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HANNOVER MESSE 2023 | PARTNER COUNTRY



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PUPUK KALTIM

PUPUK INDONESIA
HOLDING COMPANY

PUSRI
PUPUK SRIWIDJAJA
PALEMBANG



PUPUK INDONESIA IN HANNOVER MESSE 2023

TAKING OUR DIGITAL INNOVATION
TO WORLD CLASS INDUSTRIAL EXHIBITION

**PUPUK INDONESIA, INDONESIA'S LEADING STATE OWNED ENTERPRISE
IN MANUFACTURING & SUPPLY CHAIN**

17th – 21st April 2023
HANNOVER, GERMANY

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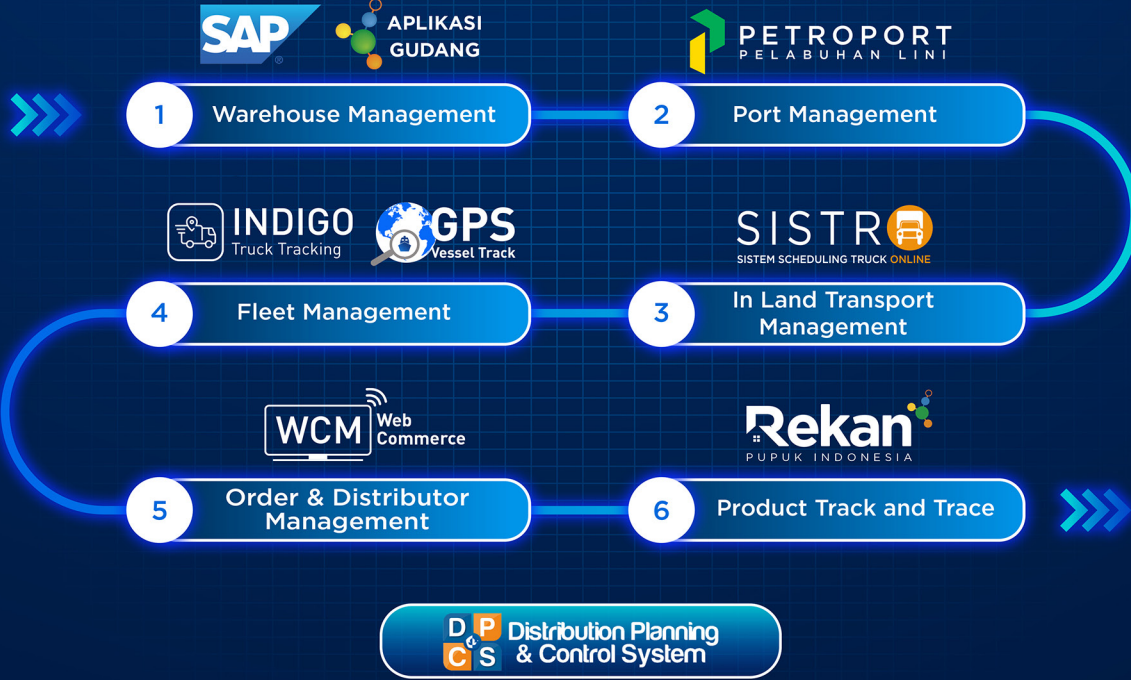
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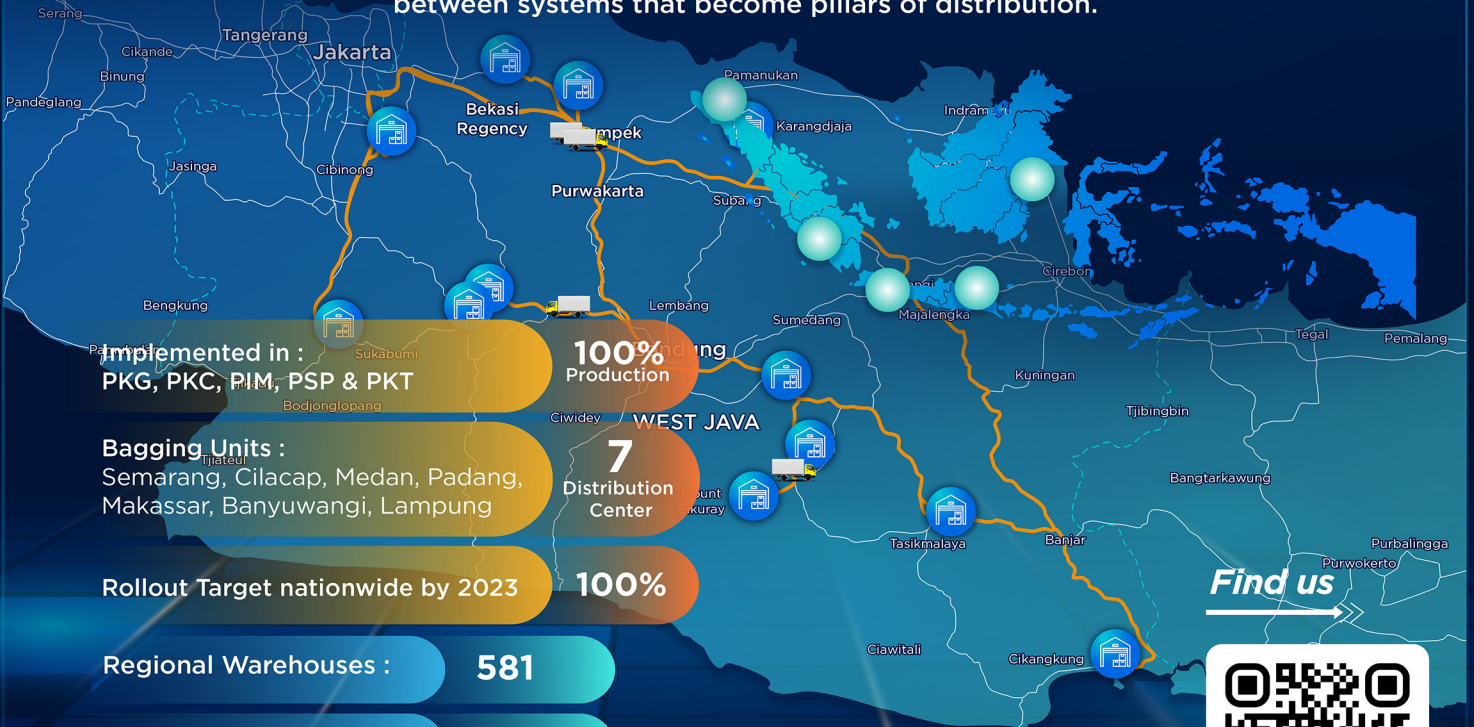


