KASIKORNTHAI

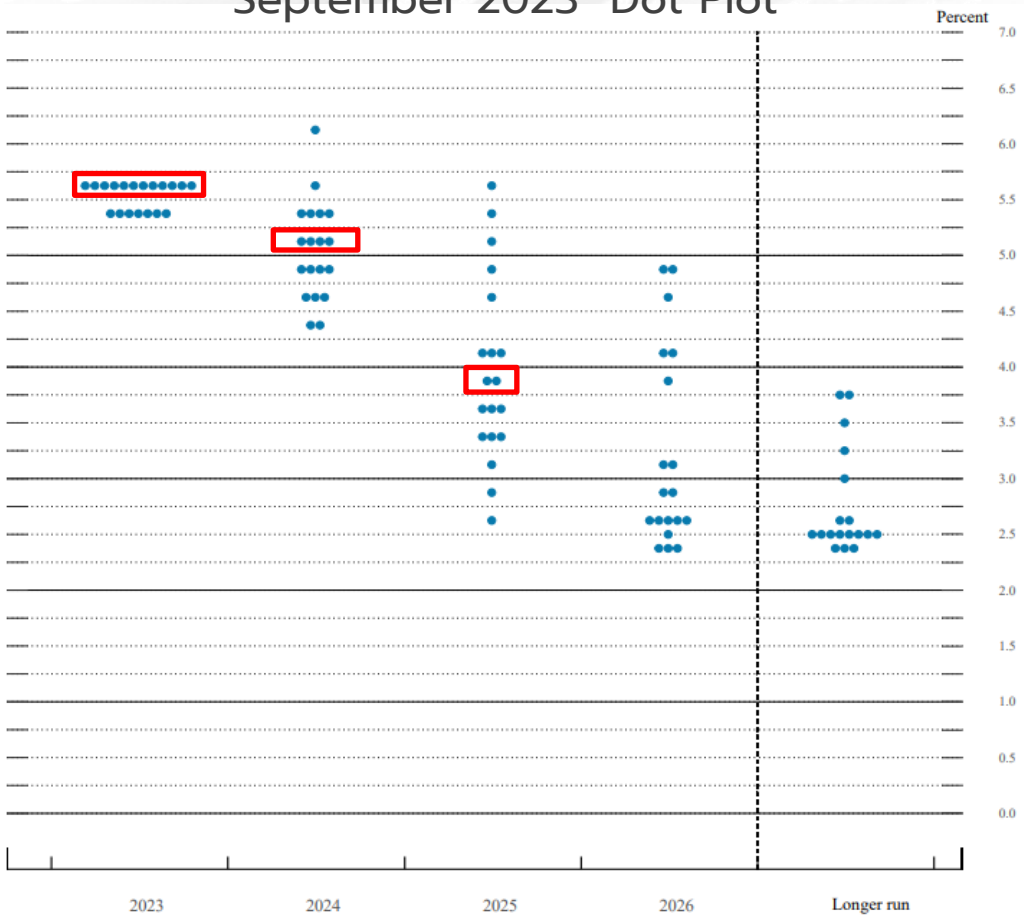
ศูนย์วิจัยกสิกรไทย
开泰研究中心 KASIKORN RESEARCH CENTER

Global Economic Outlook

Burin Adulwattana
Chief Economist and Managing Director

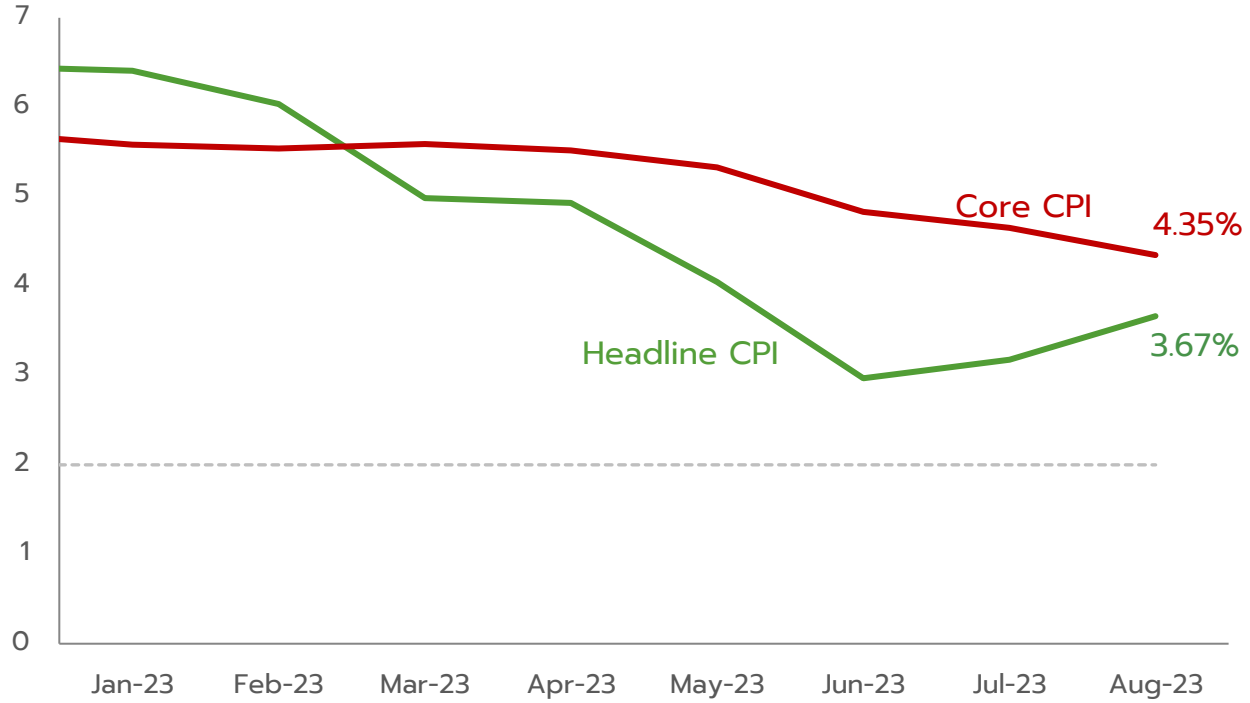
FED น่าจะขึ้นดอกเบี้ยอีกหนึ่งครั้งในปี 2023 และลดดอกเบี้ยสองครั้งในปี 2024

September 2023 Dot Plot



เงินเฟ้อพื้นฐานยังสูงกว่าเป้าของเฟดที่ 2%

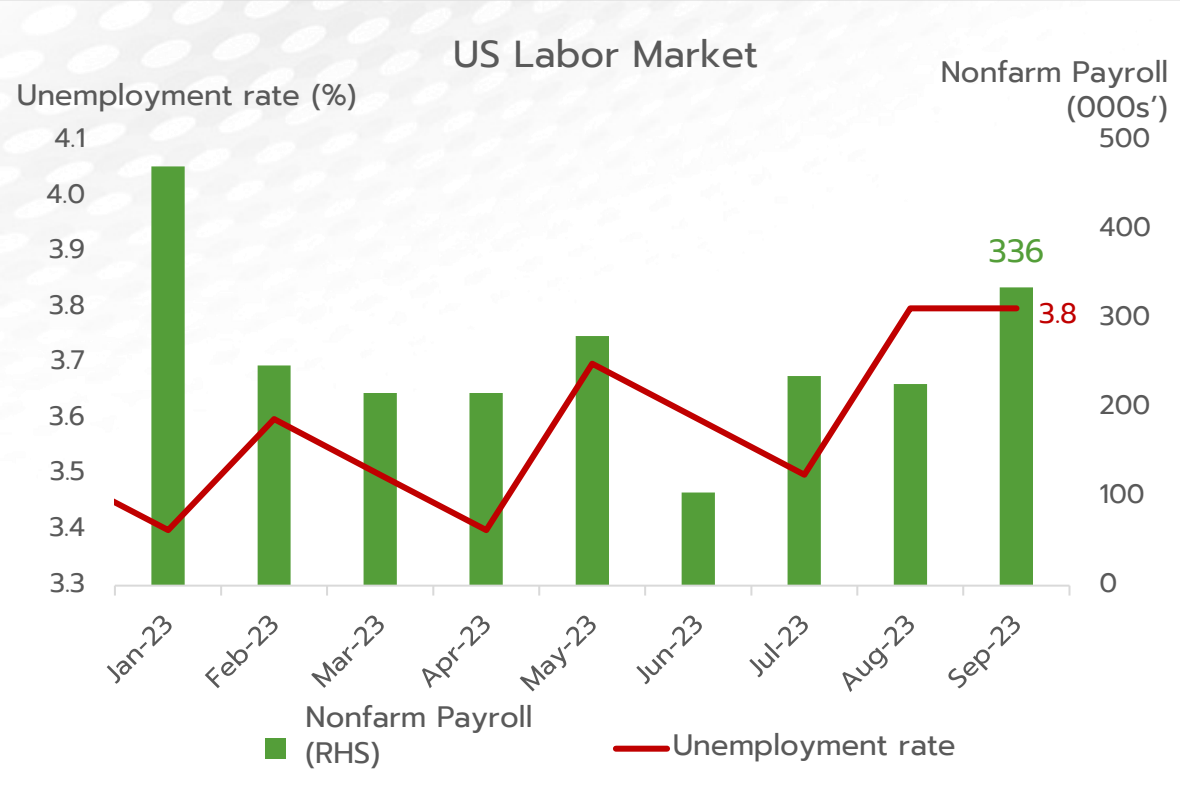
US Inflation (%YoY)



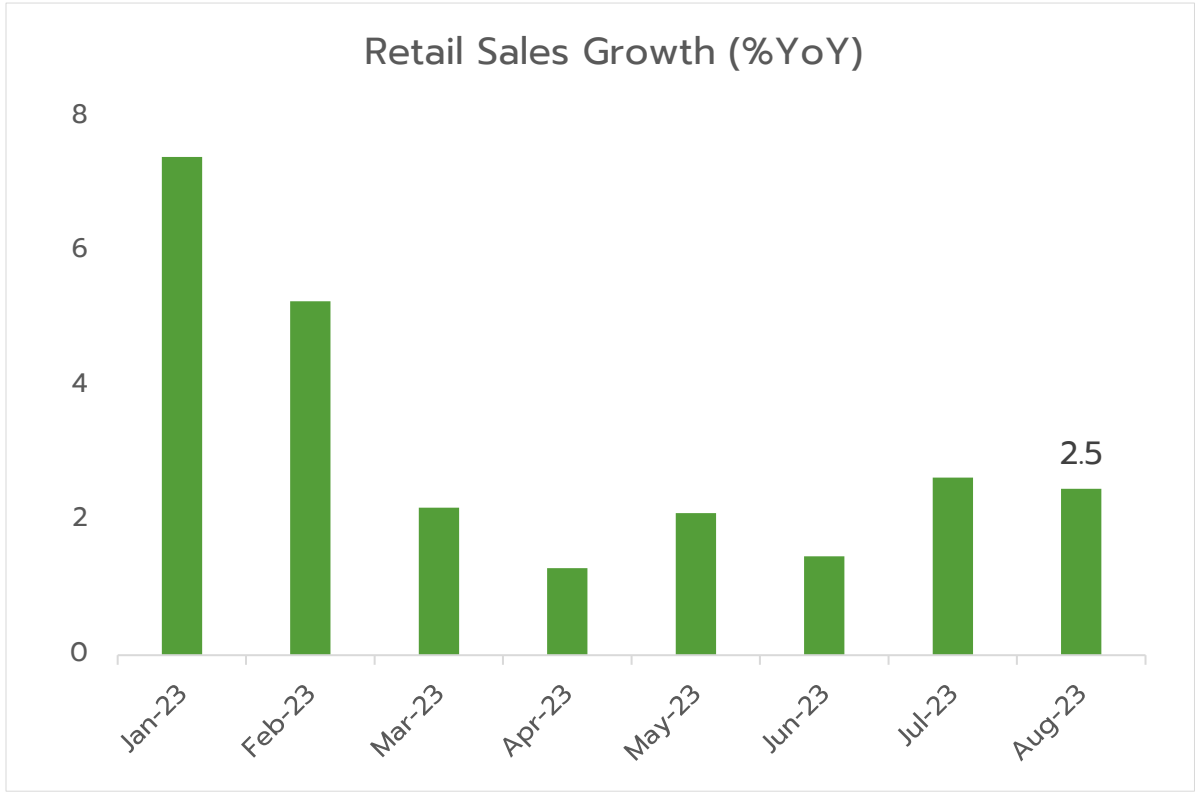
Source: Federal Reserve

เศรษฐกิจสหรัฐยังแข็งแกร่งสะท้อนผ่านตัวเลขตลาดแรงงานและยอดค้าปลีก ส่งผลให้ FED มีแนวโน้มจะคงดอกเบี้ยในระดับสูงยาวนานขึ้น

ตลาดแรงงานสหรัฐฯ ยังคงแข็งแกร่ง



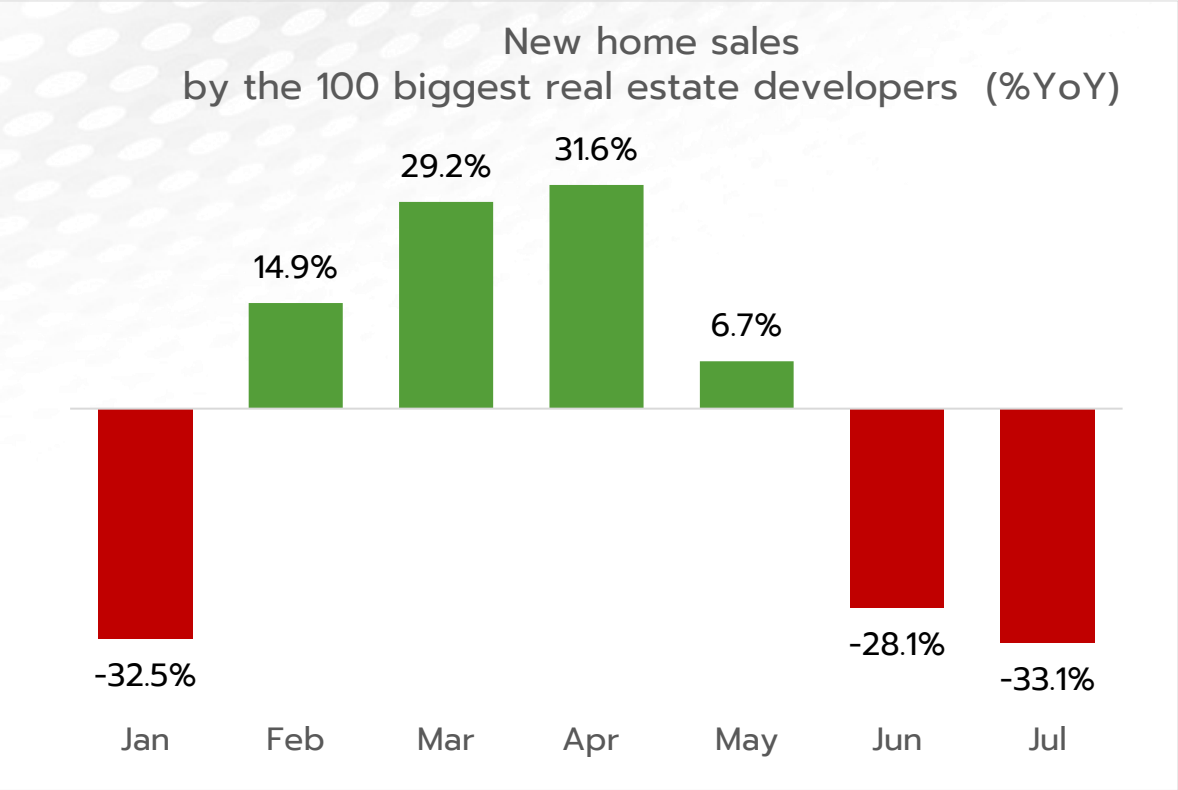
ยอดค้าปลีกยังขยายตัวได้ดี



Source: CEIC

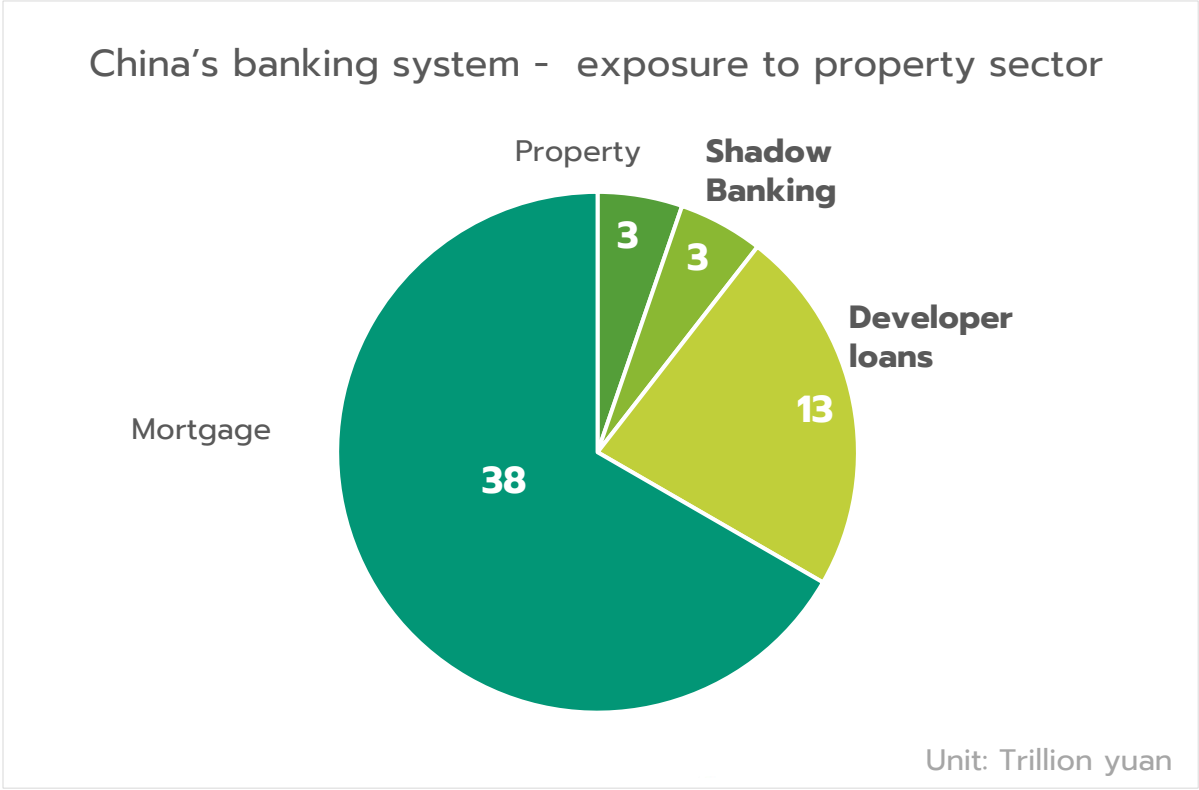
เศรษฐกิจจีนยังถูกกดดันจากภาคอสังหาริมทรัพย์

ยอดขายบ้านใหม่ของจีนยังคงปรับลดลง
แม้ทางการจีนจะมีมาตรการช่วยเหลือภาคอสังหาริมทรัพย์



Source: CRIC, Bloomberg, SCMP, Goldman Sachs

ภาคธนาคารจีนปล่อยสินเชื่อให้ภาคอสังหาริมทรัพย์
สูงถึง 40% ของ GDP



https://www.bloomberg.com/opinion/articles/2023-03-30/shadow-banking-don-t-look-at-china-the-us-also-has-a-problem

ภาคส่งออกได้รับผลกระทบจากอุปสงค์ที่ชะลอลงอย่างหนักทั่วโลก

การค้าโลกหดตัวต่อเนื่องตั้งแต่ปลายปี 2022 กดดันการส่งออกของจีน

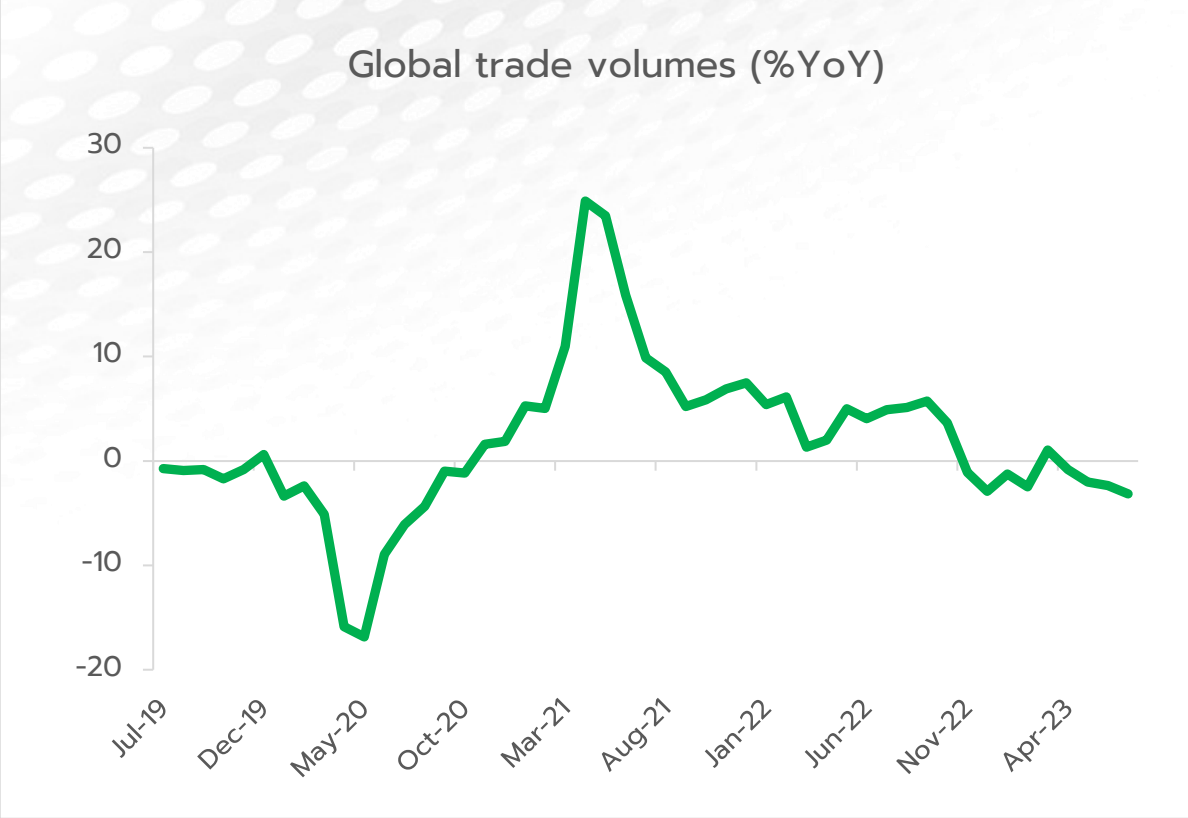
Source: CEIC
Note: *Aggregated from selected countries that has export value share about 80% in 2022

