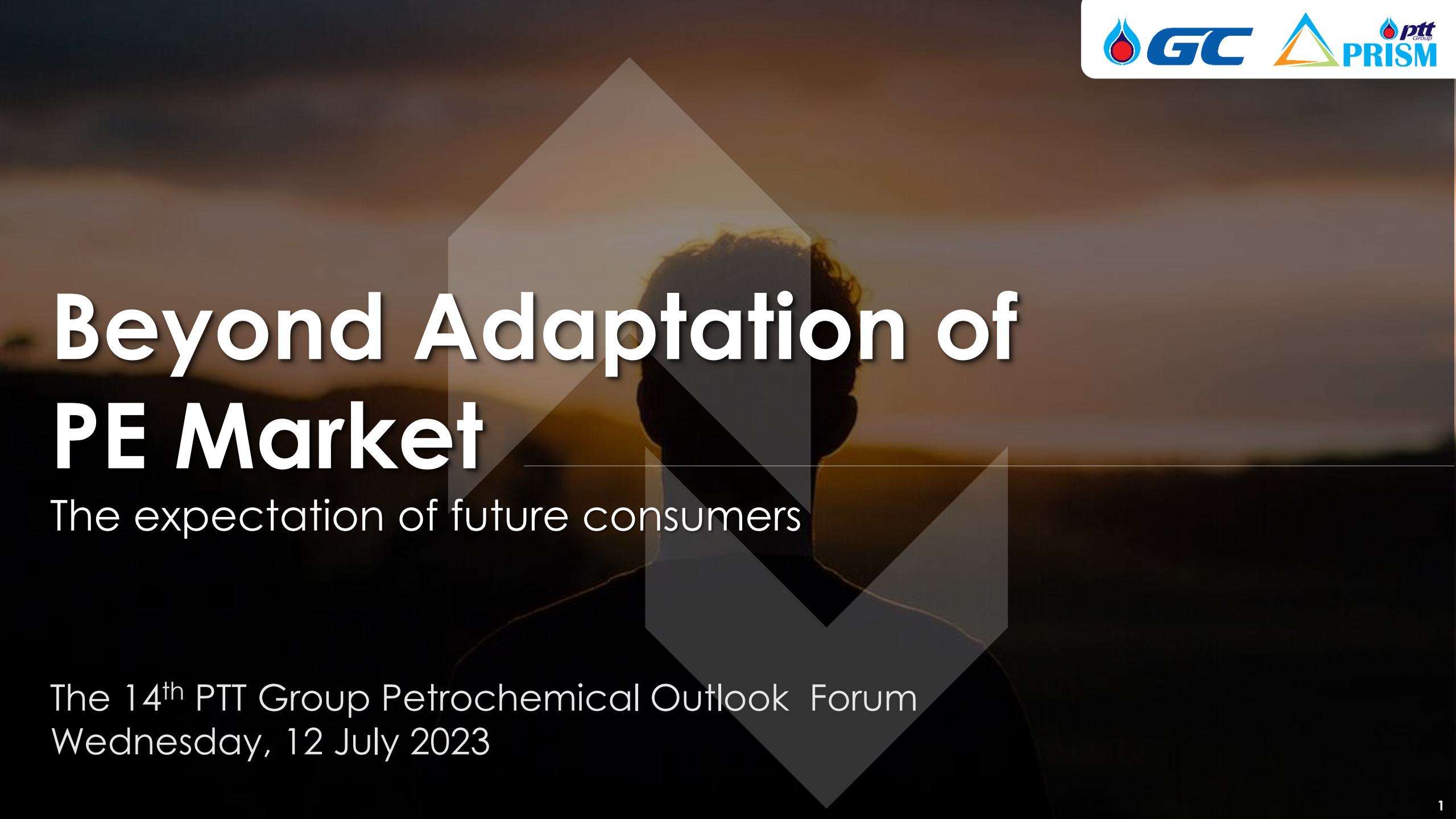


Beyond Adaptation of PE Market

The expectation of future consumers

The 14th PTT Group Petrochemical Outlook Forum
Wednesday, 12 July 2023

Polyethylene Value Chain

Natural Gas

Gas Separation

- Ethane
- Propane
- Butane
- LPG

Crude Oil

Refinery

- Naphtha

Steam Cracking

- Ethylene