INDIGO Digital Ecosystem

Integrated Distribution and Logistic Optimization



INDIGO is built from use cases and best practices that have been carried out by Pupuk Indonesia Group subsidiaries and refined to become a single integrated platform between systems that become pillars of distribution.



Implemented in :
PKG, PKC, PIM, PSP & PKT

Bagging Units :
Semarang, Cilacap, Medan, Padang, Makassar, Banyuwangi, Lampung

Rollout Target nationwide by 2023

Regional Warehouses : **581**

Regency/Cities Covered : **500+**

Kiosk Retailers : **26.300**

100% Production

7 Distribution Center

100%

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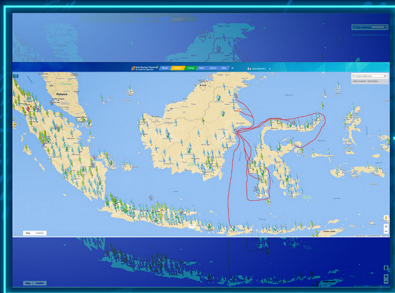
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INDIGO Digital Ecosystem

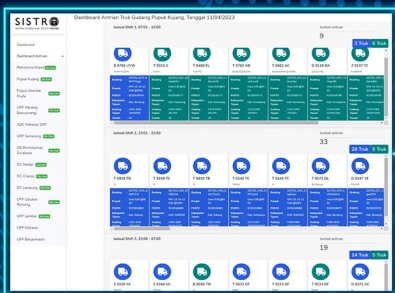
Integrated Distribution and Logistic Optimization

Distribution Planning & Control System



Monitor and control available fertilizer stock from line 1 warehouses to kiosks.

