

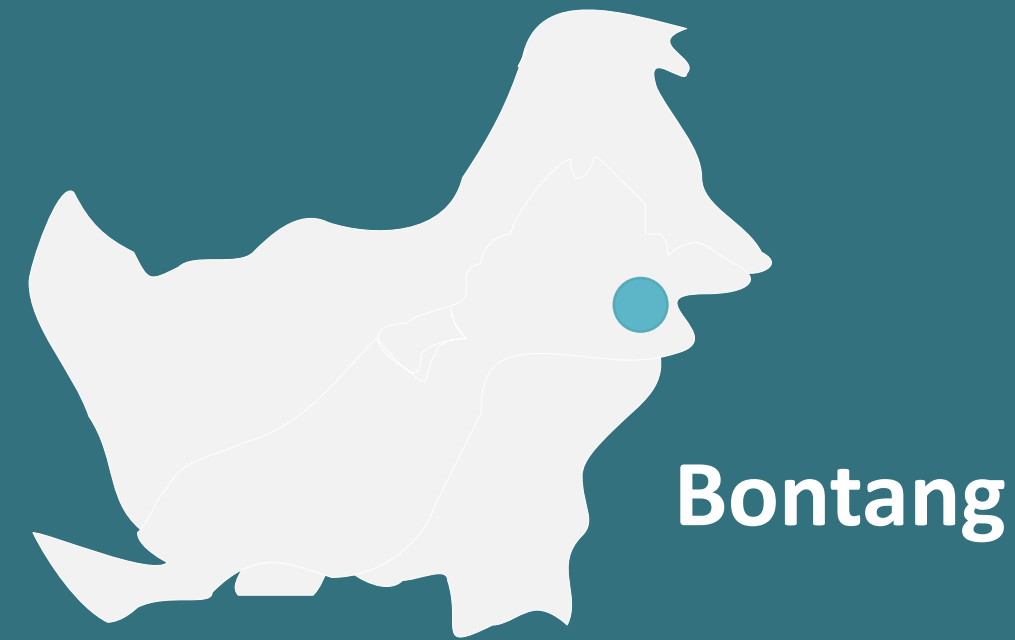


Majus Luther Sirait
SVP Operation

Improvement on Energy Efficiency and Conservation in Fertilizer Plant by Establishment of Energy Management System

The 10th Energy Management Action Network Workshop
December 2020

The member of:



December 7th, 1977

Vision

To become a growing and sustainable world-class Company in the fertilizer, chemical and Agrobusiness industry