- Propylene
- Mixed C4

- Butadiene

Rubber Product

Polyolefin Plastics

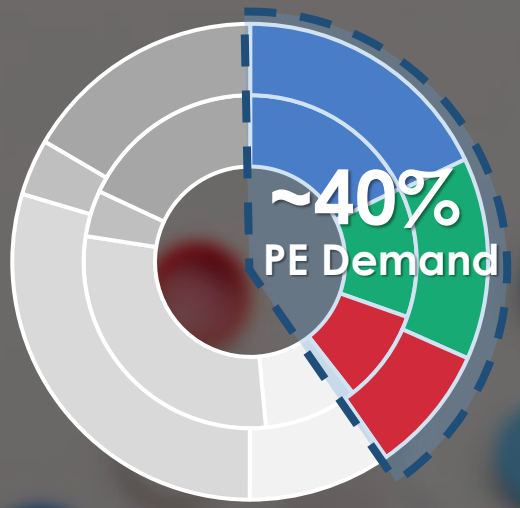
- LDPE
- LLDPE
- HDPE
- PP
- PVC

PE Plastic Products



Global PE Demand: Past, Present, and Future

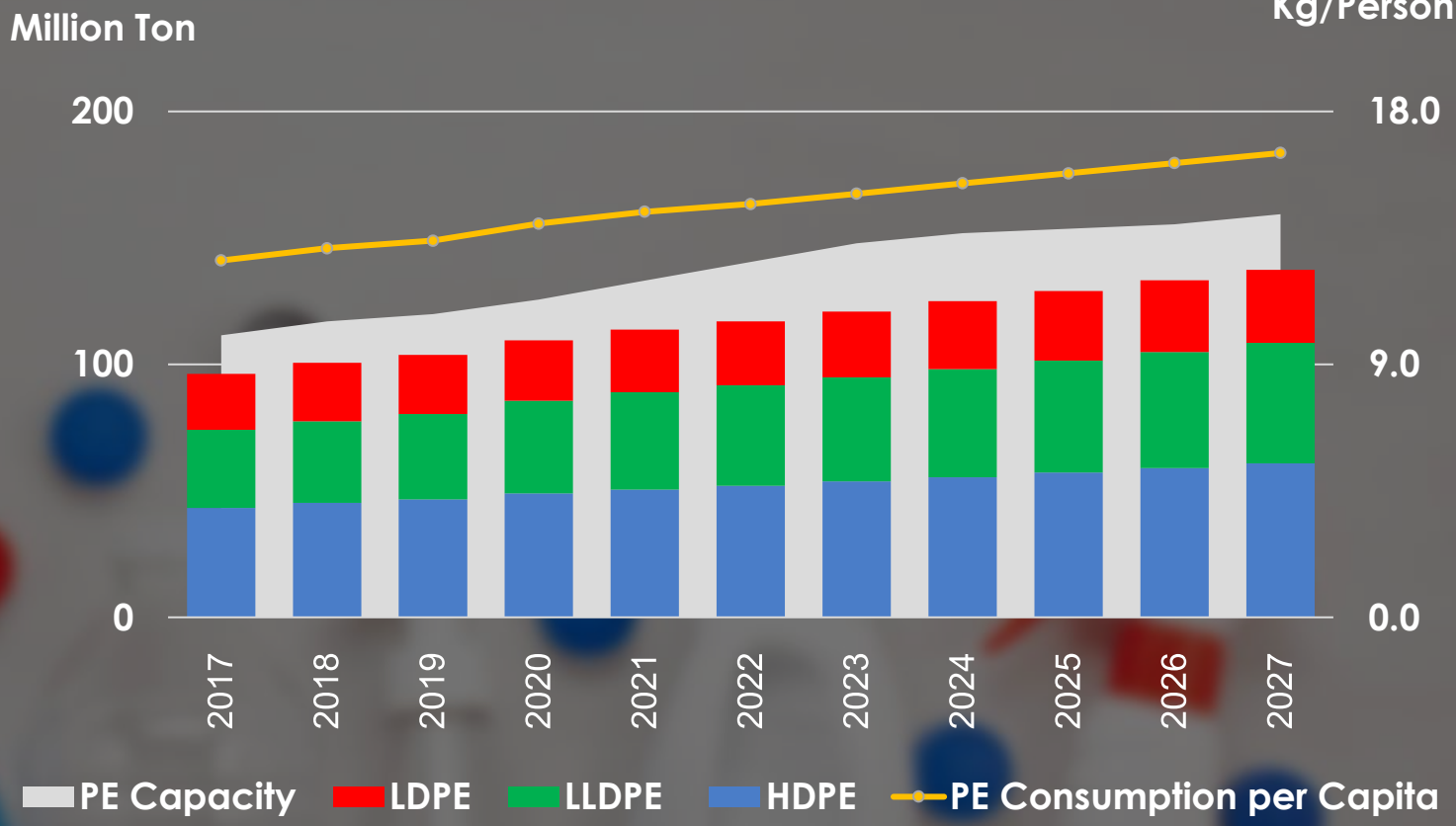
"PE remains the majority demand of any kind of plastics consumption."