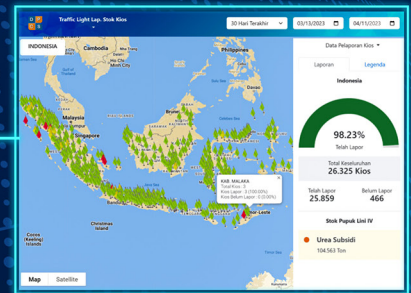
Fleet Management & Truck Tracking System



An integrated system to overcome queue buildup and truck fleet vacancies, through a loading quota management system, document standardization, and managing queues based on location and number of loads.

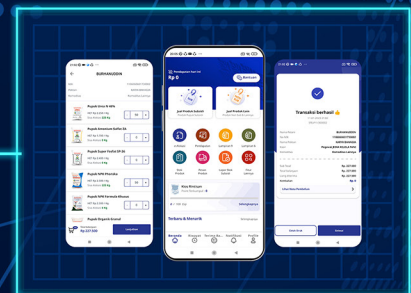


Warehouse and Inventory Management



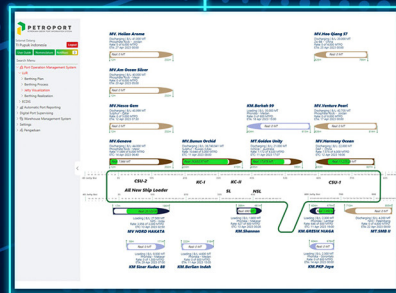
Provision of appropriate and efficient bagging technology supported by effective warehouse management.

REKAN Point of Sales



Digital platform to improve kiosk / distributor performance, simplify reporting, increase sales & market share of commercial retail products.

Port System



Digital monitoring, reporting and recommendation system for loading and unloading routes to improve port loading and unloading performance.

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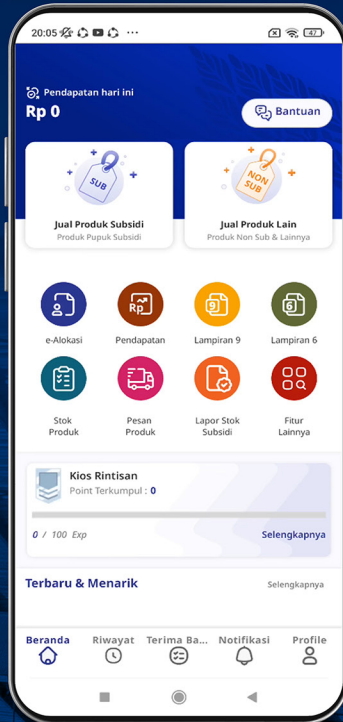


Rekan

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Digitalization of last mile distribution and retail-PSO sales channels to improve supply chain effectiveness and efficiency, and market analytics base to increase the Company's total value.

- On-board PSO Kiosks :
26.270 of 26.300 99%
- Subsidized Stock Visibility :
26.000 Kiosks 98%
- Subsidise Distribution Implementation :
3 Province Aceh, Yogya, Bali



Specific Solution-Product Line to Serve Retail Partner & Customer:

- RekanDistributor**
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1.5K+ Subsidized & Non-Subsidized Distributors
- RekanKios**
PUPUK INDONESIA
30K+ Complete Fertilizer Kiosks & Retail / Commercial Kiosks
- RekanPoktan**
PUPUK INDONESIA
Farmer Groups & their institutions
- RekanTani**
PUPUK INDONESIA
30M+ Total Farmers nationwide

Integrated with Project/Ecosystem:
#PupukIndonesiaAda + Data Science-Analytics Makmur-Agrisolution + Commercial Kiosk

- Digitalization, improvement of data management and simplification of subsidized fertilizer redemption process.
- Trace the distribution of Subsidized Fertilizer at Kiosk level through Farmer ID card & Geo tagging.
- integrated Payment system with Digital Farmer Card.
- Provide digital redemption and billing reports.
- Easy Administration: Transaction recording, financial reporting, stock management, & employee management.
- Point of Sales system for the sale of Non-Subsidized Products or other products in the kiosk.
- Offline mode is available for areas with poor signal quality.
- Simplify realtime product stock control.



