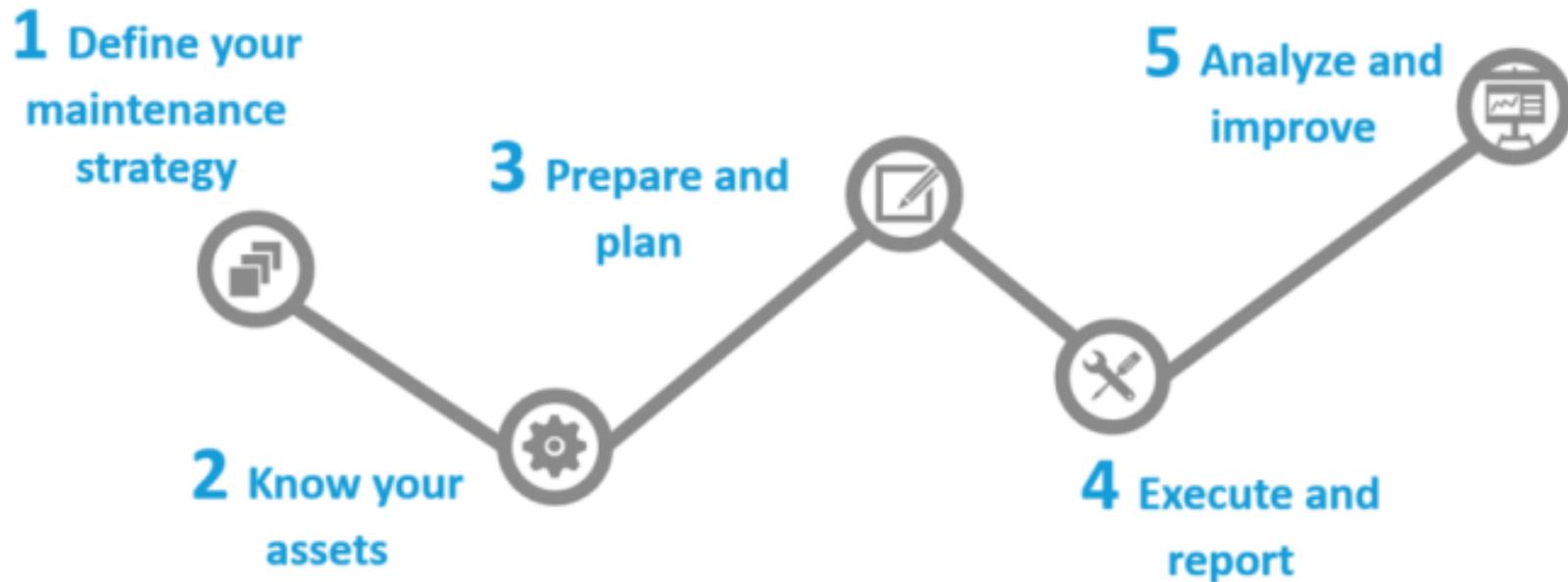
## ■ A Smart O&M approach driven by ISO 55000 (or the other way round)



## ■ A Smart O&M approach driven by ISO 55000 (or the other way round)



■ “Crossing the river by touching the stones”

