



Supply Chain and Investment Opportunities for Chemical Industry in Thailand

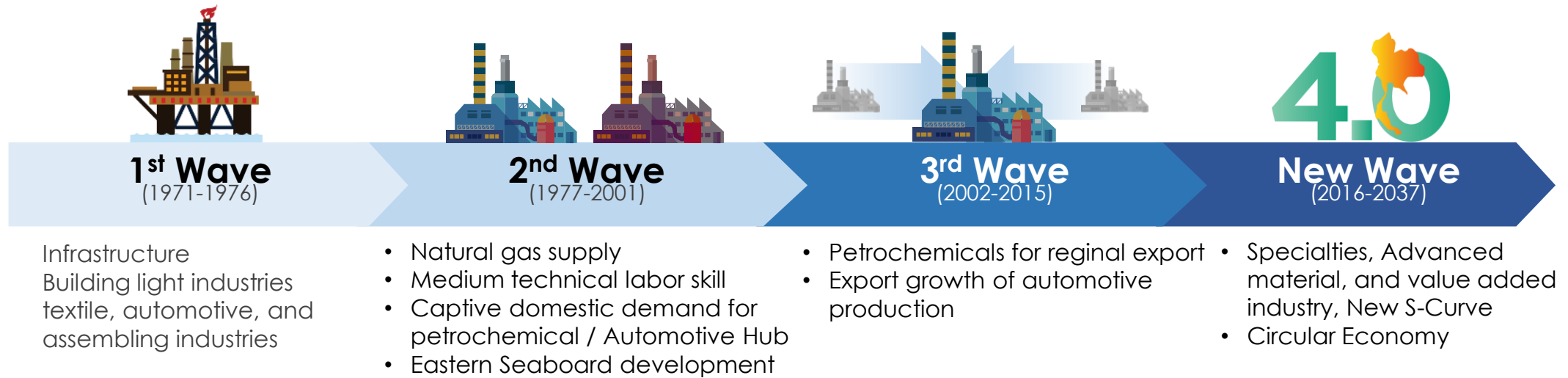
by

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PTT Global Chemical Public Company Limited
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Thai Chemical Industry leads the development of Thailand's Economic

