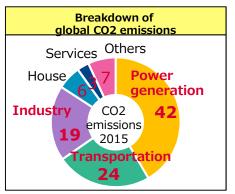
Factory Challenge

Background of Carbon Neutrality

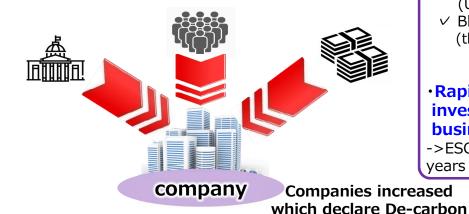
Politics

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<Trends by Industries>

Power generation: Coal/Oil has already been withdrawn

Increased pressure on natural gas (Declared at COP 20)

→The next will be transportation and industry (manufacturing).

Environmental Trend

Quickly shift from <u>"Low" carbon to "De-carbon"</u>

Game change in business competition (especially export industry)

Foundation of Lean & Clean Factory

Contributing to society by providing clean products &services



Management

[Lean Mfg. & <u>Excellent Factory</u>]

 Continuous kaizen with visualization of Muda

Technology

[Lean Automation, 1/N, Energy saving]

- Competitive Technology
- High Quality, low cost

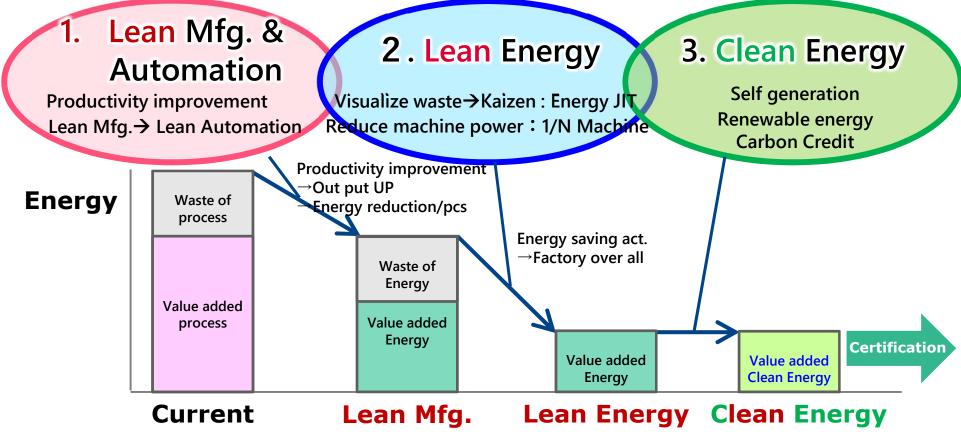
5S, Small team, Bottom up

HRD, Skill up

Factory Concept

Lean & Clean

Realize CO2 free factory by improving productivity to reduce energy consumption with continuous kaizen (waste elimination) in factory over all before replacing the minimized energy to clean energy

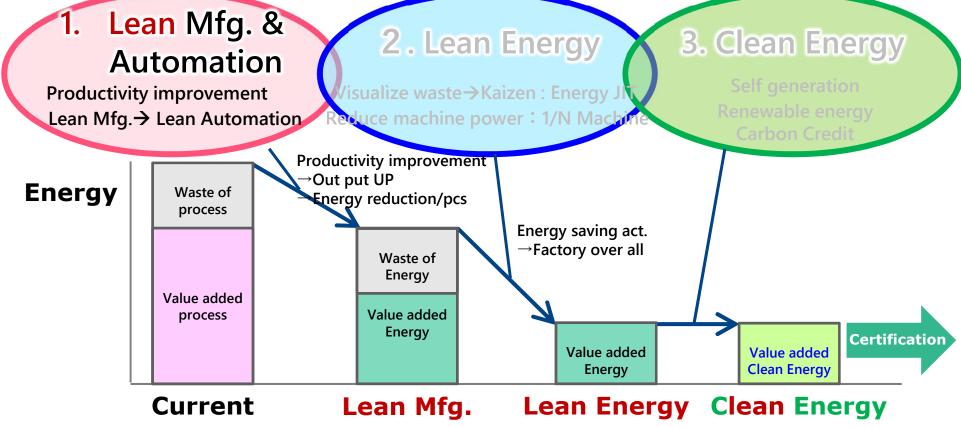


Take chance to achieve CO2 Neutral with Cost competitiveness

Factory Direction

Lean & Clean

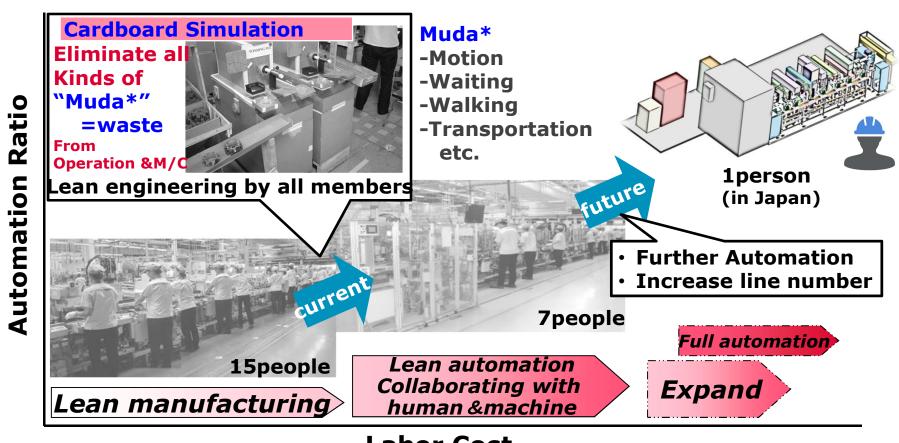
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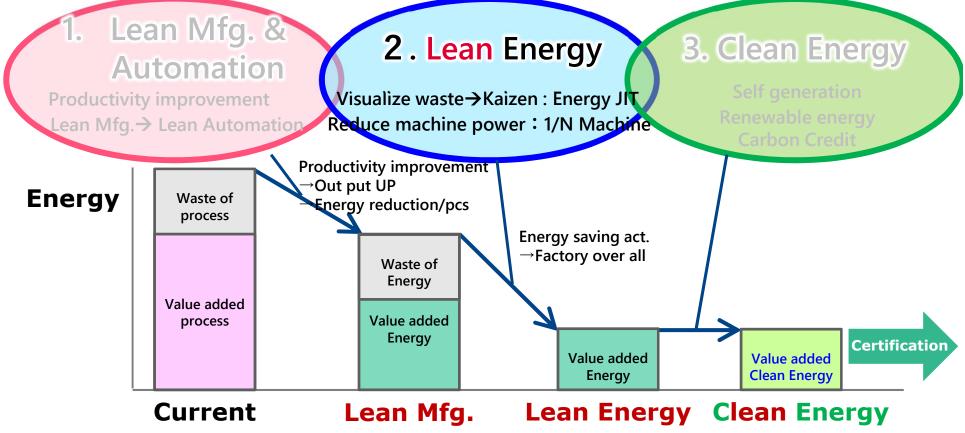
Labor Cost

ROI: <1Year, Productivity: >Double

Factory Direction

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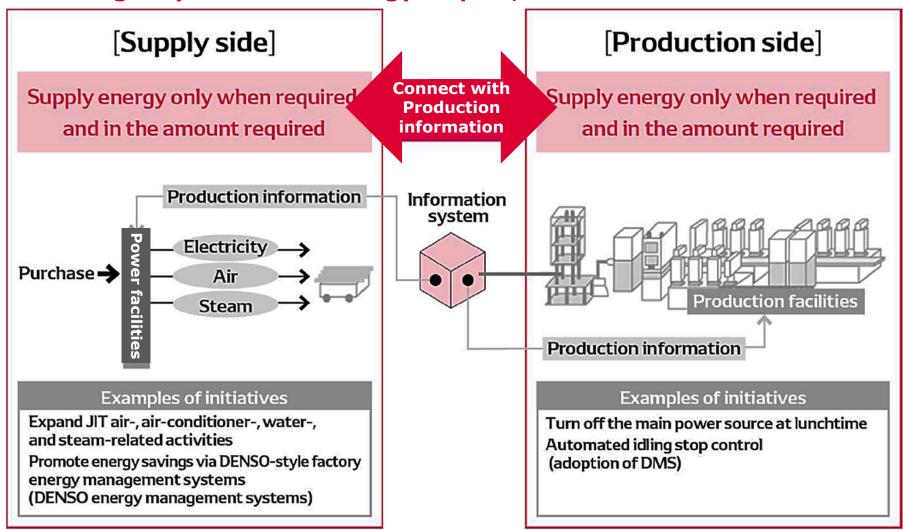
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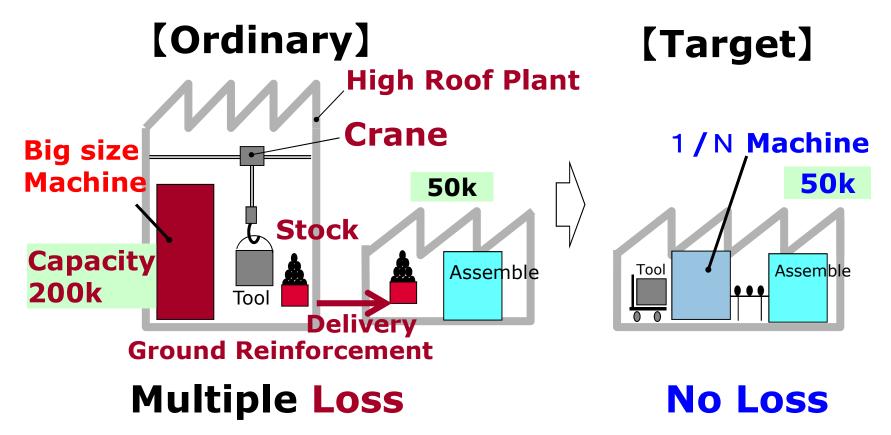


Optimize energy demand ⇔ supply as "Timing", "Place" ,"Amount"

