

IPCP Webinar Series: POPs in plastic and monitoring approaches
Part II: Sampling of plastics from major sector to monitor POPs in plastics

Sampling plastics recyclates in Thailand and information on recycling situation

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National Metal and Materials Technology Center National Science and Technology Development Agency

MTEC, established in 1986, is a national research center under the National Science and Technology Development Agency (NSTDA, Est. 1991) with a mission to develop innovative material technologies and related manufacturing techniques that enhance the competitiveness of private sectors while improving the quality of life for society.

We create and enhance capabilities in material technologies through:



Innovative Research & Development



Technology Transfer & Research Collaboration



HRD through Training Programs

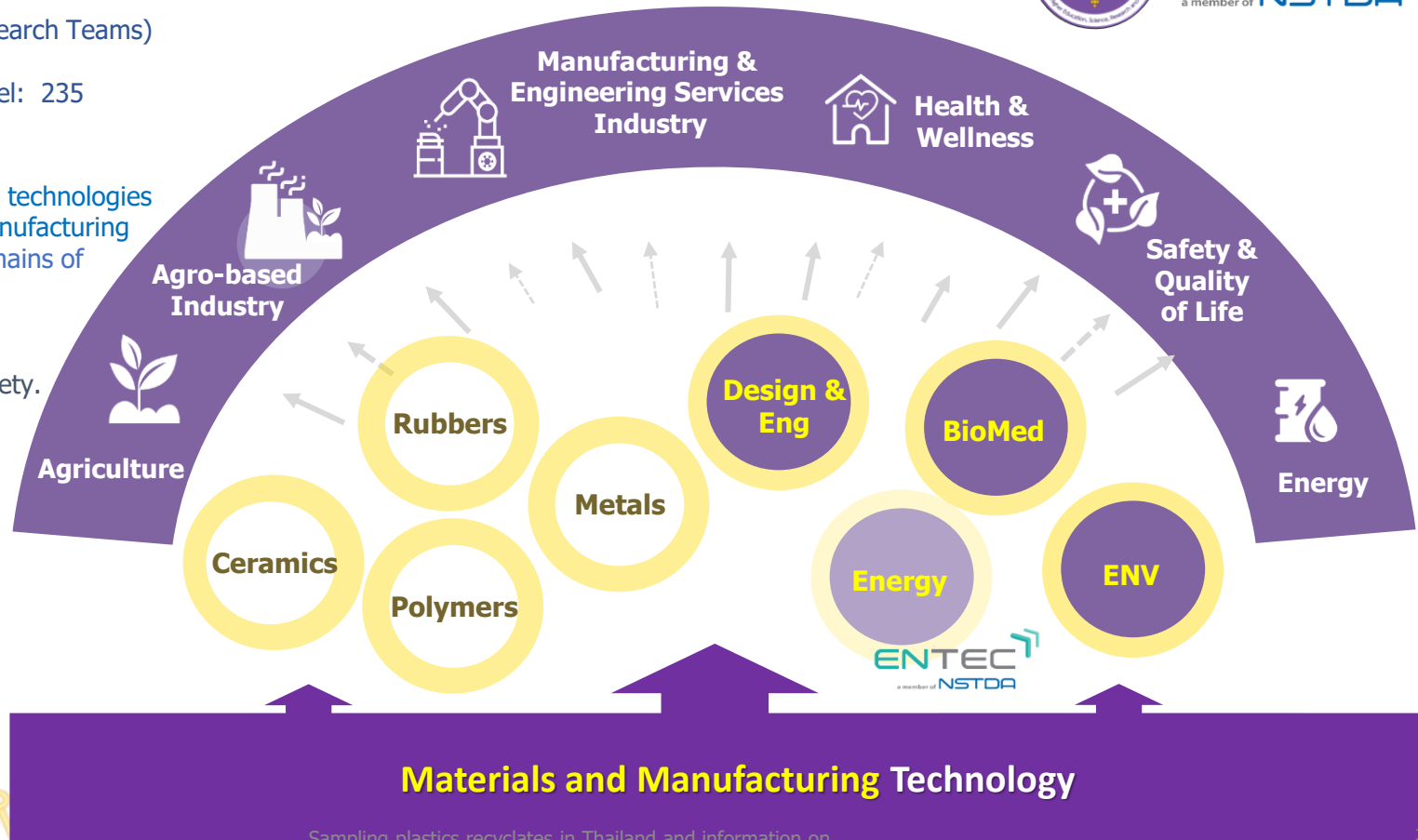




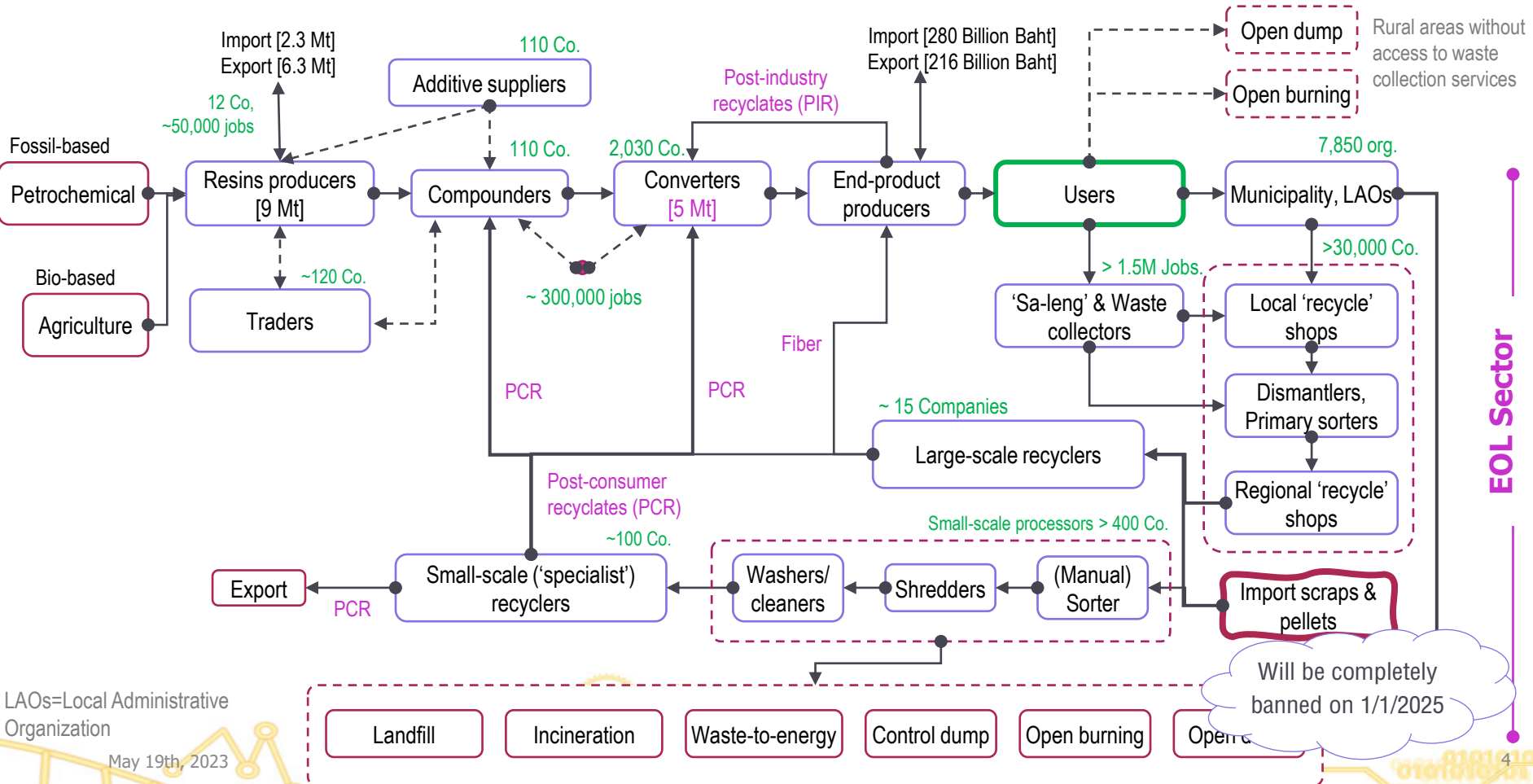
MTEC: National Metal and Materials Technology Center

- 7 R&D Groups (30 Research Teams)
- Employee: 393
- Full-time R&D Personnel: 235

develops unique material technologies and materials related manufacturing technique through 6 Domains of Utilization to enhance the competitiveness of private sectors and the quality of life for society.