ภาคการส่งออกของจีน เผชิญกับปัญหา oversupply จึงต้องลดราคาสินค้าอย่างหนัก

Source: CEIC
Note: Index where previous year =100

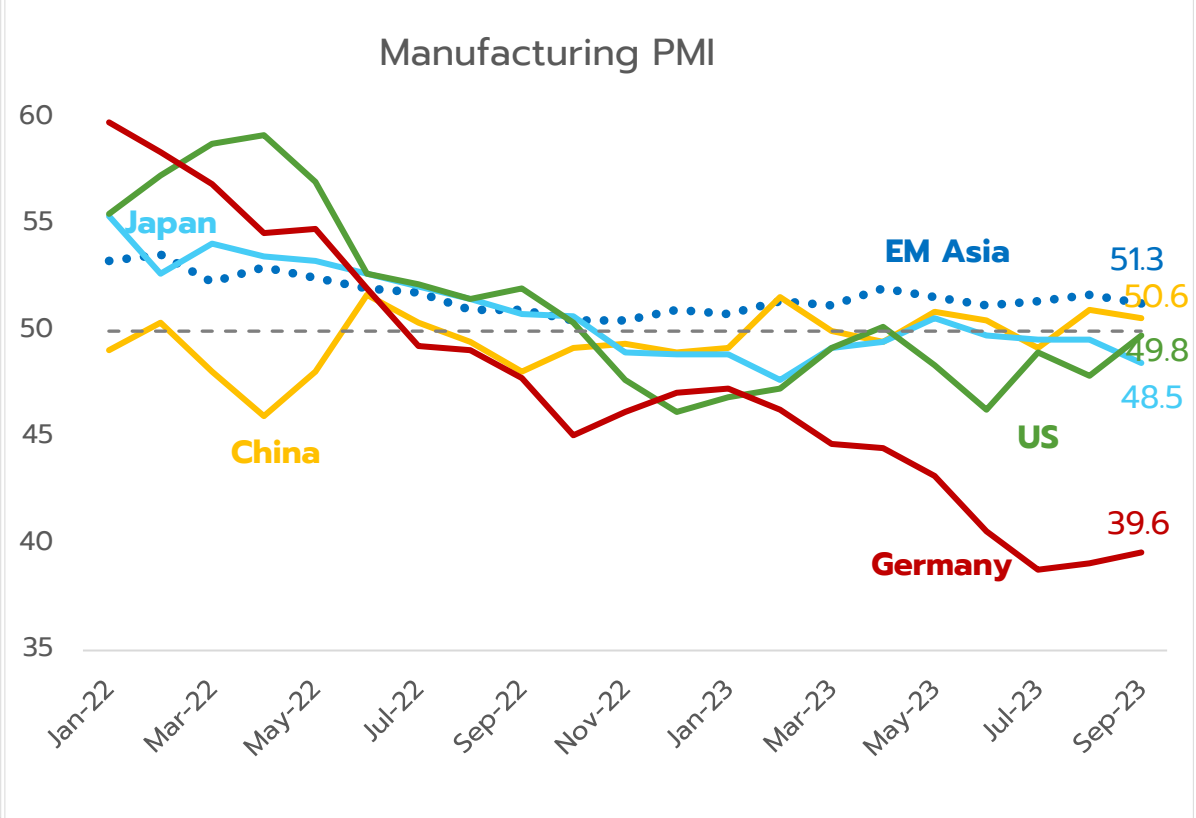
Global Trade Recession

การค้าโลกหดตัวกำลังเผชิญกับการ Destocking



Source: CPB

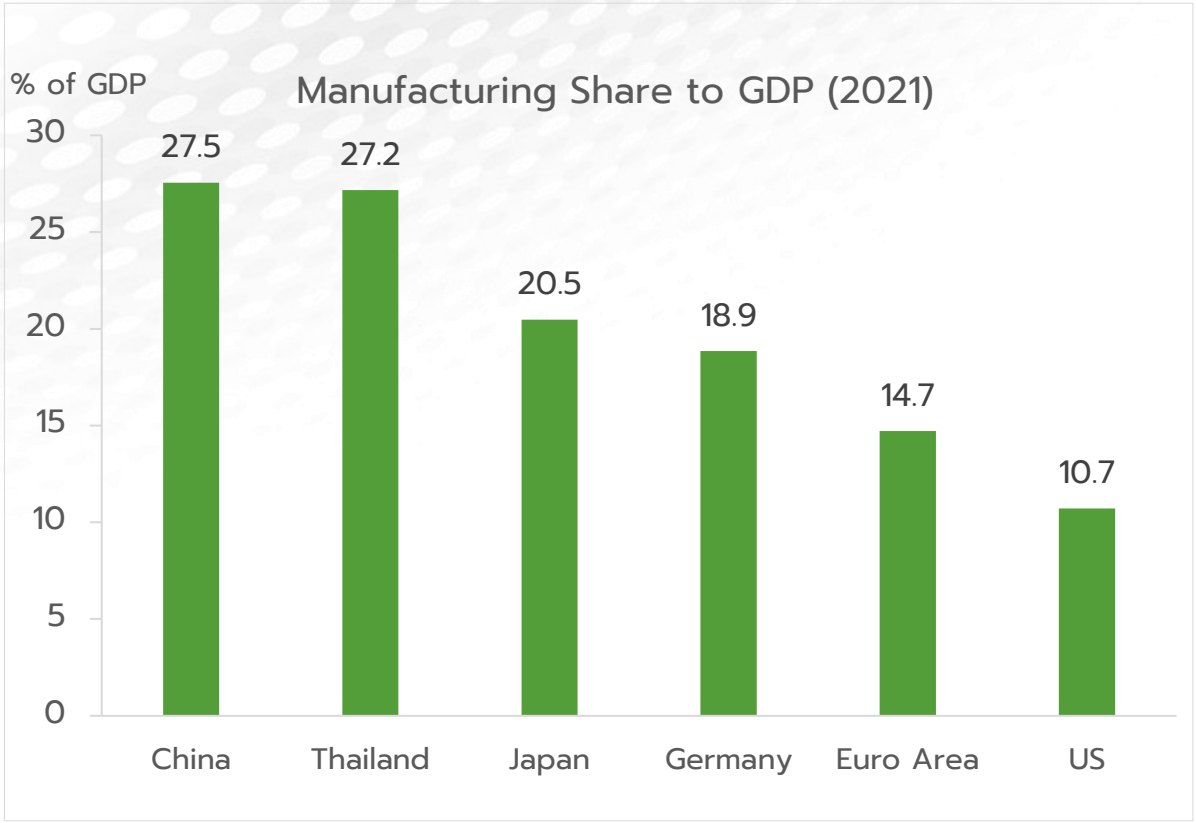
ภาคการผลิตหดตัวต่อเนื่องทั่วโลกโดยเฉพาะในเยอรมนี



Source: CEIC, S&P global

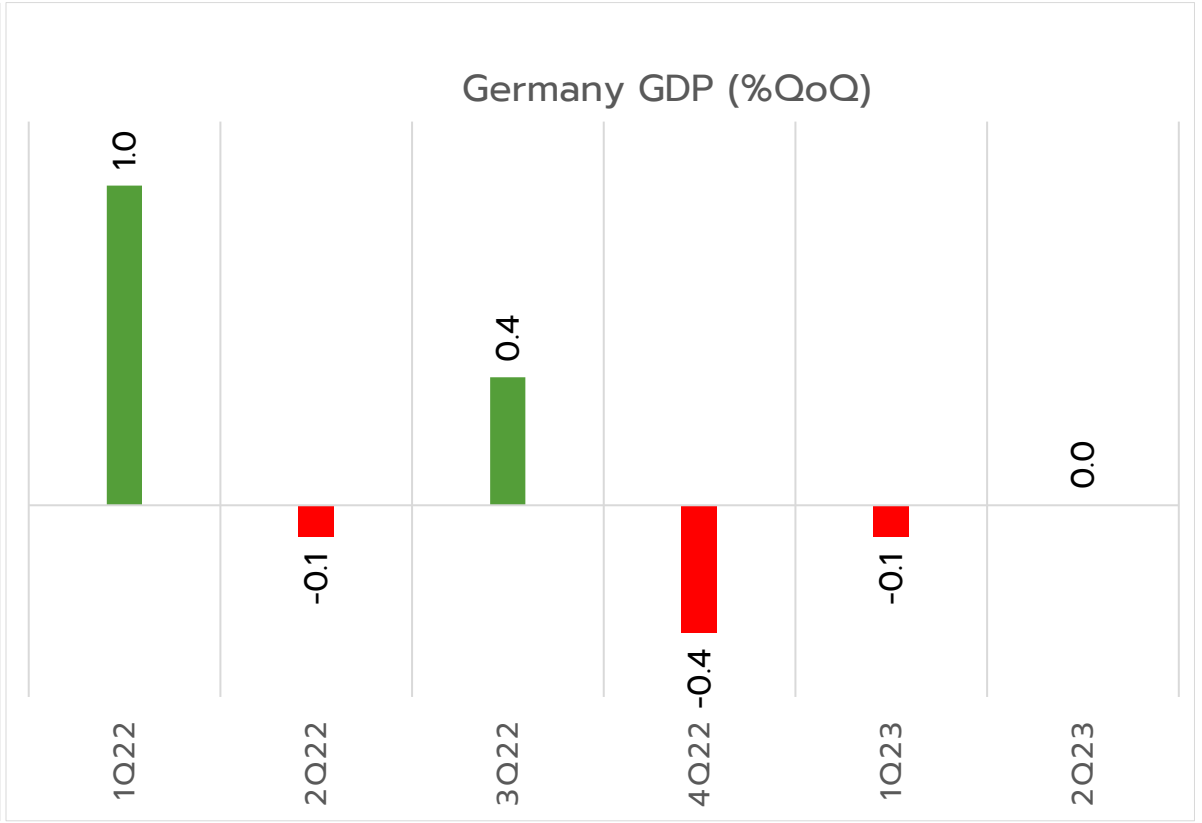
ภาคการผลิตทั่วโลกยังหดตัวต่อเนื่อง สะท้อนผ่านดัชนี PMI

เศรษฐกิจสหรัฐฯ พึ่งพิงภาคการผลิตค่อนข้างต่ำกว่าประเทศอื่นมาก



Source: CEIC

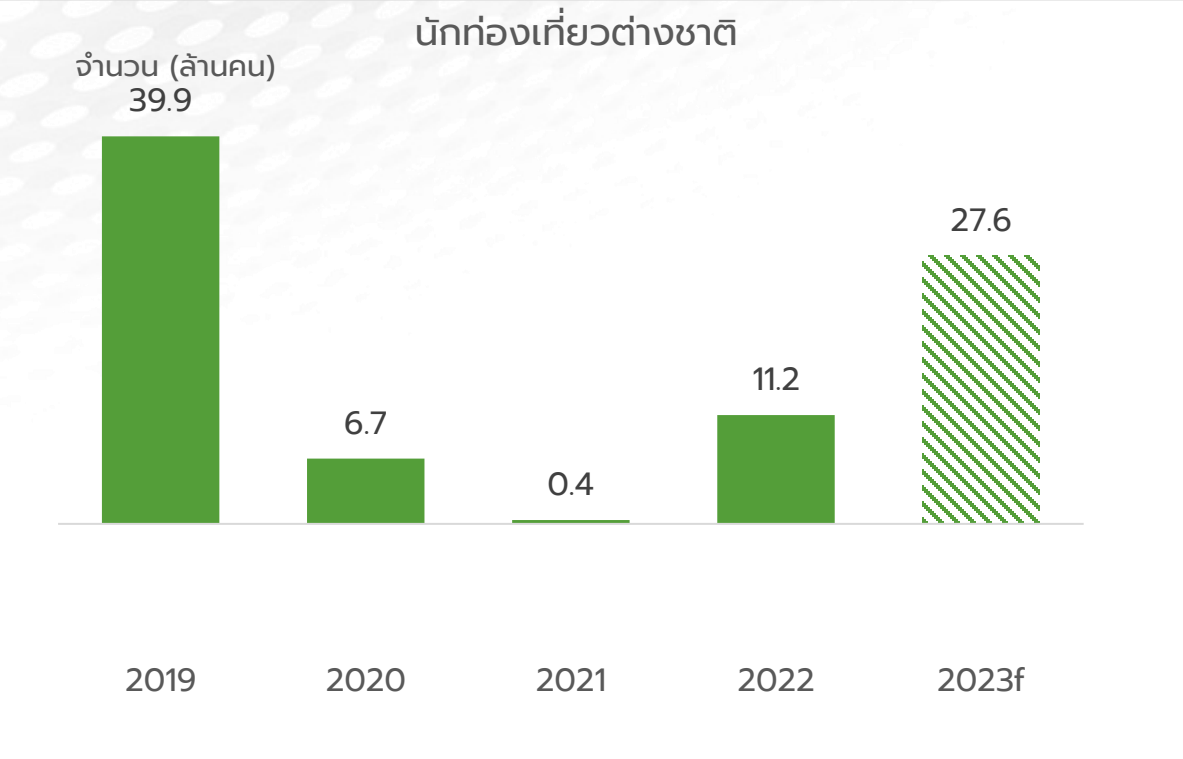
ส่วน Germany ถูกขนานนามว่า sick man of Europe?



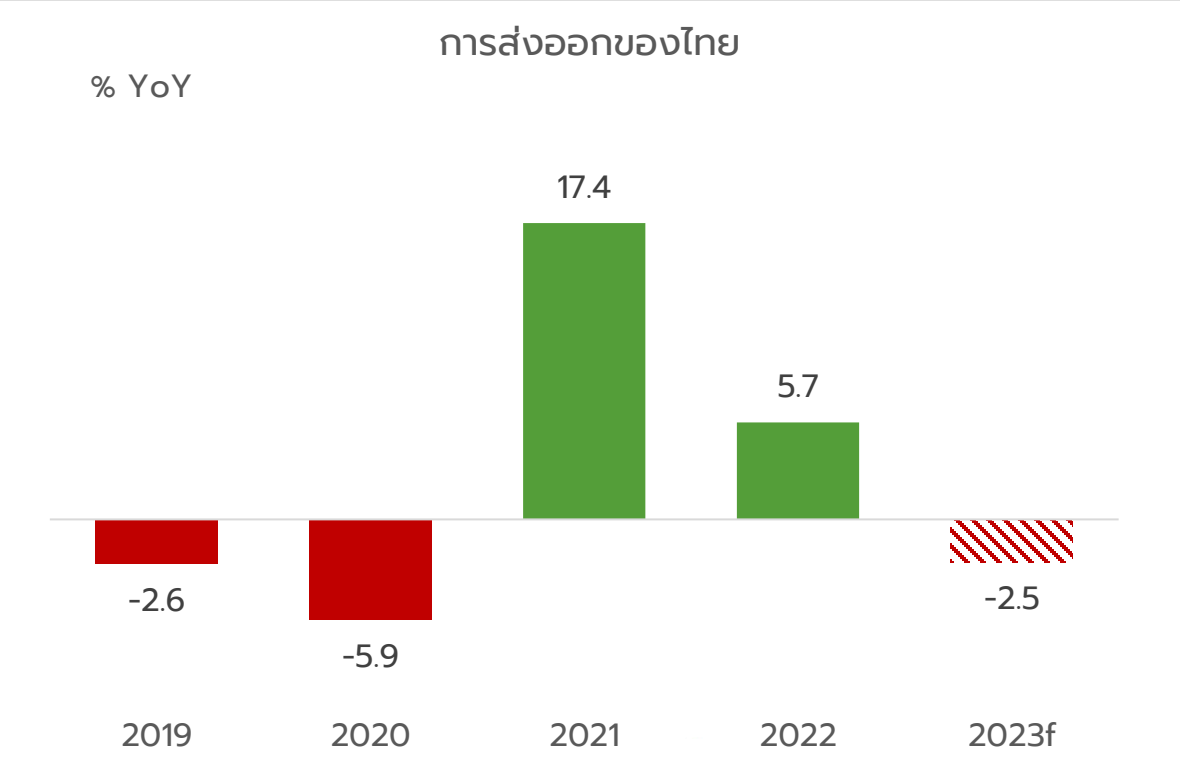
Source: OECD

เศรษฐกิจโลกที่ชะลอตัวโดยเฉพาะเศรษฐกิจจีนที่อ่อนแอ กดดันเศรษฐกิจไทยผ่านภาคท่องเที่ยวและการส่งออก

การท่องเที่ยวยังไม่ฟื้นตัวอย่างเต็มที่ โดยเฉพาะจำนวนนักท่องเที่ยวจากจีน



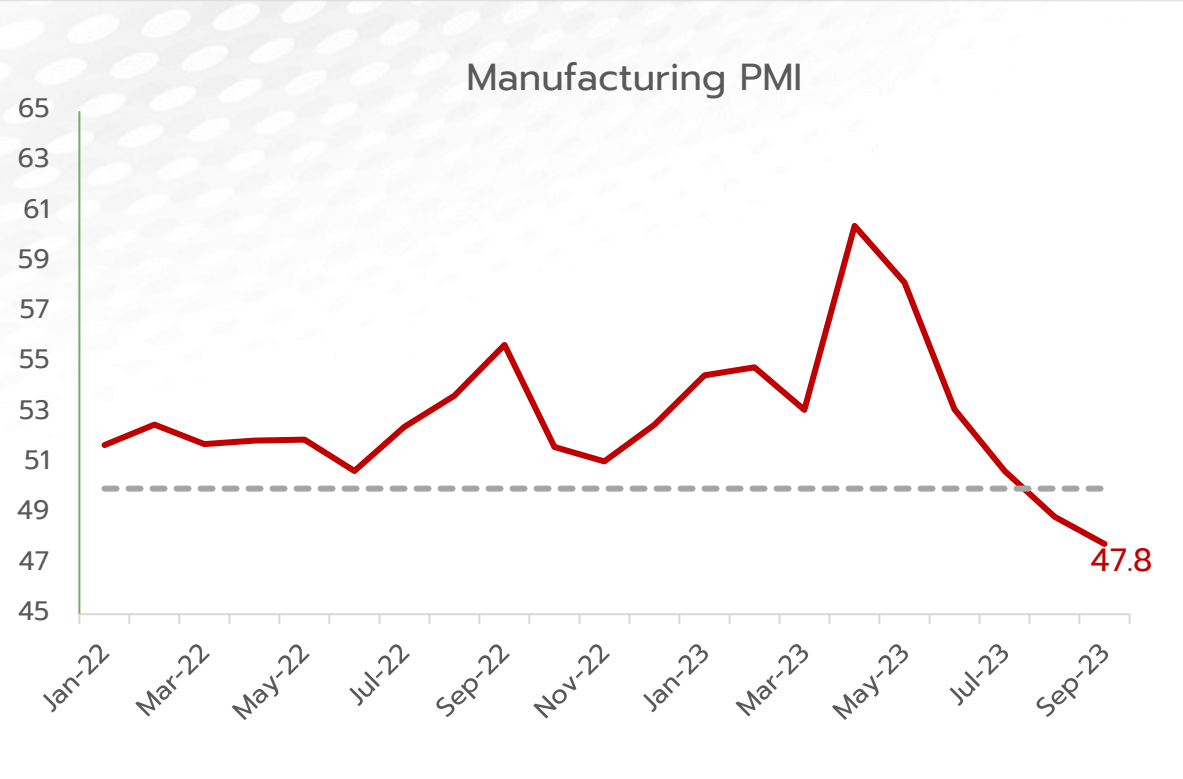
การส่งออกสินค้าหดตัวหนักกว่าที่เคยคาดไว้



Source: CEIC, forecasted by KResearch

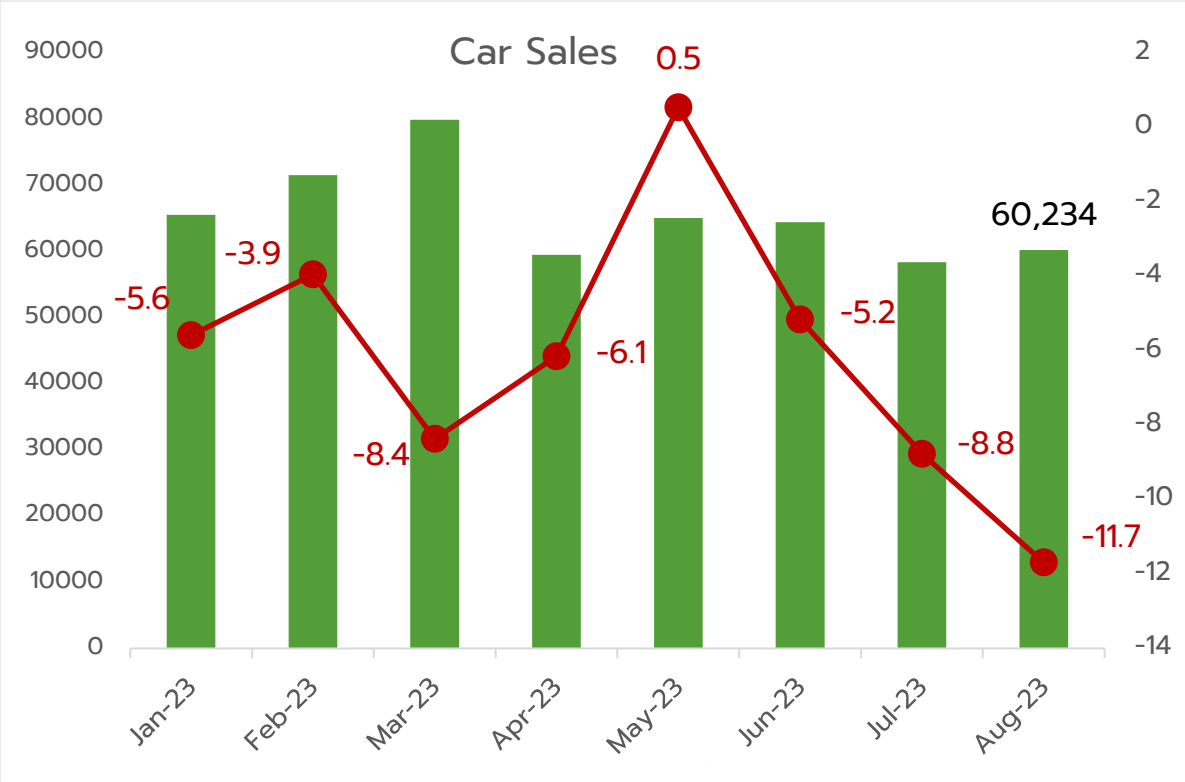
การฟื้นตัวของเศรษฐกิจไทยเริ่มส่งสัญญาณอ่อนแรง