to be a center for the ASEAN region



Petrochemical Industry

Raw material to Related Industries



Automotive
Automotive capacity
2 million per year



Electrical and Electronics
World leader in HDD and IC manufacturing



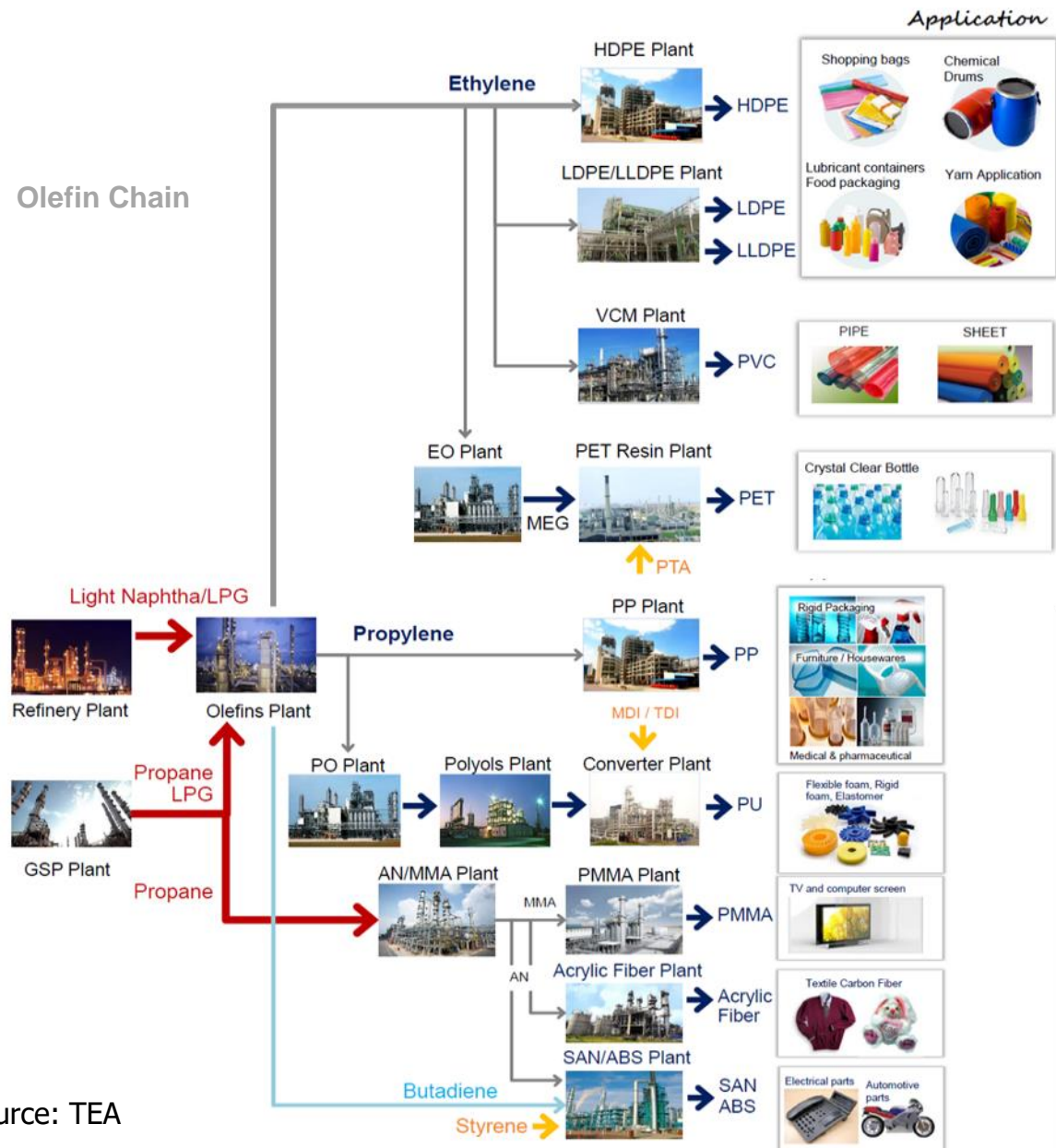
Material Supply
for various industries

Thai Petrochemical Supply Chain

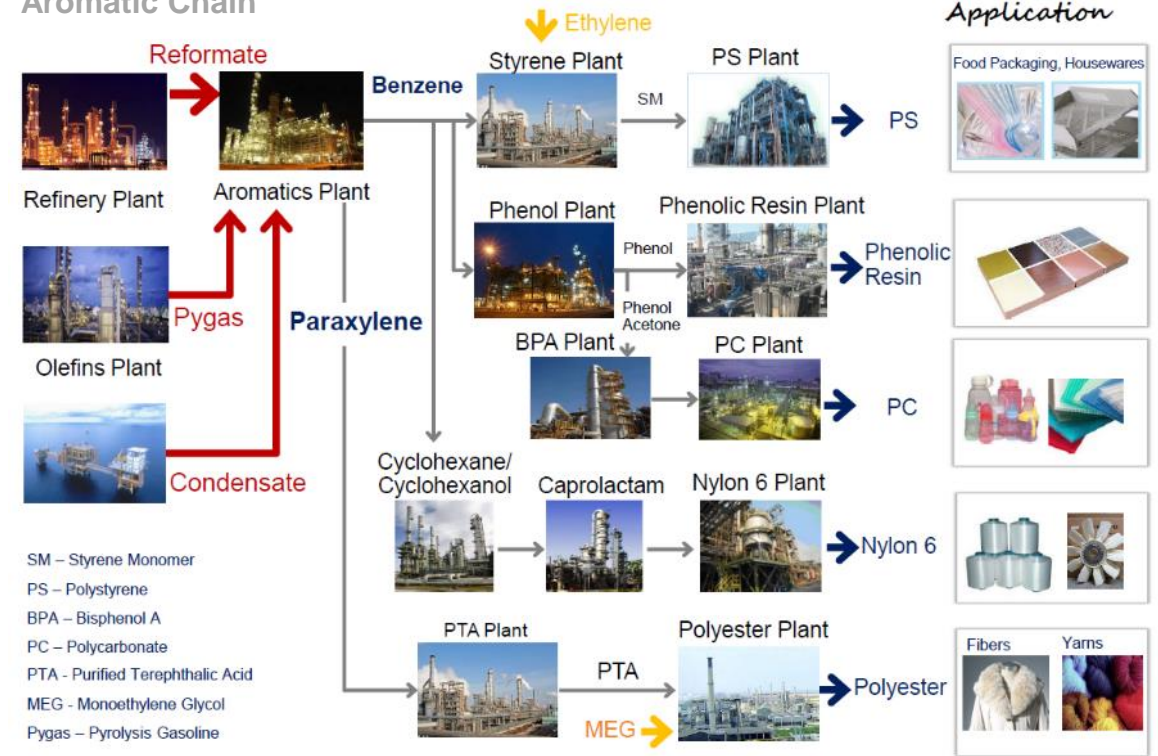
One of the most well-developed petrochemical industries in Asia