Main Products



Urea



NPK



Ammonia



5 Urea Plants
3.4 million tons/year

Amoniak Plants
2.7 million tons/year **5**

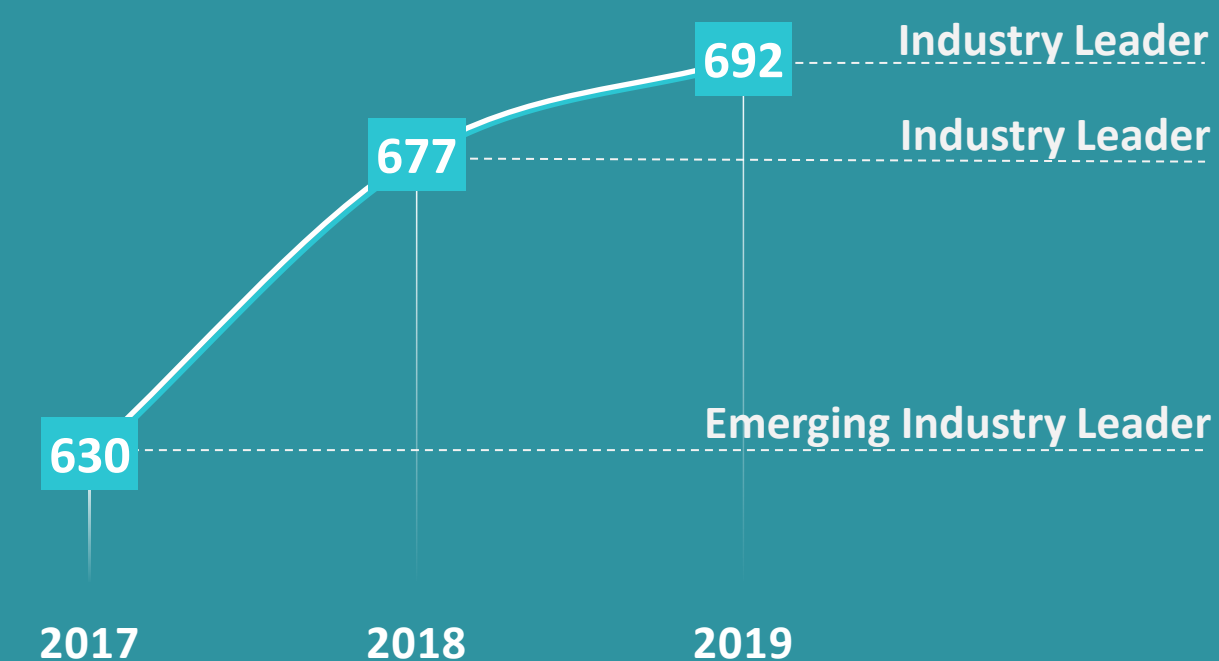
3 NPK Plants
350 thousand tons/year



35%

products for subsidies in 2/3 of eastern Indonesia

Baldrige Excellence Framework



Energy Performance

3 of 5 Ammonia-Urea plants are ISO 50001 certified



PLANTS IN PUPUK KALTIM

Energy source: **Natural Gas**



PKT-2 : 1984

Energy consumption:
Ton Oil Equivalent
(TOE) 366,566



PKT-4 : 2002

Energy consumption:
Ton Oil Equivalent
(TOE) 221,828



PKT-5 : 2015

Energy consumption:
Ton Oil Equivalent
(TOE) 269,543



PKT-3 : 1989

Energy consumption:
Ton Oil Equivalent (TOE)
183,131



PKT-1A : 2014

Energy consumption:
Ton Oil Equivalent
(TOE) 229,692

Total energy consumption (TOE)