1/N Machine: Energy Efficiency-up

[Thinking way] Investment 1/N, Size 1/N, Energy 1/N

□ Example: Die-cast production line

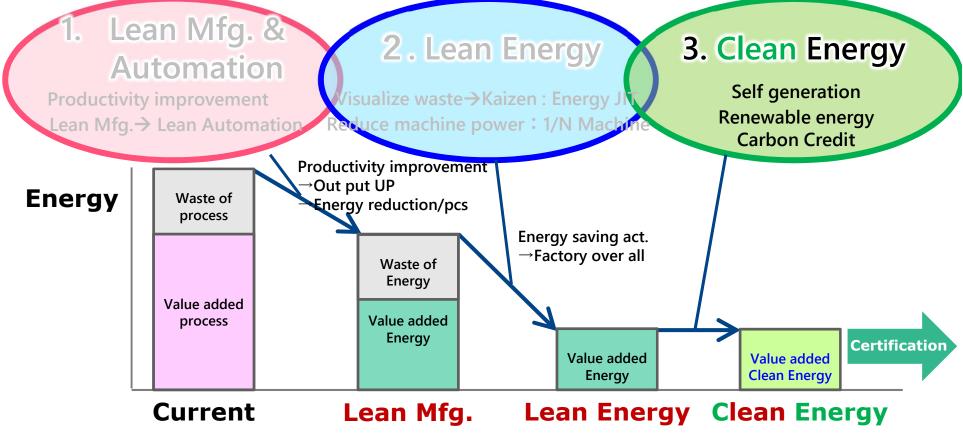


Develop 1/N Technology and expand in Asia as mother plant

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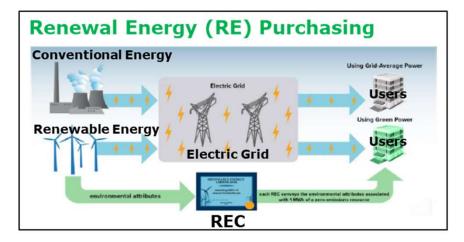
Clean Energy

[Thinking way] Continuous effort to increase energy generation









RE Self-Generation

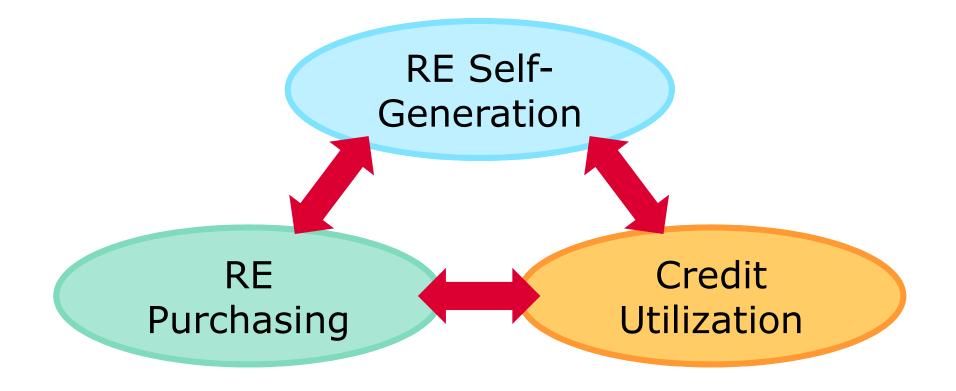
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Total 30% of overall energy

However only internal energy generation is not enough. RE purchasing is key issue to achieve competitive CO₂ Neutrality.

Difficulty in RE Purchasing



Need suitable combination model of "RE Self-generation + RE Purchasing + Credit Utilization" for each factory environment.

Summary

☐ Climate change disruption = **Opportunity to change crisis to** be chance for sustainable competitiveness improvement, and attracting more business. □ CO2 Neutral should come with productivity improvement to achieve both CO2 Neutrality and Cost Competitiveness at the same time. We use "Lean & Clean" Factory concept. ☐ Industrial sector should work together to find an **optimal model** of "RE self-generation" + "RE purchasing" + "Carbon credit utilization" combination. ☐ As an export country, Carbon emission certification system should be established such that it can be compatible for all export destinations (countries). ☐ Government incentive programs may help to accelerate CO2 Neutrality realization (Energy saving, RE generation, Credit).





Factory Challenge

May 19, 2022

By : Ampol Hompleum

DENSO Thailand Co.,Ltd., VP

Self Introduction



อำพล หอมปลื้ม

เลขาธิการ กลุ่มอุตสาหกรรมชิ้นส่วนและอะไหล่ยานยนต์ สภาอุตสาหกรรมแห่งประเทศไทย ผู้ช่วยกรรมการผู้จัดการใหญ่ บริษัท เด็นโซ่ (ประเทศไทย) จำกัด



Thai DENSO Group Companies



DNTH:

DENSO (Thailand) CO.,LTD.

Samrong: SRG

(Samutprakarn)



DNTH:

DENSO (Thailand) CO.,LTD.

Wellgrow: WGR (Chachoengsao)



DIMA:

DENSO INNOVATIVE MANUFACTURING SOLUTION ASIA CO., LTD.

(Samutprakarn)



DNTH:

DENSO (Thailand)

CO.,LTD.

Bangpakong: BPK

(Chonburi)

DELT:



DIAT:

Samutprak<mark>arn</mark>

DENSO International Asia CO., LTD.



DENSO Sales (Thailand) CO., LTD.

(Samutprakarn)



Chachoengsao

Chonburi

Rayong

311

DENSO Electronics (Thailand) CO.,LTD.

(Chonburi)



TDET:

Toyota Tsusho DENSO Electronics (Thailand) CO., LTD.

(Bangkok)



TNTH:

DENSO TEN

Bangkok

(Thailand) CO., LTD.

(Factory: Rayong)
(Office: Samutprakarn/

DIAT



ASTH:

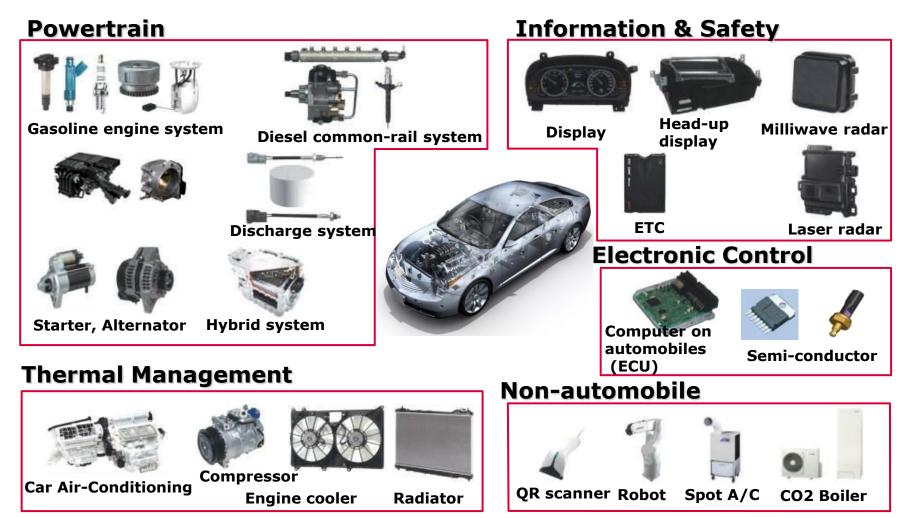
Air Systems (Thailand) CO.,LTD.

(Chonburi)





DENSO Group Overview: Main Products



Strength: Integration of several elements & engineering



Focused Field of DENSO Business

Maximize the value of "Green" & "Peace of Mind" to continue to grow with society

Electrification

Reducing environmental burden and realizing highly efficient mobility



Advanced Safety and Automated Driving

Realizing a safe society without accidents, and free and comfortable mobility



Connected Cars

Realizing a new mobile society that connects vehicles, people, and goods



Non-Automotive Businesses

(Factory Automation and Agriculture)

Contributing to improved social and industrial productivity

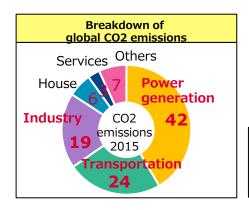




Background of Carbon Neutrality

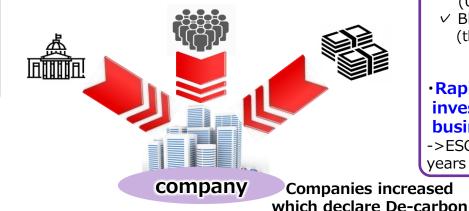
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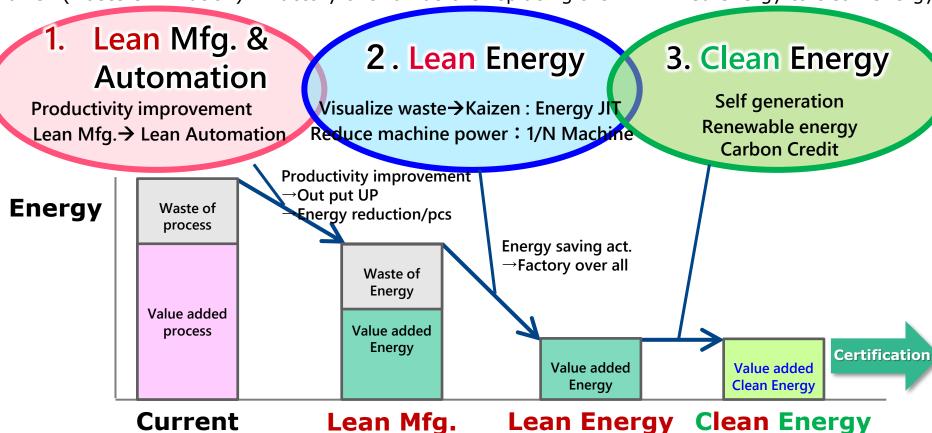
HRD, Skill up



DENSO's Factory Concept

Lean & Clean

Realize CO2 free factory by improving productivity to reduce energy consumption with continuous kaizen (waste elimination) in factory over all before replacing the minimized energy to clean energy