Olefin Chain



Aromatic Chain



Ethylene

HDPE – High density polyethylene
LDPE – Low density polyethylene
LLDPE – Linear low density polyethylene
VCM – Vinylchloride Monomer
PVC – Polyvinylchloride
PET – Polyethylene terephthalate
MEG – Monoethylene Glycol
PTA – Purified Terephthalic Acid

Propylene

PP – Polypropylene
AN – Acrylonitrile
MMA – Methyl Methacrylate
PMMA – Poly Methyl Methacrylate
PO – Propylene Oxide
PU – Polyurethane
MDI – Methylene Diphenyl Diisocyanate
TDI – Toluene Diisocyanate

Aromatic

SM – Styrene Monomer
PS – Polystyrene
BPA – Bisphenol A
PC – Polycarbonate
PTA – Purified Terephthalic Acid
MEG – Monoethylene Glycol
Pygas – Pyrolysis Gasoline

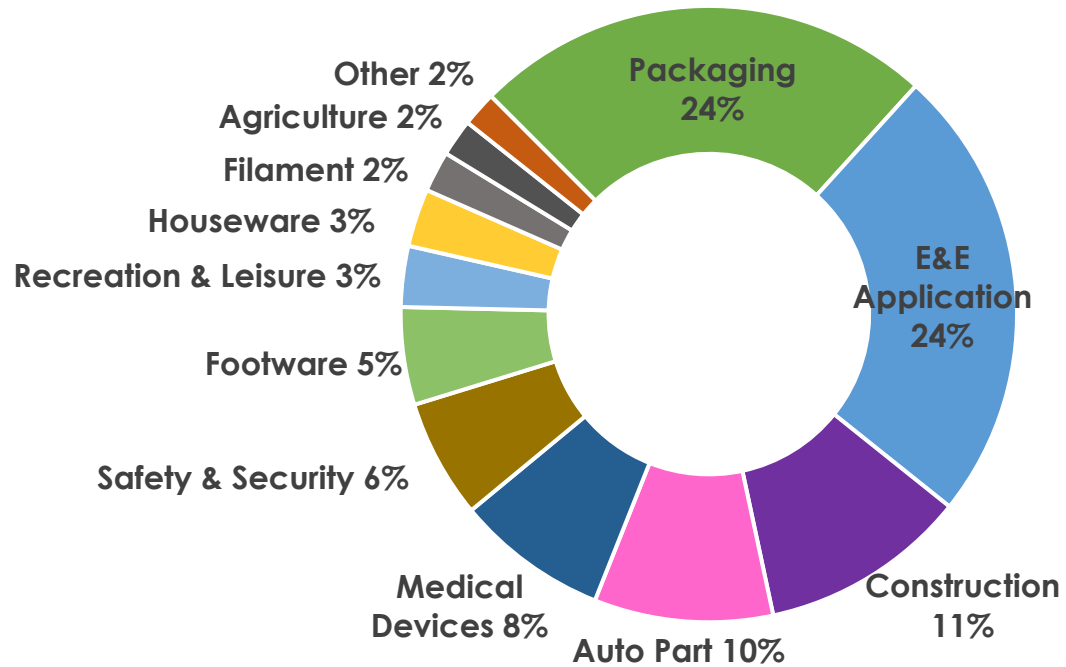
Thailand Plastics Resin Conversion Value 2020