ภาคการผลิตของไทยเริ่มชะลอตัวอย่างหนัก
หลังเดือนเมษายน 2566



Source: CEIC

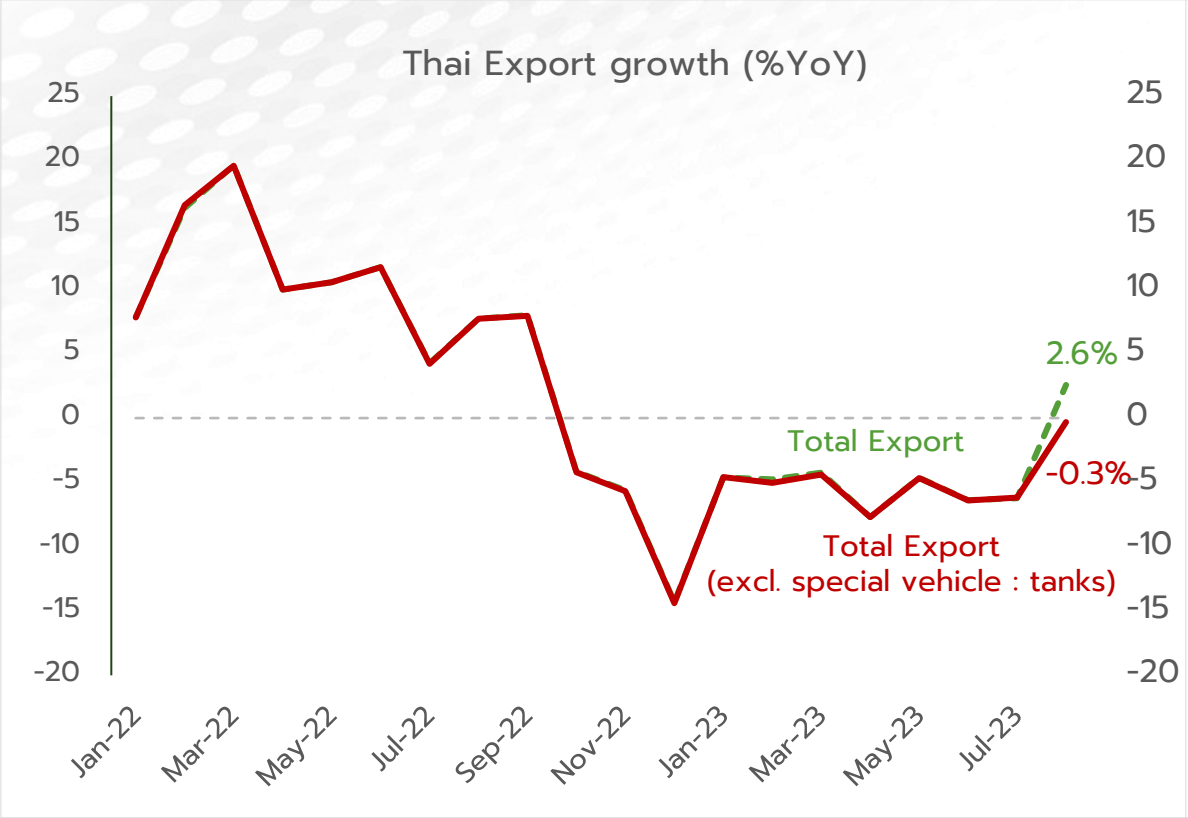
ยอดขายรถยนต์ปรับลดลงเป็นเดือนที่สามติดต่อกัน

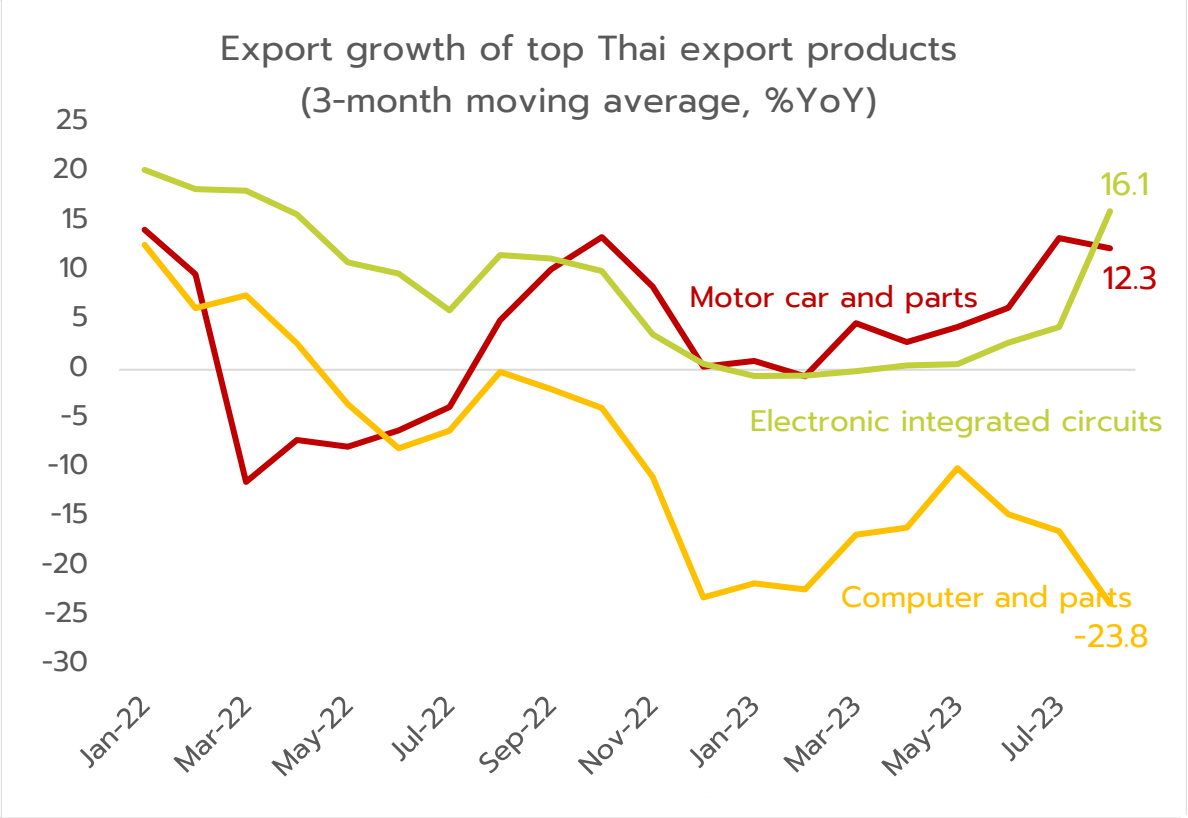


Source: Bloomberg

การส่งออกไทยเริ่มส่งสัญญาณปรับตัวดีขึ้น

หากไม่นับการส่งออกยานยนต์พิเศษ (รถถัง) การส่งออกไทยเดือนส.ค. 2566 จะหดตัวเล็กน้อย

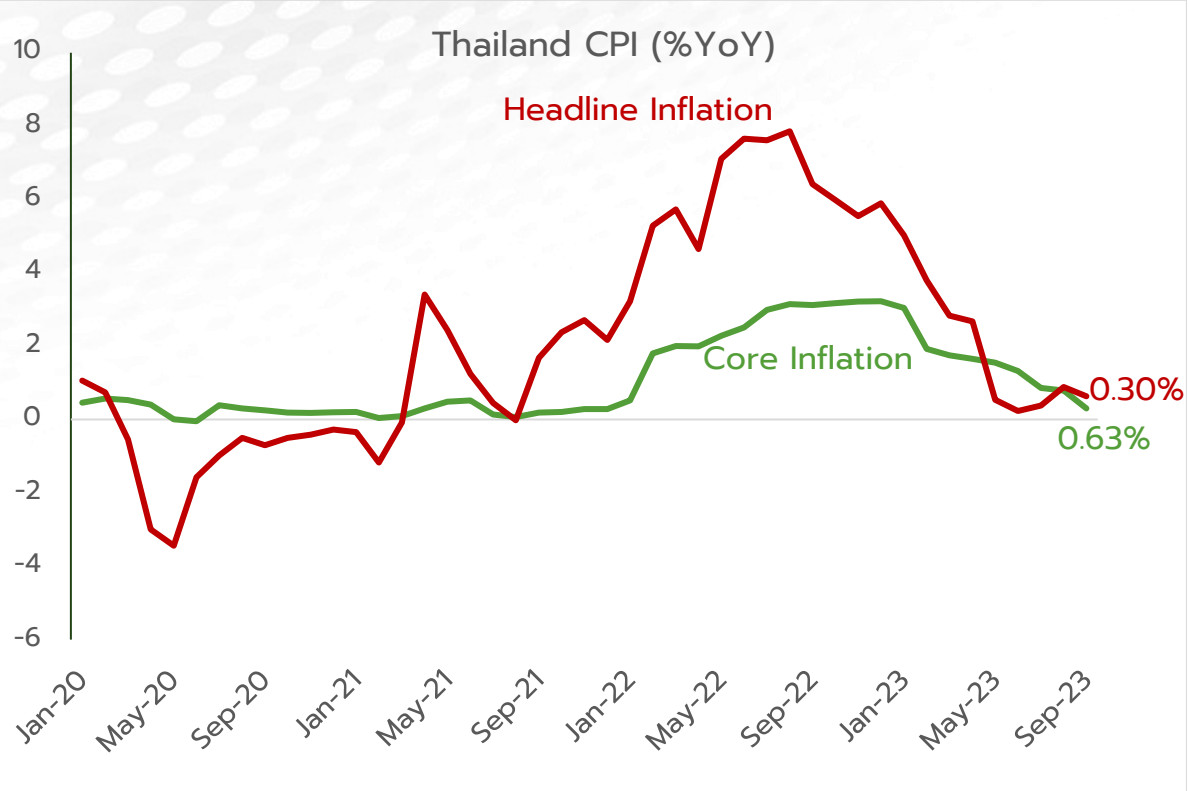




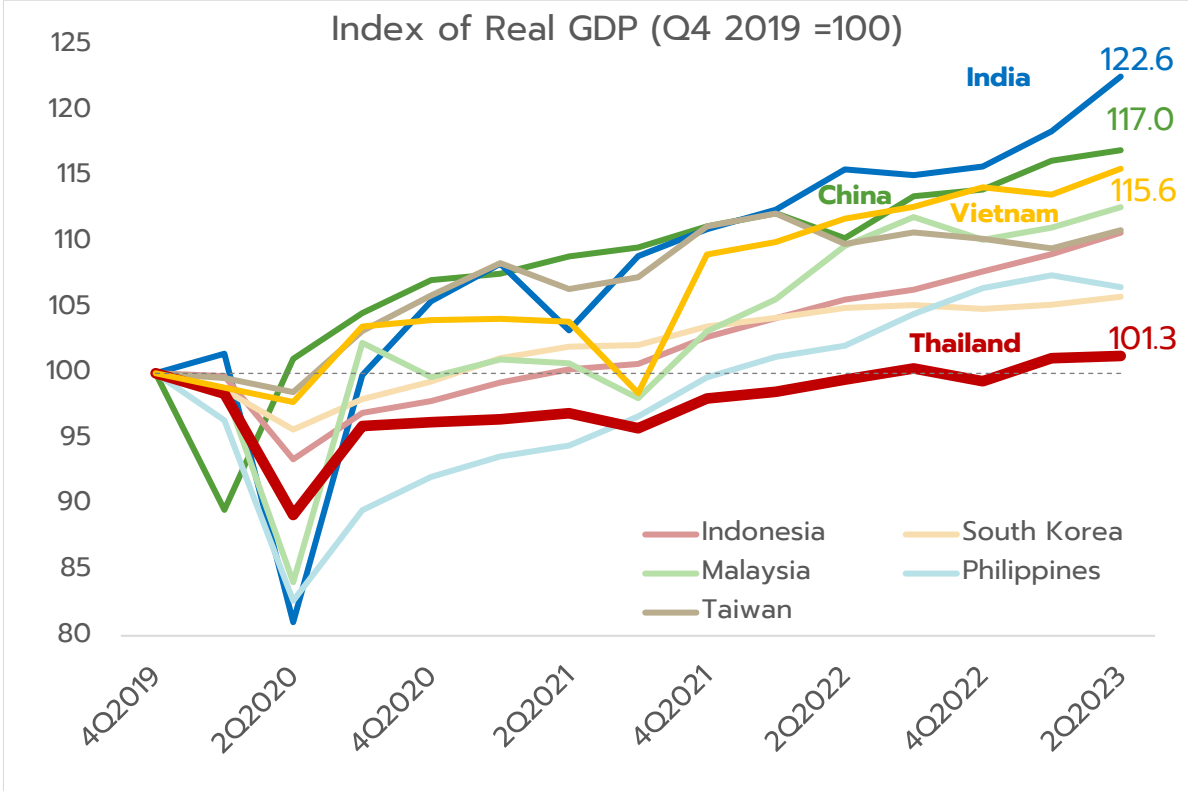
Source: MOC

อุปสงค์ภายในประเทศอ่อนแอ สะท้อนจากภาพเงินเฟ้อพื้นฐาน
ธปท. ได้สิ้นสุดการขึ้นดอกเบี้ยใน cycle นี้แล้วที่ 2.5%

เงินเฟ้อพื้นฐานต่ำกว่ากรอบเงินเฟ้อของ ธปท



เศรษฐกิจไทยฟื้นตัวช้ากว่าประเทศอื่นมาก
เราต้องการ **Growth Engines** ใหม่



Source: CEIC

ศูนย์วิจัยกสิกรไทยปรับลดประมาณการเศรษฐกิจไทยปี 2566 อยู่ที่ 3%

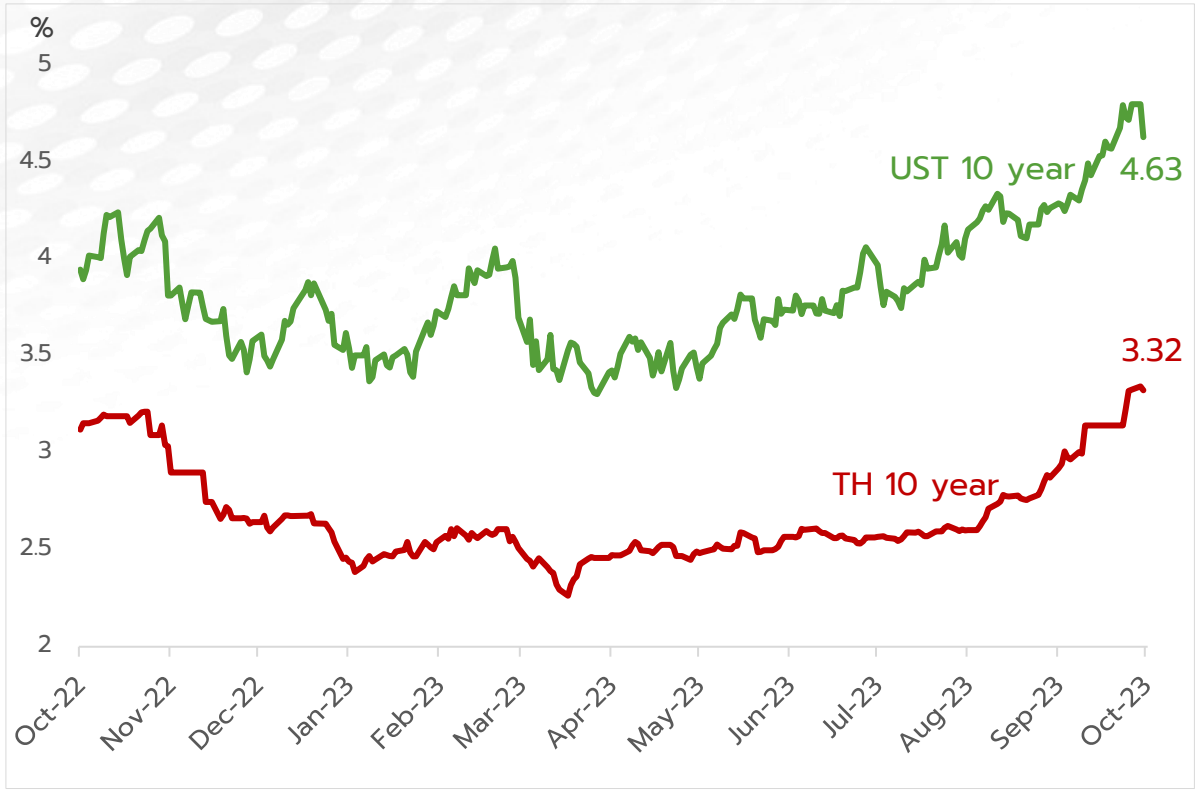
เครื่องชี้ที่สำคัญ	2564	2565	2566f (ณ ก.ค. 2566)	2566f (ณ ก.ย. 2566)	
GDP	1.5	2.6	3.7	3.0	↓
การบริโภคภาคเอกชน	0.6	6.3	3.8	5.0	↑
การบริโภคของรัฐบาล	3.7	0.0	-3.0	-3.2	↓
การลงทุน	3.1	2.3	1.8	1.6	↓
- เอกชน	3.0	5.1	2.0	2.0	
- ภาครัฐ	3.4	-4.9	2.2	1.3	↓
การส่งออก (ฐานศุลกากร ในรูป USD)	17.4	5.5	-1.2	-2.5	↓
การนำเข้า (ฐานศุลกากร ในรูป USD)	29.5	13.6	-2.4	-2.4	
อัตราเงินเฟ้อทั่วไป	1.2	6.1	1.8	1.4	↓
ราคาน้ำมันดิบดูไบเฉลี่ย (USD/Barrel)	68.8	97.0	78.0	84.0	↑
จำนวนนักท่องเที่ยว (ล้านคน)	0.4	11.2	28.5	27.6	↓

Risks

- Bond Yields ยังขึ้นต่อเนื่อง
- ความขัดแย้งระหว่าง Israel กับ Hamas ขยายตัวในวงกว้าง กระทบกับ Iran
- เศรษฐกิจจีนประสบกับวิกฤตการเงิน