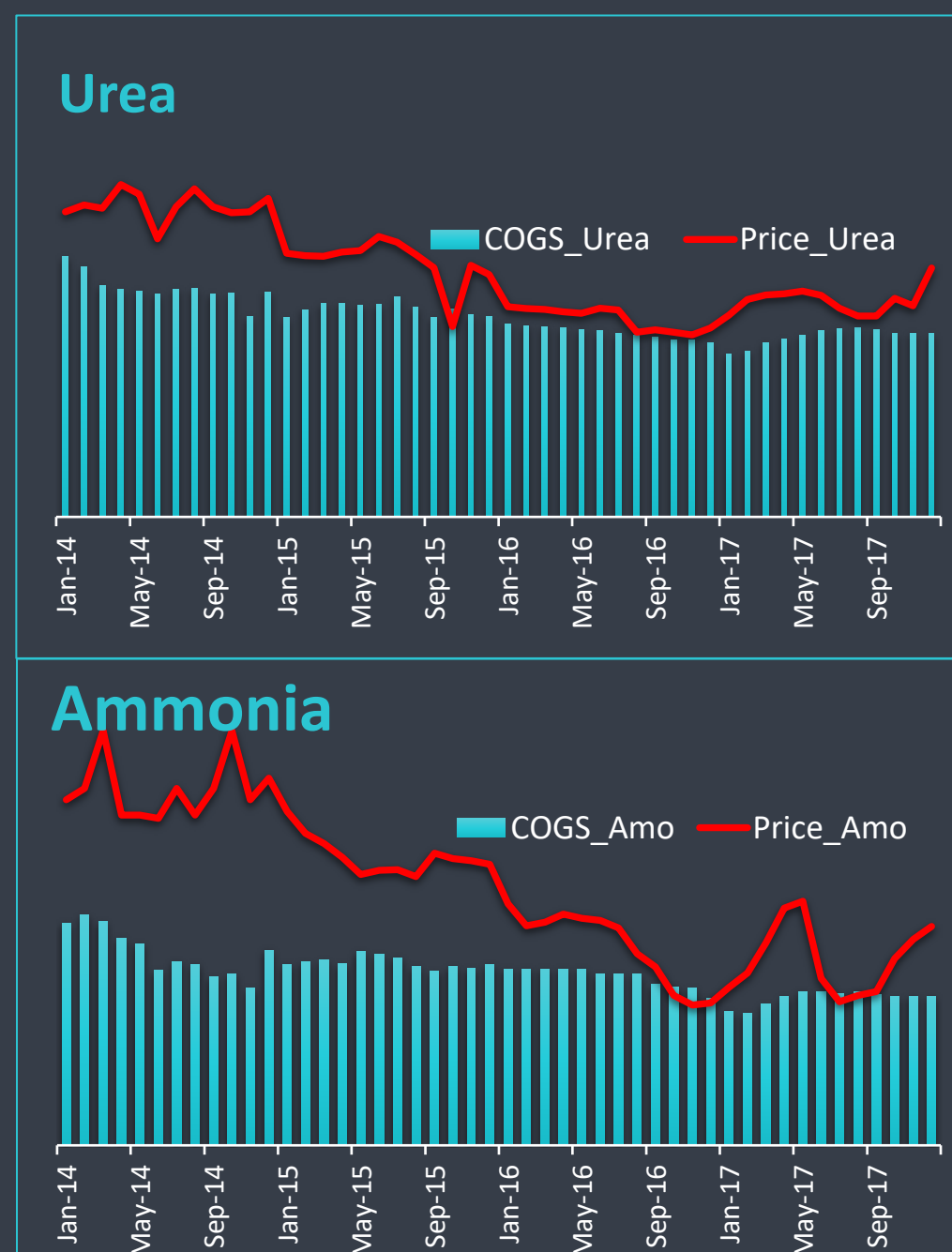
1,270,761

*Note: Based on 2019 data and
exclude energy as raw material*

ENERGY MANAGEMENT SYSTEM DRIVERS

Reduction of production cost

Energy costs account for 40% of production costs | increase in natural gas prices | The price of products on the market fluctuates



Comply to government regulation