Take chance to achieve **CO2 Neutral** with **Cost competitiveness**



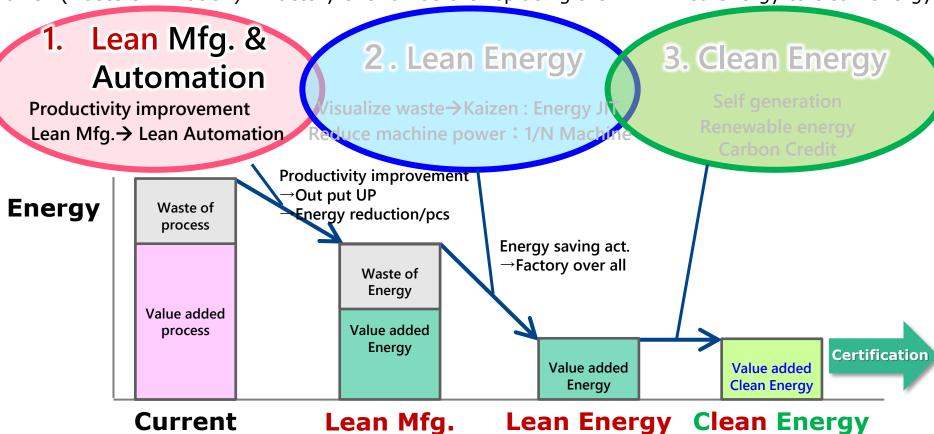
DENSO's Factory Direction

DENSO

Classification: Ceneral The Core

Lean & Clean

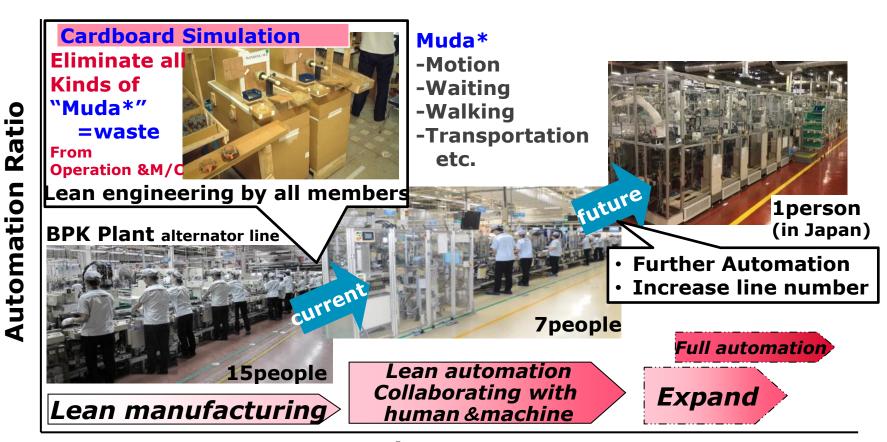
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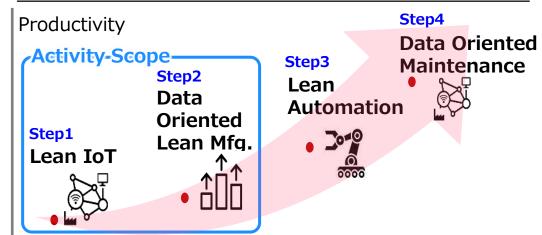


Ex.) Productivity Improvement & CO2 Reduction

Ex. Cutting line



DENSO Lean Automation Kaizen Process



Activity detail

[Step1] IoT visualization

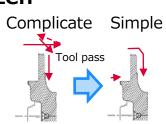


Find **real bottle-neck** from data & prioritize Kaizen

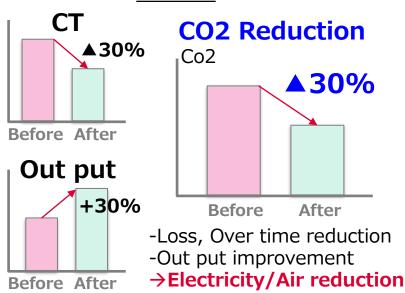
(Step2) Data Oriented Kaizen

Data + DENSO know-how → Propose effective idea

- Cutting tool integration
- Tool life improvement
- Tool pass reduction



Result





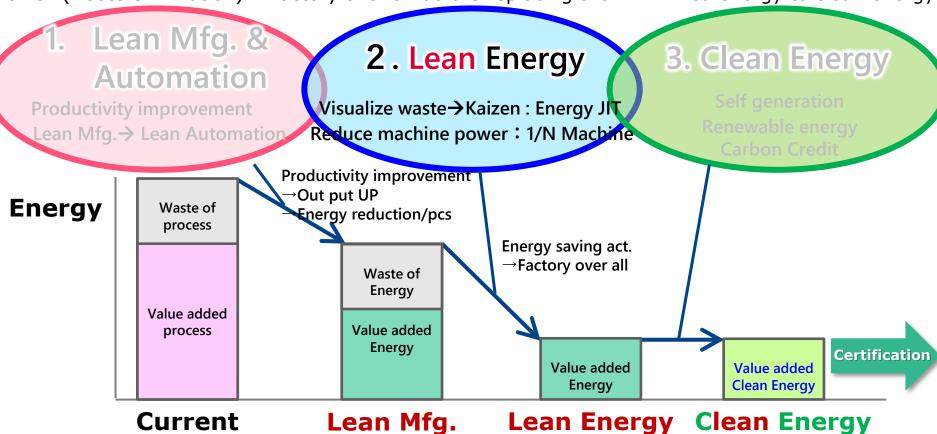
DENSO's Factory Direction

DENSO

Crafting the Core

Lean & Clean

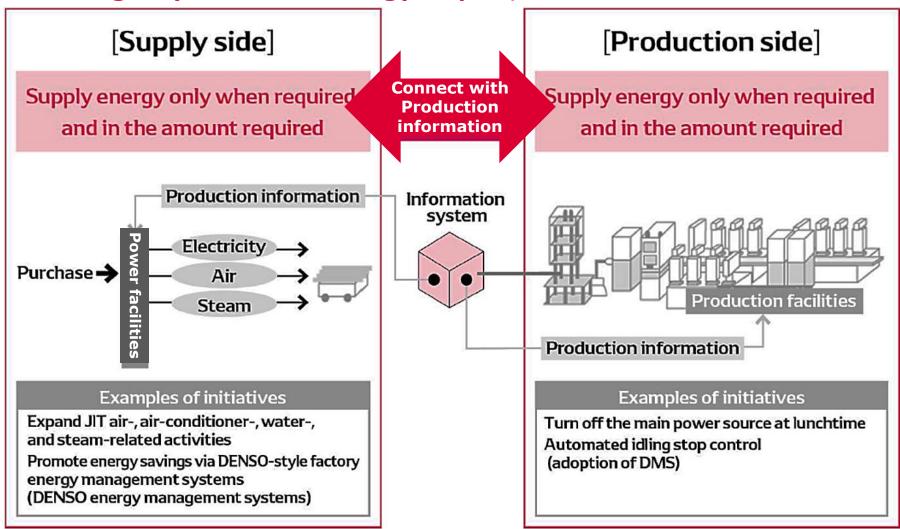
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(Thinking way) Consider energy as part, not infrastructure

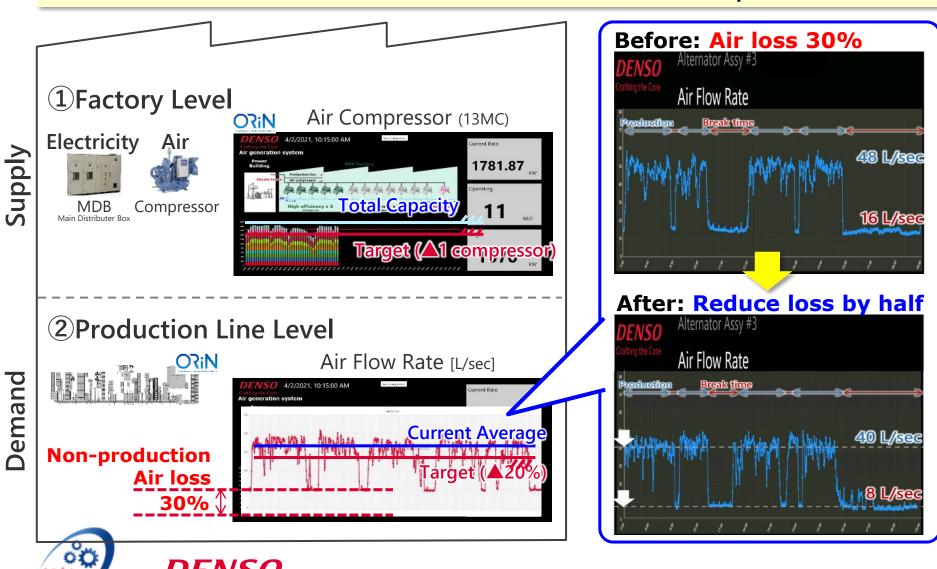


Optimize energy demand ⇔ supply as "Timing", "Place", "Amount"

Classification: Crafting the Core

Ex.) Energy JIT by Using IoT Visualization

Visualize invisible loss → Increase awareness → Quick plan & action



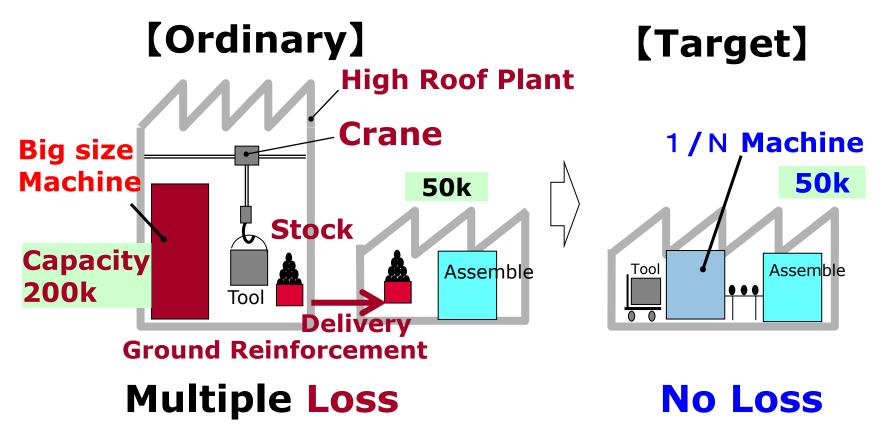
Classification: Crafting the Core

1/N Machine: Energy Efficiency-up

[Thinking way] Investment 1/N, Size 1/N, Energy 1/N

■ Example: Die-cast production line

Classification: Crafting the Core

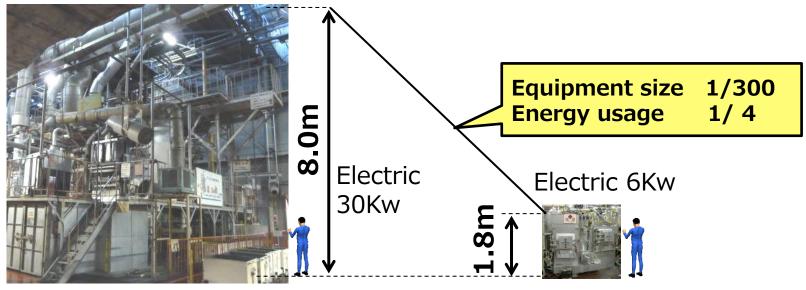


Develop 1/N Technology and expand in Asia as mother plant

Ex.) 1/N Die-Cast Production Line

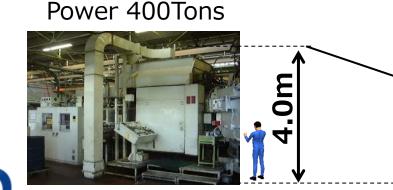
[Melting furnace]