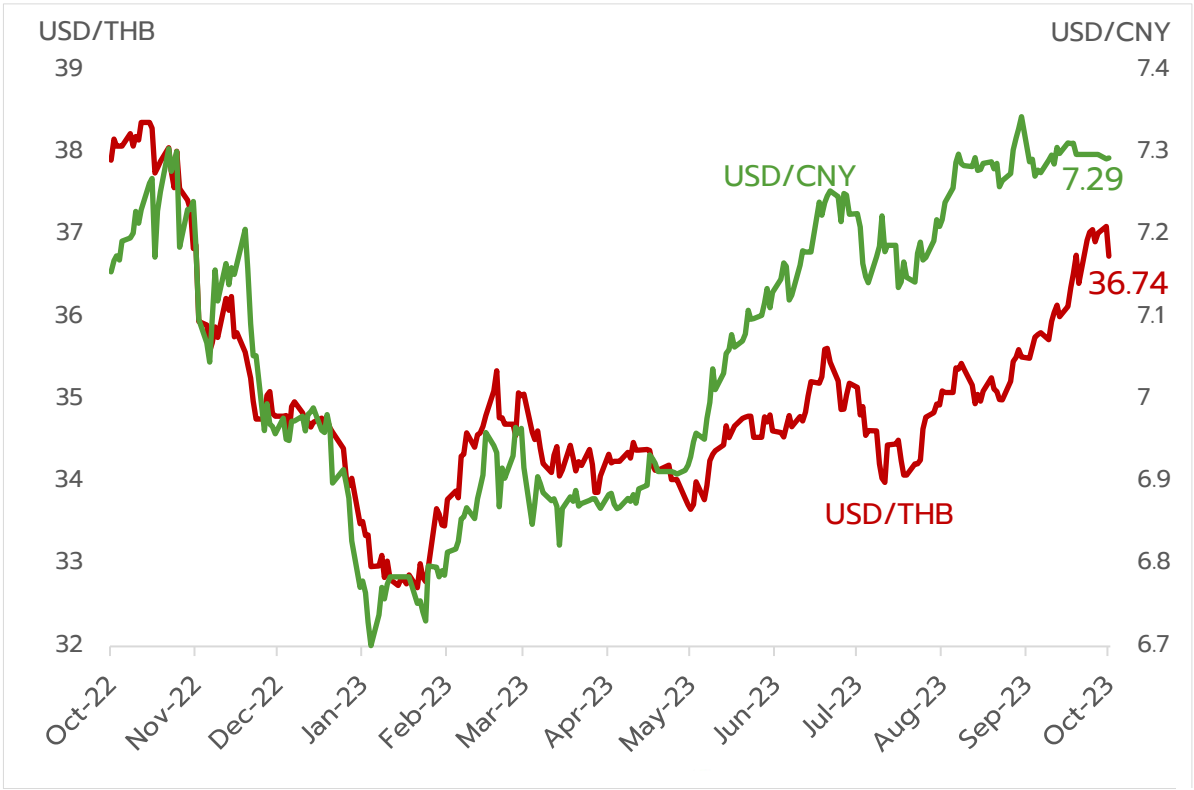
Global Bond Selloff to continue

ส่วนต่างของอัตราผลตอบแทนพันธบัตร 10 ปี ของ US กับ TH กว้างขึ้นต่อเนื่อง



Source: Bloomberg

เงินบาทอ่อนค่าลงตามทิศทางเงินหยวน



Source: Bloomberg

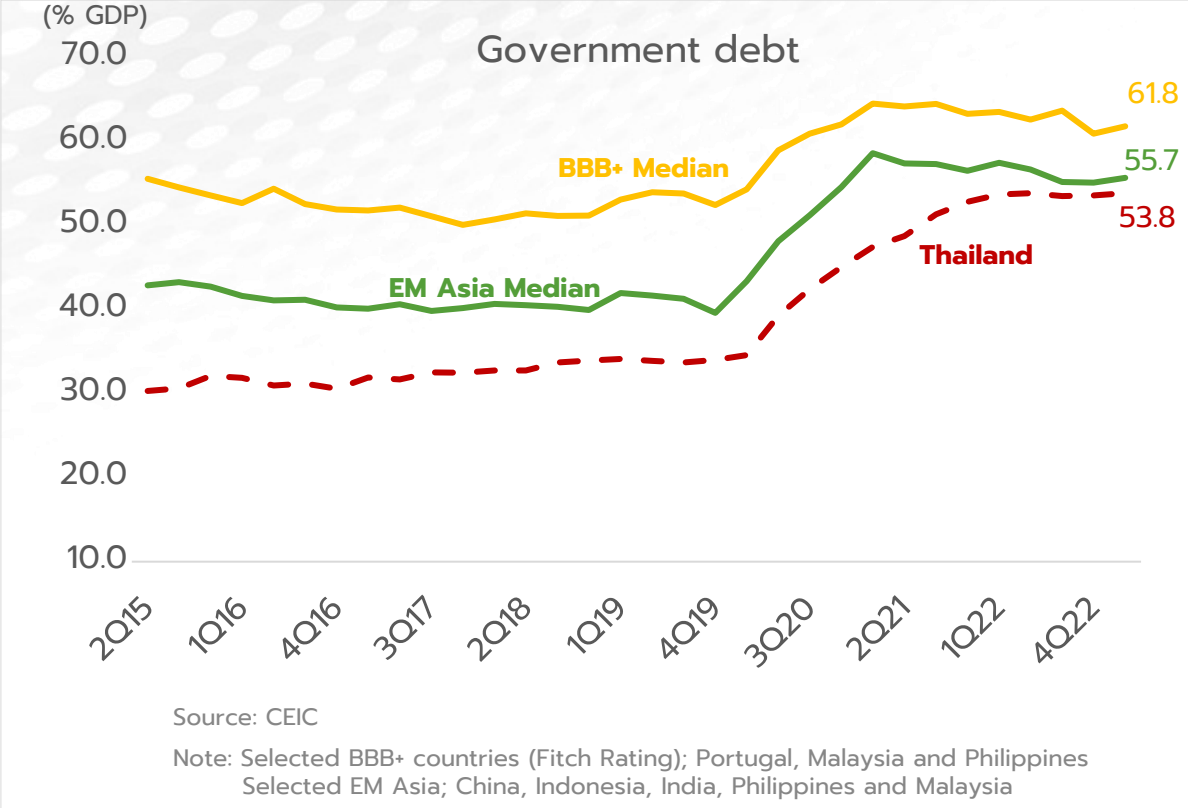
ผลของมาตรการ Quick Win ของภาครัฐในปีนี้คาดว่าจะมีจำกัด แต่คงจะช่วยลดเงินเฟ้อและค่าครองชีพของประชาชนได้ในระดับหนึ่ง

มาตรการ Quick Win ของภาครัฐ

- ✓ **ปรับลดค่าพลังงาน เช่น ค่าไฟฟ้า ราคาขายปลีกน้ำมันดีเซล**
  (มีผลบังคับใช้เดือนก.ย.66)
  - ✓ **ปรับลดค่าไฟฟ้าเหลือ 3.99 บาท/หน่วย งวดเดือนก.ย.-ธ.ค.66**
    ยืดหนี้ กฟผ.
  - ✓ **ปรับลดราคาขายปลีกน้ำมันดีเซล 2 บาท เหลือ 29.94 บาท/ลิตร มีผล 20 ก.ย.-31 ธ.ค.66**
    ปรับลดภาษีสรรพสามิต 2.50 บาท/ลิตร: แบ่งเป็น นำไปลดราคาขายปลีกน้ำมันดีเซล 2 บาทและที่เหลือนำไปบริหารจัดการที่เสริมสภาพคล่องกองทุนน้ำมันเชื้อเพลิง
- ✓ **วีซ่าฟรีสำหรับนักท่องเที่ยว (นำร่องจีนและคาซัคสถาน)**
  (มีผลบังคับใช้ตั้งแต่ 25 ก.ย.66)
- ○ **แจกเงินผ่าน Digital Wallet 10,000 บาท**
  (คาดมีผลบังคับใช้วันที่ 1 ก.พ.67)
- ○ **ปรับขึ้นค่าแรงขั้นต่ำ 400 บาทในปี 2567 และปรับเป็น 600 บาทภายใน 2570**
  (คาดมีผลบังคับใช้ตั้งแต่ 1 ม.ค.67)
- ○ **พักหนี้ 3 ปี เกษตรกร SMEs**
  (คาดมีผลบังคับใช้: n/a)

ในปัจจุบันไทยยังน่าจะรักษาอันดับความน่าเชื่อถือไว้ได้ แต่รัฐบาลต้อง deliver growth กับรักษาวินัยทางการคลังอย่างต่อเนื่อง

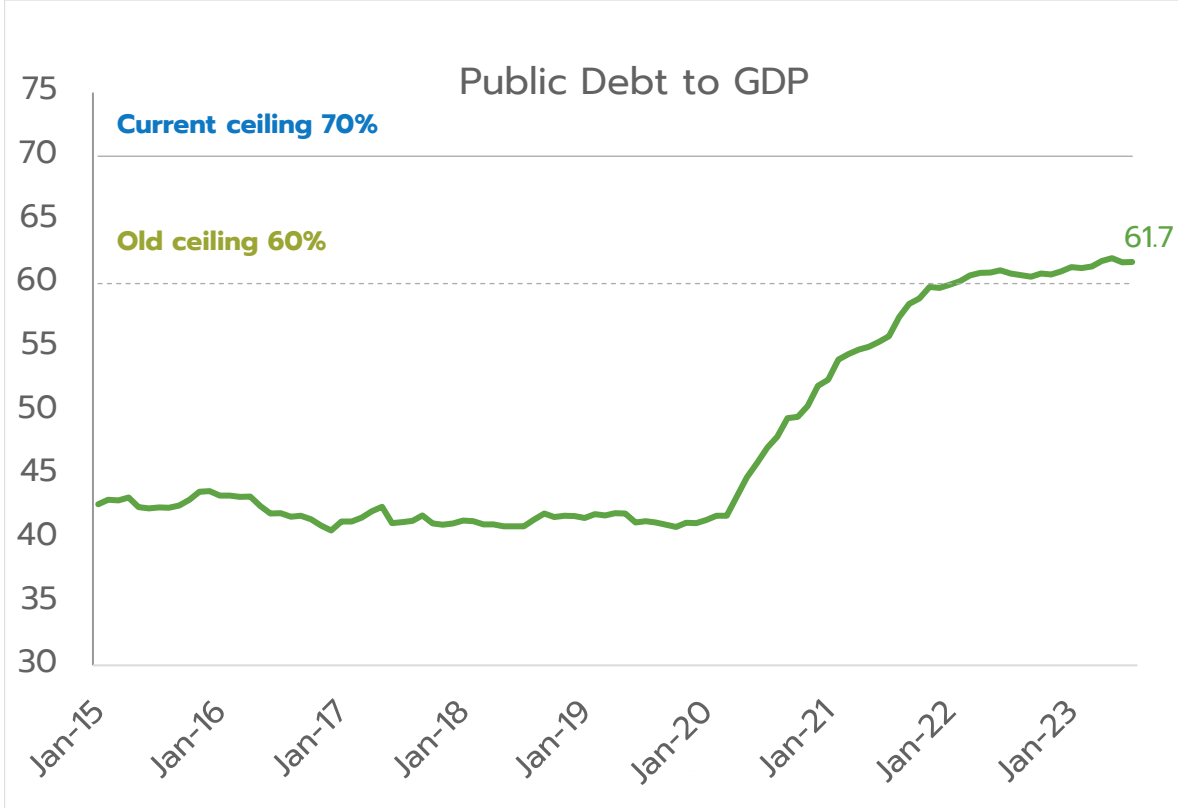
หนี้ของรัฐบาลเร่งตัวขึ้นมาเข้าใกล้กับ EM ASIA



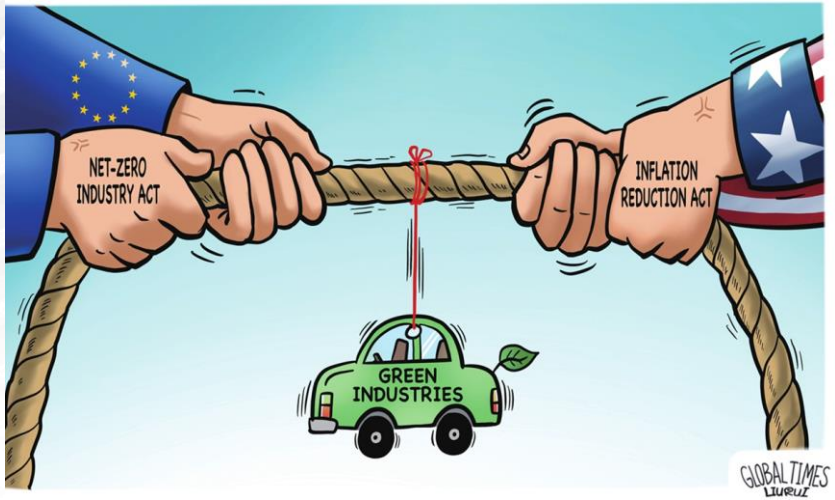
Source: CEIC

Note: Selected BBB+ countries (Fitch Rating); Portugal, Malaysia and Philippines
Selected EM Asia; China, Indonesia, India, Philippines and Malaysia

ระดับหนี้ในปัจจุบันยังต่ำกว่าเพดานหนี้สาธารณะพอสมควร



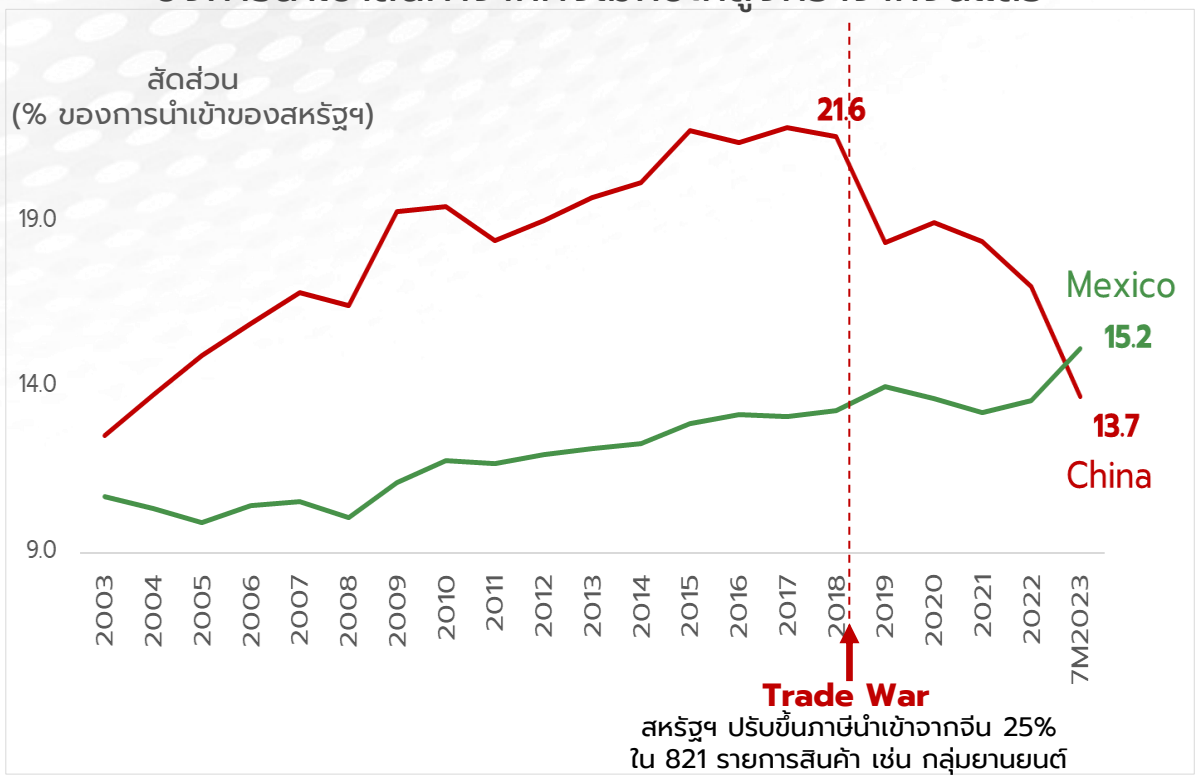
มาตรการการกีดกันทางการค้าจะเข้มข้นขึ้นเรื่อยๆ ในเวทีโลก



Source: Economist, Global Times, Prachachart, Nikkei Asian Review

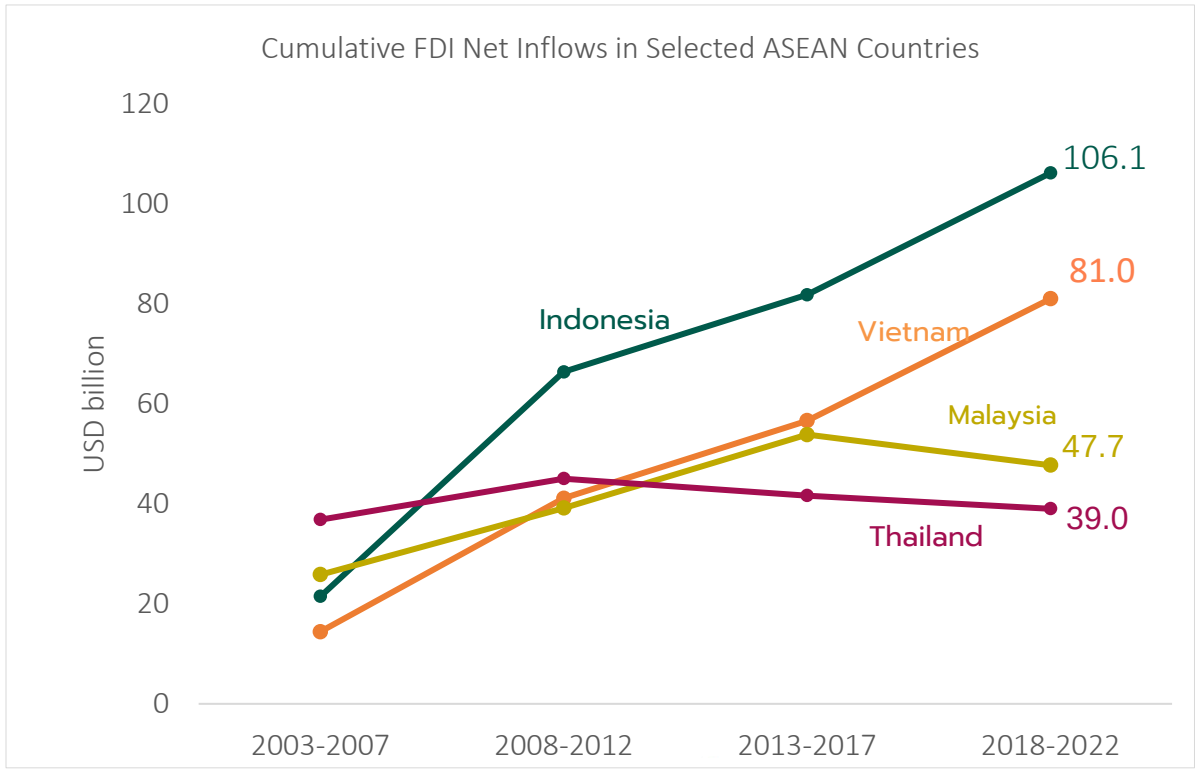
แนวโน้มการย้ายฐานการผลิตเข้ามาใน ASEAN จะเร่งตัวขึ้น
Is Thailand Open for Business?

สหรัฐฯ ลดการนำเข้าสินค้าจากจีนลงต่อเนื่อง ซึ่งการนำเข้าสินค้าจากฝั่งเม็กซิโกสูงกว่าจากจีนแล้ว



Source: trademap.org, KResearch

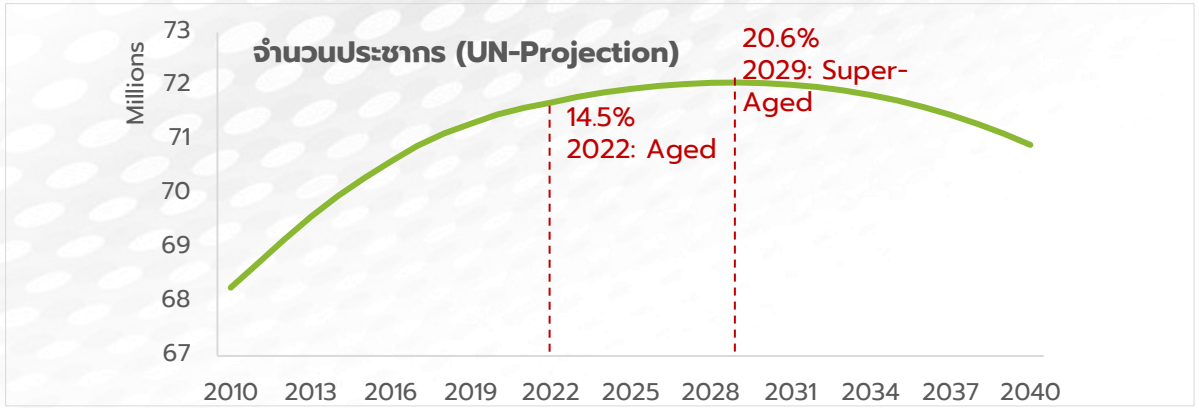
อย่างไรก็ดี การลงทุนจากต่างประเทศในไทยยังได้รับน้อยกว่าประเทศอาเซียนอื่นๆ



Source: UNCTAD, CEIC, compiled by KResearch

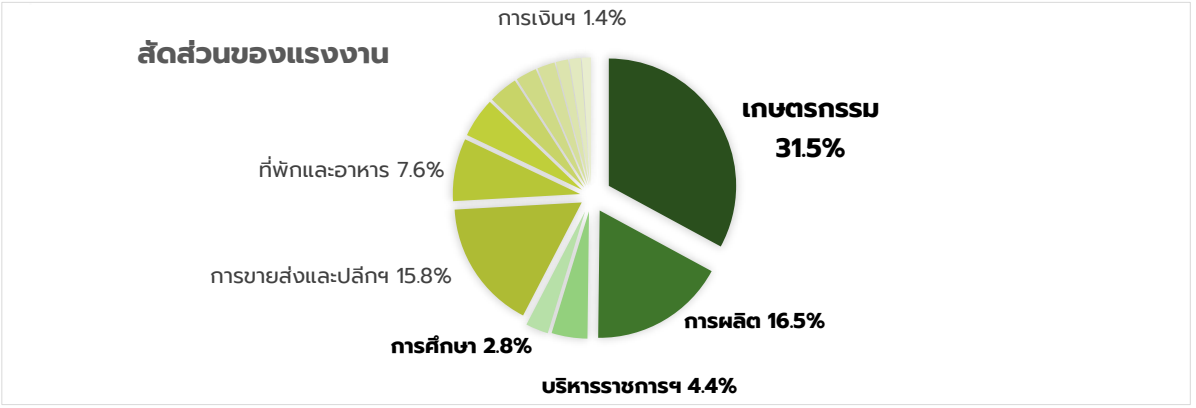
ความท้าทายต่อเศรษฐกิจไทยในเชิงโครงสร้าง

การเข้าสู่สังคมสูงวัยอย่างสมบูรณ์



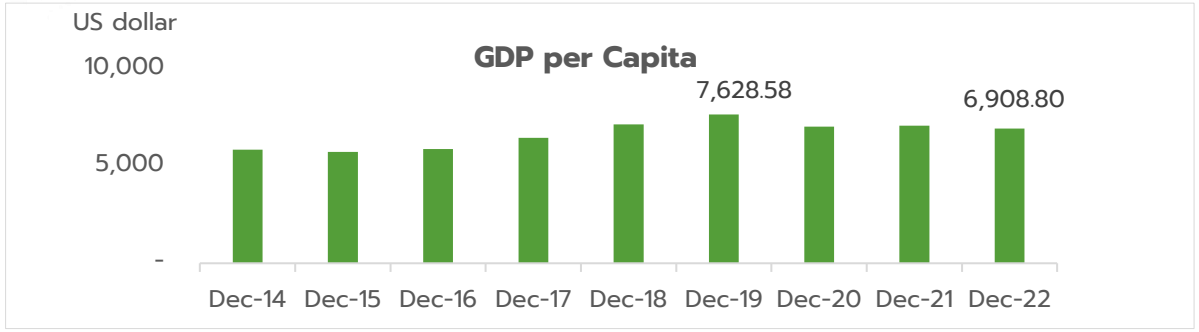
Source: กระทรวงมหาดไทย, UN, KResearch

แรงงานในภาคเกษตรสร้างรายได้เพียง 8.9% of GDP



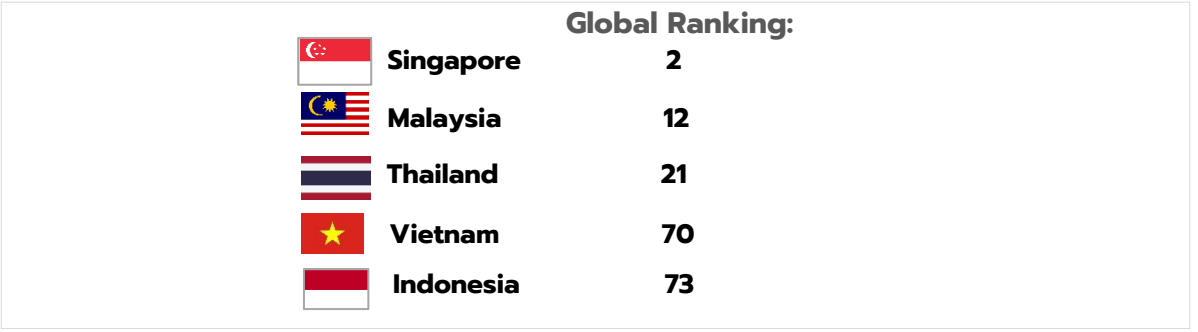
Source: สำนักงานสถิติแห่งชาติ

ไทยยังคงติดกับดักรายได้ปานกลาง



Source: Bloomberg

Ease of Doing Business เราตาม SG และ MY



Source: World bank Doing Business (2020)