HDPE LLDPE LDPE PET PP PS PVC

Inner Ratio: 2017 (Approx.100 Million Ton)
Outer Ratio: 2023 (Approx.120 Million Ton)

"PE demand & supply continues to grow globally."



"PE will have played a vital role in the world"

Sources: OPIS 2023 Edition: Spring 2023 Update, Analyzed and Calculated by D-PE-CE Team

Global PE Outlook

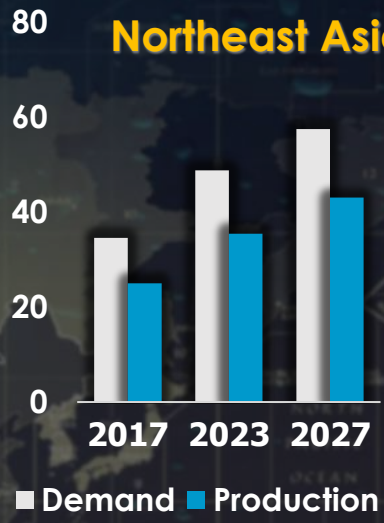
Unit: USD/Ton

Spread HDPE Film CFR SEA – Naphtha MOPJ



- Global Largest Consumption
- New Coming of Chinese Capacities

Northeast Asia



- Economic and Demand Uncertainties from Geopolitics Risk

Europe

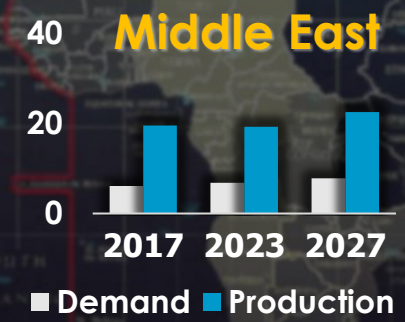


United States



- Strong Investments for Export

Middle East



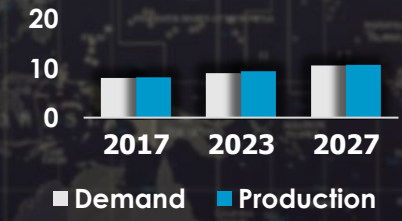
- Global Major Suppliers
- Projected New Cap in 2027

India sub.



- High Demand Growth
- Major Export Target of the Middle East

Southeast Asia



- Increasing Demand as Growing Mid-Class Population an Infrastructure

Unit: Million Ton

Source: OPIS 2023 Edition: Spring 2023 Update, Analyzed and Calculated by D-PE-CE Team

What kind of PE products?

65% of PE Demand Used for Packaging and Consumer Products

15% of PE Demand Used for Construction and Infrastructure

HDPE
(High Density Polyethylene)


Shopping Bag


Bottle Cap


Gallon Liquid


Bath Packaging


Plastics Straw


Plastics Furniture


Pipe & Fitting


Safety Net

LLDPE
(Linear Low Density Polyethylene)


Shopping Bag


Food Flexible Packaging


Box/ Cooler


Wire & Cable


Water Tank


Road Barrier

LDPE
(Low Density Polyethylene)