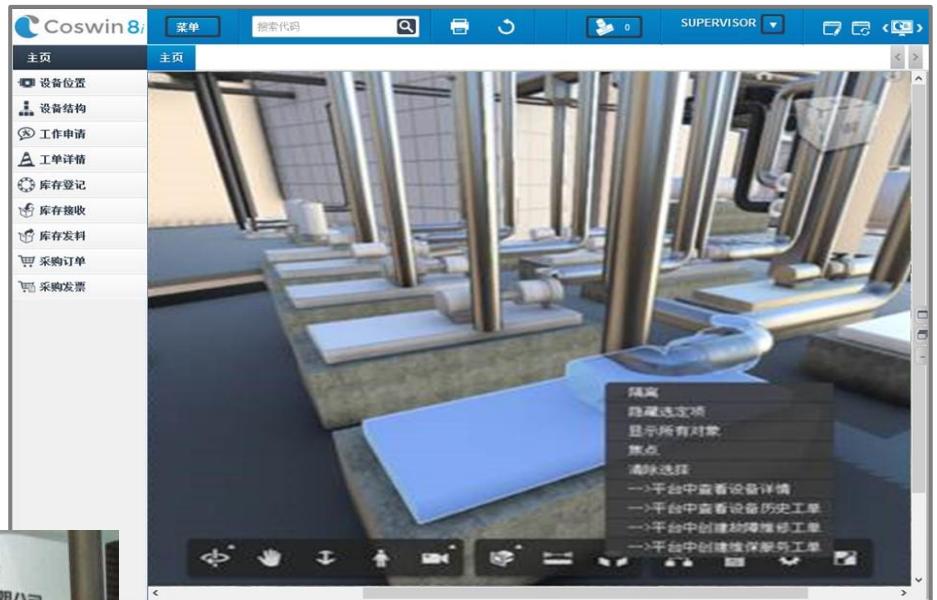


## Step 1: Define your strategy

- ✓ Goals and priorities (e.g. HSE)
- ✓ Use your circumstances (e.g. new construction)
- ✓ Stakeholders and constraints
- ✓ Actionable plans and KPIs as per ISO55000
- ✓ Assessment and training with the Smart O&M system as a visual anchoring tool

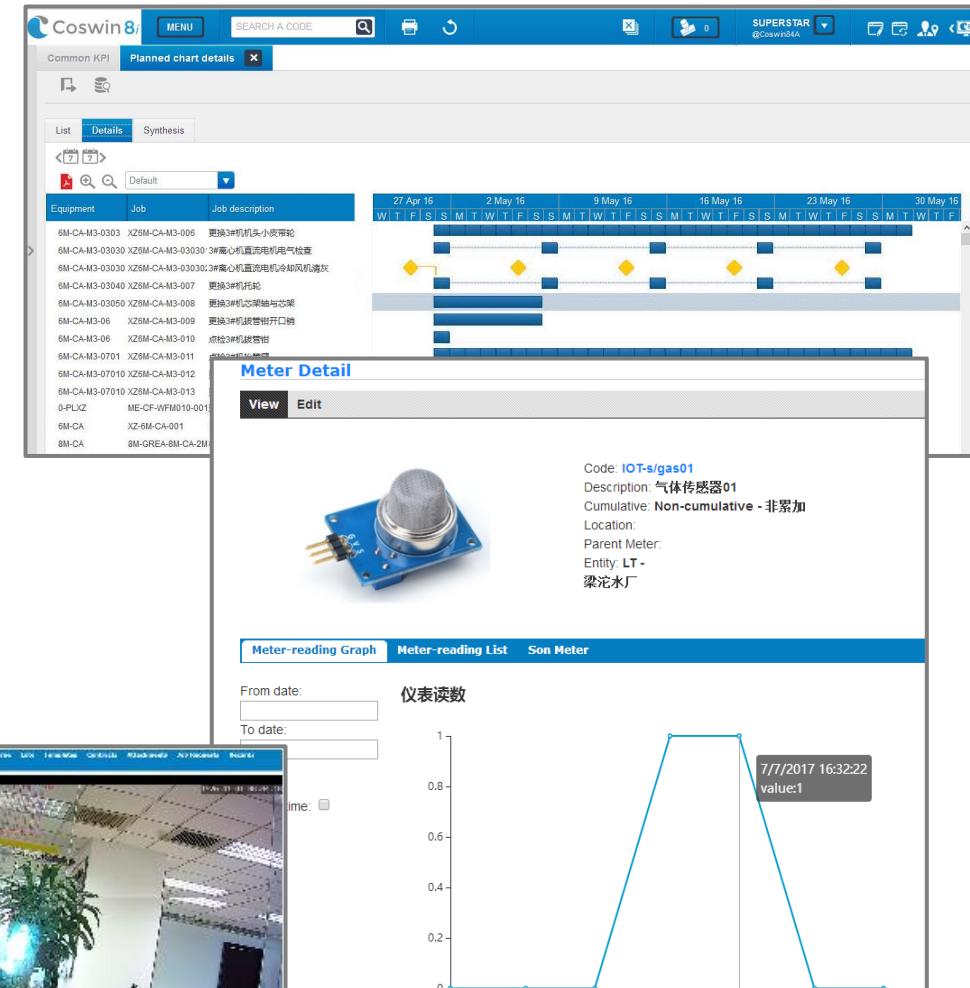
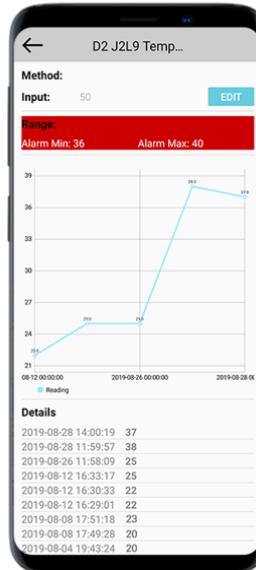
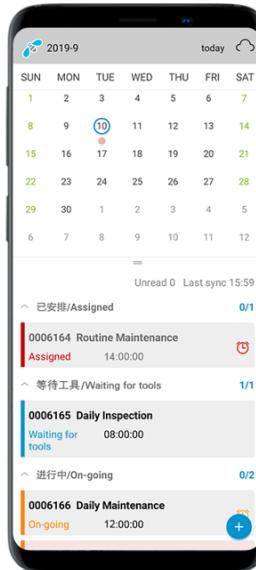
## ■ Step 2: Know your assets