PP 70/2009 (about energy conservation) | Permen ESDM no. 14/2012 (about energy management) | Participate in Nationally Determined Contribution (NDC) to reduce CO₂ emissions

Integration and Sustainability

Ensure the sustainability of existing efficiency programs | integrate with other management systems

Enhance the company's reputation

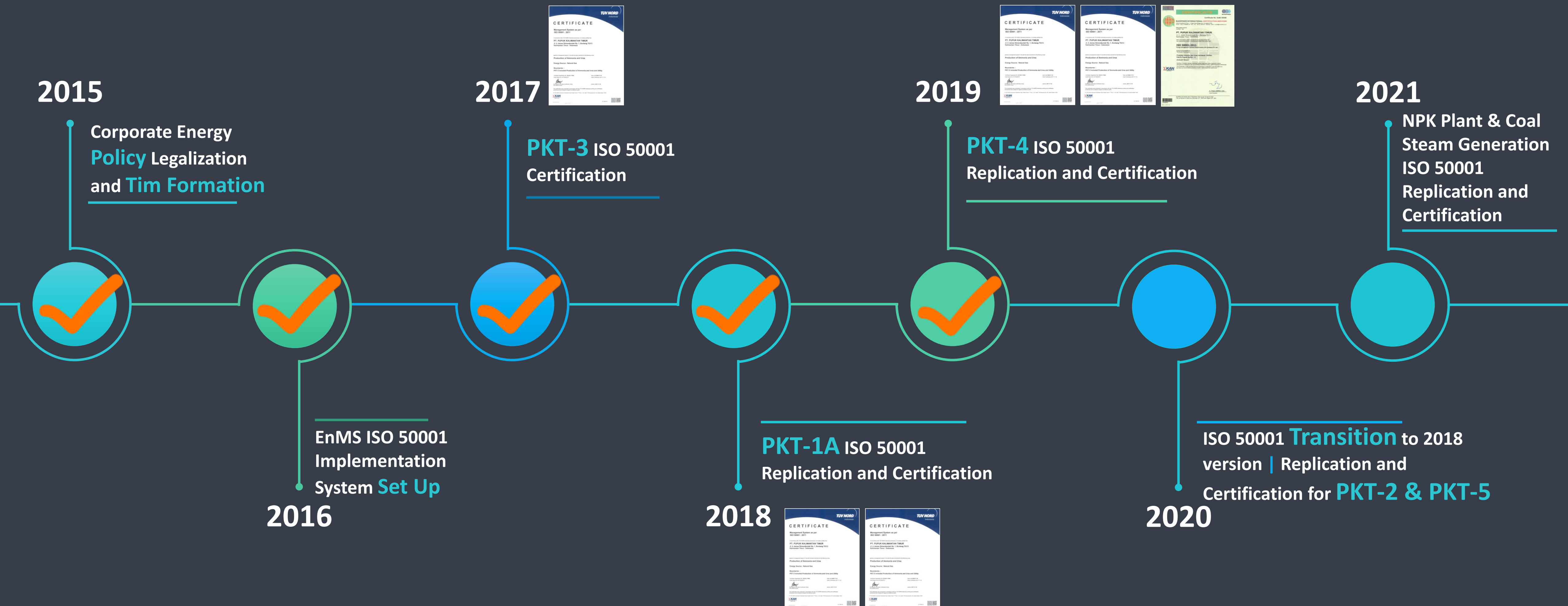
to support the achievement of the vision and mission