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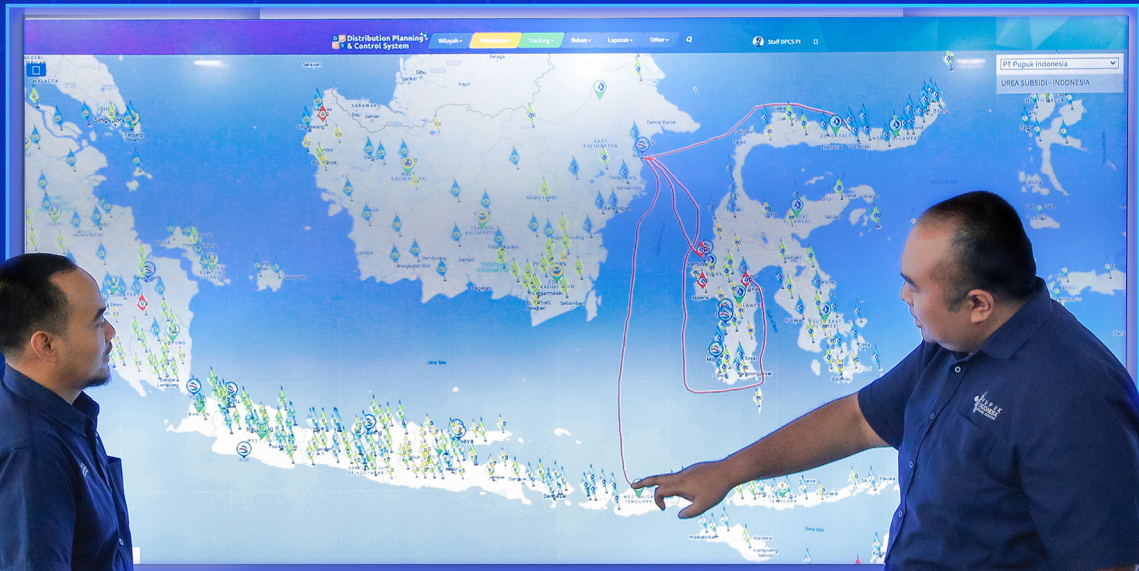


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DPCS Distribution Planning & Control System



Through Distribution Planning & Control System (DPCS), an integrated system to control the supply chain of subsidized fertilizer distribution, PIHC can ensure real-time distribution activities and national fertilizer stock and provide drill-down stock monitoring capabilities from production plant-regional warehouse-distributor to kiosk.



MONITORING

Monitoring the availability of subsidized & national fertilizer stock from line 1 to line 4.



INDICATOR

Early warning of critical subsidized fertilizer stock condition in PIHC distribution area.



TRACKING

Tracking the travel route of subsidized fertilizer conveyance with various transportation modes.



IMPLEMENTATION

Implemented in all Pupuk Indonesia Group.

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PreciRice

TERUKUR SUBUR MAKMUR



PRECIRICE - PRECISION FARMING TOOL FOR RICE

In the management of fertilizer/nutrient application on rice farming land, determining the dosage of fertilizer is an important parameter that must be considered considering that each type of plant has different nutrient requirements. In addition, land variations such as geological conditions, weather, and agricultural activities will also affect the level of natural nutrient availability in the land.

Applying fertilizer doses that are not in accordance with plant needs will cause a lack of nutrients in plants so that the productivity of agricultural land will be low. Conversely, excessive use of fertilizers will increase agricultural costs and environmental pollution by excess fertilizers that are not absorbed by plants. In practice, balanced/precise fertilization in rice farming is still not widely applied.

PreciRice is a web application used to predict soil nutrient content, specifically for rice field, based on image processing using machine learning technique. The image is produced by multispectral camera attached on a drone. In addition, PreciRice also provides fertilizer dosage recommendations based on the prediction.