<Concentrated melting furnace> <1/N small melting furnace>



[Die casting machine]

<Hydraulic die casting machine> <1/N small die casting machine>



Equipment size 1/6 Energy usage 1/6

Power 130Tons



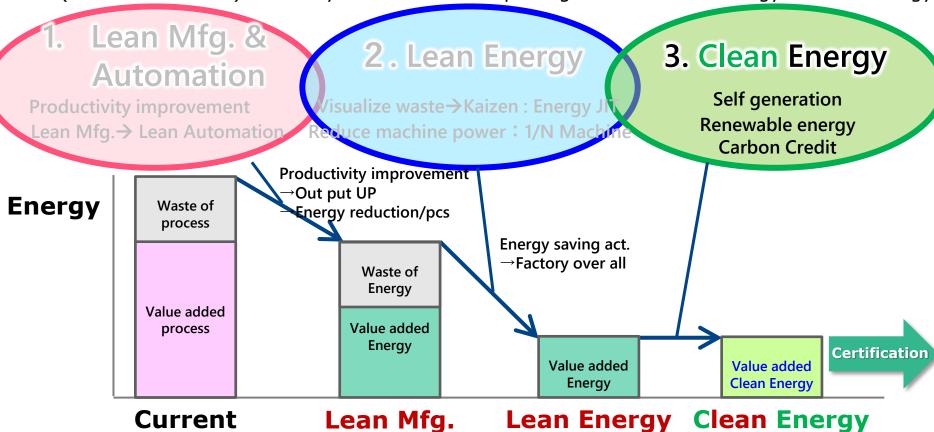
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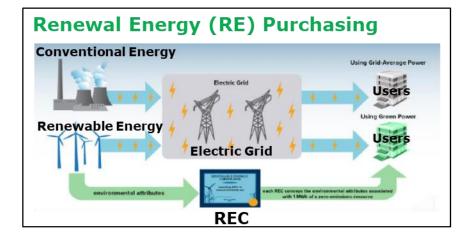
Clean Energy

[Thinking way] Continuous effort to increase energy generation









RE Self-Generation

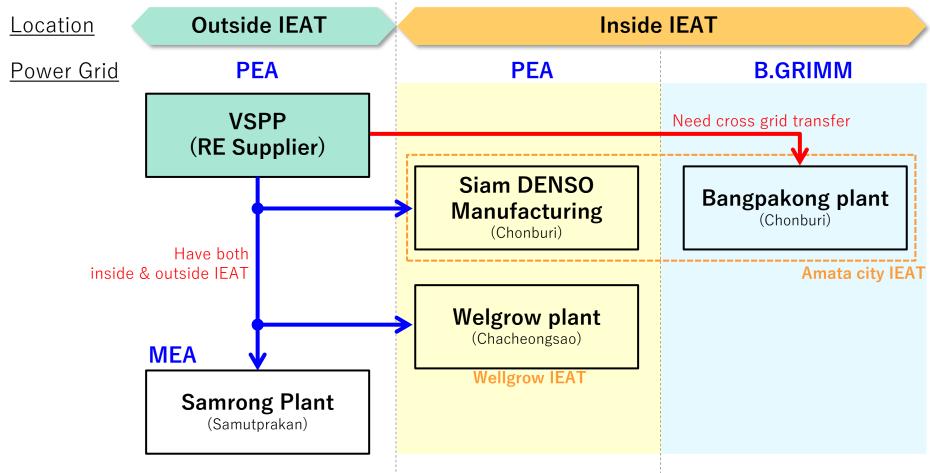
Thinking way Continuous effort to increase energy generation

Example: Siam DENSO Manufacturing Factory (Chonburi) Phase 3 (2022 Apr~) > 15,517 m² 2 MW Phase 2 (2020) 16,355 m² > 2 MW Phase 1 (2018) 8,235 m² > 1 MW Total 30% of overall energy

However only internal energy generation is not enough. RE purchasing is key issue to achieve competitive ${\rm CO}_2$ Neutrality.



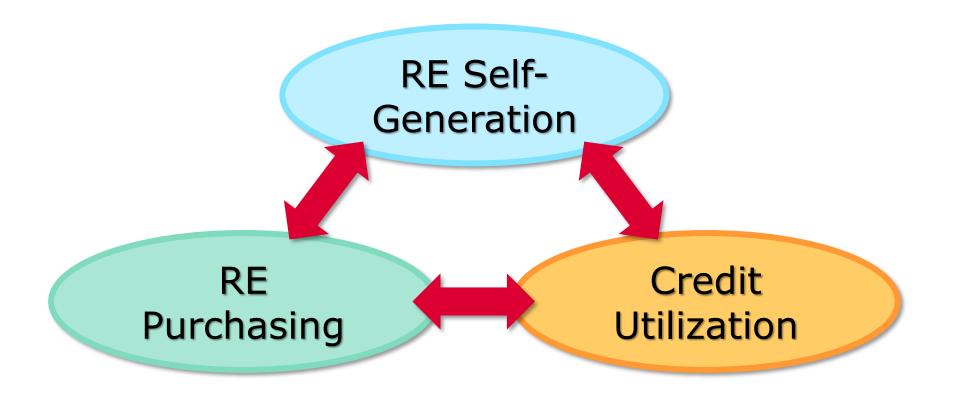
Difficulty in RE Purchasing in DENSO Case



Various environment may affect "Stable & Competitive" RE purchasing → Collaborate with FTI in RE promotion



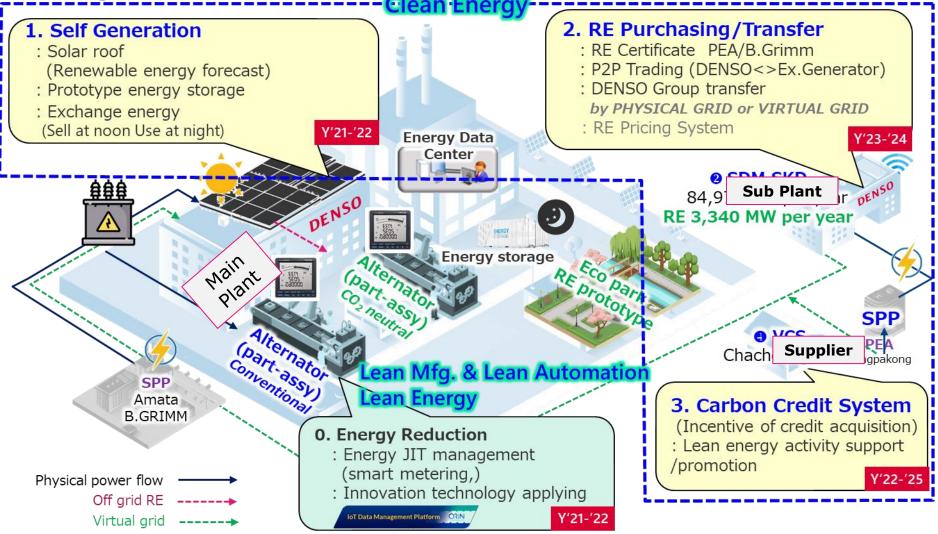
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Image of Carbon Neutrality Sandbox Model



To realize Mother plant to be Carbon Neutrality model for Thailand industries within 2025.



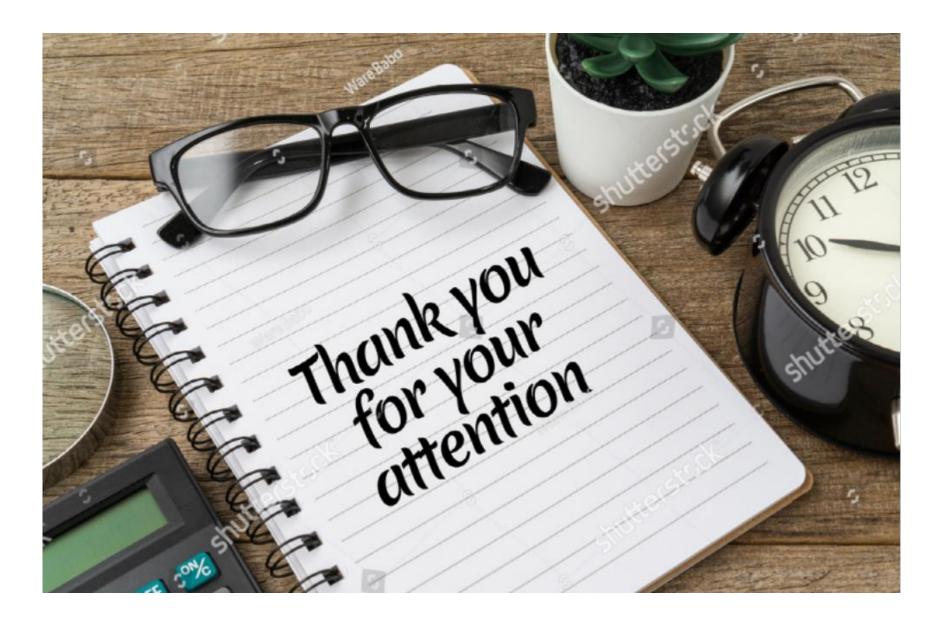
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- ☐ **Government incentive programs** may help to accelerate CO2 Neutrality realization (Energy saving, RE generation, Credit).