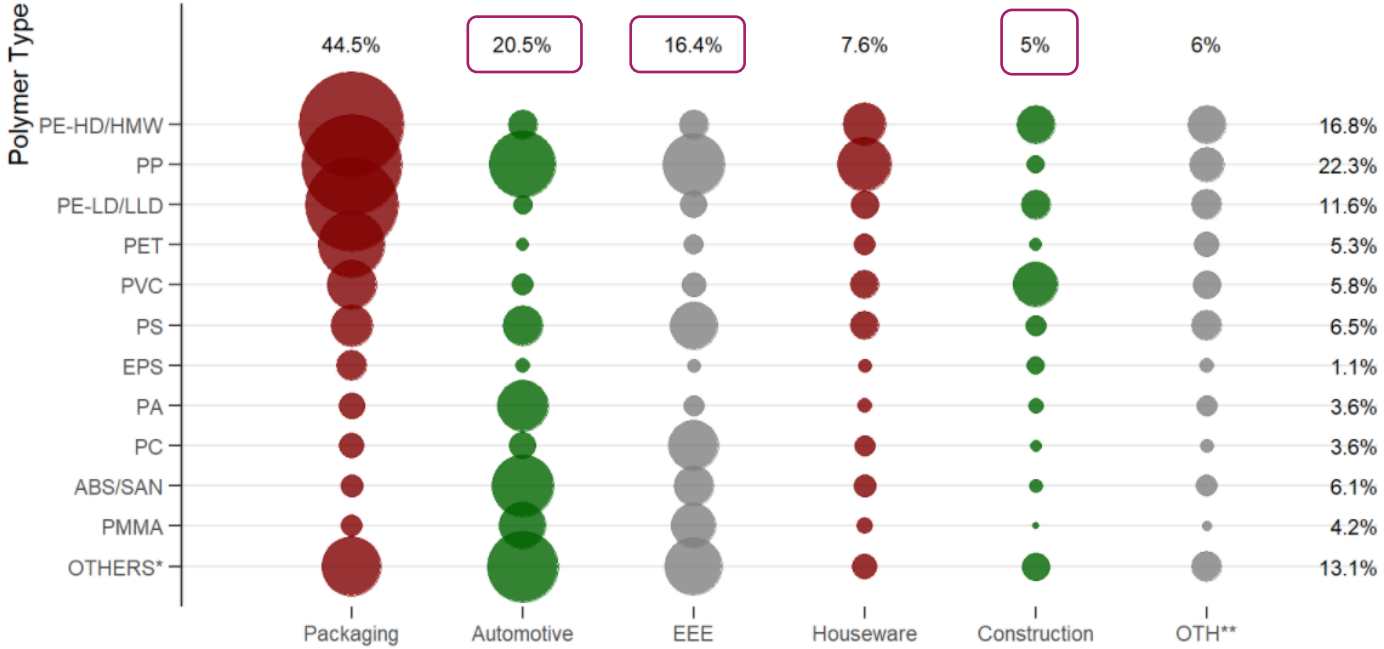
Thailand's plastic value chain (2021)



Applications of Different Plastic Resins

Durable products account for ~40% of market share, with accumulating stockpiles

(Estimated) Plastics conversion volume in Thailand in 2019 (Excl. Textile) by sector and polymer type



Conversion volume:

- PP > HDPE > LDPE > PS > ABS/SAN > PVC > PMMA > PA ~ PC

Product Lifespan

- Short (<3 years)
- Medium (<10 years)
- Long >10 years

Other* incl. BDS, EVA, Fiberglass, PBT, PEEK, POM, PU, Others
 OTH** incl. Safety & Security, Footwear, Agriculture & Fishery, Medical, Toys & Sporting Goods, Others
 Data Sources: Plastic Intelligence Unit (<http://plastic.oie.go.th>), Accessed: Oct16, 2020
 Analyzed By: MTEC