The trials in Subang, Sragen, and Purworejo shows that the applied recommendation positively increases the average productivity of rice farming by 21%.

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Super Transformation Assistance Robot - Champion

STAR-C

A COMPACT TECHNOLOGY IN ONE HAND



Inspired by military tank construction, STAR-C can move at all track condition and turn 360° at narrow space

STAR-C is robotic platform that can handle 3 methodes of Non Destructive Examination (NDE) as international standard ASME SEC-V regulation such as:

VISUAL TESTING

ULTRASONIC TESTING

EDDY CURRENT TESTING

Long Range Wireless Visual Camera

STAR-C use for visual inspection at unreachable area likes an explosive area, toxic area, and confined space. Controlled by professional device that can reach up to 500 m and monitored by FPV (First Person View) camera and recorded by ultra high definition camera.

Ultrasonic Thickness for Storage Tank

With magnetic system design, STAR-C can crawl on the storage tank wall with ferromagnetic material. Ultrasonic thickness and corrosion mapping sensor attached to STAR-C to measure the wall thickness

Eddy Current Puller & Pusher Probe

Eddy Current Test (ECT) for tube heat exchanger usually use man power to push and pull probe into and out the tube. Now STAR-C can replace manpower to push and pull ECT by its ability to push and pull ECT Probe automatically with wireless controller and can adjust the probe speed as ASME SEC V regulation for Eddy Current Testing method.



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SMART PRODUCTION

Pupuk Kalimantan Timur

The implementation of Smart Production integrates various information related to the production process such as :



Factory Operational Data



Equipment Health



Production Area Environment

Digital Ecosystem with integrated big data accessible by all work units, thus enabled more efficient operational activities.

Some of these applications are :



iSmart

Logsheet & logbook data management information system that contains records of indications and instrumentation conditions of factory tools that function as Integrated Data Acquisition (IDA) and for the calculation of each factory's performance figure.



iPerform

This is a dashboard that will show the performance of all the plants in the company. It contains production & energy consumption data and availability of each plant and displays critical equipment that needs to be monitored continuously.



PKT MAINTEX

(Maintenance Excellence)

Predictive and preventive maintenance applications for plant asset health management.



MSIS

Integrated maintenance strategy planning application



iPORTLOG

Integrated port and logistic management system

An application that integrates logistics management processes at production warehouses and loading and unloading activities at Pupuk Kaltim's special terminal port.



With Smart Production, the increase of production rates and performance can be evaluated in real-time .

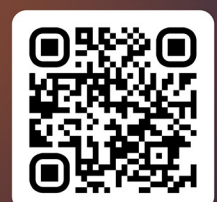
Smart Production enables Pupuk Kaltim to :

- Monitor and evaluate the production cost as part of the implementation of the Cost-Leadership Strategy.
- Automatic calculation of ratio and energy consumption which helps to measure the energy & raw material efficiency.
- View integration, performance, and overall energy efficiency through a dashboard (to support decision-making process).

Smart Production impact :

- Minimize unsheduled shutdowns frequency.
- Increase energy efficiency, production rates, and plant reliability index

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SMART PRODUCTION (IPD & I-PMS)

Smart Production (IPD & I-PMS) is the implementation of digital transformation 4.0 in the production process.



In plant digitalization process with IPD, data is taken from each automation and control equipment, using various communication protocols and processed into digital data.

With the implementation of the IPD technology, our customers receive:

- Real-time online access to information
- Ease of cause and effect analysis.
- Increase operational reliability and availability up to 10 percent.
- Increase production efficiency up to 10 percent.
- Decrease environmental impact to 5 percent.



I-PMS is able to integrate data and monitor plant operations via the internet. By using I-PMS plant performance can be improved because concerned persons can know the plant healthy condition in reference to the sophisticated dashboard indicating key parameters of process performance. Automatic warning notification will come up if the instrument equipment becomes unstable.

Smart Production can overcome unscheduled shutdown caused by critical equipment instability, increases plant reliability and availability, increases urea productivity, reduces production operational costs, speeds up reporting time and data analysis helps management make decisions, increases stakeholder satisfaction.