ISO 50001

IMPLEMENTATION ROADMAP

TARGET

Savings of **3%** by 2021 across all Ammonia-Urea-Utility plants



ENERGY MAPPING

Level-1

PKT-4

$Y = 12,37 A + 10,51 B + 109.026$
Regression

MMBTU

Level-2

AMMONIA

$Y = 9,54 A + 71.006$
Regression

MMBTU

UREA

$Y = 4,09 A + 11.270$
Regression

MMBTU

UTILITY

$Y = 0,01 A + 3,31 B + 10.660$
Regression

MMBTU

Level-3

Ammonia - Thermal

$Y = 6,57 A + 77.072$
Regression

MMBTU

Ammonia - Power

$Y = 0,72 A + 1.011$
Regression

MMBTU

Urea - Thermal

$Y = 3,26 A + 306$
Regression

MMBTU

Urea - Power

$Y = 0,83 A + 10.964$
Regression

MMBTU

Utility - Thermal

$Y=0,62A+2.987$ | $Y=0,5A+5.853$
Regression

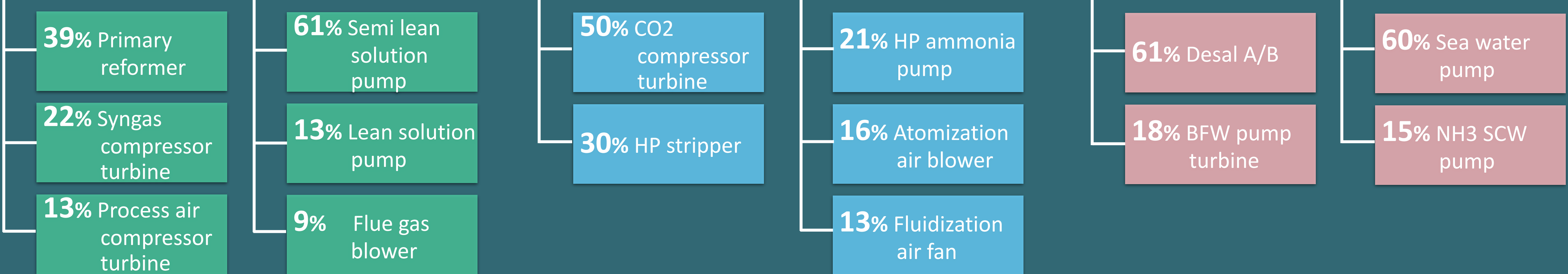
MMBTU

Utility - Power

$Y = 0,002 A + 2.989$
Regression

MMBTU

SEU



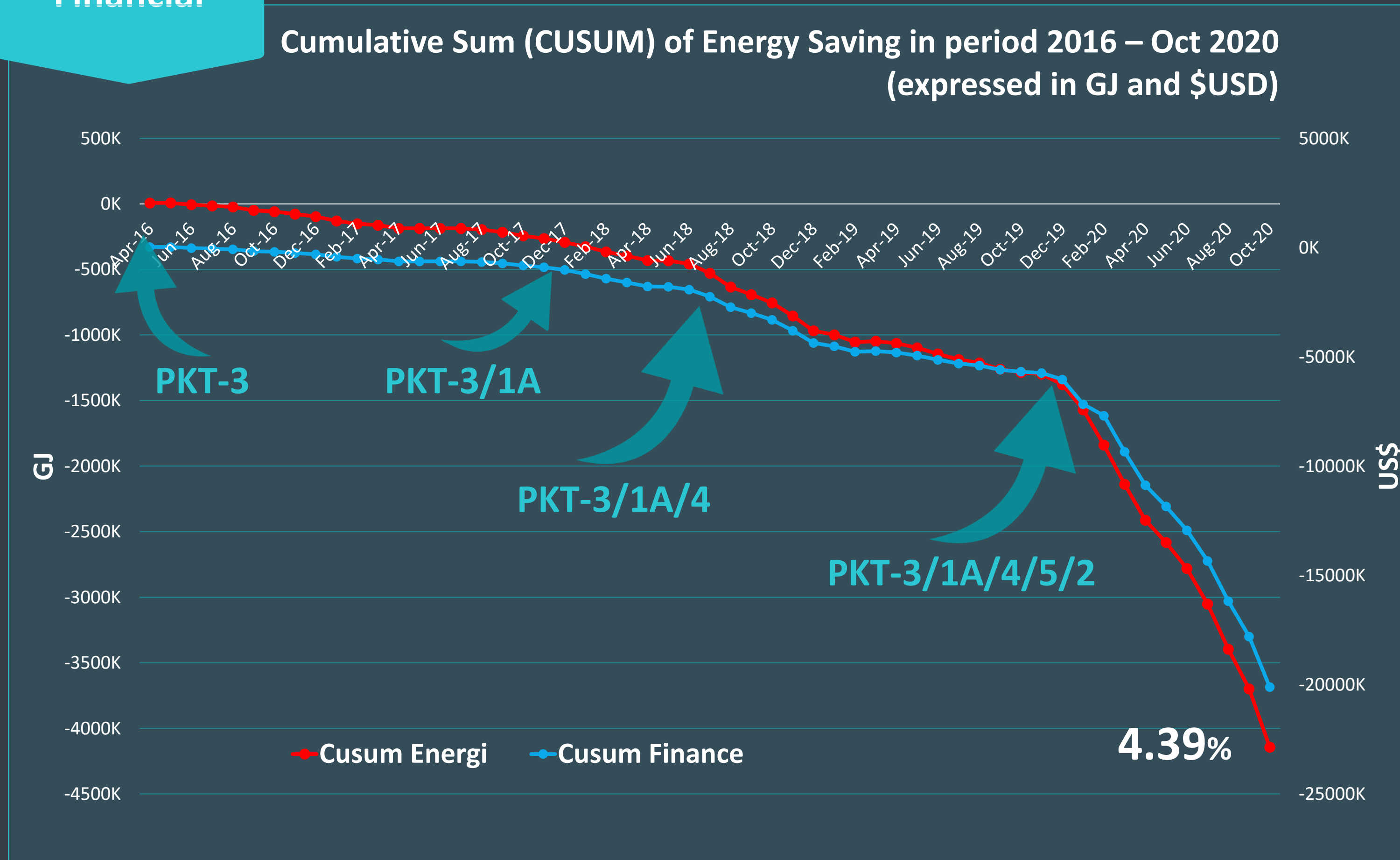
ENERGY MANAGEMENT SYSTEM

TANGIBLE BENEFITS



Financial

Cumulative Sum (CUSUM) of Energy Saving in period 2016 – Oct 2020
(expressed in GJ and \$USD)