- ✓ Inventorize, classify equipment in structures
- ✓ Including meters, sensors, etc.
- ✓ Assess criticality, prioritize data preparation
- ✓ Tag (QR code or NFC tag)
- ✓ Utilize 3D BIM models when available, optimize them for real-life usage in O&M



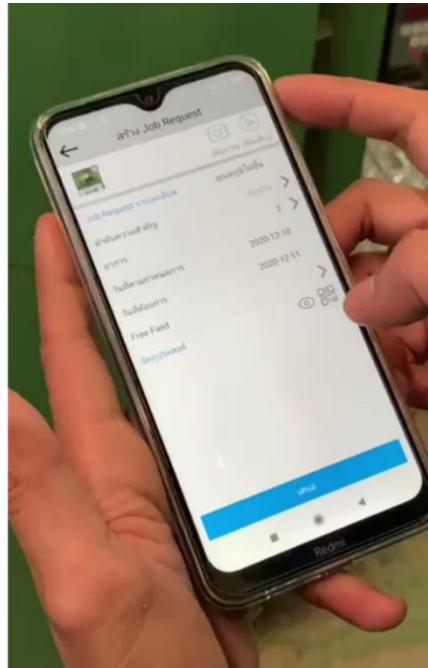
## Step 3: Plan and prepare

- ✓ Review existing preventive maintenance plans
- ✓ Utilize data from sensors (existing SCADA, DCS, BMS, PLC... or new IoT) and other Connected Objects (eg. cameras) for “predictive maintenance”
- ✓ Set up automatic planning and optimization loop
- ✓ Direct access for technicians on mobiles