KASIKORNTHAI

ศูนย์วิจัยกสิกรไทย
开泰研究中心 KASIKORN RESEARCH CENTER

Customer Satisfaction Survey
Kasikorn Research Center

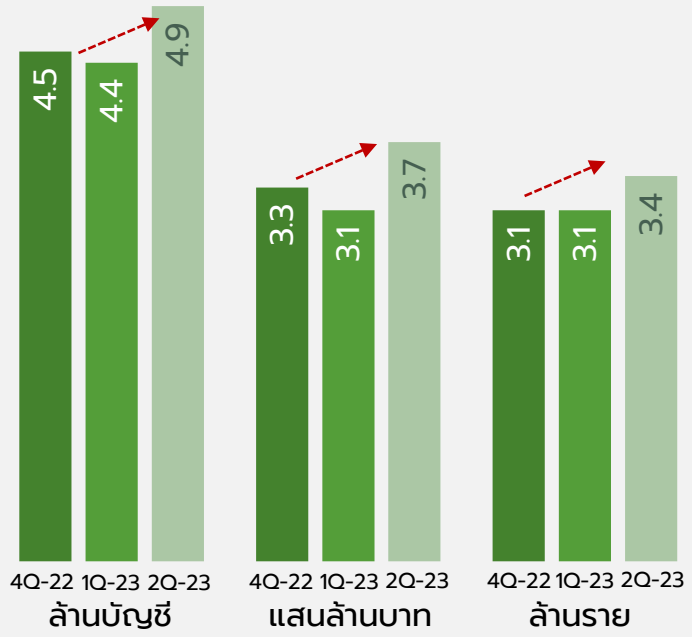
บริการทุกระดับประทับใจ


KASIKORNTHAI
บริการทุกระดับประทับใจ

Appendix

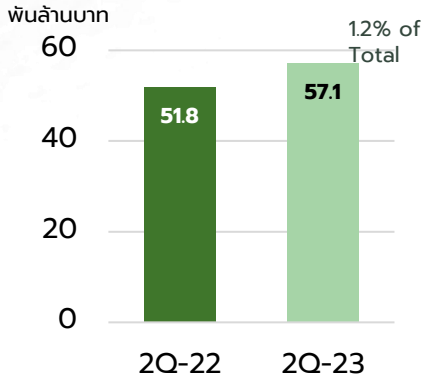
ผลกระทบจากเศรษฐกิจทำให้หนี้เสียรหัส 21
เพิ่มขึ้นมากจากปี 2022 โดยเฉพาะกลุ่มสินเชื่อรถยนต์

หนี้ NPL บุคคลธรรมดา (รหัส 21 ของ NCB)

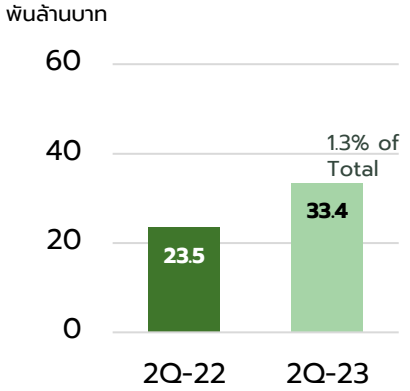


Source: National Credit Bureau

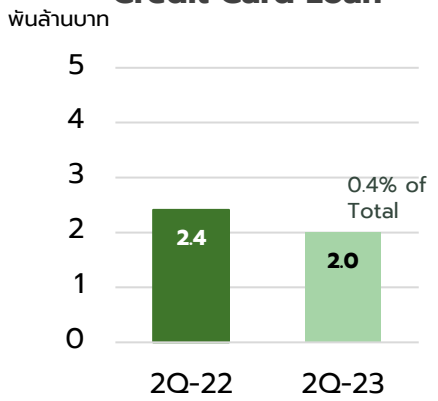
Housing Loan



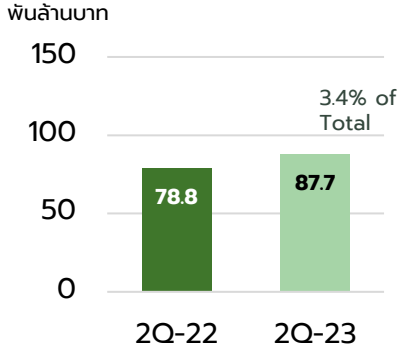
Auto Loan



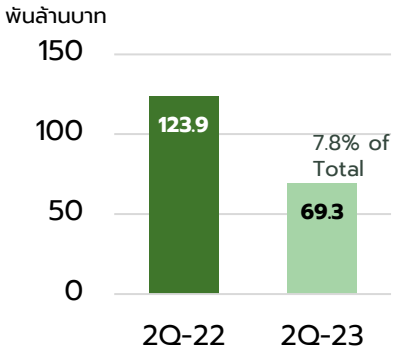
Credit Card Loan



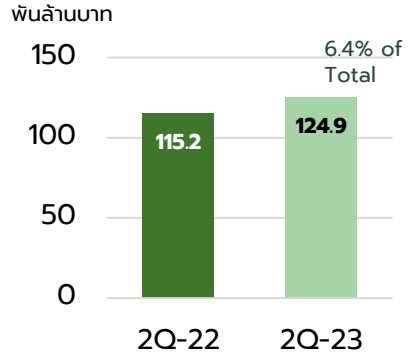
Personal Loan



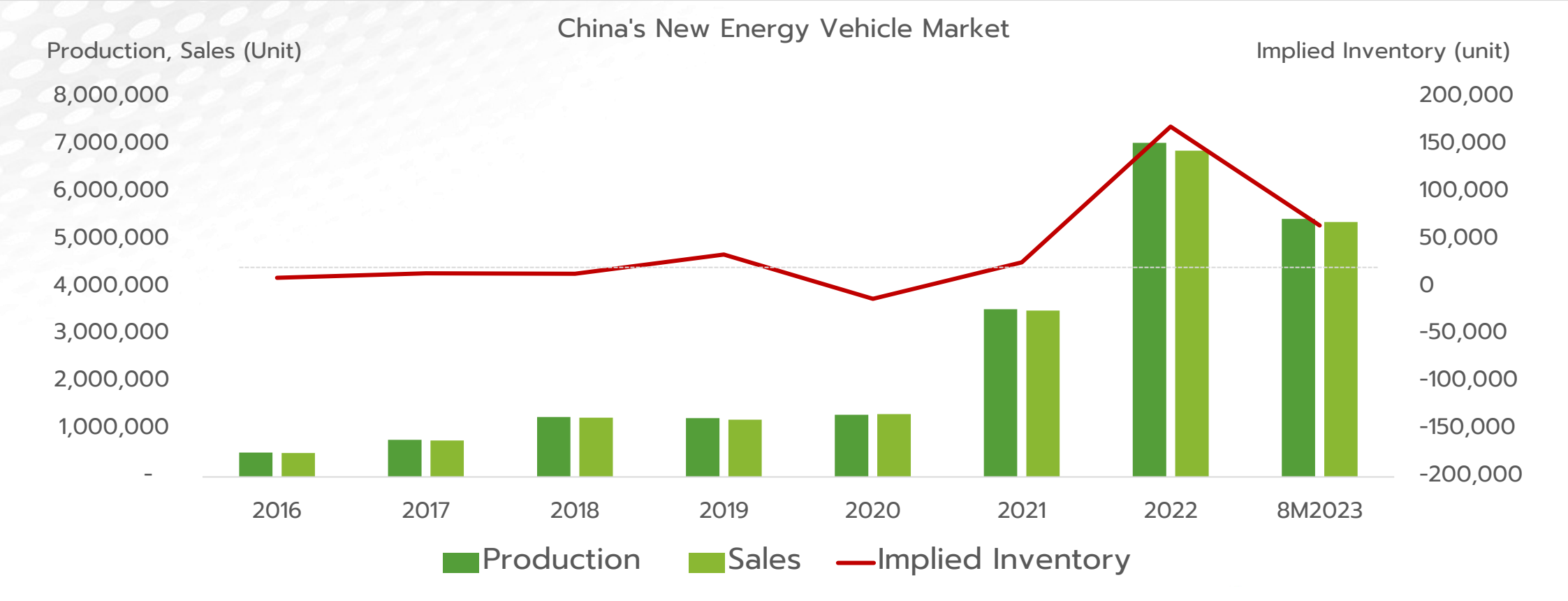
Loan for Agriculture



Commercial, OD and Other Loans



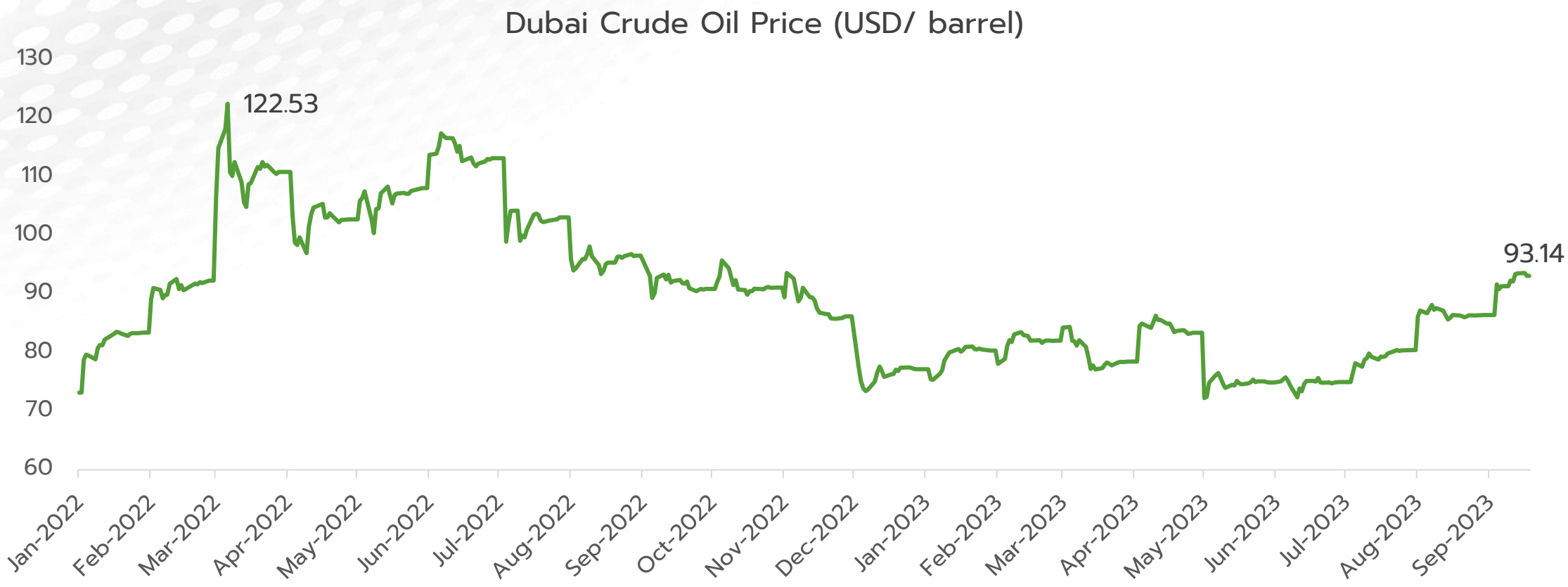
ตลาดรถยนต์ EV ของจีนเผชิญปัญหา oversupply ส่งผลให้อาจเกิดปัญหา dumping ในตลาด EV ทั่วโลก



Source: CEIC

อย่างไรก็ดี เศรษฐกิจไทยยังคงเผชิญแรงกดดันด้านเงินเฟ้อที่เพิ่มขึ้น

จากราคาน้ำมันดิบในตลาดโลก... ศูนย์วิจัยฯ มองเงินเฟ้อไทยอยู่ที่ 1.4% ในปีนี้



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INNOVATION
TECHNOLOGY
SUSTAINABILITY

Kessaraporn Trongtorsak
Vice President
Sales, Marketing and Innovation

HMC Polymers Journey to Sustainability

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1980s
Technology push to serve domestic demand

1983
Founded on Dec, 8th by Himont, Metro (SRIKRUNG WATTANA) and Bangkok Bank

1989
1st PP plant
start-up in Thailand

1990s
Enhancing the core

1997
PP Line 2

2000s
Securing business sustainability

2006
ptt
became shareholder

Feedstock security for the sustainability of business

2010s
Advanced technology for sustainable solutions

2010
PP Line 3 completed

Step into **sustainable solutions**

2017
Transfer of PTT JV ownership to GC

Feedstock security for the sustainability of business

2020s
Market driven innovation for sustainability

2022
PP Line 4 completed

Initiate and expand more collaborations for **Sustainability**

2023 40 YEARS HMC Polymers

The highest capacity of PP in Thailand with capacity of **1.06 mill tons**

New sustainable products in pipeline including bio-based and recycled PP

Achieve certifications for sustainable product business

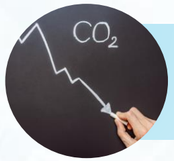
ISCC International Sustainability & Carbon Certification

Global Recycled Standard ©TextileExchange

HMC Polymers' opportunity & challenges on Sustainability trends

What we've found

Single-use plastic is banned



Everyone goes "Net Zero"

Sustainability accounts on everything

What we've faced

Increasing of Intermaterial replaced products

e.g. fiber-based, bio-based with fast development to improve performance

Enforcement of low carbon emission

Brandowners/customers seek for low carbon emission solutions

Environment aspect is just a part of sustainability

Implementation of international requirements forces the engagement along the value chain

image: Flaticon.com, IPFM, Contagious

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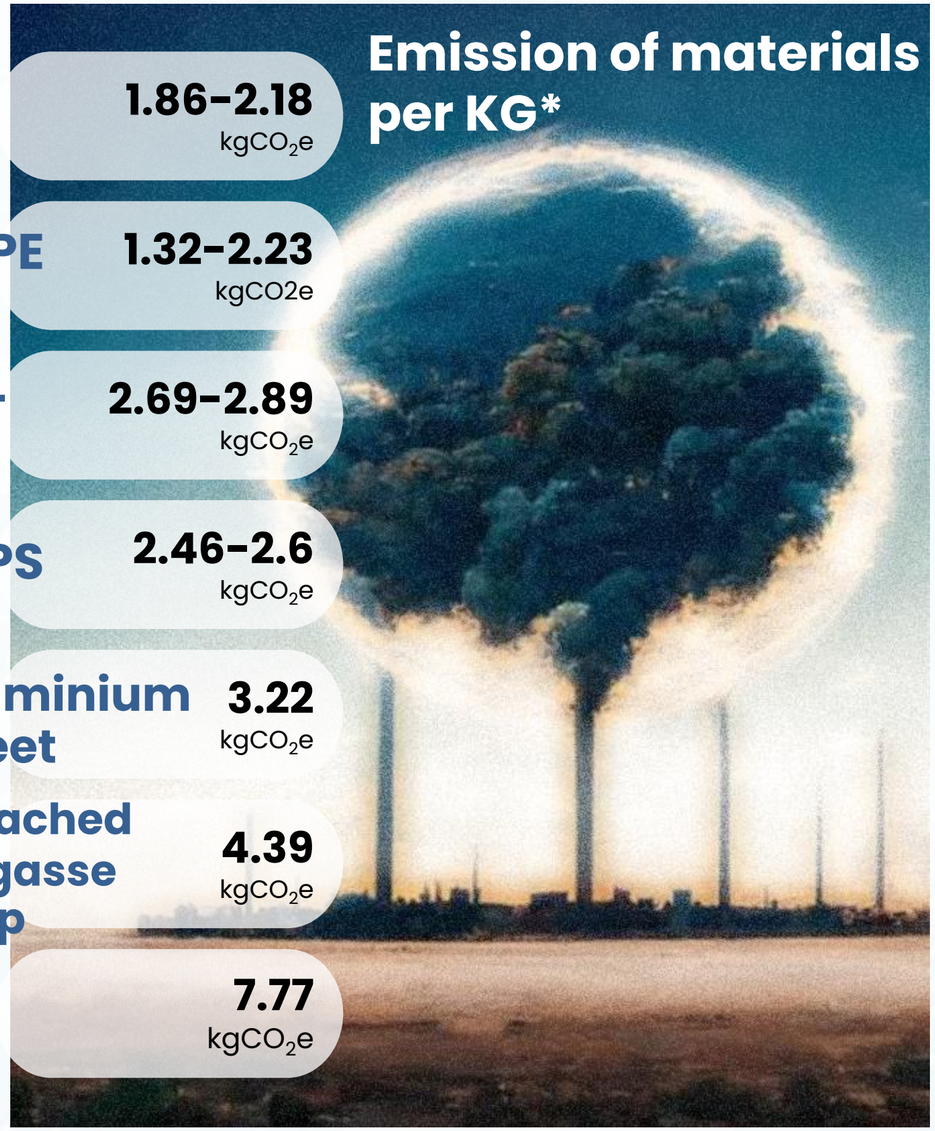

*Source Emission factor & CFP of material, not the products from TGO

How we've fought

PP is Sustainable

recyclable, less CO_2 emission comparing to other materials e.g. paper, metal, aluminum, other plastics

and we make it more sustainable

through innovation and partnership
Make it not only the products but also the process

image: Flaticon.com, IPFM, Contagious

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INNOVATION TECHNOLOGY SUSTAINABILITY

Deepali Kelekar
Department Manager
Innovation and Technical Support

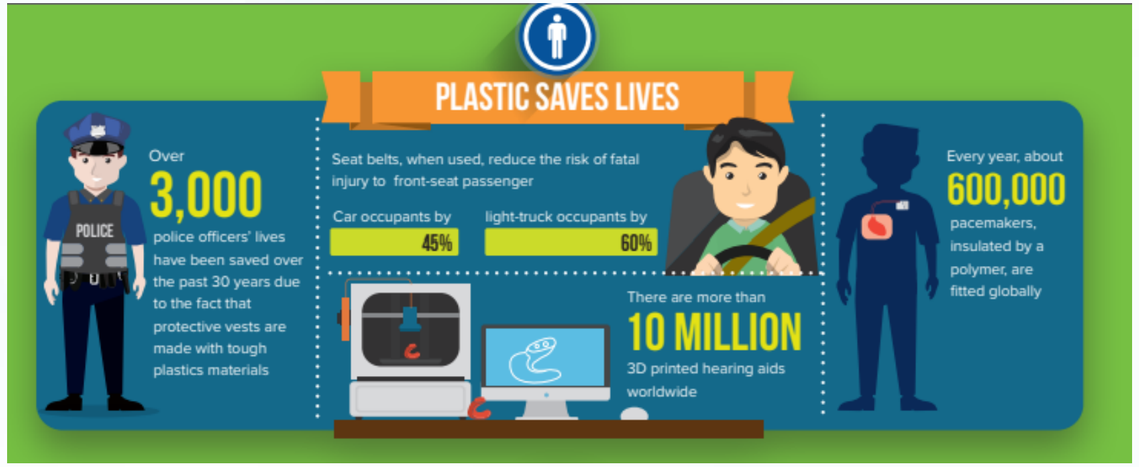
The 2030 Agenda for Sustainability

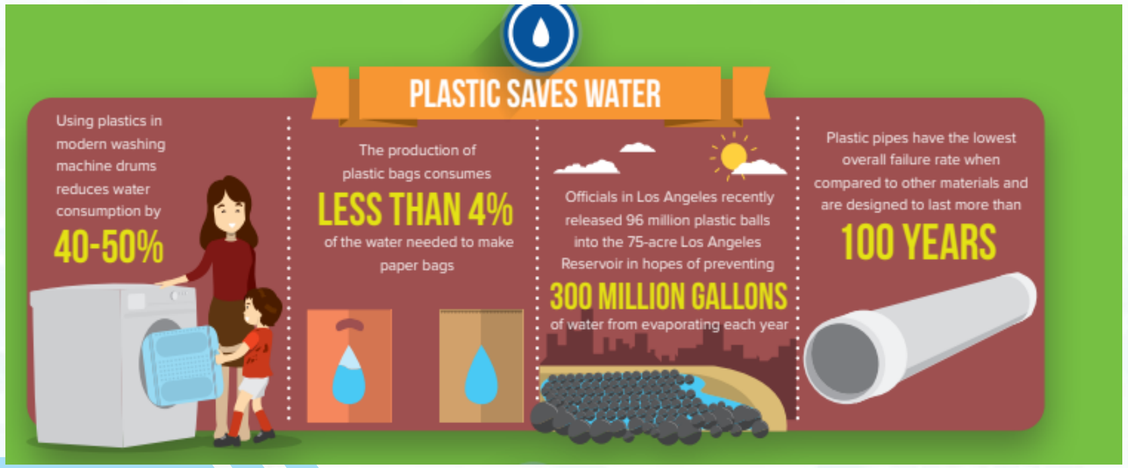
In 1987, the **United Nations Brundtland Commission** defined sustainability as

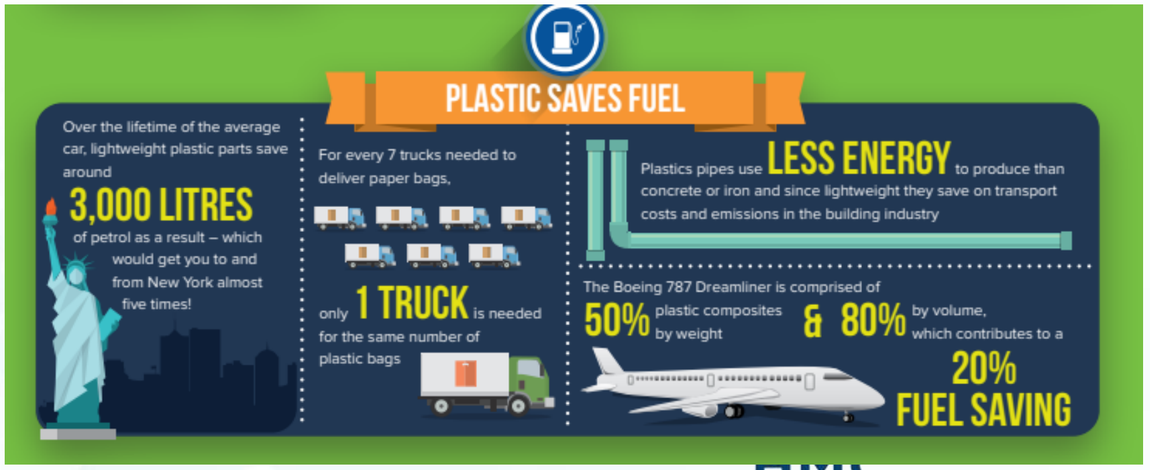
“meeting the needs of the present without compromising the ability of future generations to meet their own needs.”

