SAFE-CE:

MTEC's Safe Circular Plastic Initiative

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SMART CIRCULAR

SMARTCirc Plastics

MTEC
a member of NSTDA

A National Agency, under NSTDA

Ministry of Higher Education, Science, Research and Innovation

Established in 1986

With mandates to create and enhance national capabilities in material science and technologies

Material Solutions for Net Zero

Modern Manufacturing and Modern Transports & Roade Safety

Medical and Health Innovation

High-value/Specialty Biobased Materials

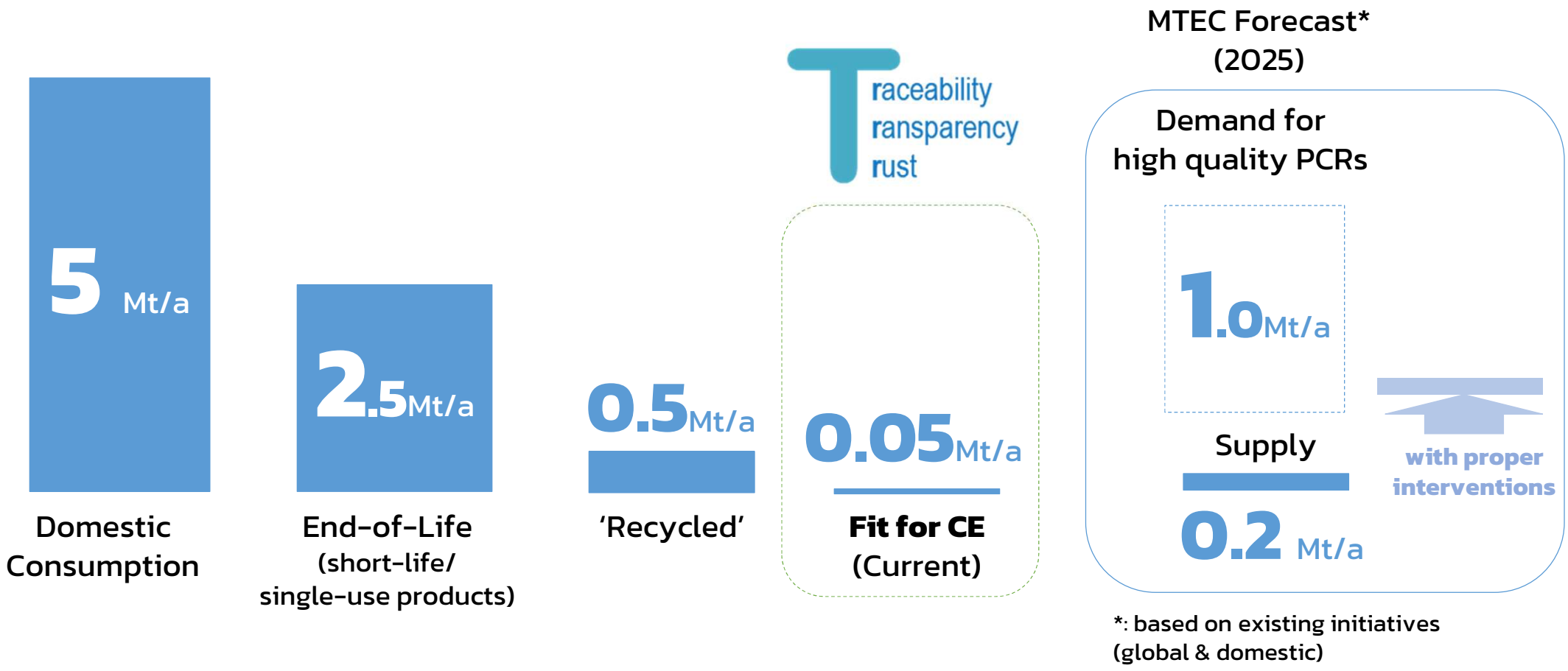
Performing R&D and Fostering Innovation

Managing Technology Transfer

Human resources development

NATIONAL METAL AND MATERIALS TECHNOLOGY CENTER, NSTDA

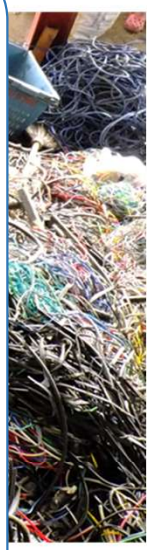
Thailand's Plastics: At a Glance



Thermoplastics: Can They Truly Be Recycled?



- Are recycled thermoplastics safe for reuse?
- What are the limitations and challenges of recycling thermoplastics?
- What to do with materials that cannot be recycled?
- How can we ensure the chemical safety and performance of recycled thermoplastics?
- What advancements are needed in recycling technology to improve the safety and recyclability of thermoplastics?