Existing CiP related regulations

- MOPH 435 PCR Approval:
- Case-by-Case Basis
 - Currently, only PET has been approved

Food contact materials

Notification of the Ministry of Public Health (No. 435) B.E. 2565 (2022): Prescribed Quality or Standard of Plastic Containers

TIS 655: Plastic utensils for food

Part 1: PE, PP, PS, PET, PVAL, PMP

Part 2: PVC, PC, PA, PMMA

Part 3: ABS, SAN

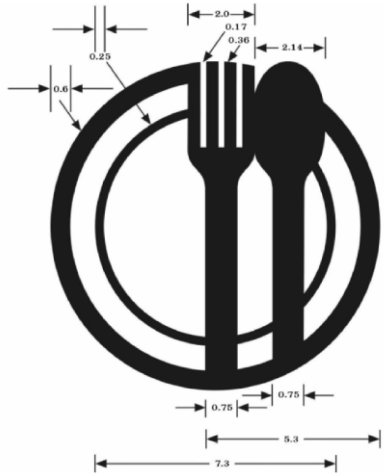
Part 4: Melamine-formaldehyde (MF), Urea-formaldehyde (UF), Melamine-urea-formaldehyde (MUF)

According to current TIS standards, only food grade virgin resins are allowed

TIS 2921-2562: MF, UF, and MUF utensils for food: Safety requirement

TIS 2493: Plastic food containers for microwave oven

TIS 1136-2559: Stretch cling film for food



EEE

TIS 2368-2551 & 2368-2564: “ThaiRoHS” Standard (Voluntary)

CiP = Chemicals in Products
TIS=Thai Industrial Standards
EEE=Electrical and Electronic Equipment

PLASTICS CIRCULARITY OPPORTUNITIES AND BARRIERS IN THAILAND

Low plastic recycling rates are a wasted opportunity in Thailand.



2.9 MILLION TONNES

2.9 million tonnes of plastics are disposed of each year.



18 PERCENT

About 18% of key plastic resins are recycled.

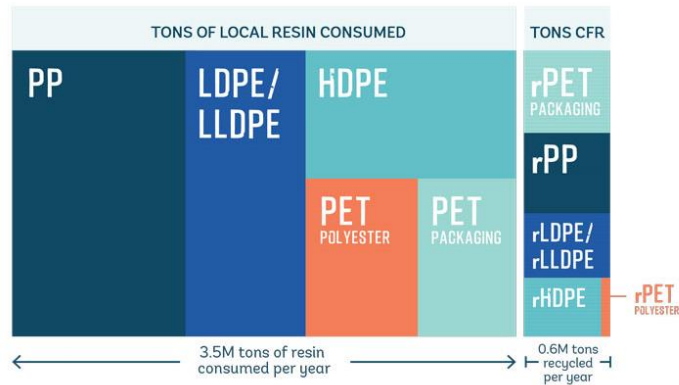


3.6-4 BILLION USD \$

\$3.6 - 4 billion of the material value of plastics is lost annually.

THE PROPORTION OF PLASTICS COLLECTED FOR RECYCLING (CFR) VARIES SIGNIFICANTLY ACROSS DIFFERENT RESIN* TYPES.