Source: United Nations

Plastics provide sustainable solutions

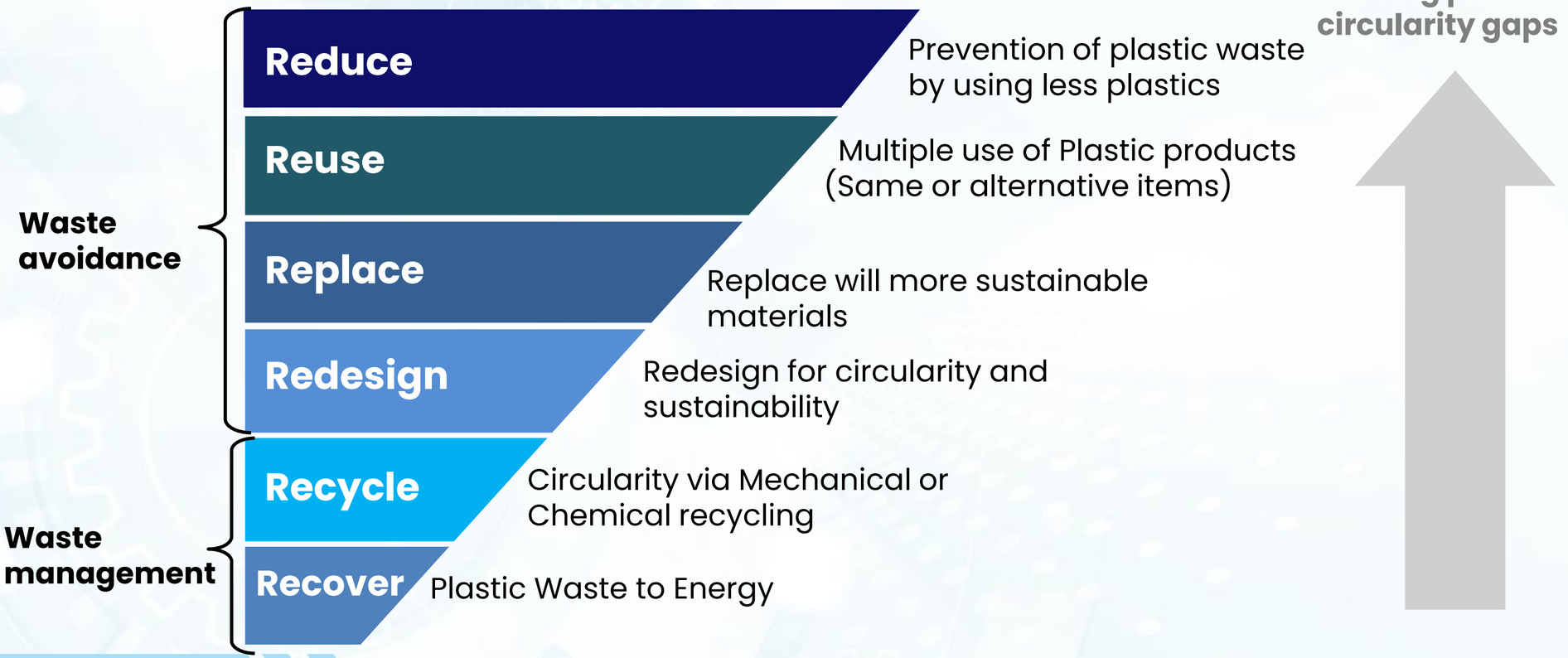






Source: http://www.wrap.org.uk/content/fast-facts-plastics

Several solutions to overcome the plastic waste issues throughout its life cycle— Driving Circular Economy



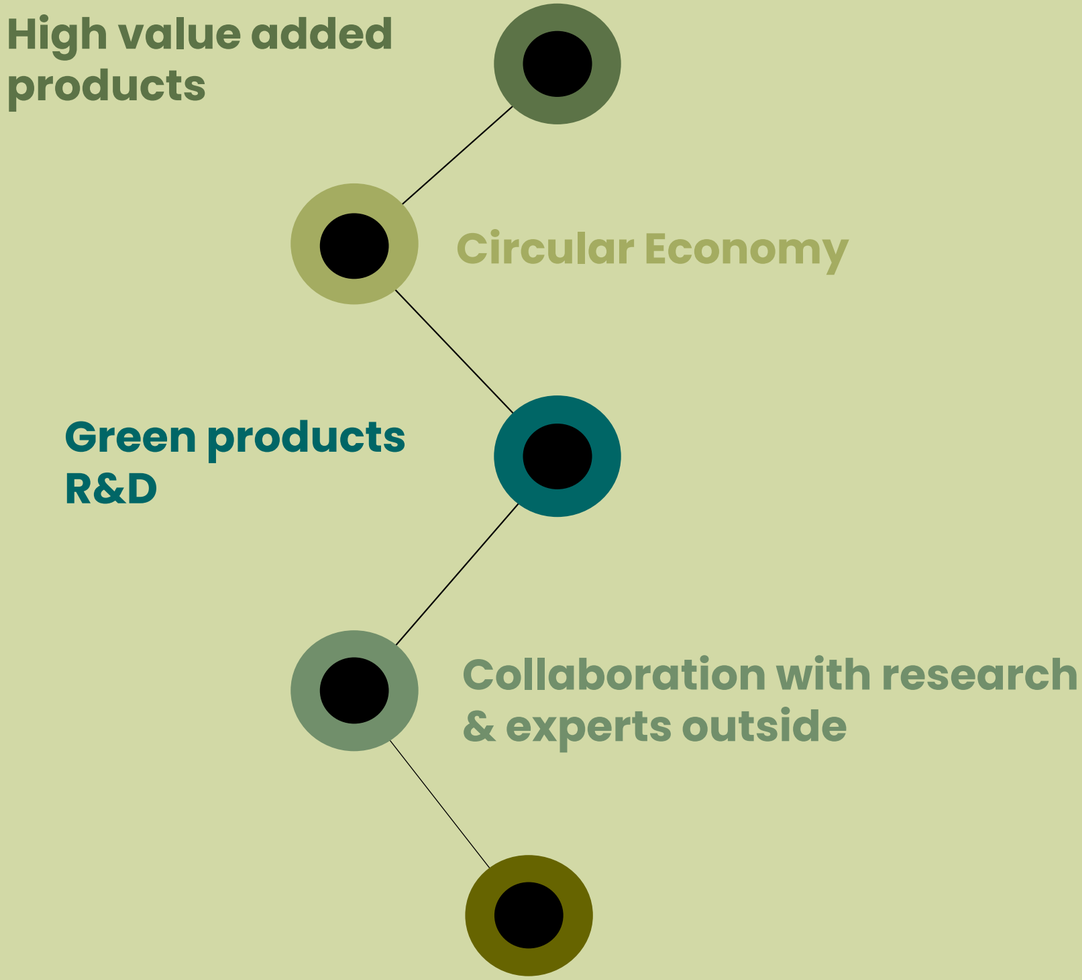
- **Plastic waste is a resource and its inherent value can be realized by developing circular Economy**
- **Collection of plastic waste at Household level before entering the municipal waste stream is critical for building circularity for plastics.**
- **Consolidated Industry-Government efforts to develop larger scale collection and segregation facilities are vital for driving efficiency of recycling**

A.J. PLAST'S Sustainability Direction

Sustainability Strategy

Continuous and Sustainable Growth	Business Operation with Environmental Responsibility	Potential People and Society Development
High-quality raw material sourcing	Energy Management	**Employee Well-Being**
Responsibly Business Operation	Water Management	Human Capital Development
Risk Management	Waste Management	Human Rights Respect
Innovation Management	**Greenhouse Gas Management**	Corporate Citizenship and Philanthropy

Innovation Management



Target

Y2023

- 1 new green product
- 4.5% increase in R&D investment
- 20% reduction in fossil-based raw material consumption
- 5% reduction in GHG emission

Roadmap to Zero Carbon Company

2021 — **Certified carbon inventory**

2022 — **Announce Carbon Neutral Target & Net Zero Year by CEO**

2023 — **5% GHG Reduced**

2024

2030 — **Carbon Neutral Company**

2050 — **Net-Zero Carbon**

2065

30% GHG Reduced
Near-term target

Net-zero carbon
Long-term target

Potential GHG Reduction Measurement in near future

- Solar P.V. project, cap 1 MWh and 4 MWh (in process)
- Floating Solar P.V. project, cap 1 MWh
- Direct flake dosing project
- Water reuse

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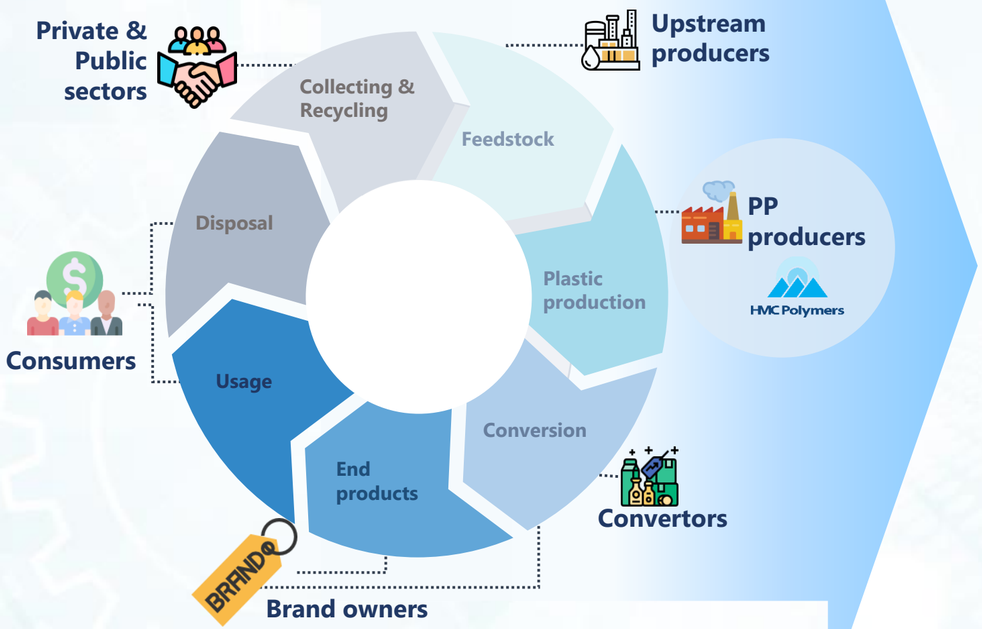
Kessaraporn Trongtorsak
Vice President
Sales, Marketing and Innovation

How we act

Then
Initiated



& Now
Act with goals

Renewable feedstock: bio-circular
Carbon footprint reduction of product

Verify CFO & CFP *(carbon footprint of organization & product)*
Understand baseline to establish action plan to reduce carbon emission
Energy efficiency program

New PP products enhancing sustainability
Mono-material, better performance for durability, lighter weight, less energy of conversion at customers

Post consumed PP collection platform
Community & Internal program to collect used PP materials

PP REBORN
ชุบชีวิต PP กับ HMC Polymers

Post-consumer recycled PP products: PCR PP
Step-in circularity with certified PCR PP

image: Flaticon.com

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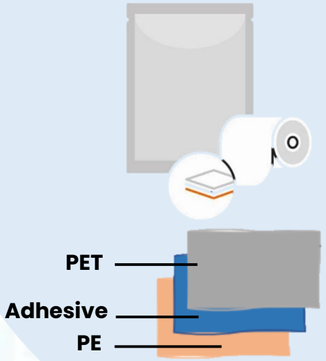
Sustainable with HMC Polymers

More Solutions

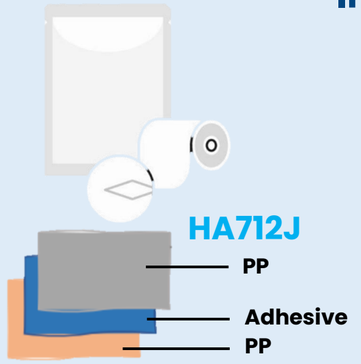
with Fossil-based PP

Mono-material

Multi-material laminate



Mono-material PP



Intermaterial substitution

Durable application
that is easily recycled.

Light weight material

EA648G

Maintaining the dimensional
stability and performance

Go Greener

with Bio-circular

Virgin-like

ISCC
International Sustainability & Carbon Certification

Circular

with Post-consumer recycled

Global Recycled Standard
©TextileExchange

AVAILABLE NOW

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image: Internal, Textile Exchange, ISCC, Flaticon.com

Our goal for Sustainability

"Creating Endless Solutions for everyday Sustainable Living"

Sustainable PP Solutions contribute 5–10% of total sale volume by 2029

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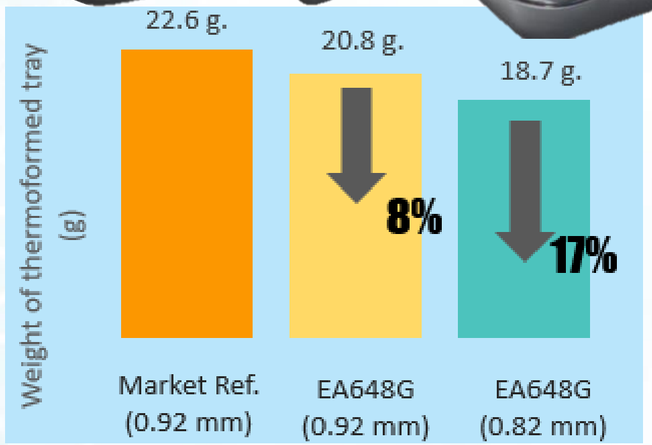
INNOVATION TECHNOLOGY SUSTAINABILITY

Deepali Kelekar
Department Manager
Innovation and Technical Support

Reduce the plastic usage by High Performance PP help to downgauge

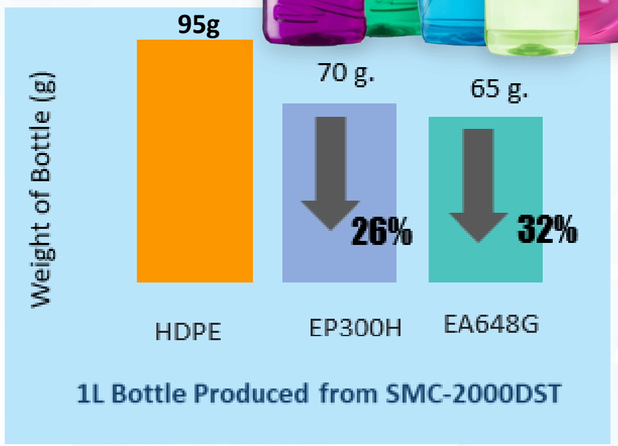
Adstif EA648G

Thermoforming



Weight reduction using *Adstif* EA648G

Blow-moulding



- 5th Generation Non-Phthalate catalyst product
- Excellent stiffness
- High heat resistance
- Excellent room and low temperature impact strength
- High deformation and stain resistance vs reference grade
- Excellent chemical resistance and higher ESCR than HDPE
- Excellent processing by vacuum and pressure forming
- Good processing and thickness control in Blow moulding

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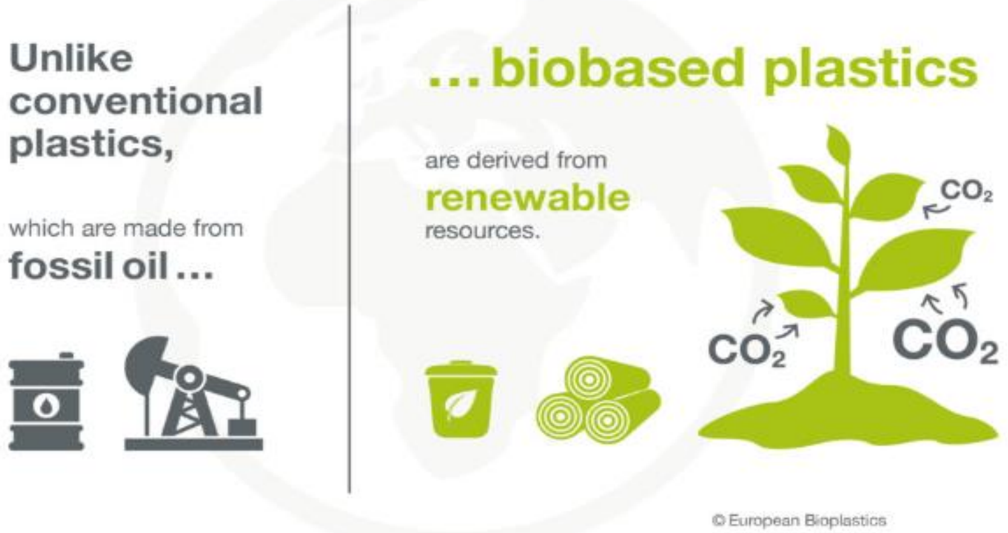
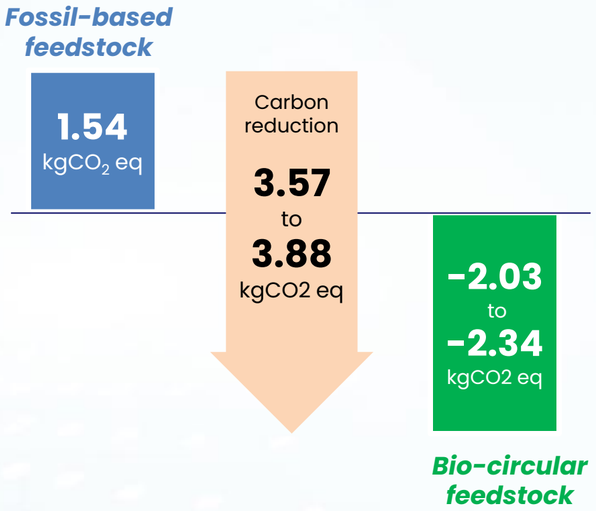
Reduce Carbon Emission with Bio-based PP



- Plants / Renewable Biomass absorb CO_2 from atmosphere and fixate it during their lifetime
- If we conduct Life Cycle Analysis (LCA), Biobased plastics (based on renewable Biomass) will help to reduce the CO_2 footprint compared to their Fossil counterparts.

CO_2 Emission reduction from the bio-based feedstock used for HMC Polymers PP production*



>230%

Carbon footprint reduction from using Bio-circular feedstock

** Source : Emission factor from feedstock supplier/HMC internal, excluding EF of conversion process to PP product*

Biobased Feedstocks help to reduce carbon emission

1st Generation Bio - Feedstock
(Food Related sources)


Corn


Palm oil


Sugarcane


Cotton

2nd Generation Bio- Feedstock
(Waste and Residue)


Tall oil


Used cooking oil


Forestry residues


Straw

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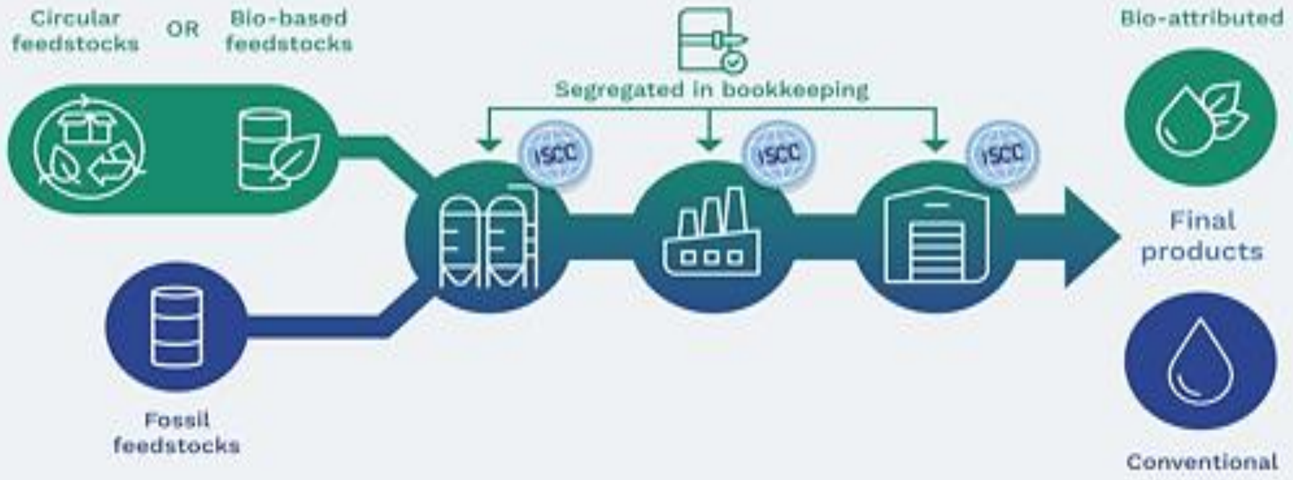
HMC PP grades using Biobased feedstock

- HMC Polymers will blend Fossil and Biobased Feedstock to produce PP grade using same manufacturing process, Catalyst and additive product recipes
- Final PP product performance is expected to be the same for Fossil or Biobased PP grades
- No need to requalify grade performance
- **Full FDA compliance** can be declared.
- Completely **recyclable**
- **HMC Polymers is ISCC Plus certified** and will issue sustainability declaration by applying Mass balance principles



- Physical segregation of Renewable feedstock content is often practically and economically difficult.
- **The mass balance approach** makes it possible to track the amount and sustainability characteristics of circular and/or biobased material in the value chain and attribute it to various products based on verifiable bookkeeping.