Valued Extension from Thai Downstream Petrochemicals

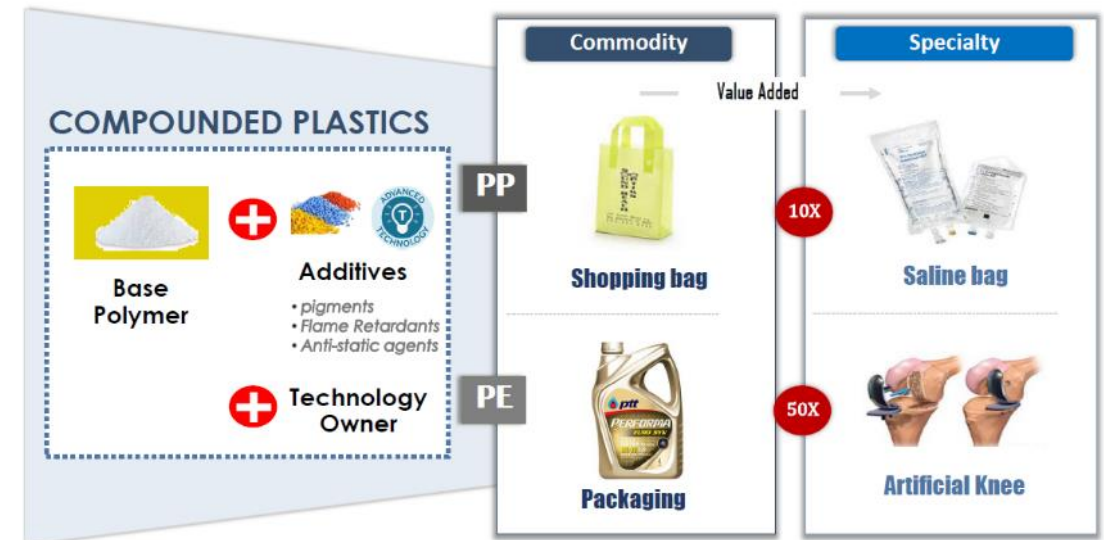


By Value

851,376 MB (27,200 MUSD)



Innovation for material solutions



PTT & SCG group produce the majority of Thailand's Petrochemicals

Thailand's four major petrochemical players are PTTGC, SCG Chemical, IRPC and Indorama



SCG Group

Year 2021

~35

กำลังการผลิตรวม
(ล้านตัน)

PTT Group 51 %

SCGC 27 %

INDORAMA 6 %

Other 16 %



กลุ่มผลิตภัณฑ์หลักของไทย

(หน่วย: ล้านตัน)