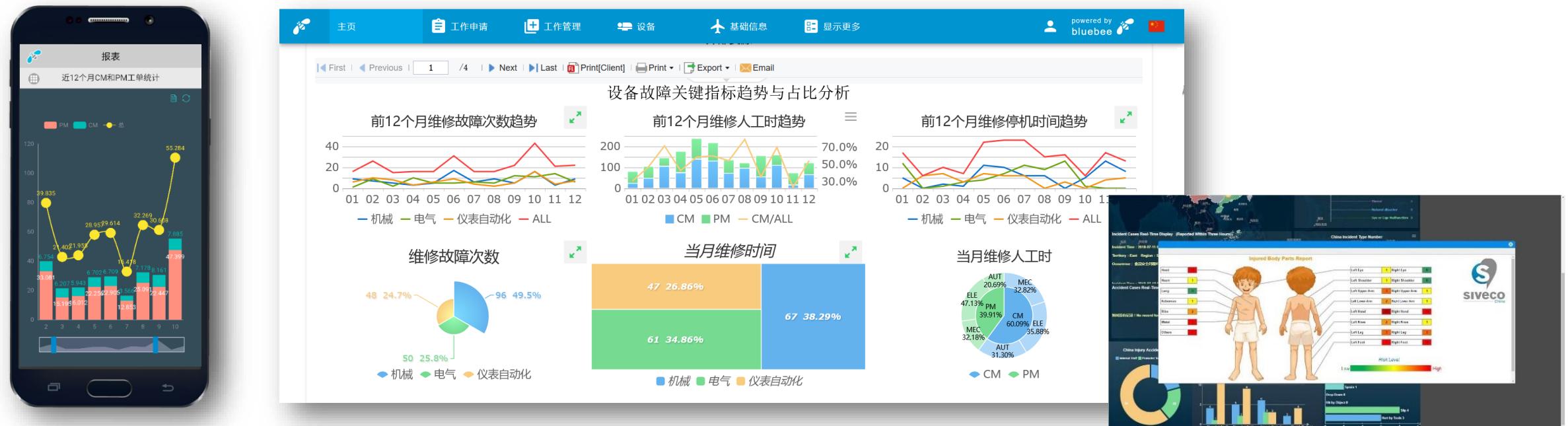
## Step 4: Execute and report

- ✓ Operators raise issues on mobile by scanning and photo (no app required)
- ✓ Technicians receive work orders, with step-by-step support from the app
- ✓ Ensure compliance (and ease of use) with mandatory tag scanning



## Step 5: Analyze and improve

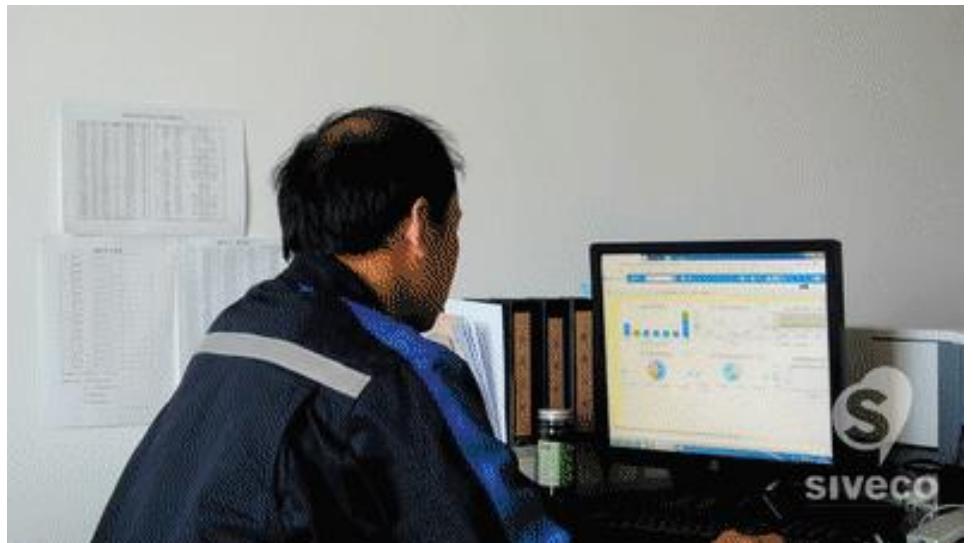
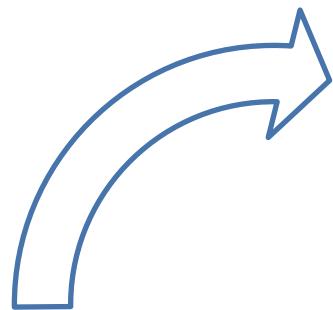
- ✓ Make O&M visible and “touching is believing”
- ✓ Measure (KPIs based on standards) based on true (proven) data from the field (from people and objects)
- ✓ Continuous improvement tool



## ■ All together: closing the ISO 55000 loop

Assist technicians in their onsite work, enforce best practice.

Bring valuable data from the field, ensure compliance.