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HMC Polymers : ISCC Plus Certification

ISCC
International Sustainability & Carbon Certification

- **The International Sustainability and Carbon Certification (ISCC)** is an independent third-party leading certification system supporting **sustainable, fully traceable, deforestation-free and climate-friendly supply chains.**

- Sustainable characteristics of products are well documented and forwarded by HMC Polymers through the supply chain by means of **Sustainability declarations for each transaction.**

- The combination of both **the traceability and chain of custody** ensure that the physical flow of materials can be traced back and forth throughout the supply chain, which **guarantees the integrity of sustainability statements**

SGS

ISCC PLUS Certificate

Certificate Number: ISCC-PLUS-Cert-DE100-15572123
SGS Germany GmbH
Europa Allee 12, D-49685 Emstek
certifies that
HMC Polymers

I-1 Road Map Ta Phut 6
21150 Rayong
THAILAND

complies with the requirements of the certification system
ISCC PLUS
(International Sustainability and Carbon Certification)

Place of the audit:
see above

This certificate is valid from 31/07/2023 to 30/07/2024

The site of the system user is certified as:
polymerization plant, trader with storage

The scope of the certificate includes the following chain of custody options:
mass balance

Emstek, 31/07/2023
Place and date of issue

SGS Germany GmbH
Stamp, Signature

The issuing Certification Body is responsible for the accuracy of this document.
Version / Date: 1 (no adjustments) / 31/07/2023

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Reuse – Multiple use and Upcycling

Reuse means to maximize plastics usage through reusing, repairing, refurbishing, redesigning or upcycling

Reuse

Upcycling

Multiple Use

Redesign—enhancing circularity with Mono-material packaging (example)

PP for bottle, cap and label

PP for tube, shoulder and cap

PP can offer the following to develop mono-material tubes and bottles

- Good stiffness and impact balance
- Good chemical resistance and ESCR
- Good barrier properties
- Good aesthetics
- Ease of processing
- Completely recyclable

Redesign—enhancing circularity with Mono-material packaging (example)

Main properties

- Sterilization for 1h @128°C
- High seal strength after retorting, ≥23.5N/15mm
- O2TR < 1c (m2 x 24 hr)
- WVTR < 2 g/m 2x 24 h

PET film	Heat Resistant BOPP Film
Al Foil	AlOx coated BOPP film
CPP Retort film	CPP film

Frozen to Microwave food

Main properties

- Good Drop Impact resistance
- Good high temperature resistance during microwave applications

Nylon Film	Heat Resistant BOPP Film
Adhesive	Adhesive
CPP film	CPP / Blown Barrier film

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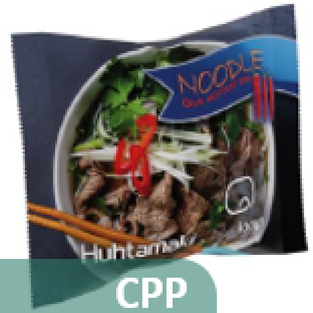
HMC Polymer solutions for Mono-material laminates

Applications	Existing	Mono-material	New requirements	HMC Solutions
 BOPP	PET film Adhesive PE film	BOPP film Adhesive CPP film / BOPP Film	BOPP film with - High Heat resistance - High stiffness - High Barrier	*Adstif* HA712J
 CPP	PET film Adhesive Metallized PET Film Adhesive PE film	BOPP film Adhesive Metallized CPP film	CPP film with - Lower SIT - Higher hot tack strength - Broad processing window	*Adsyl* 6093 *Adsyl* 6064

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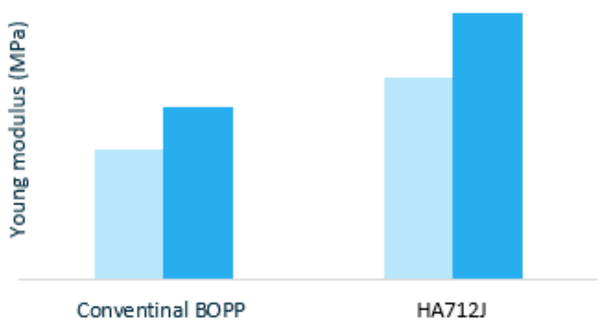
HMC Polymer solutions for Mono-material laminates

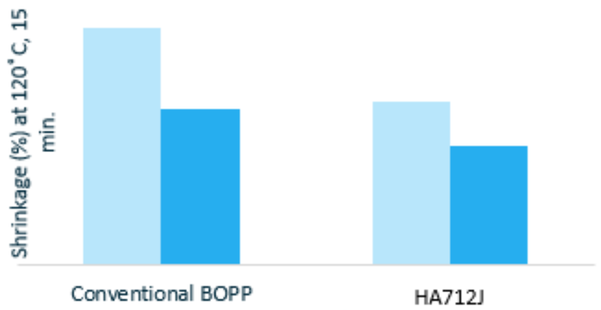
Adstif HA712J



% Improvement

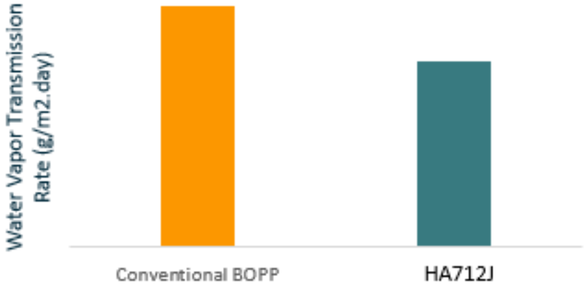
MD	17.2 %
TD	23.7 %

Better dimensional stability

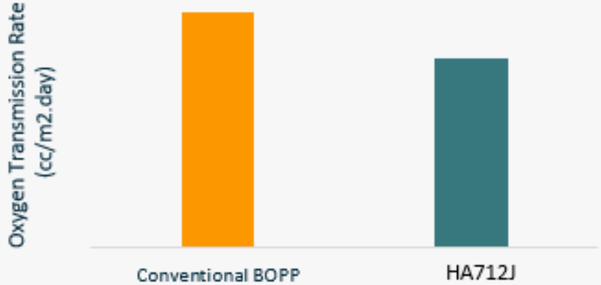


% Improvement

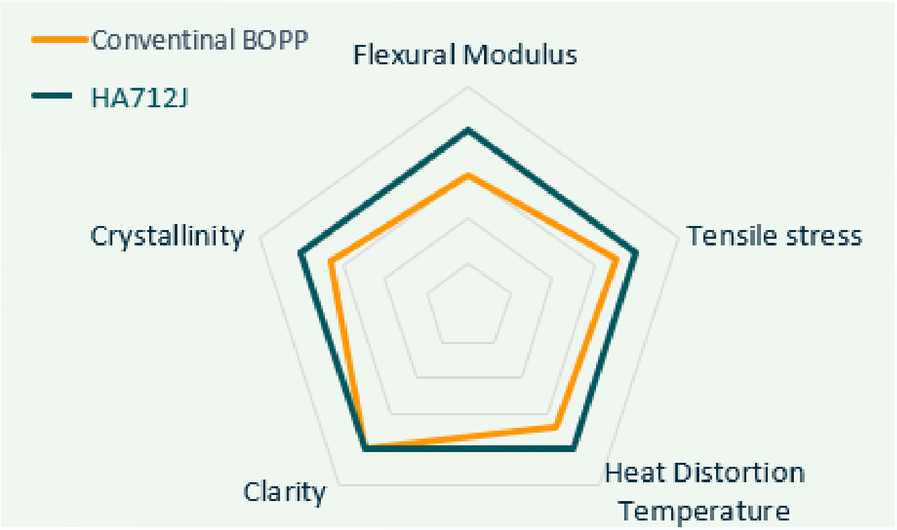
MD	34.4 %
TD	27.2 %



23.0 % Improvement



19.8 % Improvement



Key features of *Adstif HA712J*

- High stiffness
- High temperature resistance
- High barrier

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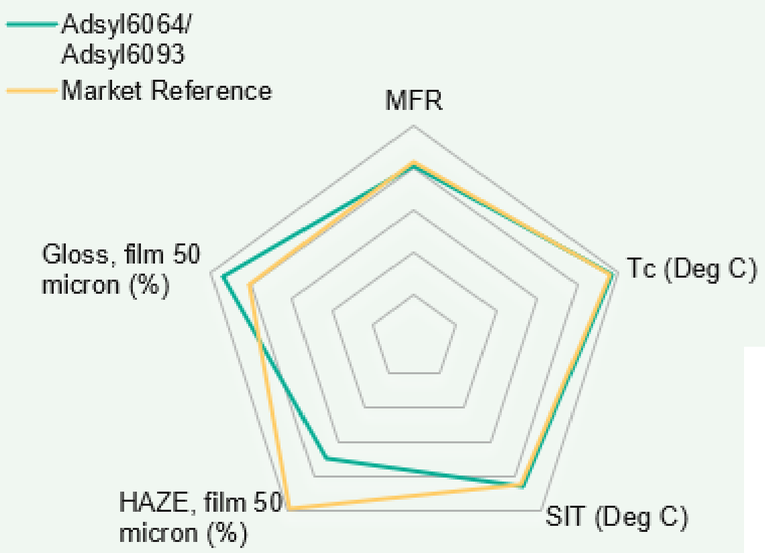
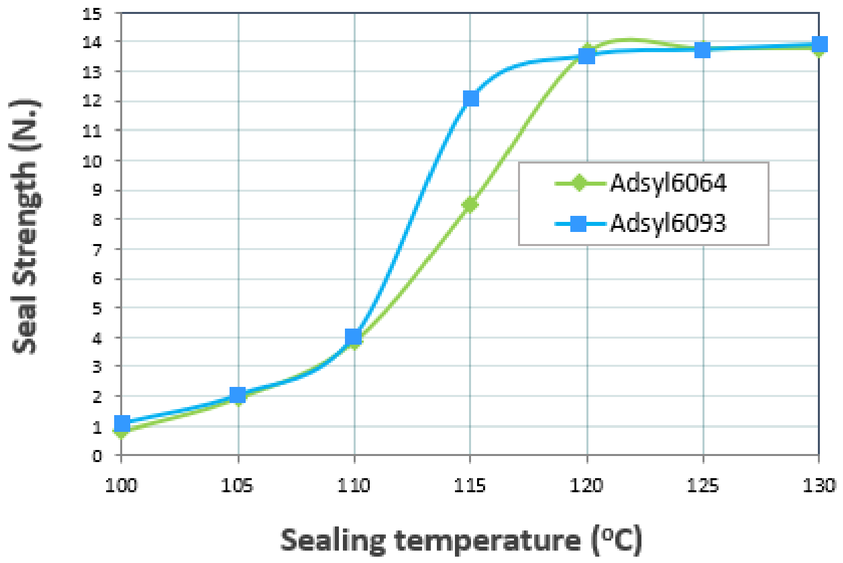
HMC Polymer solutions for Mono-material laminates

Adsyl 6064, *Adsyl* 6093





Need low SIT CPP film for BOPP/CPP laminates

- Better dimensional stability of laminate on FFS machines
- Lower sticking of outer layer BOPP film to sealing jaws

Key features of *Adsyl* resin for CPP

- **Low SIT of 107–110°C on CPP film**
- **Good seal strength**
- **Good optical properties**
- **Suitable for metallizable films**
- **Broad processing window**

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Replace with More Sustainable Solutions

Tin can replacement

with *Adstif* HA849K

- Lighter weight
- Transparent-product visualization
- More flexible for packaging design
- Comparable product protection
- Microwavable
- Lower packaging cost
- Lower transportation cost per product unit

Glass replacement

with *Moplen* RP242G

- Lighter weight
- More flexible for packaging design
- Comparable product protection
- Safety—breakability resistance
- Lower packaging cost
- Lower transportation cost per product unit

Beverage Packaging comparison

(comparative on same product weight)

	Glass bottle	Plastic Bottle	Aluminum can	Stand-up pouch
Packaging weight	🔴	🟡	🟡	🟢
Energy consumption	🔴	🟡	🟡	🟢
Emission per packaging	🔴	🟡	🟡	🟢
Waste weight per consumption	🔴	🟡	🟡	🟢
Recyclability	🟢	🟢	🟢	🟡
Transportation cost *(product quantity /shipment)*	🔴	🟡	🟡	🟢
No. of load @ same product quantity *(illustration only)*				
Improvement for sustainability	Increasing scrap content & lower energy consumption tech	Recycled bottle	Higher recycled content, thinner can	Mono-material, recyclable material

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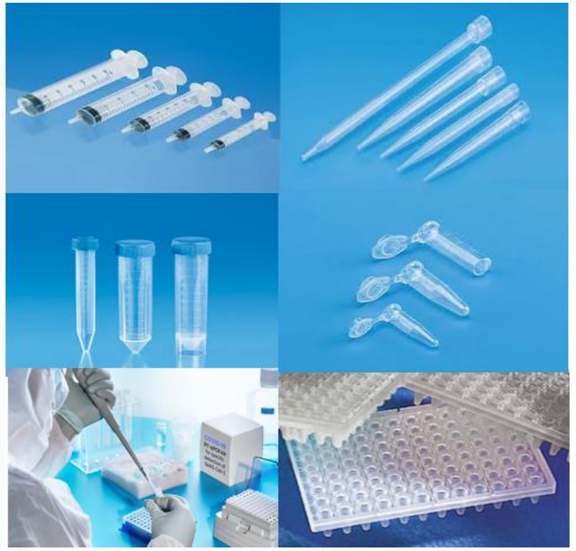
Replace Glass, Polystyrene, Polycarbonate, ABS

Purell Portfolio offer sustainable solutions for medical applications

Pharma packaging




Diagnostics



Medical devices



Purell Brand stands for

- High standards of quality
- High consistency
- Extensive regulatory support
- Change management support

Dedicated **"*Purell* Product portfolio for medical applications.**

- Lower density: Weight reduction at source
- Good chemical resistance
- Good stiffness and impact balance
- Good clarity : Fit for purpose
- Lower energy consumption for conversion
- Can be sterilized by steam, ETO and Gamma ray sterilization (with suitable additivation)

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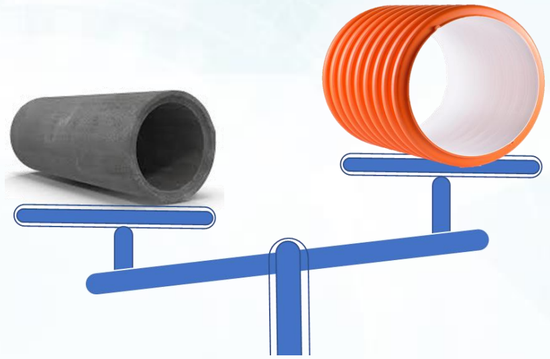
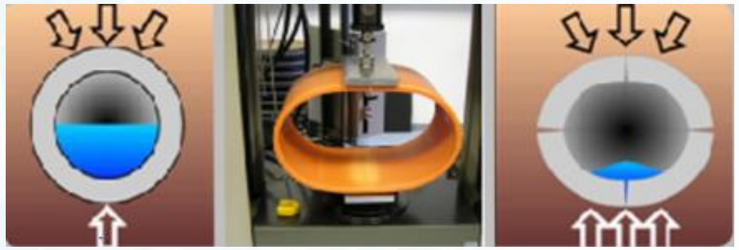
Replace cement pipes with High Modulus PP for waste water management

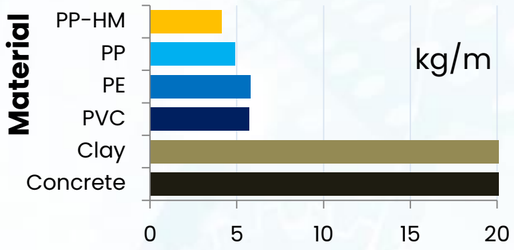
Hostalen PP H2483

Hostalen* PP H2483** is a **High Modulus (HM) PP block copolymer (Flexural modulus >1700 MPa)** produced using ***Spherizone technology that can be used for production of solid wall and corrugated pipes





Lowest Specific Weight



Key feature of PP pipe offering the sustainable solution for wastewater management

- **Performance:** Lower weight, corrosion free, good stiffness and balance over wide operating window
- **Flexibility & resilience:** to withstand soil movement and maintain integrity of the system. Wide service temperature from high to subzero temperatures.
- **Increased hydraulic capacity :** The surface roughness is lower than that of concreate, the water flow rate is higher for the same pipe diameter.
- **Ease of installation:** Lower weight, lower construction cost, can lay in the soft trenches, lower COF i.e. drain off waste water at low inclination
- **Ease of maintenance:** lower dredging or cleaning cost due to smooth inner surface

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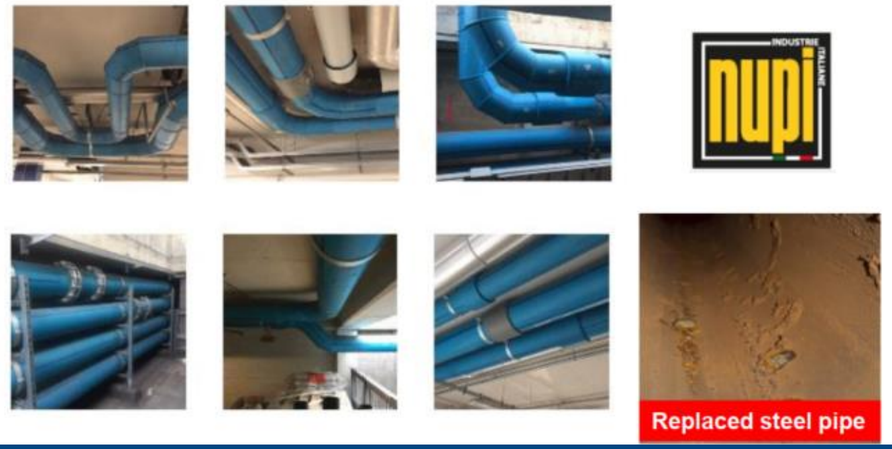
Replace metal pipe with PP-RCT Pipe grades

Replacement of steel pipes in conditioning system



PPRCT and Fiber Basalt multilayer pipe for Hospital

Hostalen XN 125 / XN112

New generation

Materials that significantly outperform reference curves of **PP-R** and even **PP-RCT** (EN ISO 15874)

Hostalen PP XN125-P

Top pressure resistance
MRS 12.5, $\sigma_{LPL(70°C,50y)}$ 5.9
EN ISO 15874

Hostalen PP XN112-I

Improved impact performance maintaining regression curves above PP-RCT

Higher pressure resistance of the pipes at application temperatures

Pipes with reduced wall thickness/diameter

- Higher hydraulic capacity
- Easier installation (smaller/lighter pipes)
- Overall system cost reduction
- Sustainable solution

Pipes with Superior pressure resistance

- Increase pipe system lifetime rather than reducing wall thickness
- Longer life span in challenging environments containing Chlorine

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Recycle—make the loop happen with mechanically recycled PP

HMC Polymers achieves **GRS certificate** for recycled PP business (mechanical recycling)

Clean Globe International (Pty) Ltd
Level 1, Paspalis Centrepoint, 48-50 Smith Street Mall
Darwin, NT 0800, Australia.
+61 881214151, certification@cleanglobeint.com

Clean Globe

SCOPE CERTIFICATE

Scope Certificate Number CGI-700274-GRS-2023-01

Clean Globe International
Certifies that

HMC Polymers Co., Ltd.
License Number CGI-700274
20/F, Sathorn City Tower, 175 South Sathorn Road, Thungmahamek,
Sathorn, 10120
Bangkok - Thailand
has been audited and found to be in conformity with the

Global Recycle Standard (Version 4.0)

Product categories mentioned below (and further specified in the product appendix) conform with the standard(s):
Processed pre-consumer materials (PC0035), Processed post-consumer materials (PC0041)

Process categories carried out under responsibility of the above mentioned organization for the certified products cover:
Trading (PR0030)
*The processes marked with an asterisk may be carried out by subcontractors.

This Certificate is valid until: 2024. 09. 26

Place and Date of Issue	Stamp of the issuing body	Standard
Darwin, 2023.09. 27 Last Updated: 2023. 09. 27	CLEAN GLOBE CERTIFIED	Global Recycled Standard

Nipuni Rathnayake | Certifier

Certification Body Licensed by: Textile Exchange; Licensing Code: CB-CGI
Certification Body Accredited by: SLAB; Accreditation Number: CP 010-01
Inspection Body: Clean Globe International (Pty) Ltd

This Scope Certificates provides no proof that any goods delivered by its holder are GRS certified. Proof of GRS certification of goods delivered is provided by a valid Transaction Certificate (TC) covering them.
The issuing body may withdraw this certificate before it expires if the declared conformity is no longer guaranteed.
This scope certificate can be authenticated by emailing to info@cleanglobeint.com
This electronically issued document is the official version
License No. CGI-700274

page 1 of 4

FDA REACH COMPLIANCE RoHS EN71

Certified recycled PP covers both PIR and PCR.

Source: Internal, Textile Exchange, Flaticon.com

HMC Polymers focuses on the **certified recycled PP** to ensure the **chain of custody**, **traceability** and **transparency** to **customers**.

Applications

- **Automotive**
- **Household**
- **Furniture**
- **Textile**
- **Film / Sheet**
- **Appliance**

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Recycle—make the loop happen with mechanically recycled PP

it's not the waste, create value on it!!!