Shopping Bag


Film Wrap Film Shrink


Plastics Glove


Cosmetic Tube


Flexible Bottle

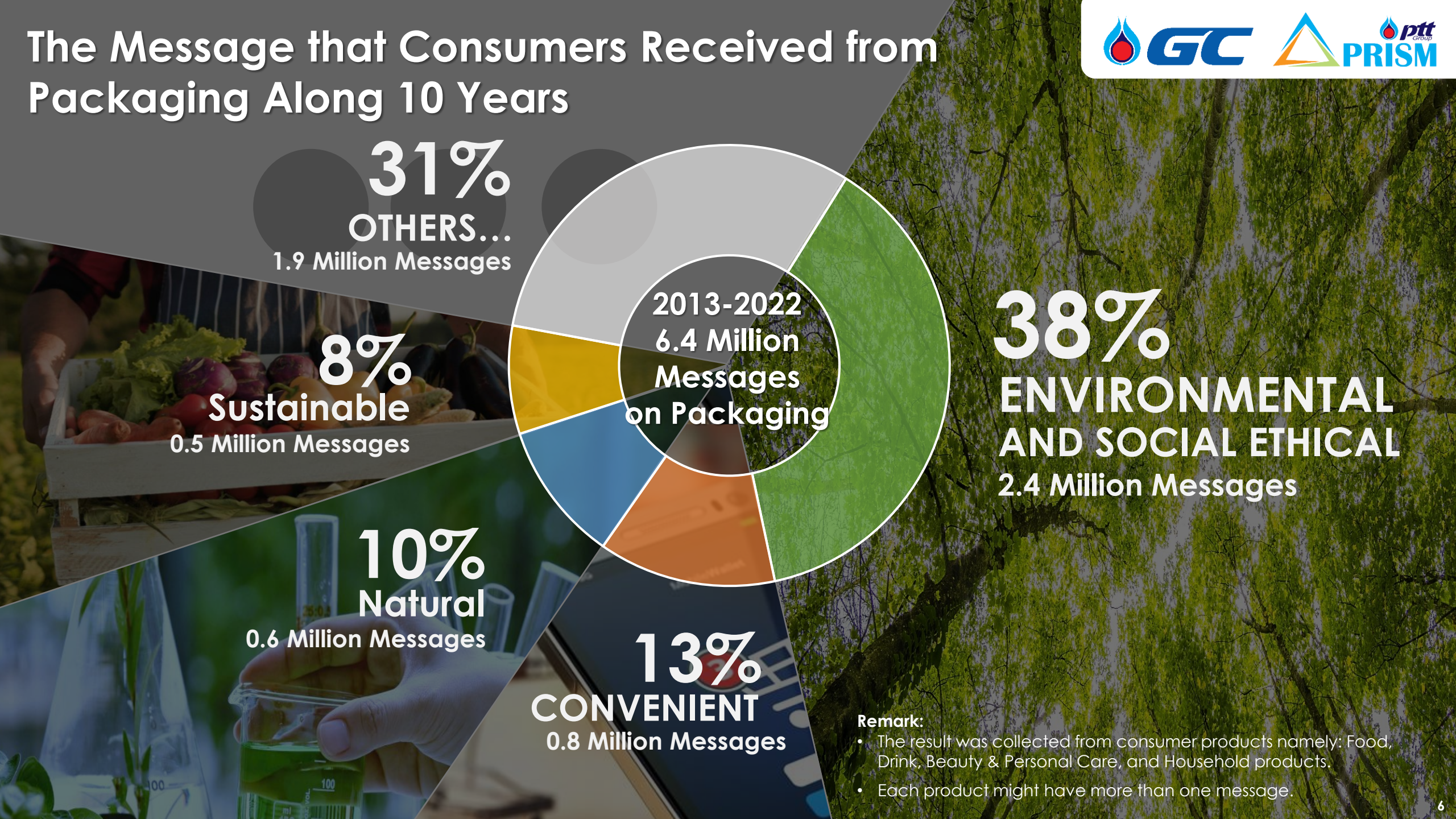

Insulation Foam


Agricultural Pipe


Hose

Sources: Fortune Business Insights (Polyethylene Market Size, Share & COVID-19 Impact Analysis, By End-use Industry), Research Gate (Typical applications of plastic materials in Europe)

The Message that Consumers Received from Packaging Along 10 Years



Remark:

- The result was collected from consumer products namely: Food, Drink, Beauty & Personal Care, and Household products.
- Each product might have more than one message.



Consumer Trends: the Future
PE Market Leading Indicator

Will stuff in the basket be the same things in the future?