Environmental

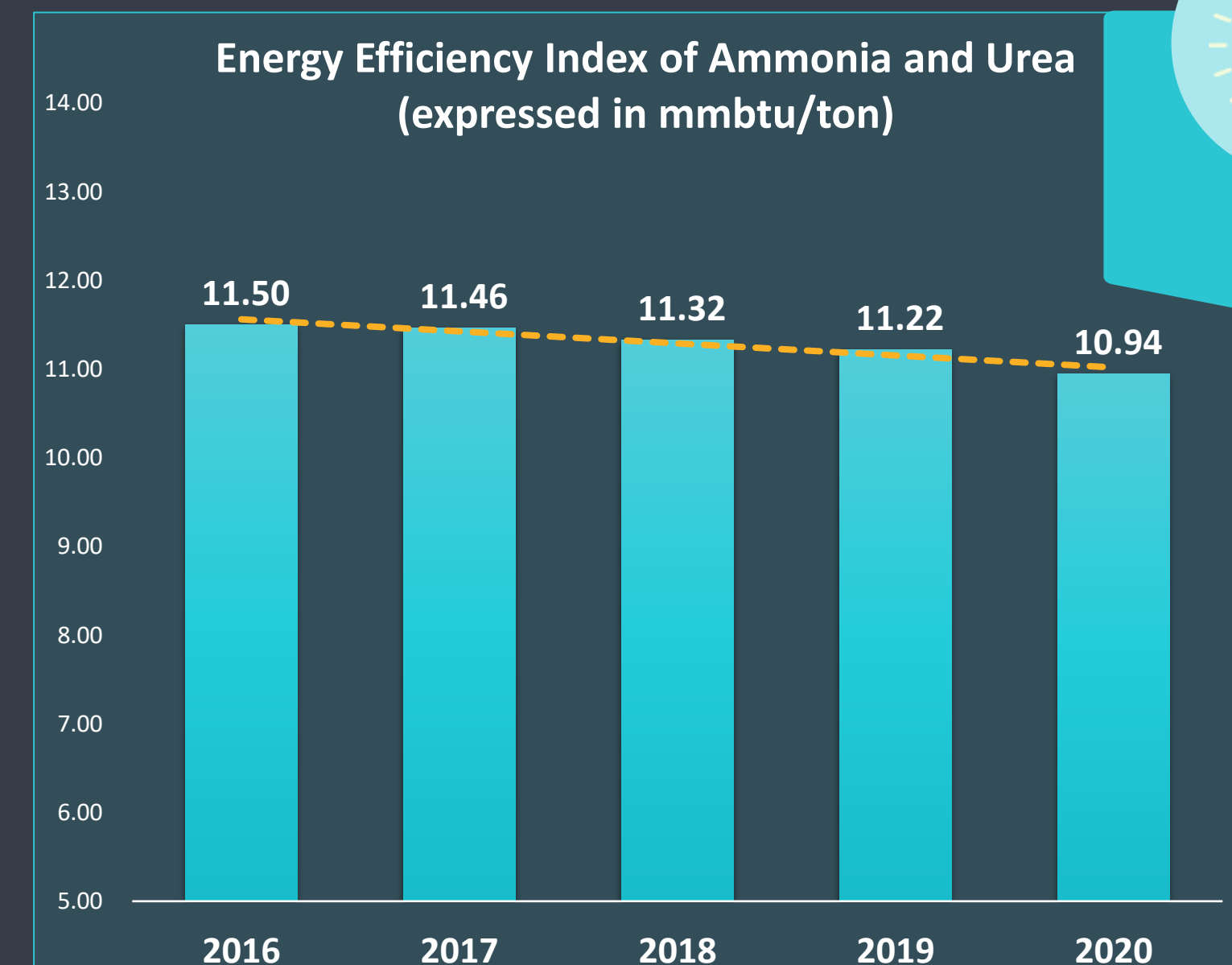
Cumulative Sum of CO₂ Reduction Profile
in period 2016 – Oct 2020 (expressed in ton CO₂ eq)

2020	208.381
2019	69.311
2018	48.688
2017	14.756
2016	4.876



EII

Energy Efficiency Index of Ammonia and Urea
(expressed in mmbtu/ton)



INTANGIBLE BENEFITS



Inspire the Holding Company to implement EnMS in all subsidiaries



Increase energy-saving culture through energy efficiency innovations



Increase competitiveness in the global market, especially in countries that care about the environment and energy