Movie on YouTube:



## An approach that delivers results

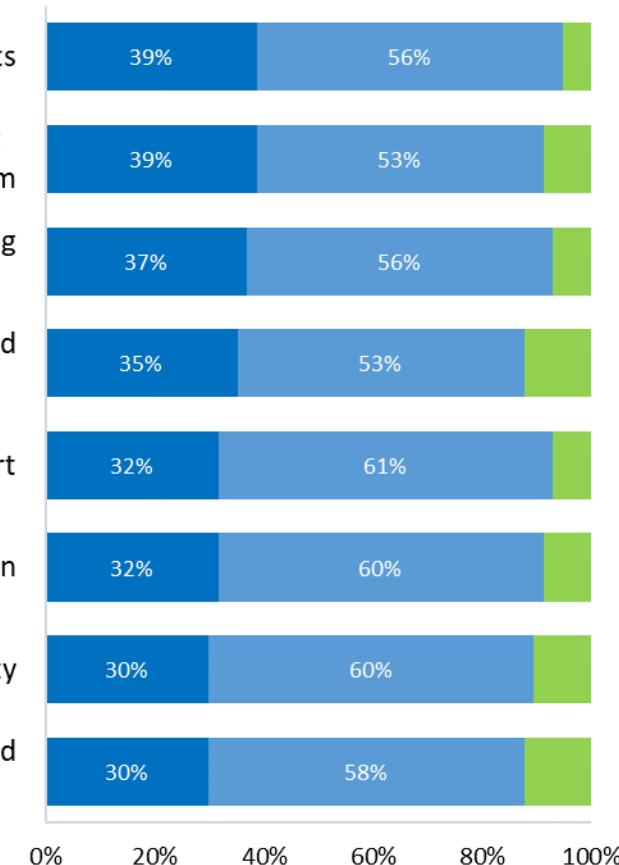
2021 customer satisfaction survey result  
(audited by Bureau Veritas in March 2022)

100%

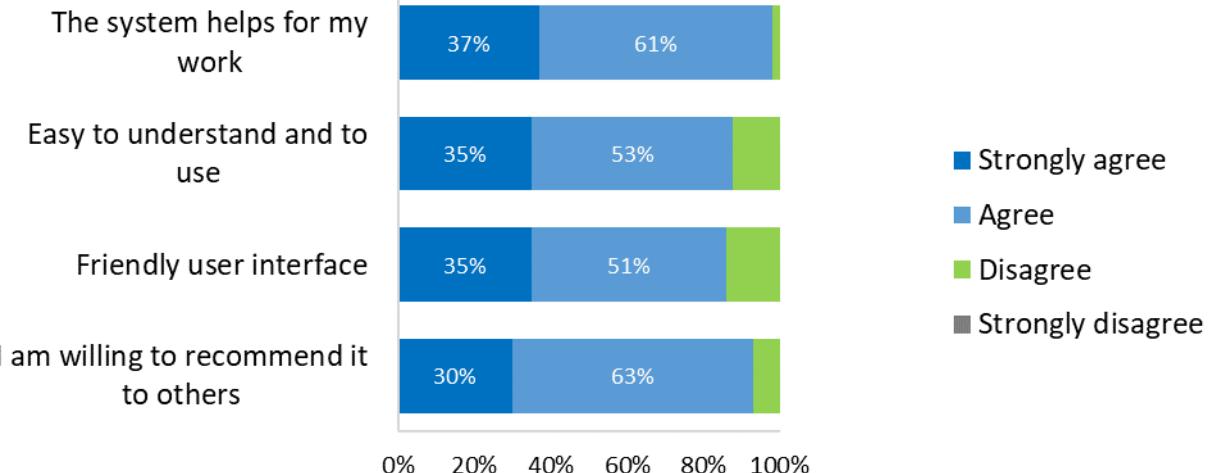
93%

of respondents say Siveco China solutions provide **good support for maintenance**  
are **willing to recommend Siveco China** solutions to others

### Benefits obtained



### User experience



35%

of clients were under **Enhanced Support**  
(regular visits and coaching for continuous improvement, contract renewed yearly)

## ■ Daramic Thailand (Prachinburi)



The largest polyethylene battery separator manufacturing site in Asia, part of Japanese group Asahi Kasei.

Maintenance audit in Nov. 2015, improvement program based on the setup of cloud-based system, replacing failed CMMS, combined with coaching program.