Showcase from Post-consumer recycled PP (PCR PP)

Raffia bag
PCR PP inside and recyclable

Upcycled products from PP Reborn project

More products on testing

What's next?..
Let's join hand

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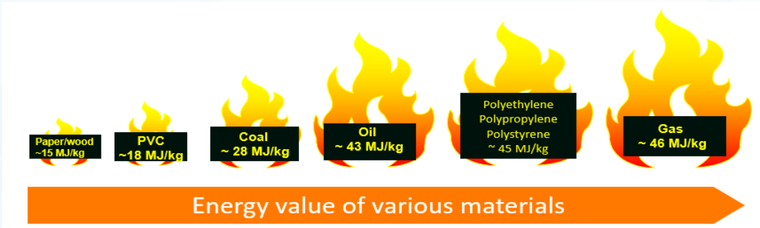
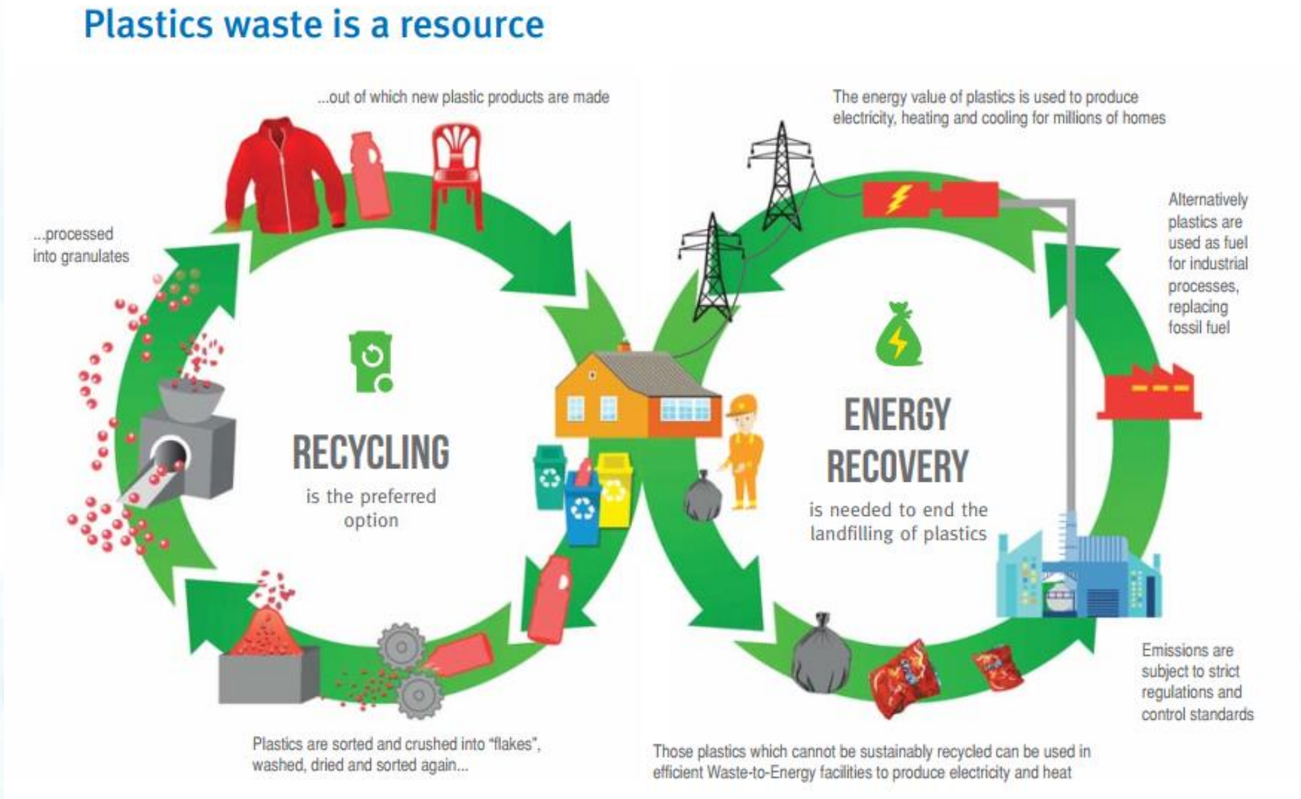
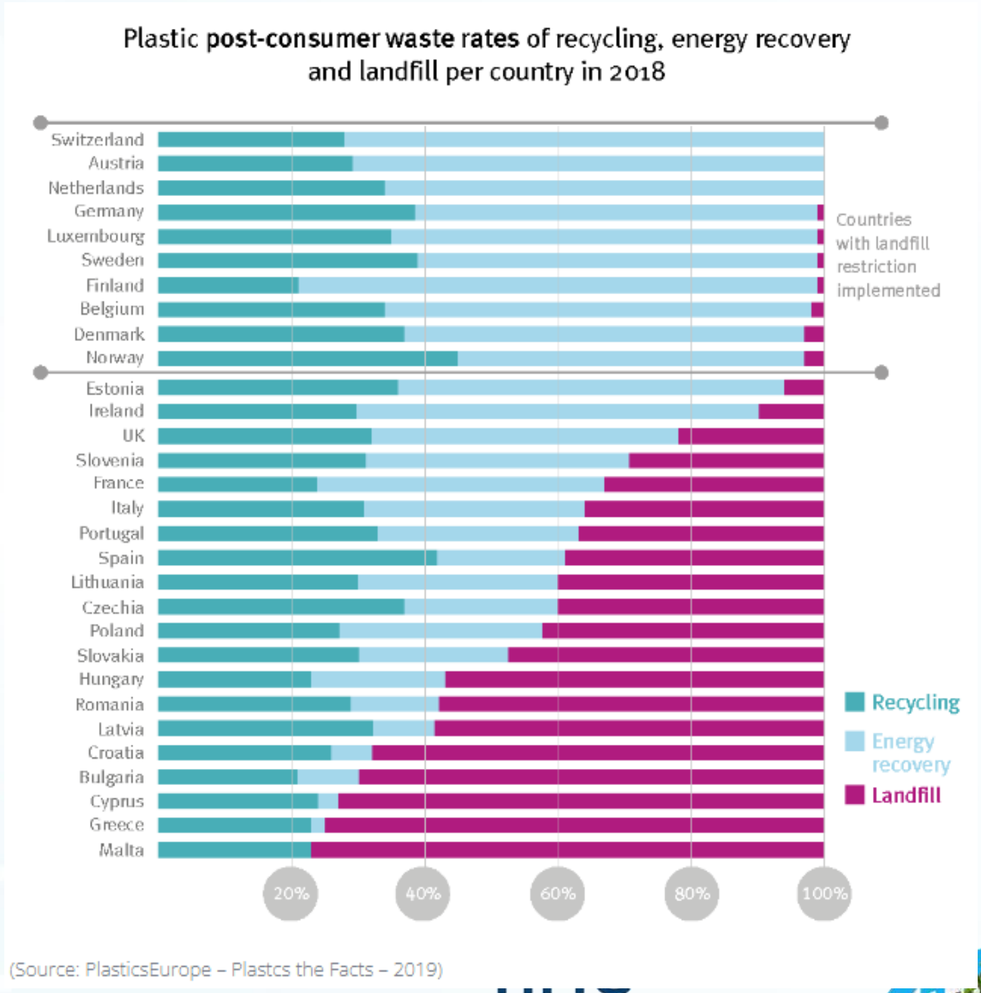
Recover







(Source: PlasticsEurope – Plastcs the Facts – 2019)

Due to

Conclusion

- **Plastics can bring solution** to mankind that are **sustainable and environmentally friendly** but their irresponsible usage and disposal leads to environmental issues

- Innovative ways to **reduce usage** of plastics at source, **designing for multiple usage** and **recyclability**, **replacing non sustainable materials** can help to unveil sustainable solutions.

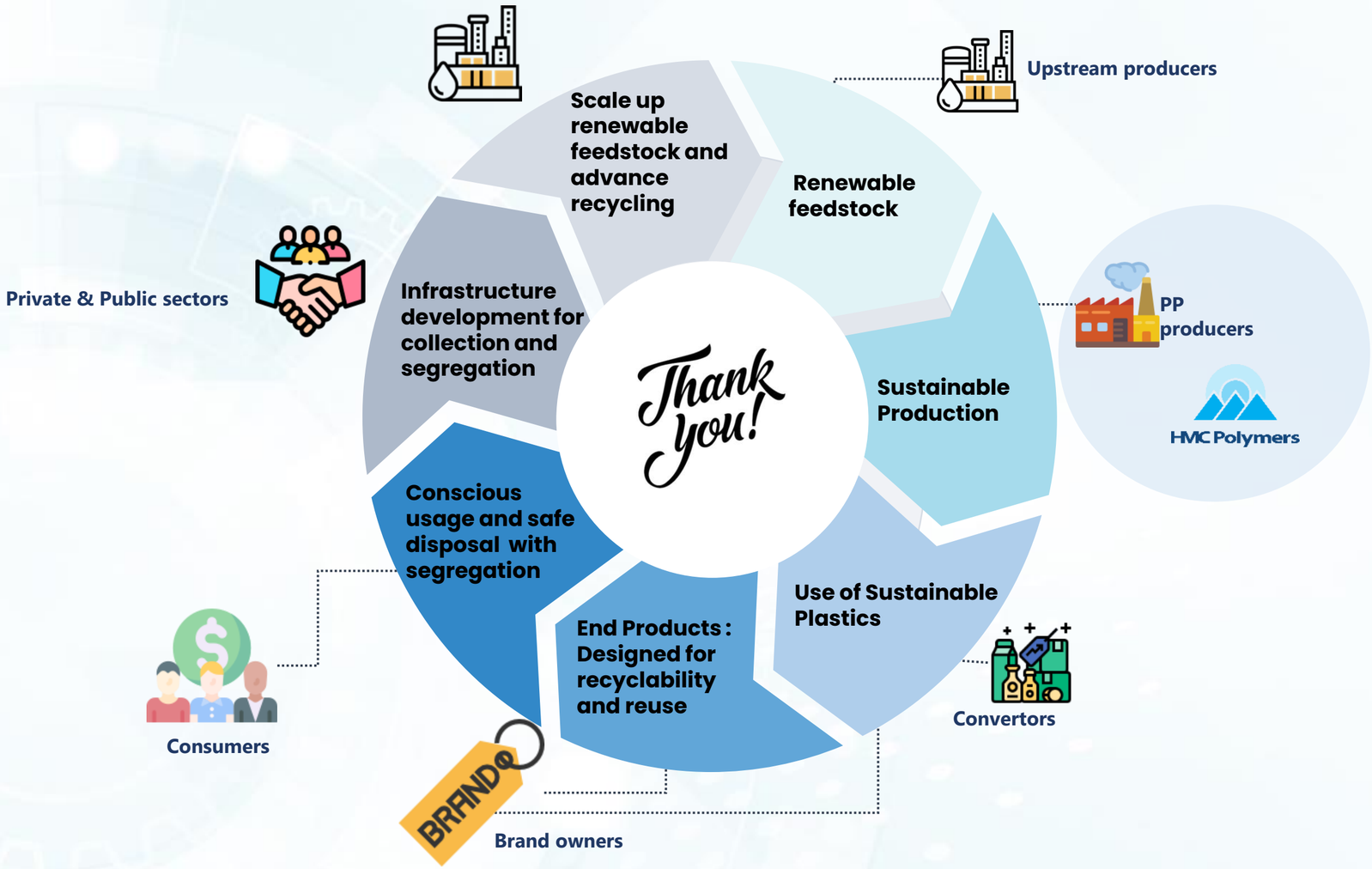
- By embedding **Sustainability in Innovation**, **HMC Polymers is bringing new products** to market that benefit our customers, society and environment

- HMC Polymers has developed **high performance PP grades** using advanced catalysts and *Spherizone* production technology that enable **inter- material replacement and support weight and energy saving without compromising on product performance**

- **Reduction of carbon footprint** is the key to control climate change and meet Net Zero targets. **HMC Polymers is ISCC Plus certified** and **offers Bio-based PP grades** that can help to significantly reduce Carbon emissions

- **HMC Polymers is now GRS certified** and is working closely with its partners to bring **mechanically recycled solutions** to the market for wide range of PP applications

- HMC Polymers is committed to **bringing sustainable PP solutions to the market** by working closely with its value chain partners such as technology suppliers, customers and end users



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A.J. PLAST'S Sustainability Direction

SUSTAINABILITY AWARDS 2022

A.J.PLAST

ได้รับเลือกให้เป็นหนึ่งใน

"หุ้นยั่งยืน"

THSI

THAILAND SUSTAINABILITY INVESTMENT 2022

Excellent CGR 5-star Rating

บรรษัทภิบาลแห่งชาติ National CG Committee

Interview with SET (THSI)

WEPs Awards

Collective Action Against Corruption (CAC)

CAC CERTIFIED

A.J.PLAST

Sustainable Product

Green Products

Bio-based

Non-Biodegradable and Biobased

BOPPlus™ FUSION BIOBASED FILM

BIOPA Film™ WORLD 1ST BOPA FROM BIOMASS

Biodegradable and Biobased

BOPLA Film

Non-Biodegradable — **Biodegradable**

Conventional Plastics

e.g., **PP, PET, PA**

PCR-BOPET

PCR-BOPA

Biodegradable and Fossil-based

Fossil-based

A.J.PLAST

BOPPplus™
Bio-based PP Film

Bio-based PP resin From Sugarcane

Film Production

BOPPlus Film

BOPPlus Film is bio-based film contained 10% of biomass polyethylene come from the process fermentation and distillation of sugarcane to be ethanol by Braskem. Biomass content can be checked by carbon-14 determination method. Currently, finished products using BOPPlus packaging film are sold in convenience stores in Japan.

バイオマス
No.190052

BOPPplus™
FUSION BIOBASED FILM

SEVEN&i

PIR-PP

Post-industrial recycled PP/PET/PA Film

PIR Film is produced from in-house waste recycling resin which are PP recycled resin

Conversional Resin

Film Production

PP Film

PIR Resin

In-house Recycling

In-house Waste

Mono-material project for snack packaging

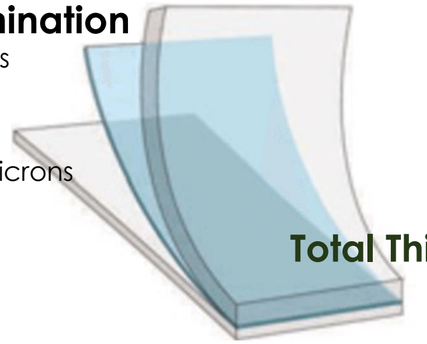
Mono-material Film

Heat Sealable PP // PE // Barrier PP for 14 gram pack

Metalized BOPP 17 microns

PE lamination
9 microns

HSL
17 microns



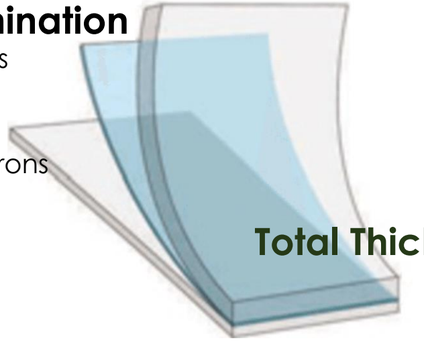
Total Thickness: 43 Microns

Plain PP // PE // Barrier CPP for 57-80 gram pack

Metalized CPP 25 microns

PE lamination
9 microns

Plain
25 microns



Total Thickness: 59 Microns

Multi-material Film

PP // PE // Barrier PET // Dry Lamination // CPP

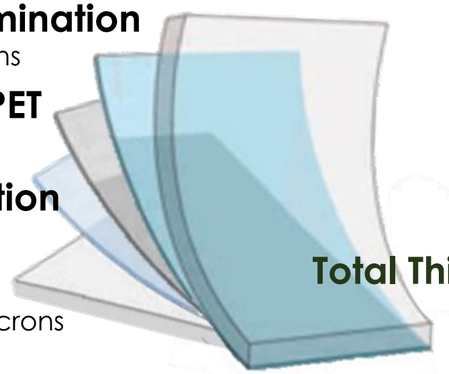
BOPP 18 microns

PE lamination
9 microns

Metalized BOPET
12 microns

Dry lamination
3 microns

CPP
18 microns



Total Thickness: 60 Microns

PEPSICO

Circular Economy

Product & Process Development and Certification

Product

Bio-Based

バイオマス
No.190052

OK biobased

S444
VINÇOTTE

Post-Consumer Recycled

RECYCLED 100 claim standard

RECYCLED BLENDED claim standard

Process

ISO 14001:2015

Green Industry Ministry Of Industry Level 2

Certified Sustainability ISCC ISCC PLUS

Global Recycled Standard

Green Industry Ministry Of Industry Level 3-4

Certified

Plan to certify

A.J.PLAST

Collaboration with HMC Polymers

2020 High heat-resistance BOPP for BOPET printing web replacement

2022 New skin for metallization for better bonding and barrier

2023 Lowering SIT towards sustainability

Potential :

- PCR (Post consumer recycle) BOPP
- Bio-based BOPP

Printing Substrate

Replacement of BOPET film 12 um

- PPJ (High heat resistant)

✓ Improve thermal stability

✓ Resistance to higher temperature

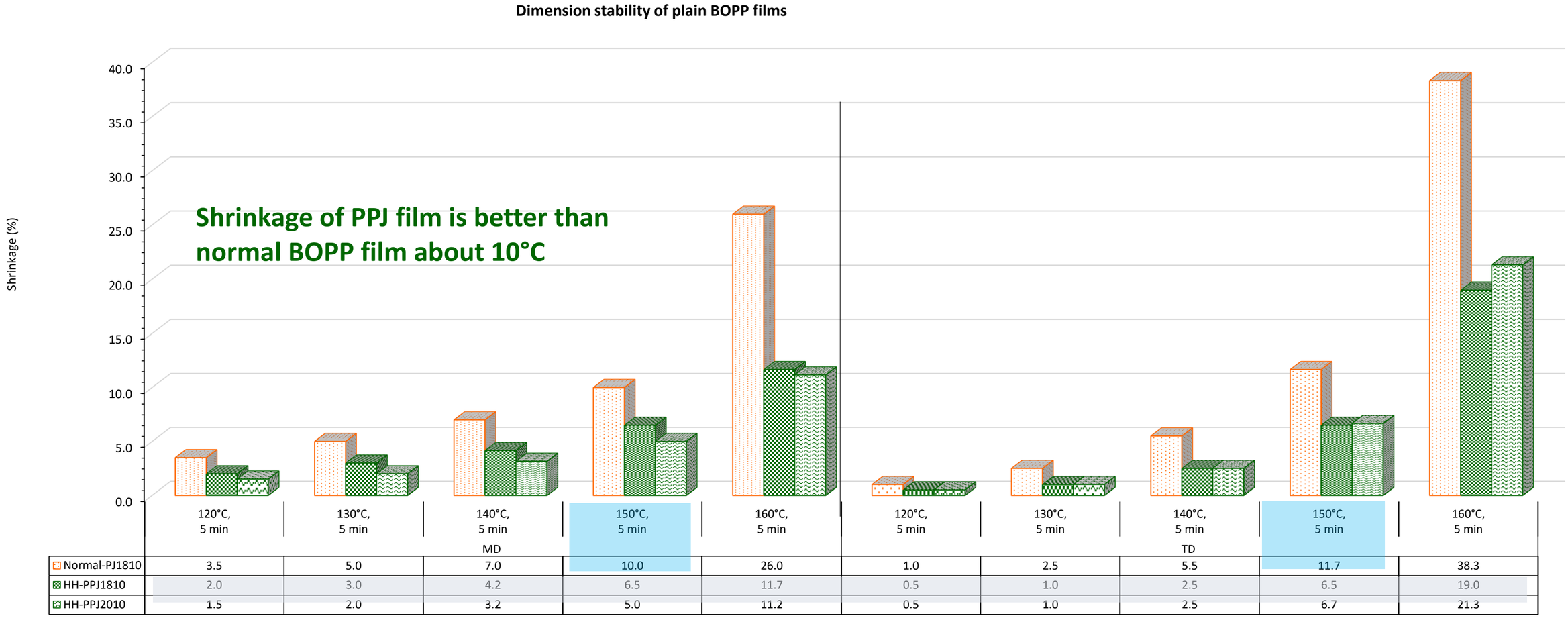
✓ Higher Stiffness

✓ Excellent printing ability

✓ Suitable for PE Extrusion lamination

PPJ (High heat resistant BOPP)

Target: ≤ 7% at 150°C for 5 min



	MD					TD				
Normal-PJ1810	3.5	5.0	7.0	10.0	26.0	1.0	2.5	5.5	11.7	38.3
HH-PPJ1810	2.0	3.0	4.2	6.5	11.7	0.5	1.0	2.5	6.5	19.0
HH-PPJ2010	1.5	2.0	3.2	5.0	11.2	0.5	1.0	2.5	6.7	21.3

MONO-MATERIAL: BOPP FILM

PPJ & MCHX

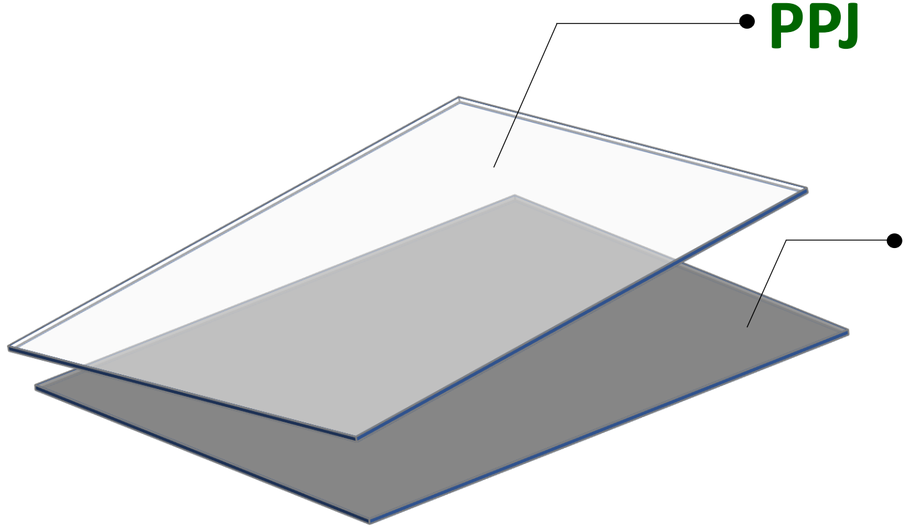
FOR SNACK PACKAGING

>40 grams per package

Recyclability

Old structure: BOPP // VM-PET // CPP

New trial structure: PPJ /PE/ MCHX



- **PPJ**
  - ✓ Excellent printing ability
  - ✓ Resistance to higher temperature
  - ✓ Higher Stiffness
- **MCHX** :**High Bond-High Barrier** and heat-sealable
  - ✓ Metal adhesion ≥ 350 gf/25 mm
  - ✓ WVTR ≤ 0.3 g/m^2.day and O_2TR ≤ 20.0 cm^3/m^2.day.bar
  - ✓ High heat-seal performance strength

30th Anniversary

A.J.PLAST