Durable products are not covered

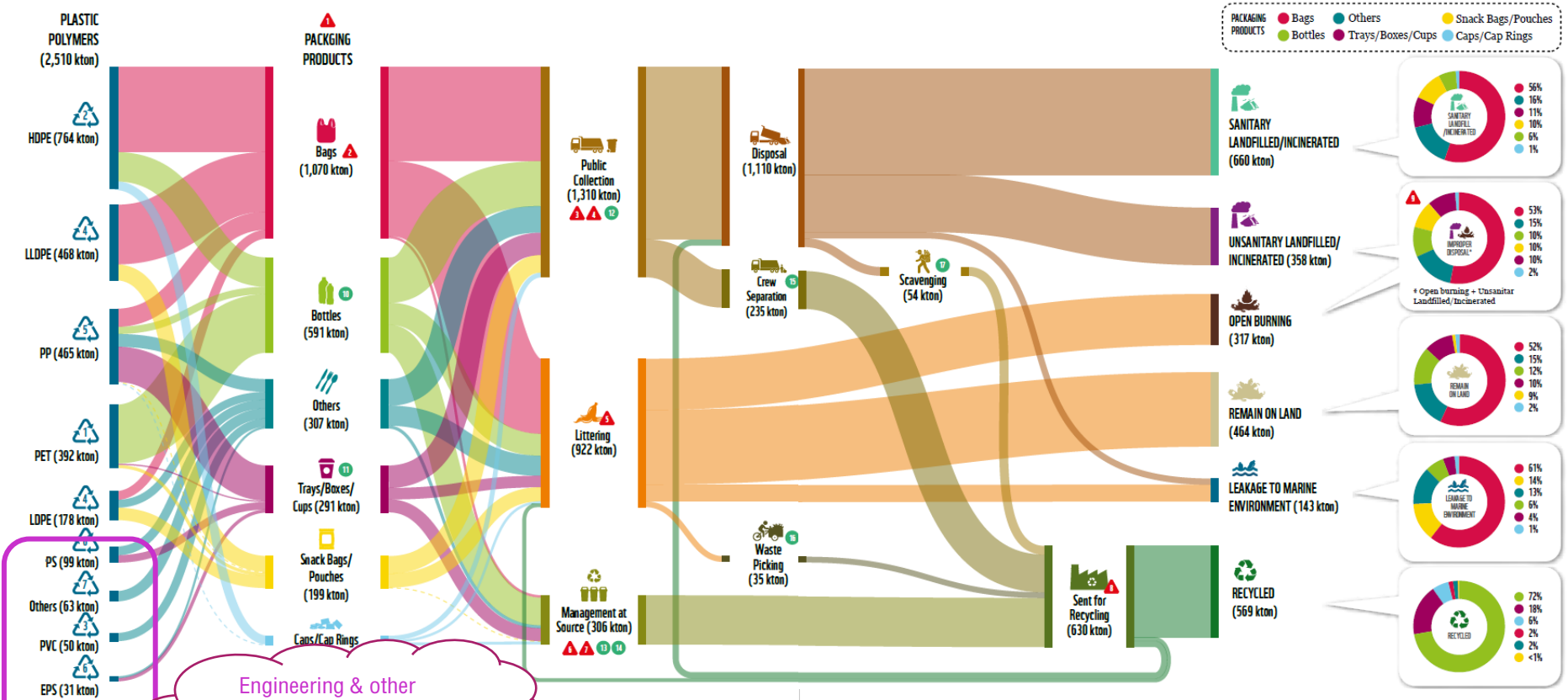


* Plastic resins assessed: Polyethylene Terephthalate (PET), Low Density Polyethylene (LDPE), High Density Polyethylene (HDPE) and Polypropylene (PP).



Material flows: Overview

Resin???



Engineering & other durable plastics are not covered

WWF Thailand, SCALING UP CIRCULAR STRATEGIES TO ACHIEVE ZERO PLASTIC WASTE IN THAILAND, November 2020

National Science and Technology Capability
Sampling plastics recycles in Thailand and information on recycling situation

Key characteristics of plastic material flows in Thailand from a CE (systems thinking) perspective



- Long-standing history of **buy-back systems** for still-valuable materials
 - Serve as a 'built-in' mechanism for materials sorting. But current material category is not discrete enough.
- **Weak controls** of products/materials composition at the upstream and pre-market stages
 - concerns regarding the presence of legacy and emerging additives, which pose challenges to effective control and monitoring
- **Weak end-of-use & end-of-life management**
 - lack of comprehensive collect-back schemes, which hinders effective recycling and disposal practices
- **Lack of data**
 - issues related to data availability, data traceability, and data literacy
 - needs for improved data collection and management practices, specifically for materials flow and material composition data
 - Disproportionate impacts to SMEs and middle-stream producers in terms of data availability and utilization