CARBON NEUTRAL

ความท้าทายของผู้ผลิตชิ้นส่วนยานยนต์ไทย EP.2



Presented by : Sompol Tanadumrongsak (Chairman of the Executive Committee)

| Fortune Parts Industry Public Company Limited

FPI at a glance – "We are one of the leading plastic automotive parts manufacturer in Thailand"



ONE STOP SERVICE

ส่งออก 140 ประเทศ ใน 6 ทวีป





1. Products Produced by FPI





2. Trading Products



SERVICE





STANDARD







ISO 50001: 2011



ISO 14001: 2015



Roadmap to Low Carbon and Sustainable Business

















- SET Sustainability Awards Outstanding
- Prime Minister's Award 2018 Best Exporter and Best Thai Brand
- SDGs & FPI Sustainability Strategy
- IATF 16949: 2016
- ISO 14046 Water footprint
- Carbon Footprint Process Carbon Label Process Reduction Label
- Global Reporting Initiative (GRI)
- Care the Bear/ Eco Event
- Heat and Electrical Facilitator Award
- SDG 13 Targets





- ESG 100
- Corporate Sustainability Advisory Program

2559 / 2016

Global Reporting Initiative (GRI)











2557 / 2014 - Start ISO 14001, ISO 16949.

2546 / 2003

ISO 9001, OHSAS18001

- CSR-DIW

2558 / 2015





reen Industry

2560 / 2017

- Thailand Sustainability Investment 2017
- SET Sustainability Awards Rising Star

- ISO 14064, ISO 14067 Carbon Footprint of Products, Carbon of Process, Carbon
- ESG 100
- Global Reporting Initiative (GRI)
- Care the Bear/ Eco Event
- SDG 10 Targets













2561 / 2018

- ISO 50001: 2011
- ISO 14001
- Energy Management Awards
- **Footprint Reduction Label**







- Internal Carbon Pricing (ICP) LCS
- LCSi Award Outstanding from TGO
- ZWL-DIW Certification
- Ethics Club of the Thai Chamber of **Commerce Brooch**
- SDG 16 Targets
- Cr6+ Free
- Race to Zero

2566 / 2023

2565 / 2022

2564 / 2021

2563 / 2020

- 1st company in SEA (Automobiles & Components): Science Based Targets (SBTi)

Approval & Publication & 4th of setting target on

- 1.5degree scenario in the world
- Sustainability Innovation Values
- PEA-Global Sustainable Energy and **Environment Award (PEA-GSEE)**
- Carbon Neutral Man
- SDG 14 Targets
- Green Industry level 4
- Zero Waste to Landfill
- Biomass Boiler 100%
- Certificate of Thai Chamber of Commerce
- **Business Ethic Standard Awards**

- SET Sustainability Awards - Highly Recommended

- Thailand Sustainability Investment 2019
- ISO 50001:2018
- ISO 45001:2018
- Science Based Targets (SBTi): Target Development
- ESG 100

2562 / 2019

- T-VER
- Carbon Neutral Event
- Care the Bear/ Eco Event
- Green Office
- The Prime Minister's Industry Awards 2019 (Potential Industry)
- Sustainability Disclosure Awards
- Global Reporting Initiative (GRI)
- SDG 13 Targets

- Circular Mark Circular in Action
- Circular Economy Standard Verified
- Circular economy management system for organization
- Carbon Disclosure Project (CDP)
- Carbon Footprint of Circular **Economy Product (CE-CFP)**
- Industry 4.0

2567 / 2024

- Achieve the SBTi Target by 25.2 % of GHG Emission Reduction

ECO

- EE 83.57 thousand BHT/ tCO e
- Factor X 1.50















































Our Business and Our Challenges

Automobile Part Industry Challenges



Carbon Neutral by 2039



Carbon Neutral by 2050



Carbon Neutral by 2050



Carbon Neutral by 2051



Carbon Neutral by 2050



Carbon Neutral by 2040



Carbon Neutral by 2050



Carbon Neutral by 2050



Carbon Neutral by 2035



Carbon Neutral by 2045



Carbon Neutral by 2050



Carbon neutrality before 2050

FPI Challenges











25.2

Target: FPI has set a target for GHG Emission Reduction 25.2% with SBTi by 2024, base-year 2018



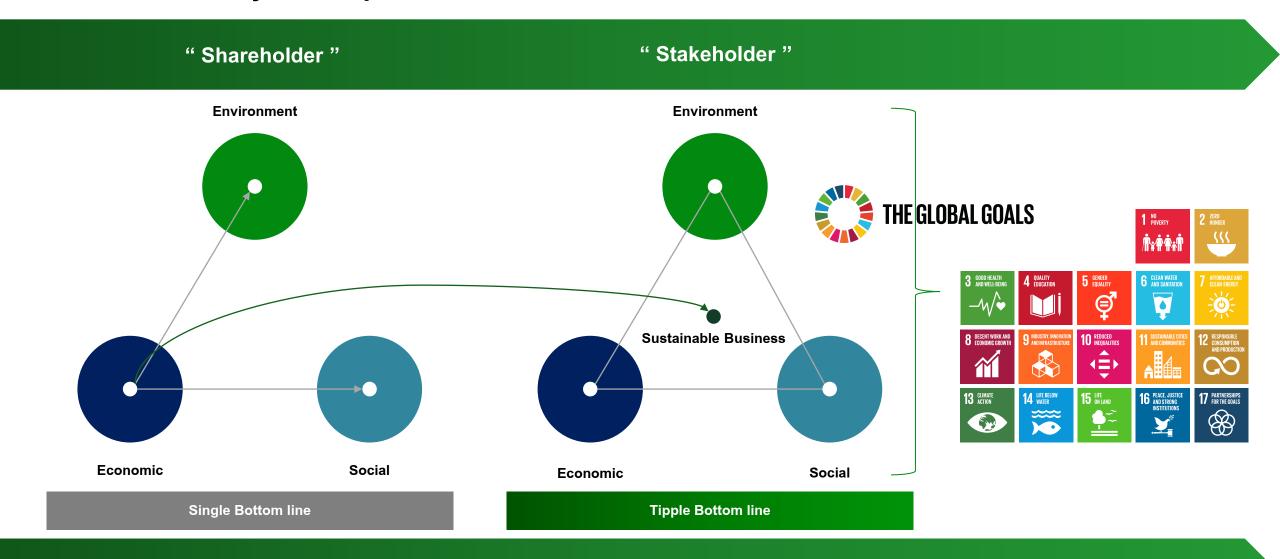
Target: FPI has set a target for GHG Emission Reduction 42% by 2026, base-year 2016



Target: FPI has set a target Carbon Neutrality (Scope I&II) by 2040

Management to Reduce Greenhouse Gas Emissions

FPI Sustainability development



Past: Profit - Driven Business

Future: Value - Driven Business

FPI Sustainability development

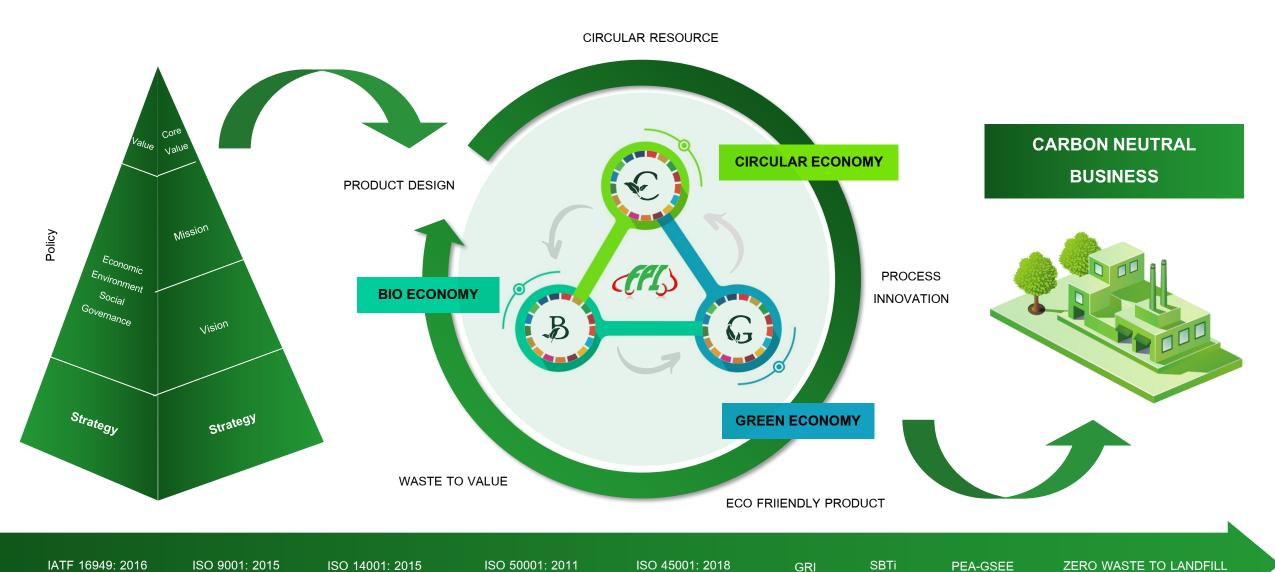


Autonomous

Environment

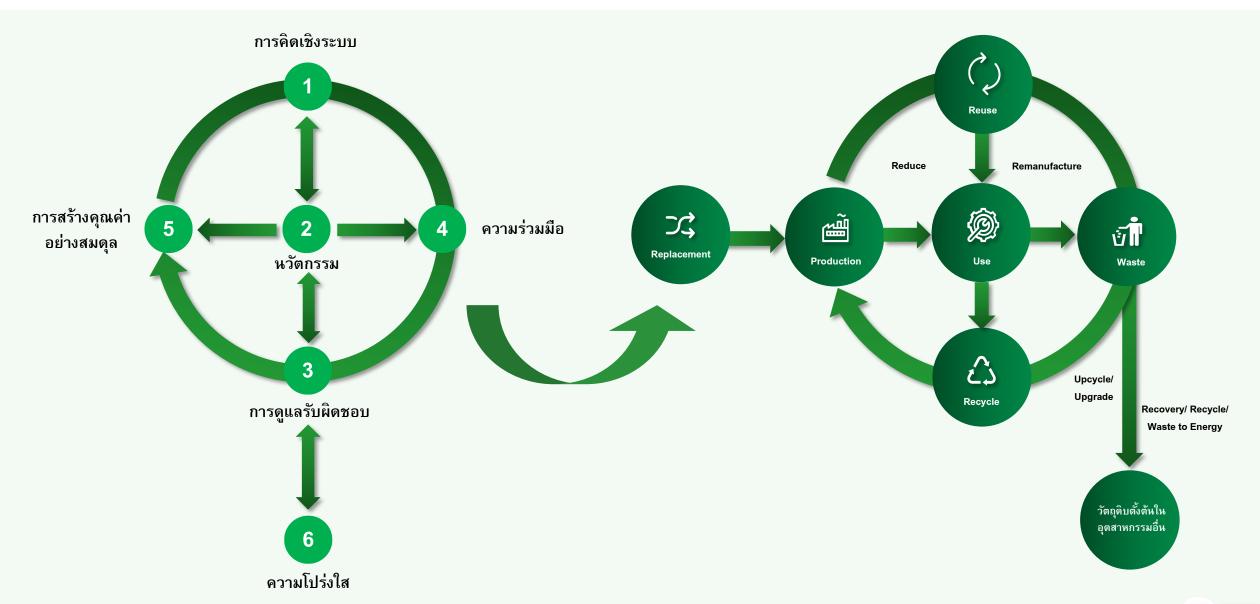
Transformation

FPI Sustainable Management to Achieve GHG Reduction Target with BCG Model



(PL)