Since 2017, Pupuk Kaltim has received Gold Medal-the highest award in National Program for Assessment of Company's Performance Rating in Environmental Management out of 1906 industry participate in national level



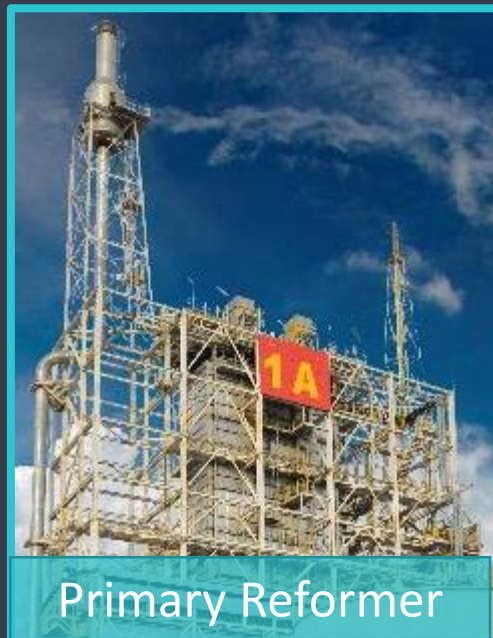
Achievement as world class industry by Global Performance Excellence Award (GPEA) in 2018 and 2019

ENERGY MANAGEMENT PROGRAM



Operational Program

| New best practices



Reduce O₂ excess
Reduce S/C ratio
Off gas utilization
Methane slip optimization

Reduce O₂ excess
Reduce flue gas temperature



| Predictive and preventive maintenance based on ISO 55001

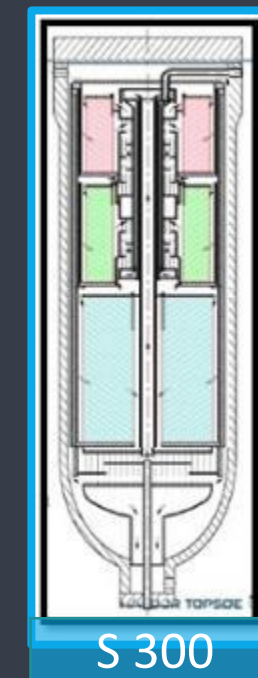
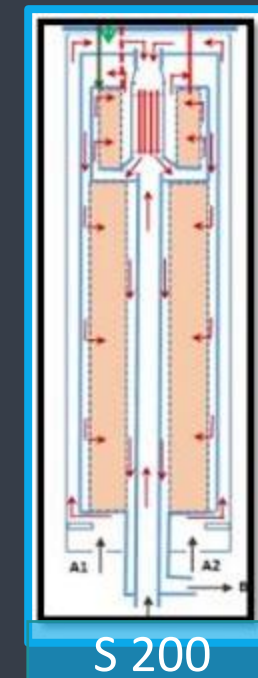
| SEU's online monitoring

| Procurement based on Life Cycle Cost Analysis

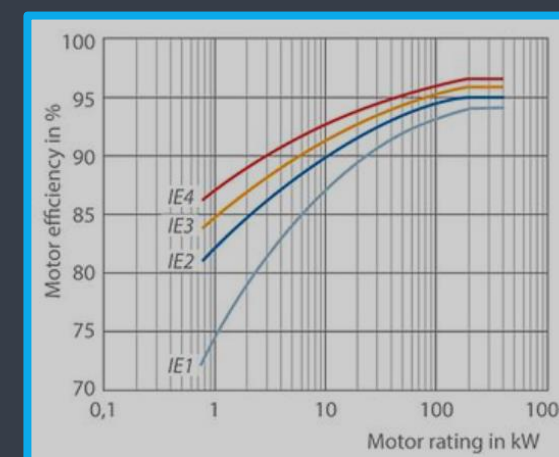


Investment Program

| Upgrade the type of Ammonia Converter (Reactor)