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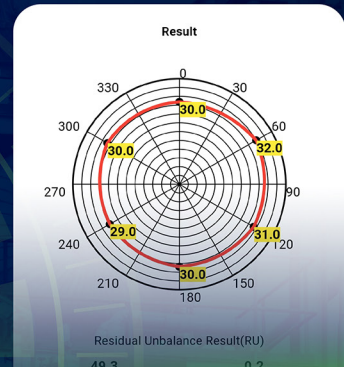
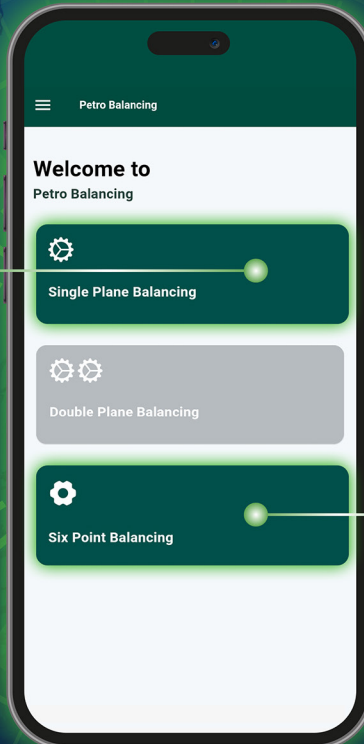
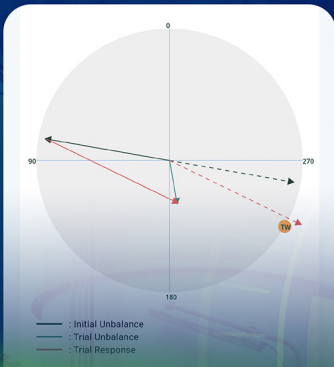
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INSITU BALANCING ON ROTATING MACHINERY (PETRO BALANCING)

Petro Balancing is a smartphone application used to calculate and resolve the unbalance condition of rotating equipment.



Single Plane Balancing

Calculating and resolving the unbalance are the essential innovation of this app. Remarkably simple to use, equipped with vector graph visualization and comes with accurate result.

Six Point Balancing

This feature is used to calculate and verify the quality of low speed balancing result based on ISO or API standard. Provide accurate decision to accept or reject the result of low speed balancing.

PETRO *Benefits*

BALANCING

- Speed up the insitu balancing process with Precise Result
- Reduce loss of revenue.
- Make rotating equipment more reliable and increases lifetime.
- Can be used for learning tool to understand balancing process, step by step.



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PASTI CRAWLER

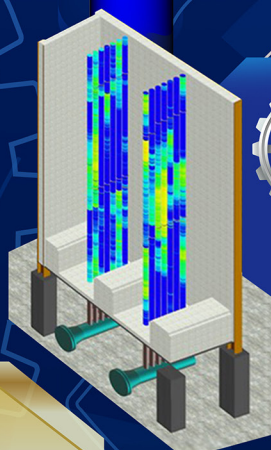
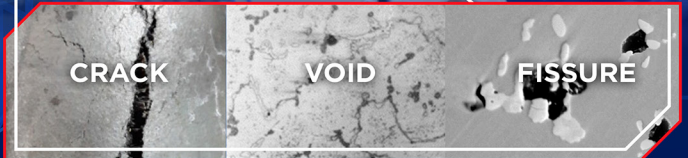
Phased Array Scan For Tube Inspection-Crawler

Pupuk Sriwidjaja Palembang use steam reformer to produce ammonia gas from natural gas and use it to produce urea fertilizer. Reformer has hundred catalyst tube inside it. Exposing at extremely high temperature, the deformation occurred in catalyst tube and may deliver to catastrophic failures, such as rupture and may causing explosion. Tube catalyst failure may stop production process (loss of production) and human being (the fatal injury or death), also its environmentally effects.

PASTI Crawler is NDT Technology using phased array UT metode that can examine the quality of reformer catalyst tube by identify material deterioration may form as voids, fissures or micro cracks along the thickness of the tube that were occurred due to long term extremely high temperature exposure. Examination report is automatically generated by using the software to profile tube in colour imaging visualization making it easier to identify actual condition from each tube.