FPI Sustainable Management to Achieve GHG Reduction Target with BCG Model



How to Implement to Achieve GHG Reduction Target

1.Assessment







2. Target Setting



SBTi

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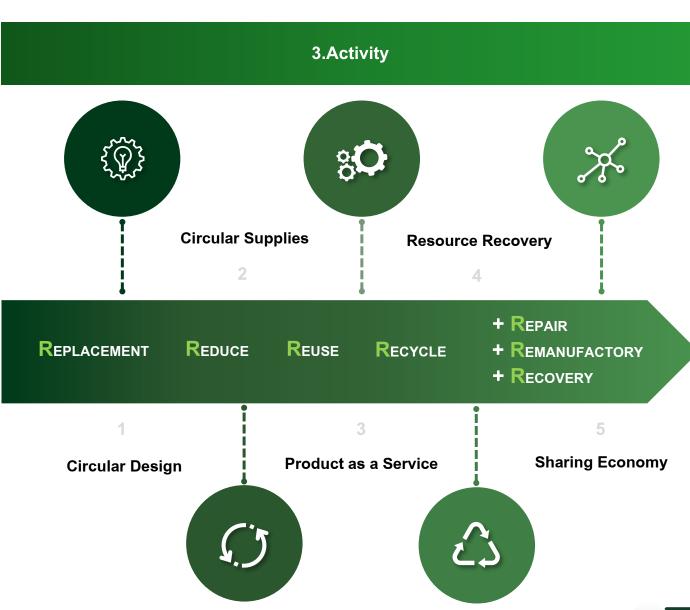




Target: FPI has set a target

Carbon Neutrality

(Scope I&II) by 2040



How to Implement to Achieve GHG Reduction Target

Base year 2016



GHG Emission Scope I

1,267 tonCO₂e

3.15%



- 2. Fuel combustion: Mobile On-road **0.74%**
- 3. Fuel Combustion: Mobile Off-road **0.04%**
- 4. Product use & fugitive **0.04%**
- 5. Wastewater **0.25%**

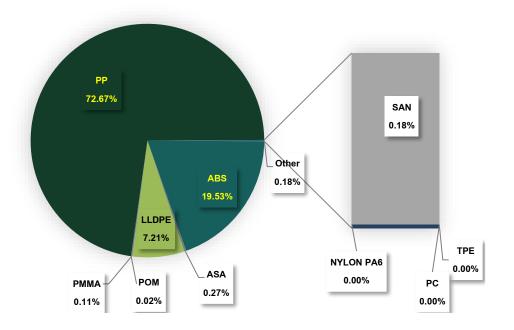


GHG Emission Scope II

9,183 tonCO₂e

22.85%

1. Electricity from national grid system **22.85%**





GHG Emission Scope III

29,740 tonCO₂e

74.00%

- 1. Purchased goods and services 62.69%
- 2. Capital goods
- 3. Fuel-and energy-related activities 8.18%
- 4. Upstream transportation and distribution
- 5. Waste generated in operations 3.13%

- 6. Business travel 0.03%
- 7. Employee commuting
- 8. Upstream leased assets
- 9. Downstream transportation and distribution
- 10. Processing of sold products

- 11. Use of sold products
- 12. End-of-life treatment of sold products
- 13. Downstream leased assets
- 14. Franchises
- 15. Investment

Highlights to Reduce Greenhouse Gas Emissions

ยืดอายุการใช้งานผลิตภัณฑ์ผ่านกระบวนการ R&D

EOE-Design

- ใช้วัสดุหลักเป็นเม็ดพลาสติกรีไซเคิล
- ออกแบบให้มีน้ำหนักเบา
- ออกแบบให้1-Part ใช้ได้กับหลากหลาย Model
- 📠 ลดปริมาณการใช้สารต้องห้าม
- ลดการใช้วัตถุดิบและของเสียใหการผลิต
- ใช้วัตถุดิบหมุนเวียนแทนการใช้วัตถุดิบจากฟอสซิล

ผลิตภัณฑ์ End-of-life สามารถนำชิ้นส่วนมารีไซเคิลได้













- Renewable Energy 41%, Biomass 100% Solar 13%
- Recycle Plastic 82.15%, Reuse 1.43%
- Mold Remanufacturing







ECO FRIIENDLY PRODUCT









PROCESS INNOVATION







กระบวนการผลิตที่เป็นมิตรต่อ สิ่งแวดล้อม

- ฉีด
- มัก
- พ่นสึ





- RPA (Robotic Process Automation)
- Andon i-Factory
- ผลิตไอน้ำที่เป็นมิตรต่อสิ่งแวดล้อม









PRODUCT DESIGN

CIRCULAR RESOURC

PROCESS INNOVATION

ECO FRIIENDLY PRODUCT

WASTE TO VALUE



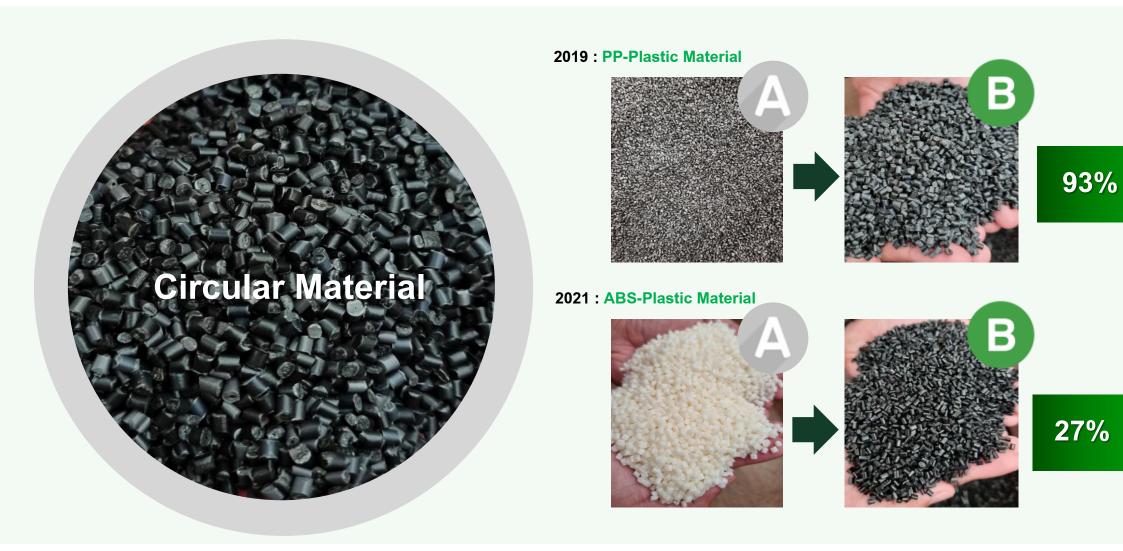
PRODUCT DESIGN

CIRCULAR RESOURCE

PROCESS INNOVATION

ECO FRIIENDLY PRODUCT

WASTE TO VALUE



PRODUCT DESIGN

CIRCULAR RESOURCE

PROCESS INNOVATION

ECO FRIIENDLY PRODUCT

WASTE TO VALUE

100%



2017: Thermal Energy



2018 : Electrical Energy



13%

PRODUCT DESIGN

CIRCULAR RESOURCE

PROCESS INNOVATION

ECO FRIIENDLY PRODUCT

WASTE TO VALUE



PRODUCT DESIGN

CIRCULAR RESOURC

PROCESS INNOVATION

ECO FRIIENDLY PRODUCT

WASTE TO VALUE















ECO FRIIENDLY PRODUCT



Circularity indicators:



Key Resources







Cost Structure



Revenue Streams

"CE MANAGEMENT SYSTEM"

"PRODUCTION PROCESS"

- ปรับหนาแน่นเม็ด PP-B เพื่อลดการใช้วัตถุดิบ ขณะที่คุณภาพคงเดิม
- ใช้พลังงานสะอาด
- ปฏิบั Condensate กลับมาให้ฟ้า
- ไม่มีการปล่อยของเสีย
- ไม่มีการใช้สารเคมี
- ลภารปล่อยก๊าซเรื่อนกระจก



CIRCULAR MARK

FRONT BUMPER

1-Ton Pickup:

Plastic type PP

"CIRCULAR DESIGN"



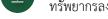
RECYCLE ใช้ Recycle PP (PP-B) เป็นวัตถดิบ 98%



REUSE ใช้ Reuse-Plastic เป็นวัตถุดิบ 2%



REDUCE ลดความหนา EPE จาก 2 mm เป็น 1.5 mm เพื่อลดการใช้ ทรัพยากรลง 25%





REDUCE ลดการใช้บรรจุภัณฑ์ (กล่อง) 100%



RECYCLE MATERIAL 98%











2 mm

1.5 mm

ข้ออาหนด

- การออกแบบเพื่อการหมุนเวียน (CIRCULAR DESIGN)
- กระบวนการผลิต (PRODUCTION PROCESS) ที่ส่งเสริมการหมุนเวียนและเป็นมิตรกับสิ่งแวดล้อม
- ระบบจัดการเศรษฐกิจหมุนเวียน (CIRCULAR ECONOMY MANAGEMENT SYSTEM)
- การใช้งาน (USE) นี้คานึงถึงผลกระทบต่อการหมุนเวียนของวัสดุ หรือ ผลกระทบต่อสิ่งแวดล้อมในภาพรวม
- การจัดการของเสียหลังหมดอายการใช้งาน (END-OF-LIFE) ส่งเสริมการคัดแยกของเสีย การรับคืน และ การอาจัดของเสีย ที่แสดงให้เห็นถึงการขยาย ความรับผิดชอบของผู้ผลิต (Extended Producer Responsibility, EPR) ที่ส่งเสริมการหมุนเวียนของวัสดุ
- 12Rs