| New equipment: LP Ammonia Scrubber



| Upgrade pump to IE3 based



Turn Around Program

| High catalyst replacement efficiency due to implementation of LCA Analysis



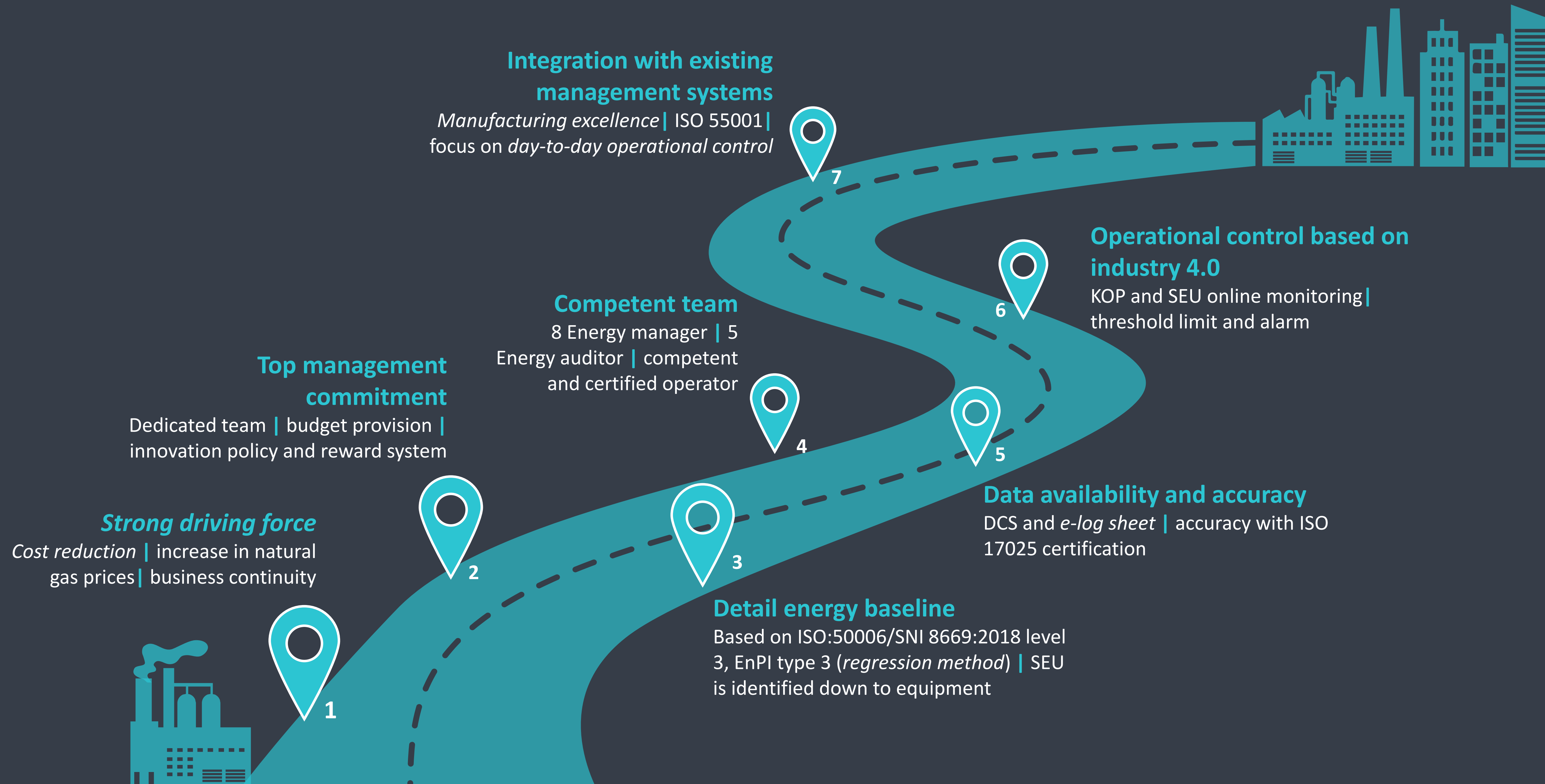
| Chemical and mechanical cleaning



| Rotating equipment overhaul



KEY SUCCESS FACTORS





www.pupukkaltim.com



PT Pupuk Kaltim



[pupukkaltim_id](https://www.instagram.com/pupukkaltim_id)



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PUPUK KALTIM

Thank You

.....and may we all conquer the pandemic together