Results obtained:

- Successfully reversed preventive/corrective maintenance ratio in 6 months
- Reached plant uptime objective 98% (up from 91% in 2015)
- Extension to other Asian plants

Case study: <http://newsletter.sivecochina.com/en/customer-story/daramic-thailand-towards-world-class-maintenance/>

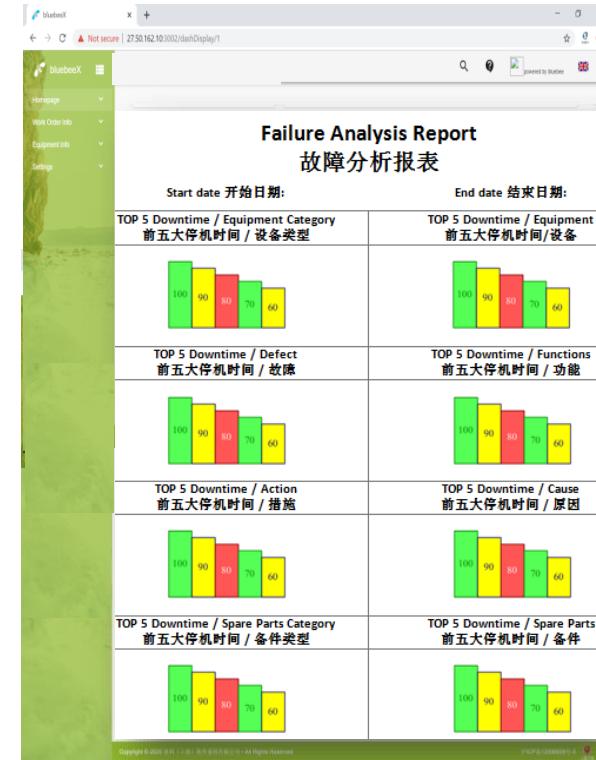




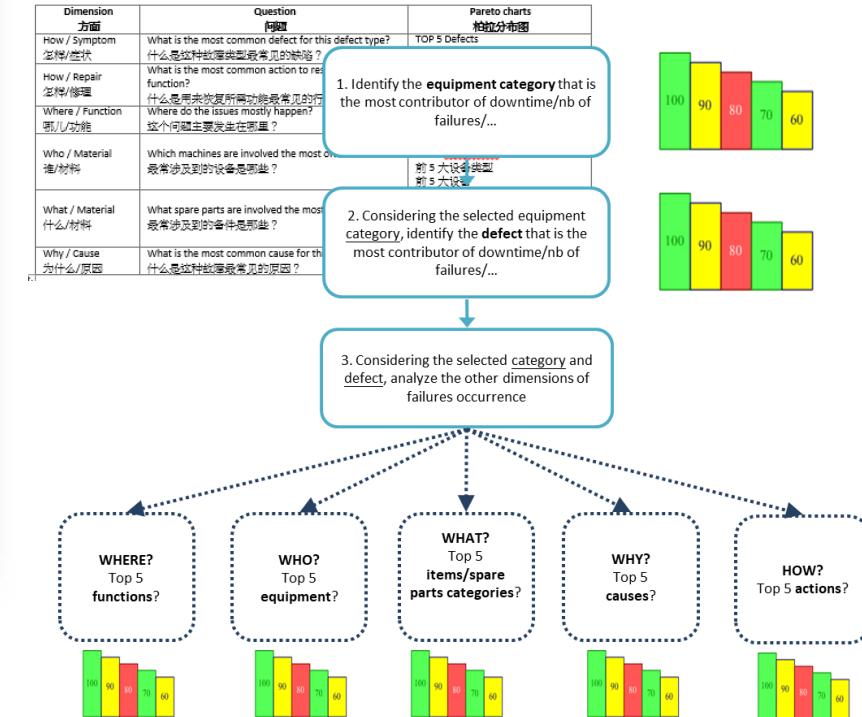
The world leading manufacturer of optical lenses.