CIRCULAR MATERIAL 100%

- การลดการใช้ (reduce)
- การใช้ช้า (reuse)
- การรีไซเคิล (recycle) การเรียกคืน (reclamation)
- การปรับปรุง (recondition) การบากลับคืนมาใหม่ (recover)
- 1) การปรับปรงใหม่ (refurbish)
- 2) การผลิตใหม่ (remanufacture)
- การซ่อมแซม (repair) การส่งคืน (return)
- - 6) การออกแบบใหม่ (redesign)







PRODUCT DESIGN

CIRCULAR RESOURCE

PROCESS INNOVATION

ECO FRIIENDLY PRODUCT

WASTE TO VALUE

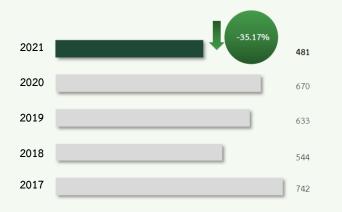


Zero Waste to Landfill



Reduction of Hazardous Waste

เป้าหมาย : ลดปริมาณของเสียอันตราย ร้อยละ 20 ภายใน ปี 2023 เทียบกับปีฐาน 2017





RECYCLE PLASTIC AND REUSE PLASTIC

PP-Plastic, ABS-Plastic

Circular Material

83.58%





- GHG Reduction 7,085 tCO2e/year
- Single Use Plastic Reduction 5,194 Ton/year
- ✓ Cost Reduction 60 Million Baht/year

MOLD REMANUFACTURING

- GHG Reduction 40.61 tCO₂e/model
- Raw Material Reduction 15,000 Kg/model
- Cost Reduction 900.000 Baht/model

Scope I, 377 Reduction 70,24% from baseline 2016

Scope II, 7,283 Reduction 38.42% from baseline 2016

Reduction 20.69% from baseline 2016

RENEWABLE ENERGY: THERMAL ENERGY

Biomass Boiler and Absorption Chiller



- GHG Reduction 3,073 tCO2e/year
- Energy Consumption from Fossil Fuels Reduction 630 Ton/year
- Cost Reduction 9 Million Baht/year

TRANSPORTATION MANAGEMENT







RENEWABLE ENERGY: ELECTRICAL ENERGY 83% ของพื้นที่หลังคา **Solar Roof**



- GHG Reduction 1,154 tCO2e/year
 - Energy Consumption from Fossil Fuels Reduction 8.3 Million MJ/year
 - ✓ Cost Reduction 4.4 Million Baht/year











Scope III, 18,315

Management Results to Reduce Greenhouse Gas Emissions

Results: GHG Reduction and Cost Reduction



GHG Reduction



Cost Reduction



GHG Emission Scope I

Reduction 890 tCO₂e : **70.24%** from base year 2016



GHG Emission Scope II

Reduction 1,900 tCO₂e : **20.69%** from base year 2016



GHG Emission Scope III

Reduction 11,425 tCO₂e : **38.42%** from base year 2016



Raw Material

Cost Reduction 60.9 Million Baht/year



Energy

Cost Reduction 13.4 Million Baht/year



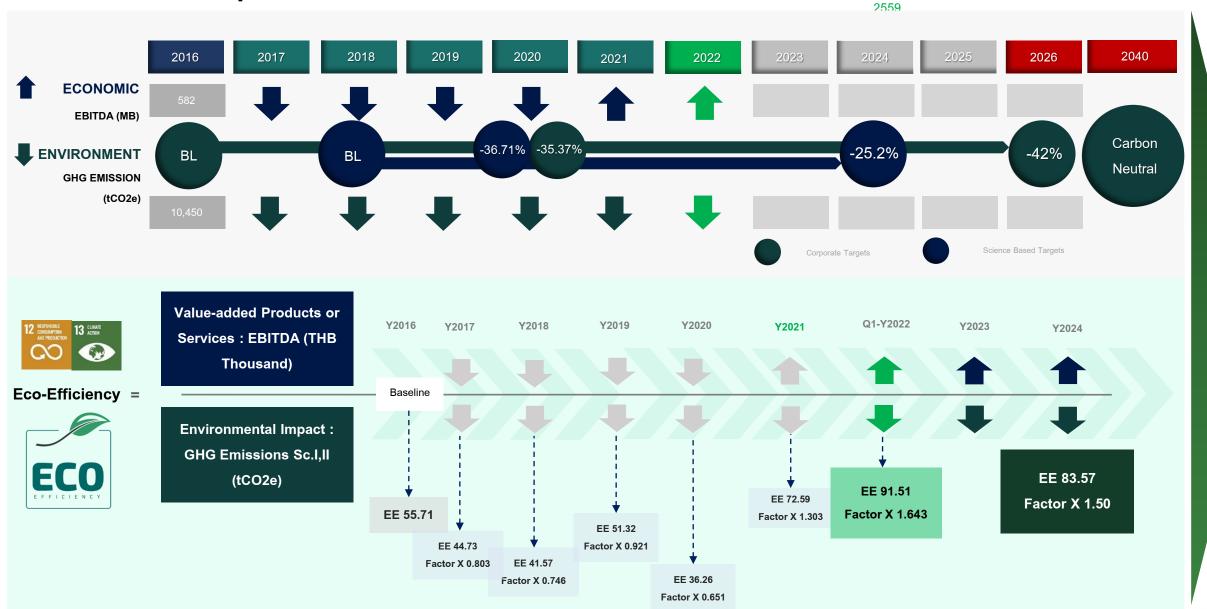
Waste to Value

Cost Reduction 4.7 Million Baht/year

Note: Result 2021

Results : Eco Operational Excellent

เป้าหมาย : ค่าประสิทธิภาพเชิงนิเวศเศรษฐกิจขององค์กร 83,567 บาทต่อตันคาร์บอนไดออกไซด์เทียบเท่า ที่ Factor 1.5 ปี 2567 จากปีฐาน



Summary of Management Challenges

Direction to Low Carbon and Sustainability Business





รักษาความสมดุลของ คุณค่าต่อผู้มีส่วนได้เสีย คำนึงถึงคุณภาพชีวิตและ ประโยชน์ของสังคม





ยกระดับการผลิตที่มีการ ปล่อยคาร์บอนสุทธิเป็นศูนย์

ร่วมมือพัฒนาพลังงานสีเขียว



COMMITMENT

Demonstrate commitment to policy and development goals



COMMUNICATION

Communication of the target to stakeholder in value chain



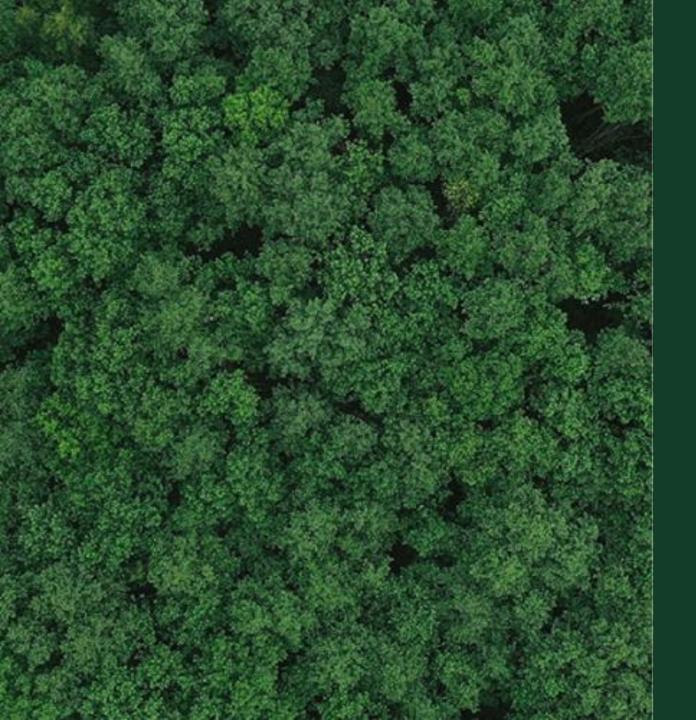
COLLABORATION

Stakeholder engagement and collaboration



CULTURE

Create a green culture leading to a sustainable business with social responsibility



Thank you



FORTUNE PARTS INDUSTRY PUBLIC COMPANY LIMITED

11/22 MOO. 20 NIMITMAI ROAD, LAMLUKKA, LAMLUKKA, PATHUMTHANI 12150 THAILAND

www.sd.fpiautoparts.com

Ampas Industries Co., Ltd.

For more than 40 years, Ampas Industries has grown to become the leading OEM of mirrors, lamps, and plastic parts in Southeast Asia.

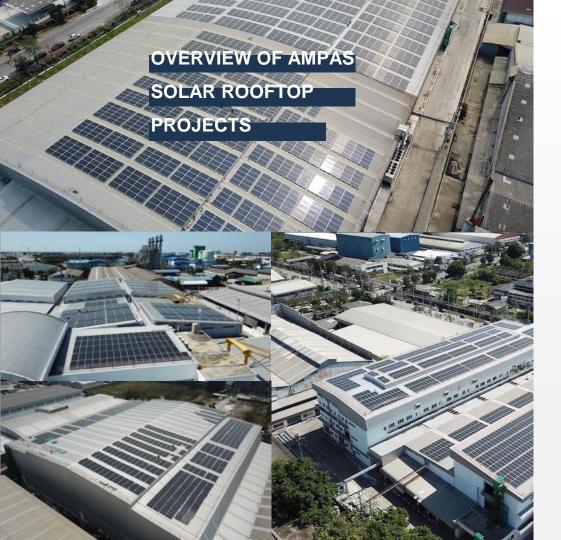
With 9 production facilities in the total area of 213,600 square meters, located in Bangpoo Industrial Estate, Ampas has supported all car and motorcycle makers in Thailand and the region.