1. "Health Awareness"

Key Driver

- Epidemic
- Hygiene Concern

Need

- To Well Being
- To Long Living

Behavior

- Health Consciousness

Sources: Mintel's Global Annual Trends 2023, Euromonitor (Global Consumer Trends 2023)

Smart Packaging Role with Health Consciousness

ACTIVE PACKAGING

Subsidiary constituents have been deliberately included in or on either the packaging material or the packaging headspace to enhance the performance of the packaging system

SMART PACKAGING

INTELLIGENT PACKAGING

Contains an external or internal indicator to provide information about aspects of the history of the package and/or the quality of the food

Key Features

- Oxygen Scavenging
- Carbon Dioxide Release
- Humidity Control
- Ethylene Scavenging





Key Features

- Informative Indicator for Decision
- Data Carrier
- Marketing Tools

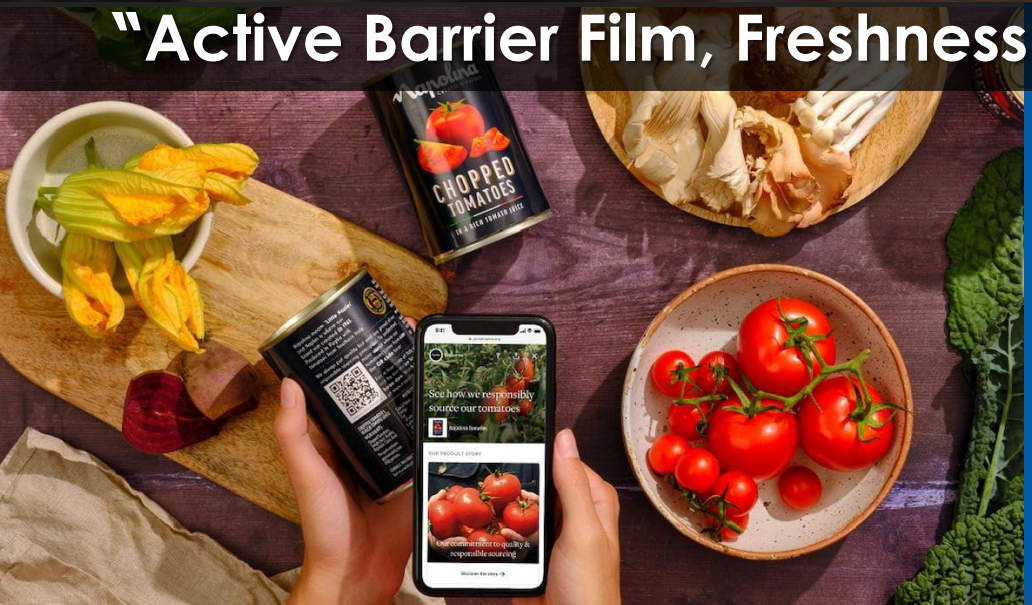
Sources: Science Direct (Smart Packaging: the Opportunities and Challenges), Polish Journal of Food and Nutrition Science (Active and Intelligent Packaging Food – Research and Development – A Review), Research Gate (Bio-Based Sensors for Smart Food Packaging—Current Applications and Future Trends)





Active Packaging and Intelligent Packaging

"Active Barrier Film, Freshness Indicator, QR Code for More Information, etc."





2. "Earth-Care Thinking"

Key Driver

- Global Pollution
- Waste in the Environment
- Environment Legislation

Need

- To be the Global Healer

Behavior

- Environmental Concern
- Eco Product Consumption

Sources: Mintel's Global Annual Trends 2023, Euromonitor (Global Consumer Trends 2023)







Eco-Friendly Plastic

"Bioplastics, Recycled Plastics, Mono Material Plastics, etc."







NEW
อัพเดทเทรนด์รักษ์
สิ่งแวดล้อม
ซอง ฟิล์ม บรรจุภัณฑ์
Mono
Material
รีไซเคิลได้

3. "More Convenience"

Key Driver

- Digital Revolution
- Overwhelm Information

Need

- To Complete Daily Tighten Schedules

Behavior

- Convenience-lism
- Doing Faster

Sources: Mintel's Global Annual Trends 2023, Euromonitor (Global Consumer Trends 2023)





Usage Enhancement with Design

"Functional Design, Engineering Design, Aesthetic Design, etc."









“They’re still the same old stuff, but they’re DIFFERENT”

Focus on providing the solution and experience through synergizing the right technology more than introducing an advanced product that no one knows, what is it?

Key Takeaways

- **PE demand and supply will have grown** by increasing the global population and **will still be in plastic packaging and consumer daily products** mainly.
- Key consumer trends toward PE packaging development still are the same trends in the present but **more delicacy and specific demand**, which results in **more efficient PE packaging usage.**
- **The right technology platforms integration** to develop customer solutions through **an understanding of consumer insight** will be the key to adaptation of PE market.

“You’ve got to start with the **CUSTOMER EXPERIENCE** and work back toward the technology.”

- Steve Jobs