PASTI CRAWLER identify :



Experience

Reformer :

- Ecogreen Oleochemical - 2020
- Pupuk Sriwidjaja Palembang - 2021
- Petrokimia Gresik - 2021
- Pupuk Srwidjaja - 2022
- Pupuk Kalimantan Timur - 2022

Achievement

- 1st Winner PUSRI Innovation & Excellence Award 2020.
- Diamond Rank TKMPN & IQPC 2020
- The Best Performance TKMPN & IQPC 2020
- 3 Stars Winner APQO 2021
- Spesial Award Impact On Innovation APQO 2021
- 3rd Winner-Pupuk Indonesia Quality Improvement (PIQI) 2022



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VIRTUAL REALITY NPK FERTILIZER FACTORY (HC DEV)

Virtual Reality (VR) is an interactive digital learning media by presenting the real conditions of NPK factory machines in Petrokimia Gresik.

- **Virtual Reality - NPK Fertilizer Factory** is an application that contains digitization of NPK production machines starting from the production process to maintenance.
- VR is designed same as the existing machines in the company to provide a real experience for users.
- **Learning by Virtual Reality** have an aims to accelerate learning for employees without reducing the forms and conditions that exist in the factory. This learning also has no risk to occupational safety and health.
- In **Virtual Reality - NPK Fertilizer Factory**, there are 18 digitized machines used in the operation of the NPK Factory through Virtual Reality, including: Belt Conveyor, Material Crusher, Rotary Dryer, Rotary Coater, Rotary Cooler, Rotary Granulator, Vibrating Screen, Furnace, Cyclone, Material Bin, Pigment Bin, Bagging, Bucket Elevator, Scrubber & Stack, Blower, Centrifugal Pump, Compressor, and Reciprocate Pump.
- Each of these machines has learning scenarios including: production processes, Corrective, Preventive and Reactive Maintenance, as well as assembly processes with a total of 187 scenarios that have been documented in this platform.



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VIRTUAL REALITY PKT

Virtual Reality PKT is one of the innovations made by PT Pupuk Kalimantan Timur to increase the competence of plant operators through VR-based learning.



- Enabled plant operators to learn on how to operate equipment without having to be directly on site.
- Enabled plant operators to perform various simulations such as preparing Protective Personal Protective Equipment (PPE), running the plant normal operation process, the plant shutdown process
- Available in two modes, single and multi-player.
- All VR-based learning modules have been adjusted to the existing Work Instructions.
- Can also be used for guests who are visiting Pupuk Kaltim to take a virtual tour of the factory area such as Ammonia, Urea, and Utility, and view details of equipments and process (eg. Granulation Process, Desalination Process, Waste Heat Boiler Process, Etc).

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BLUE AND GREEN AMMONIA



BLUE AMMONIA

Development of Blue Ammonia in Aceh

Cooperation Partners: Mitsui, Energi Mega Persada - Gebang, PGN

Development of Blue Ammonia in South Sumatera

Cooperation Partners: Pertamina, Mitsubishi Corporation.

Development of Blue Ammonia in West Java

Cooperation Partners: PLN, Mitsubishi Corporation.

Development of Blue Ammonia in Abadi Gas Field (Yamdina Island)

Cooperation Partners: INPEX.

Key Milestone

2022 Pre-FS	FS, FEED, FID, EPC	2030-2040 Start Operation
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GREEN AMMONIA

Development of Green Ammonia / Green Hydrogen in Aceh

Cooperation Partners: PLN, TOYO and other potential partners.

Development of Green Ammonia / Green Hydrogen in Bontang

Cooperation Partners: PLN, Pertamina Power Indonesia, and other Potential Partners.

Development of Green Ammonia / Green Hydrogen in West Java

Cooperation Partners: PLN, Mitsubishi Corporation, Pertamina Power Indonesia, and other potential partners.

Development of Green Ammonia / Green Hydrogen in East Java

Cooperation Partners: IHI Corporation and other potential partners.