Ampas Industries Co., Ltd. Tel: + 662 709 3668 www.ampas.co.th info@ampas.co.th





Ampas, 7 Factories In Samut Prakon

COD: February/March 2020

Total Power Installed: 5.084 MWp

PV modules: JA Solar 385 Wp

Inverters: Huawei Technologies SUN 2000-

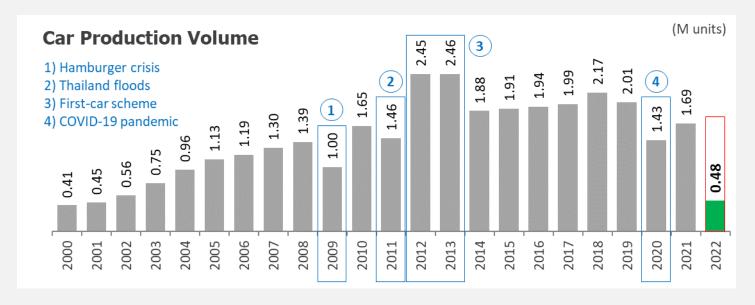
60KTL

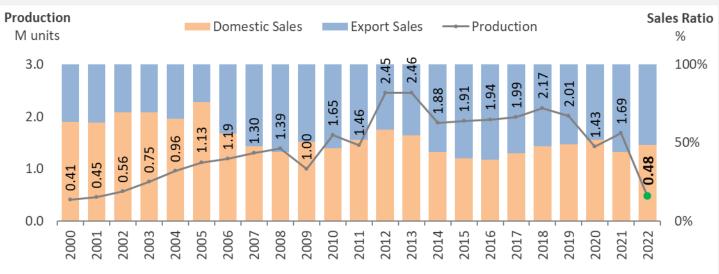


Thai Automotive and Auto-Parts Performance

Yr.2019-2022 (update Mar 2022)

Thailand Car Performance





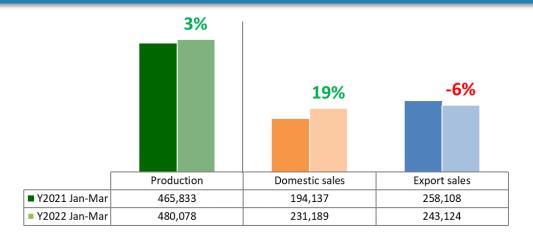
Forecast

Production volume Y2022 is around
 1.8 M units. Volume increase by 7%
 from last year and divided into 0.8 M units for domestic sales and 1.0 M units for exports.

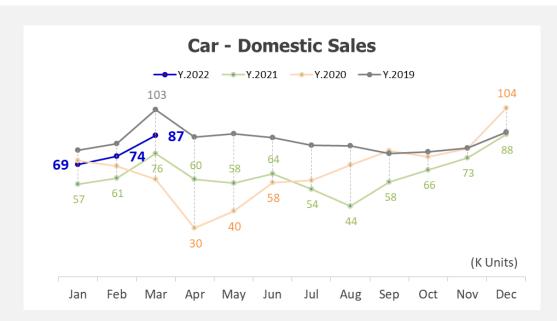
Actual

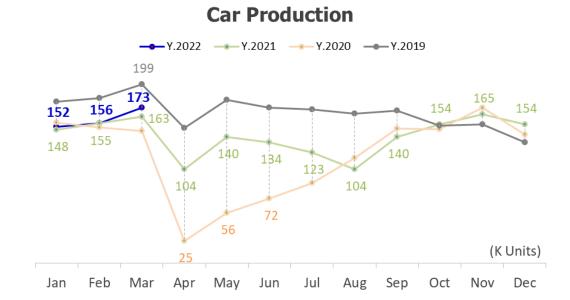
- Production volume of Jan-Mar 2022
 was 480,078 units, 27% as of forecast
- Sales volume of Jan-Mar 2022 was divided into 49% for domestic sales and 51% for exports.

Thailand Automotive Performance



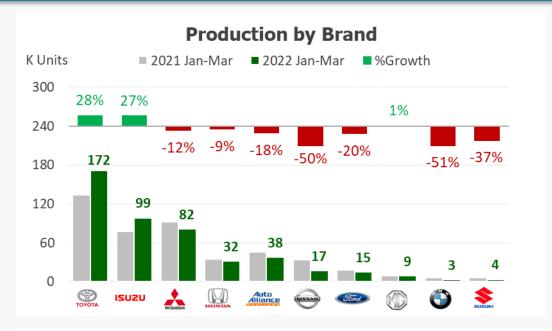
- Production of Jan-Mar 2022 growth 3% as yr.21
- Yr.2021 is a milestone to return 2 million unit.

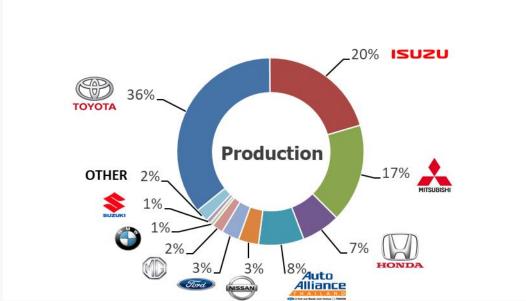


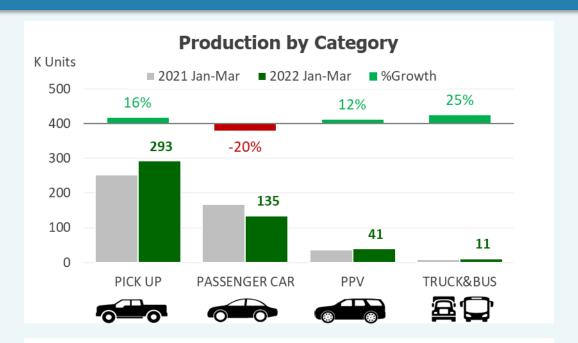


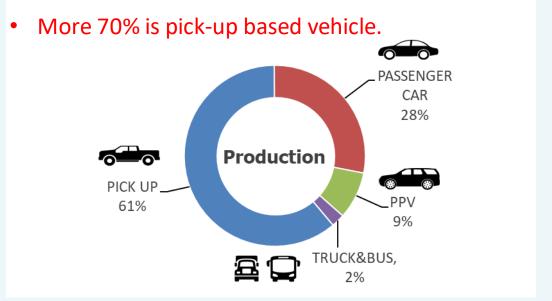


Thailand Car Performance

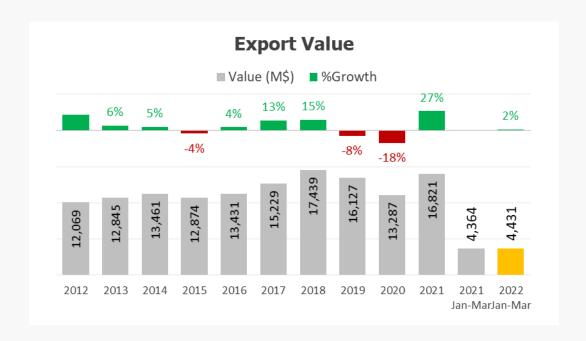




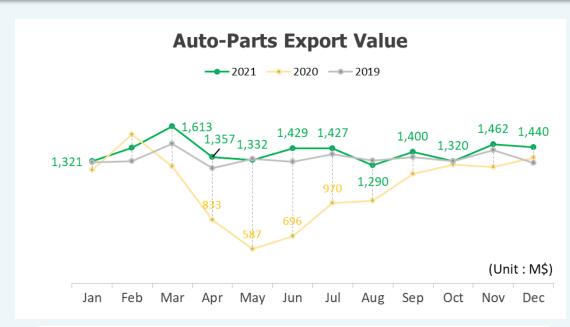


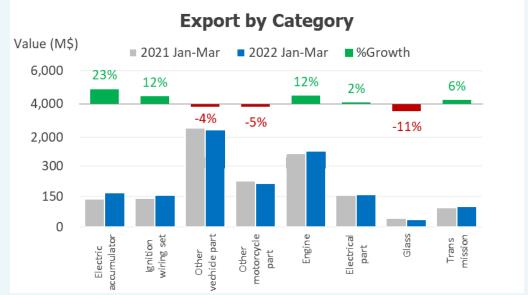


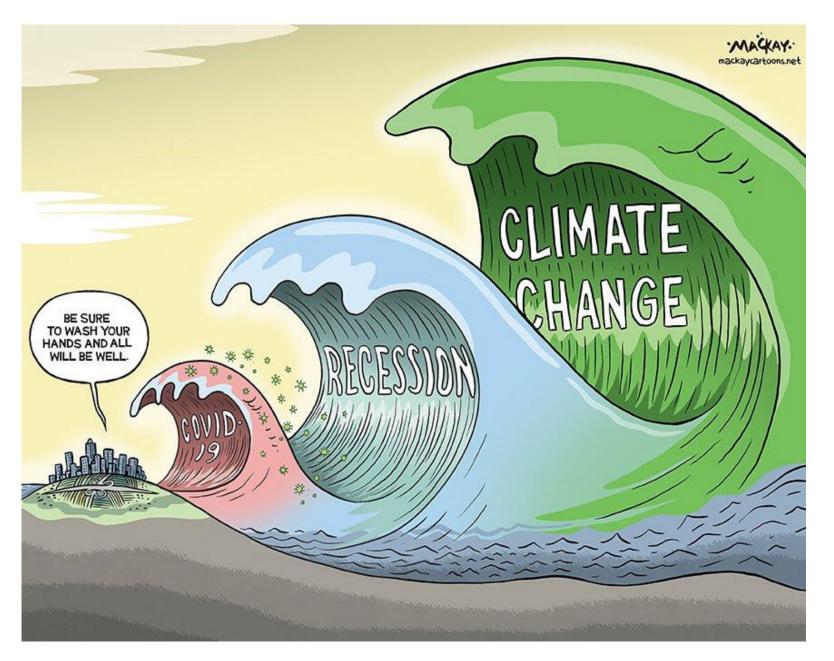
Thailand Auto-Parts Performance



- Auto-parts export value of Jan-Mar 2022 was 4,431 million USD, +2% as yr21.
 (Tire is excluded)
- Top five exporting counties (approx. 50% of total export) was USA, Japan, Indonesia, Malaysia and South Africa.
- Top export recorded in Yr.2018 and Yr.2021 at around 17,000 Mil USD. (550,000 MB if 32 THB/USD)







Credit: https://mackaycartoons.net/tag/climate-change/