Initial results in Shanghai:

- MTBF +30% in two years
- Downtime year 1: -13%, year 2: -38%
- ROI in 1.5 years
- “One-click” compliance audit report

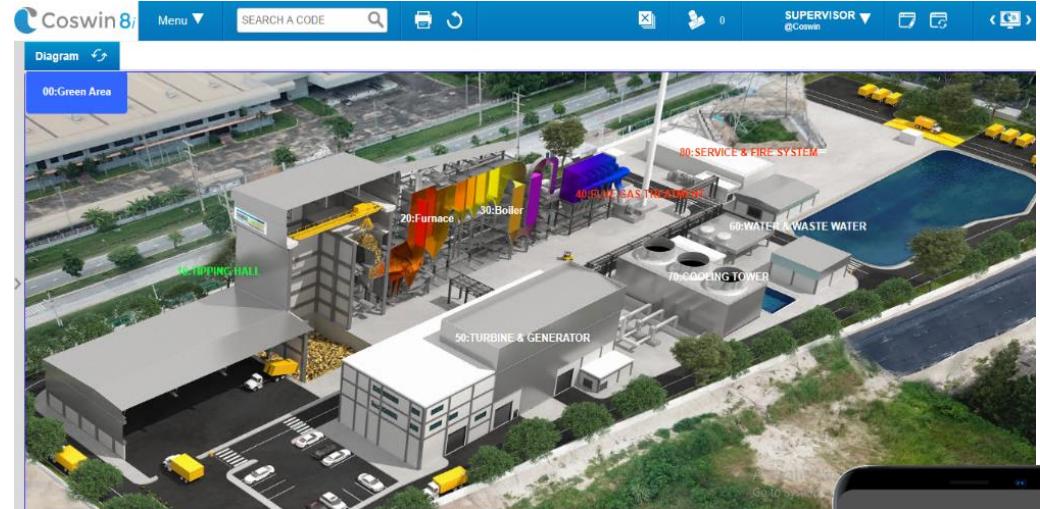


The methodology described below is inspired from 6 sigma methodology and should help the maintenance manager to figure out where reliability efforts have to be brought. Basically, failure analysis sessions should focus on several dimensions of failures' occurrence, shown in the following table:



Extension to Laos (2013) and Thailand (2018), replacing a failed local “cheap CMMS”.

# Chonburi Clean Energy (Thailand)

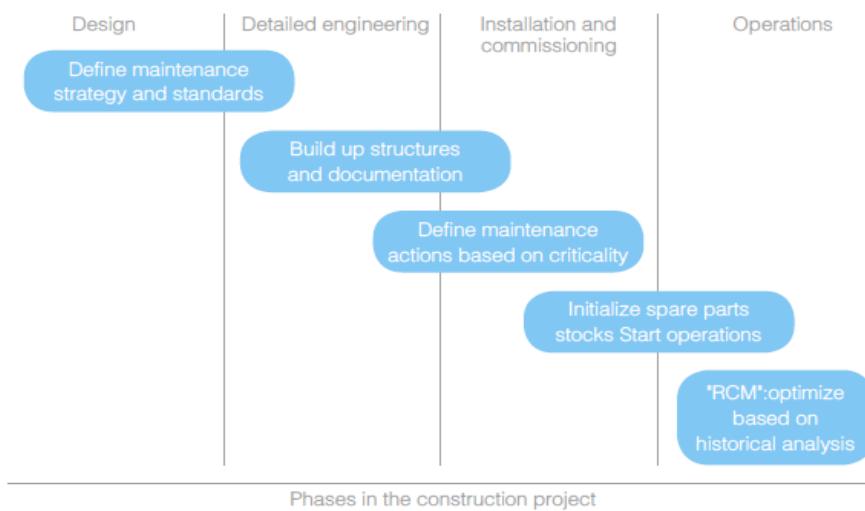


Waste to Energy joint-venture between Glow, WHA Utilities & Power and Suez. Nov 2017: construction starts. Nov 2019: power to grid.

## Results obtained:

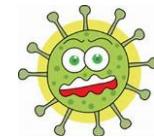
- Maintenance readiness before start-up
- Compliance with Suez O&M best practices
- Compliance with Glow admin and IT best practices
- A tool for continuous improvement

## ■ Veolia Circular Polymer (Bangkok, Thailand)



Plastic recycling plant (30,000 tons/year), now part of Veolia.