~13

ผลิตภัณฑ์ขั้นต้น
Upstream

- Ethylene
- Propylene
- Benzene
- Paraxylene

~ 8

ผลิตภัณฑ์ขั้นกลาง
Intermediate

- VCM
- Styrene
- PTA
- EG

~14

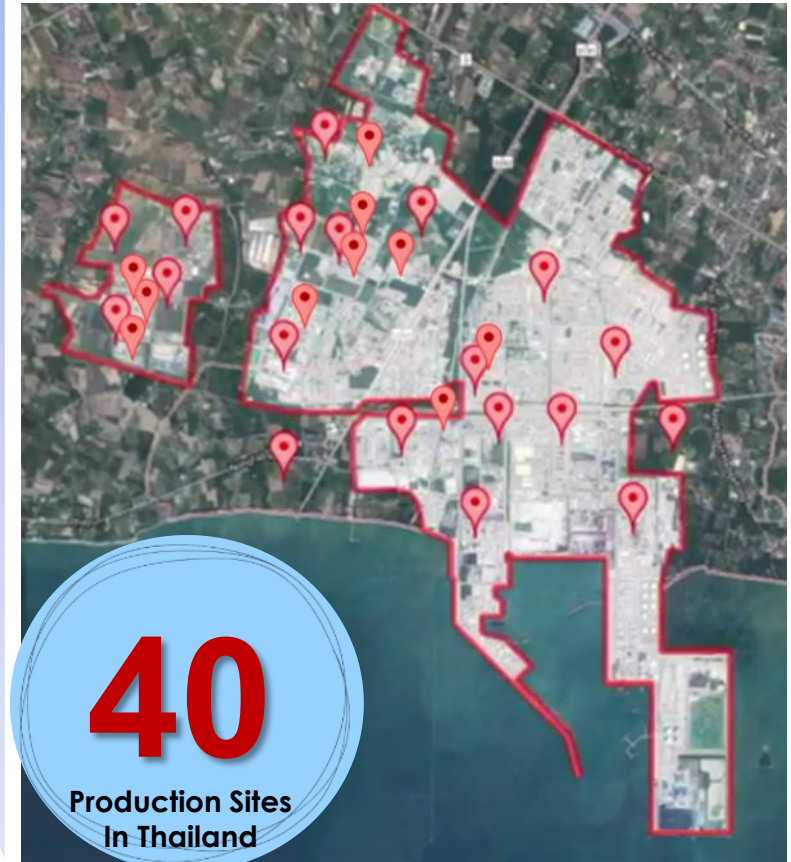
ผลิตภัณฑ์ขั้นปลาย
Downstream

- PE
- PP
- PVC
- PS/ABS/SBL
- PET
- PC

PTT Global Chemical

Public Company Limited

GC is Thailand's largest and Asia's leading integrated petrochemical company



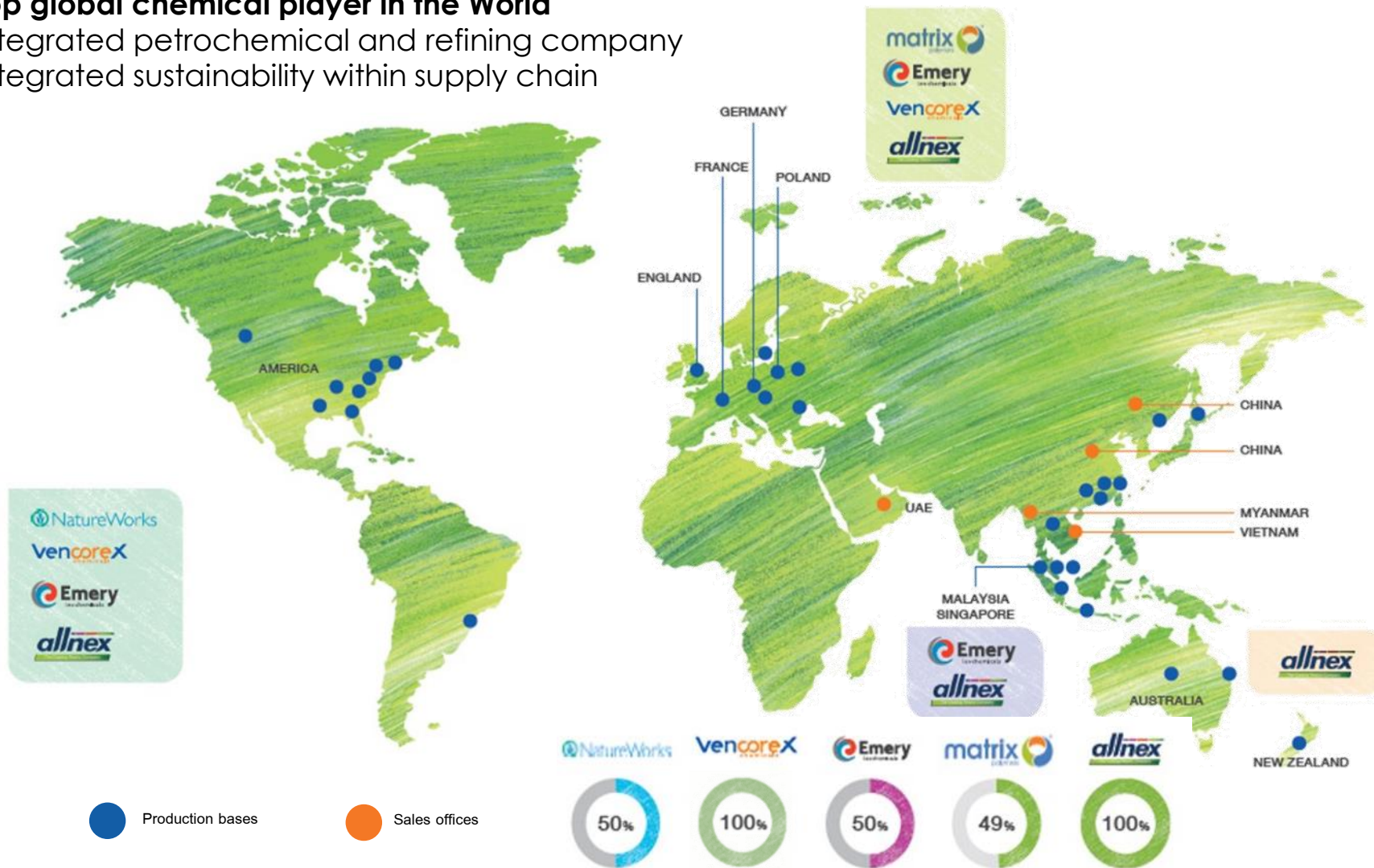
GC Global Footprint

Leveraging global presence to explore inbound and outbound investment & partnership opportunities