Key Barriers

Factors hindering the production of high-quality Recyclates

Feedstocks' Quality

- **Contaminations** (no mandate/infrastructure for separation at source)
- **Embedded (legacy) additives**
 - no data & no system/initiative on the horizon to keep track/acquire data for chemicals in products (CiP)
- **Poor & diverse product design** (from sorting/recycling perspective)

Design & Treatment (Technology) Mismatch

- (Traditional) recyclers & product designers are operated at different pace
 - Recycling modern materials (products produced with new technologies) using traditional technology
- **Lack of data**
 - Ecodesign based on foreign technology/infrastructure
 - Ecodesign is viewed as a 'magic wand' to cast 'fit for CE' products

Technical Capacity/ Competency

- Post-consumer value chains are (mostly) operated by MSMEs
 - Learning from experience
 - Down cycling
- **Lack of infrastructure/system to assure quality & traceability**

3T – Key to Success

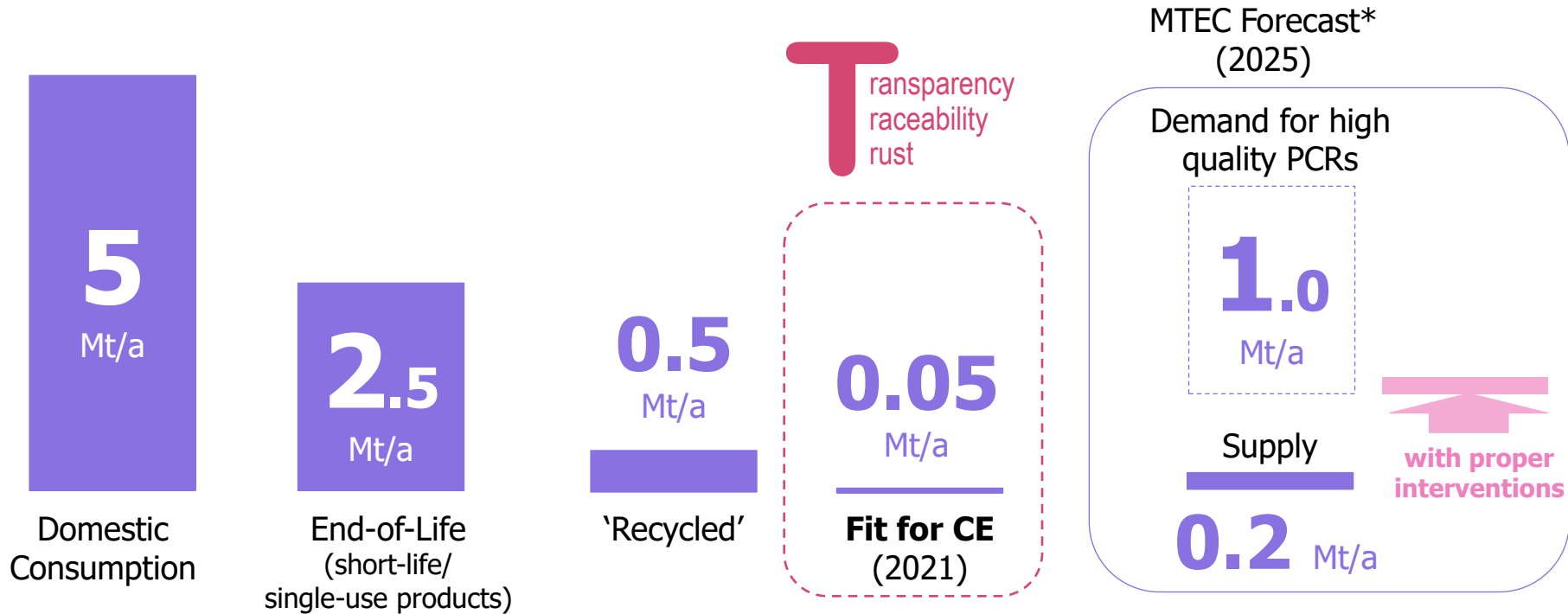


Transparency

Tracability

Trust

Summary: A concise overview of Thailand's plastics recycling



*: based on existing initiatives (global & domestic)



MTEC
a member of NSTDA

THANK YOU

ศูนย์เทคโนโลยีโลหะและวัสดุแห่งชาติ

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