- Definition of Maintenance “Core Model” based on best practices
- Ensure system, O&M data and users’ readiness before startup (June 2020)
- Interface with SAP ERP
- Fully remote project during Covid-19 crisis!



## ■ AstraZeneca Wuxi (China)

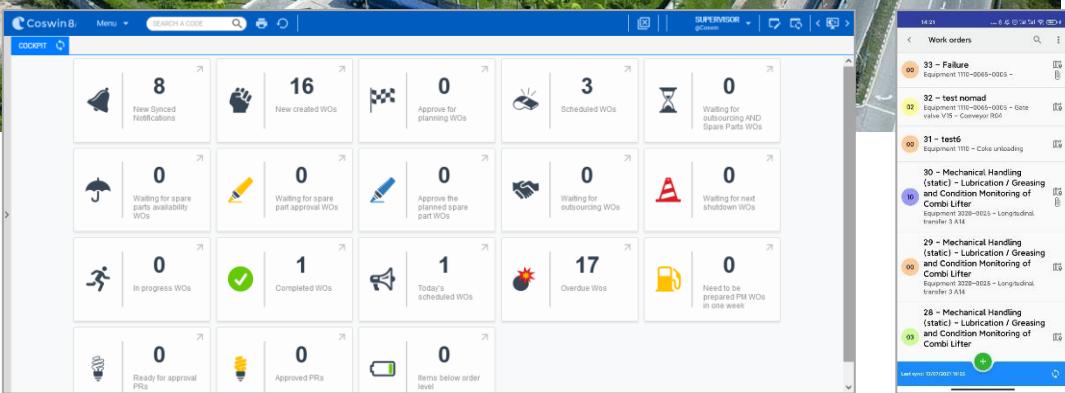


Pharmaceutical plant using the opportunity of a new wastewater plant to deploy best practices using Digital Twin for O&M.

- Full asset lifecycle management
- Ensure compliance and traceability of O&M
- Enable energy savings and emission reduction
- Establish a feedback loop between outsourced service team (PACT) and the owner (AZ) to assist the owner in making decisions and controlling costs and risks
- Fully cloud based, 100% managed by Siveco China in compliance with local regulations and AZ's GMP



## Showa Denko Carbon (Malaysia)



Japanese producer of graphite electrodes.

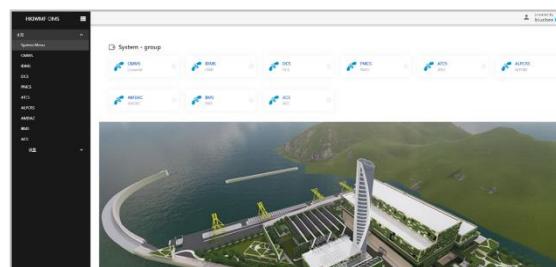
- Initial need for calibration management
- Very strong IT constraints (corporate SAP program)
- Finally leading to full Smart O&M implementation with mobile solution for technicians
- Deployment for other plants now under consideration

## Hong Kong Integrated Waste Management Facilities



Large scale utility project under Hong Kong EPD, under DBO contract with Singapore firm Keppel Infrastructure.

- Digital Twin for O&M covering maintenance, documentation, environmental compliance, energy efficiency, regulatory reporting.
- Embedded BIM model, integration with 9 different subsystems incl. DCS, BMS, OMCS, ATCS, AMDAC etc.
- Under detailed design. FAT planned June 2023. Commissioning June 2024.



## ■ Take-aways

- ✓ Don't worry about "4.0", think "Industry of the Future"
- ✓ Fully utilize BOI incentives
- ✓ Use ISO55000 to drive the Smart O&M project
- ✓ If possible, take advantage of new construction
- ✓ Focus on people, not machines
- ✓ For projects with Siveco China, use our Thailand Ecosystem of partners and help us build it further!

<https://survey.sivecochina.com/index.php/985728/lang-en>



Take an efficient next step:  
benchmark your Thailand maintenance  
with our China Maintenance 4.0 database →



Don't hesitate  
to talk to us!



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