Top global chemical player in the World

Integrated petrochemical and refining company
Integrated sustainability within supply chain



42

International

Operating Sites

(in 20 countries)

29

R&D Centers

Employee Demography

Employee

15,000

Thai

International

62 %

38 %

Operating in 32 countries

Opportunities for the Thai Chemical Industry Investment

Advance Product in transition of Thai Chemical Industry from commodity into higher-value fine, specialty chemicals, biobased chemical and low carbon business



Petrochemical business are driven toward advanced materials for New S-Curve and low carbon product under BCG Model

Thailand New S-Curve

Thailand 4.0 is expected to generate new engineered plastic demands and applications for Thailand New S-Curve



Next Gen. Vehicle



Robotics



Smart Electronics



Aviation



Defense



Advanced Agriculture



Medical



Education



Food for the Future



Biofuel & Biochemicals



High Value Tourism



Digital

BCG Model

The BCG model capitalizes the country's strengths in biological diversity



GC Roles as the host to collaborate with international partners

Partner of choice in growing business and commercializing the technologies in ASEAN



GC's Roles

- Competitive feedstock
- Industrial land & infrastructure
- Support for applying various permits
- Knowledge of local context, incl. local community

Partners' Roles

- Process technology & technical assistance
- Product / application knowledge
- Market understanding & network
- Key personnel to manage operation & knowledge transfer



GC Supporting Infrastructures for New Investment

Land for New Investment

- Available lands in EEC Map Ta Phut



Utility, Jetty and Tank Farms

- Supply of Electricity, Steam and industrial water
- Service provider of Jetty, Tank Farm and Warehouse

BOI and Permit Services

- Experienced > 50 BOI certificates and EIA&E/HIA permits approved



Plant Management, Engineering & Safety Services

- Maintenance, Design & Engineering Consultation, Construction
- Safety Training & Consultation









R&D and LAB Facilities

- R&D, Tech. Services
- Analytical Testing
- Pilot Plants



Others

- Finance & Accounting
- Procurement
- Human Resource

Project	International Partners
PP	LyondellBasell (29%) 
Roto Compound	Matrix (51%) 
ACN & MMA	Asahi Kasei (50%) 
Bio-PBS	Mitsubishi Chemical (50%) 
PO & Polyols	Sumitomo Chemical (Licensor) Sanyo Chemical (14.9%) Toyota Tsusho (3%) 
HSBC & PA9T	Kuraray (53.3%) Sumitomo Corp. (13.3%) 
PTA & PET	Mitsui Chemical (26%) 
PP Compound	Dynachem (51%) Nissho Corp (5%) 

GC has invested 3.4 Billion USD in new projects for the last 3 years



GC Support Bio-Circular-Green (BCG) Model Initiated by Thai Gov.



Three dimension: 'B' for Bio-Economy, 'C' for Circular Economy, and 'G' for Green Economy

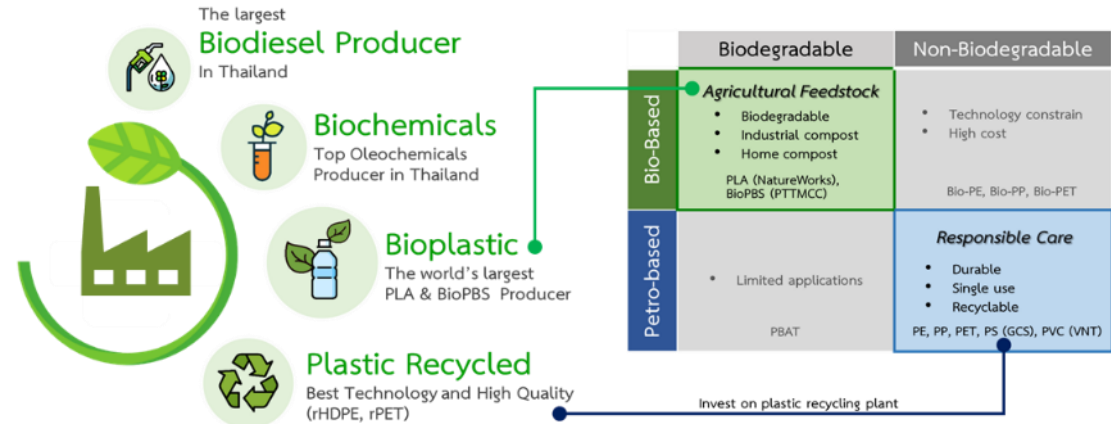
Ensure effective resource management providing maximum benefits, drive bioeconomy and recycling to reduces waste or even generates zero waste. Improve the environment and quality of life that supports sustainable economic growth.