Key Milestone

2022-2023 FS	FS, FEED, FID, EPC	2027-2030 Start Operation
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Key Milestone

2022 Pre-FS	FS, partner search, FEED, FID, EPC	2030-2040 Start Operation
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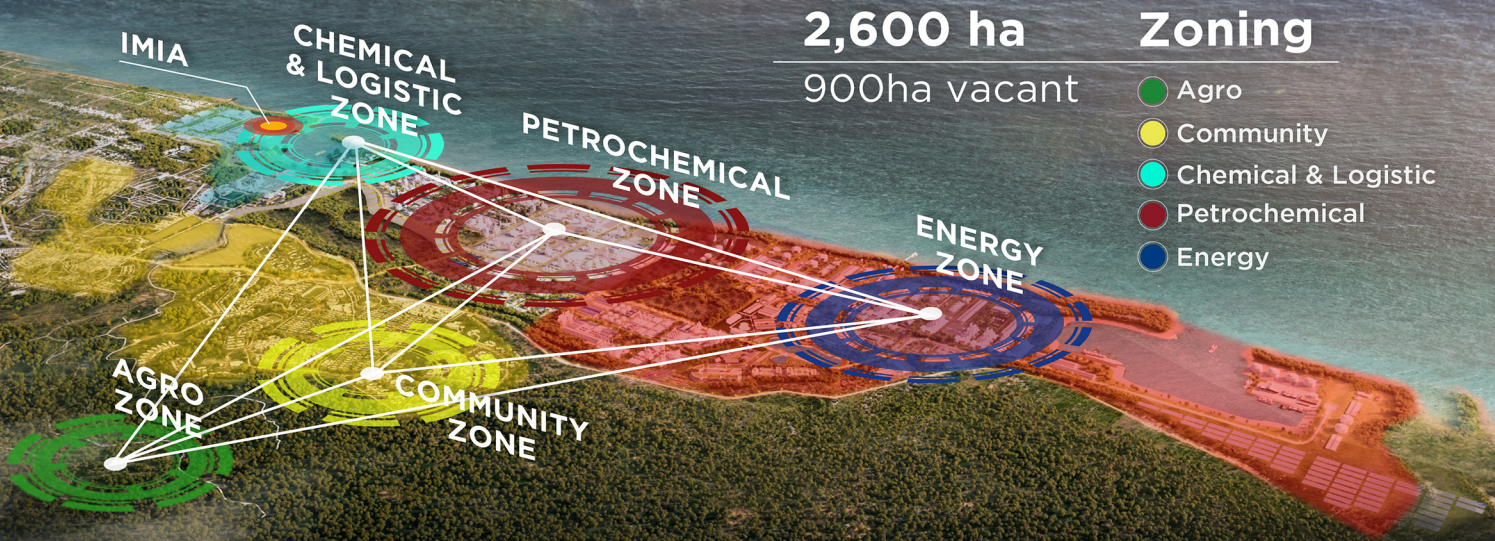
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ARUN LHOKSEUMAWE SPECIAL ECONOMIC ZONE

Will become Green Industry Cluster development to achieve the 2060 Net-Zero emission target. In this zone, Pupuk Indonesia will develop clean ammonia hub and ammonia bunkering partnering with local and foreign partners.

Arun Lhokseumawe SEZ is located in Aceh with its very strategic location has great potential to develop in the international trade market, especially ASEAN.



2,600 ha
900ha vacant

Zoning

- Agro
- Community
- Chemical & Logistic
- Petrochemical
- Energy

Arun Lhokseumawe

The Integrated Energy and Chemical Industrial Estate



POTENTIAL SECTOR



LNG-LPG Hub



Clean Ammonia Plant



Green Electricity



Ammonia Bunkering



Ship yard



BIG IDEAS

- ✓ Circular Economy Concept
- ✓ Smart & Integrated Utility
- ✓ Green Energy Supply
- ✓ Smart & Green Estate Operation
- ✓ Community Within Estate

DEVELOPMENT

of Arun Lhokseumawe SEZ

is run by consorstium that was formed between BUMNs (Indoensia State-Owned enterprises) and Local Government of Aceh.

BUMN's Synergy



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