Bioeconomy



Thailand has abundant bio-feedstock resources, such as sugar cane, cassava, molasses, palm and other natural products.

The Thai government aims to promote the production of chemicals derived from these bio-feedstocks.



Climate Actions

International and value-chain collaboration for a greater greenhouse gas reduction

Waste Mgmt Platform

Leverage the Platform to create waste mgmt ecosystems with multiple partners

New Circular Model

Pioneer in hybrid models where sustainability meets the current contexts of society



Bio-based Solutions

GC reinforcing our leadership in Sustainability and Supporting the BCG Economy model

Comprehensive green portfolio

World's No. 1
Bioplastic Capacity



World's No. 1 producer of PLA



World's sole producer of Bio-PBS



#1 Oleochemicals in North America



The pioneer and leading oleochemicals player in TH

Key Investments in TH



Growth

Portfolio Restructuring & Synergy



Ethanol	Bio-Ethylene
BHD / SAF	Bio-MEG
BSA	+ Others

Differentiation

Value-added Applications, Label & Certification



Ingeo™
 Ecorenew™
 TOLONATE™
 EMERREEN, EMERON, EMEROX, DEHYLUB+ Others

Recycling & Circularity

GC reinforcing our leadership in Sustainability and Supporting the BCG Economy model



World Class PCR Production Technology & SEA Biggest Integrated Recycling Production Line



Used Plastics

40 KTA PET
20 KTA HDPE



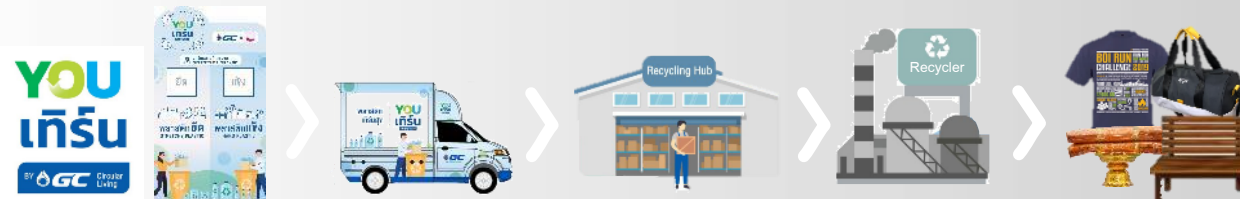
Products

30 KTA rPET
15 KTA rHDPE

InnoEco



End-to-end Plastic Waste Mgmt Platform



Collaboration & Inclusiveness

Growth



Mechanical Recycling

- Expansion (TH)
- New facility (US)



Chemical Recycling

- New facility (TH)



New Opportunity Exploring



YOUเทิร์น
App & Platform



Waste Collecting
Hub



B2C Business

Differentiation

Label & Certification



European Food Safety Authority



GC strategic investment to maintain and further enhance our competitiveness

by enhancing resilience and creating an advantage over competitors to create a foundation for future growth



Drive Thailand Industries Sector Competitiveness

Feedstock Flexibility | Value Added Products | Enhance Process Efficiency | Support BCG Model

GC as Leading investor in EEC

**GC has invested
in Thailand up to
4.2 Billion USD**

between 2017-2022

**More than
1.8 Billion USD**
of investment plan
over the next 5 years
2022+

Olefins Reconfiguration Project (ORP)	1.2 Billion USD	Engineering Plastic (PA9T and HSBC)	0.48 Billion USD
PO / Polyols	1 Billion USD	Plastic Recycling	0.08 Billion USD
OMP	0.14 Billion USD	OIP	0.06 Billion USD
Infrastructure	0.17 Billion USD	Value enhance and Diversify product	1.4 Billion USD

Projects under final investment decision ~0.6 Billion USD

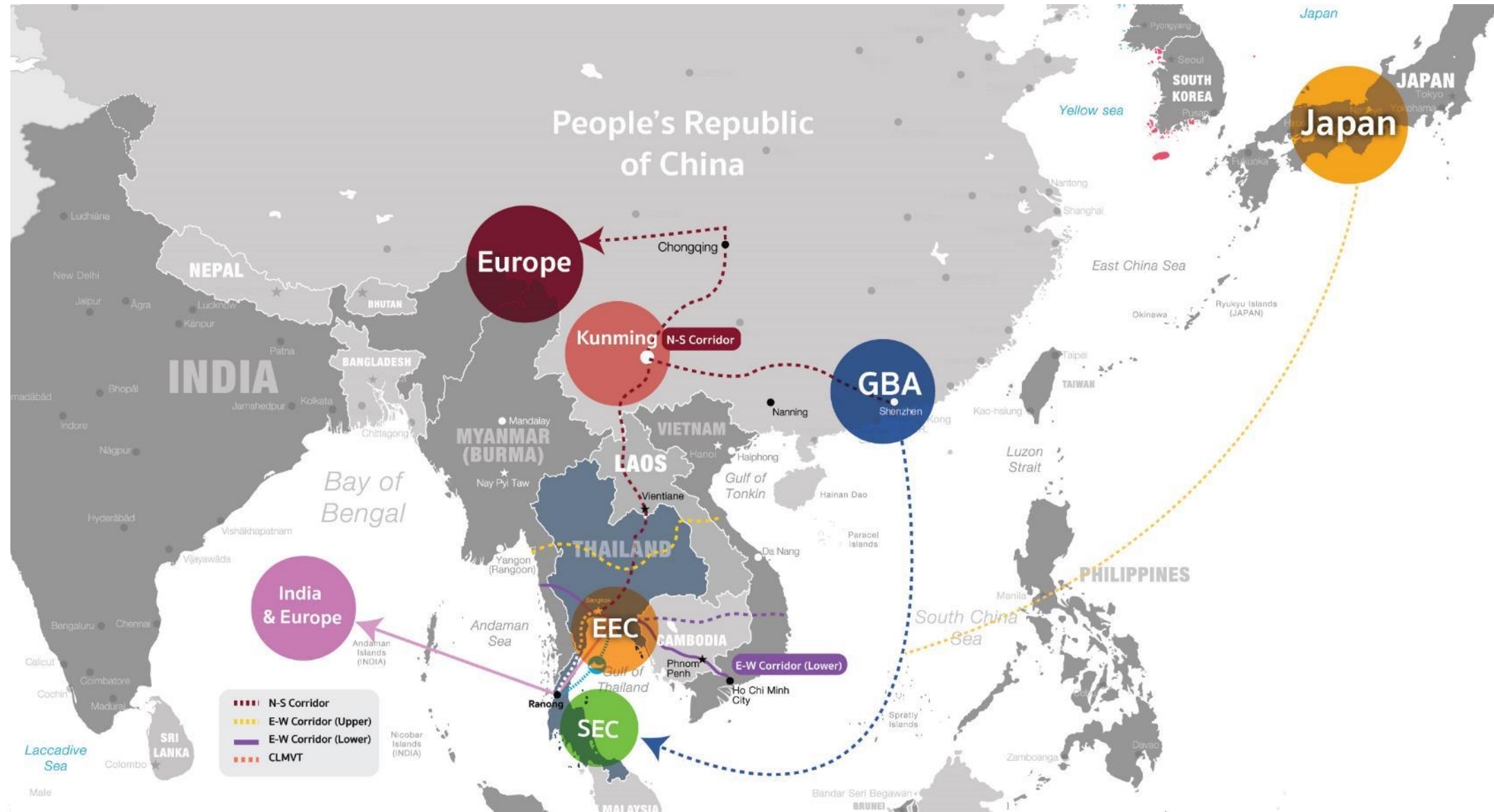
Projects under study 1.2 Billion USD



Thai Chemical Industry and the connectivity among multi-regions in Asia



Promote Thailand and as an "International Business Hub" and the "Regional Trade and Investment Gateway"



Thank you