The Fate of Non-Recyclable Plastics: Pollution & Hazard

Ensuring Safe Circular Plastics with SAFE-CE:

from Safe Feedstock to Safe Recyclates

Focused on durable products

**BAT/BEP = Best Available Techniques and Best Environmental Practice

Novel tests & screening methods for Identification & Monitoring of Substances of Concerns

CiP* Hotspot

CiP Alert Network

Guideline, BAT/BEP**, screening methods

*CiP = Chemicals in Product

SAFE-CE awareness program

Trainings: Best practices in 'circular materials mfg'

Pilot mfg/recycling process management

Circular by DESIGN

Fit-for-CE evaluation service

chemSHERPA JAMP

New fit-for-CE material formulation

CSIRO

IPPIN Plastic Innovation Hub

Transparency

Tracability

Trust

Safe and Sustainable Circulation of Plastic Products

Key partners

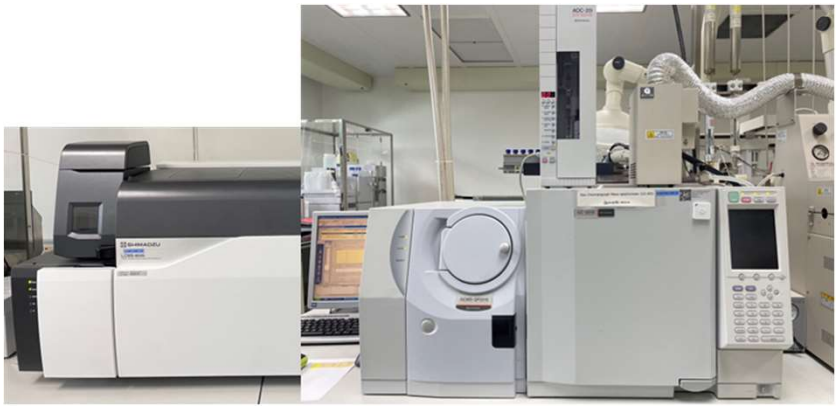
Speeding Up Safety:

Economical Testing for POPs Monitoring and Plastic Recycling

Hours to Days

- Require hazardous organic solvents and strong acids
- > 50 kBaht/sample

Conventional Method based on Solvent Extraction XC-MS



30-40 minutes

- No chemicals needed
- ~ 10-20 kBaht/sample

Pyrolysis GC-MS

2 minutes

- No chemicals needed
- <1 kBaht/sample

ATR-FTIR + Materials Analytics

Speeding Up Safety (2):

Economical Testing for POPs Monitoring and Plastic Recycling

~ Tens
Samples/Project

- Compliance check
- Exposure and Biomonitoring activities

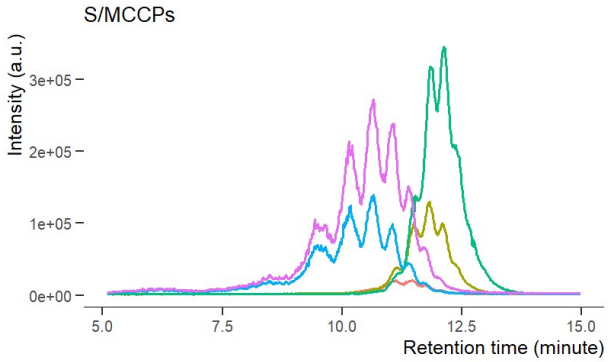
~ Hundreds
Samples/Project

- Identify contaminated materials
- Quantify levels of contamination
- Differentiate between different homologues

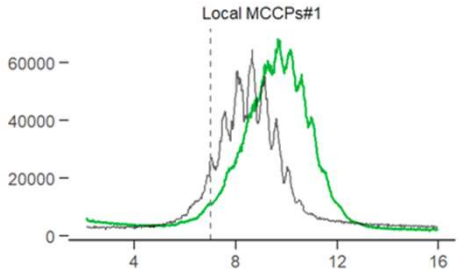
~ Thousands
Samples/Project

- National Contamination Monitoring Activity
- Feedstock inspection

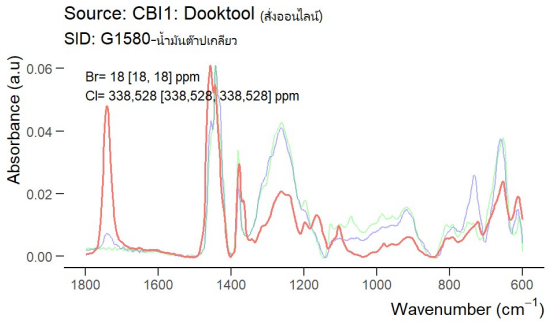
Conventional Method based on Solvent Extraction XC-MS



Pyrolysis GC-MS

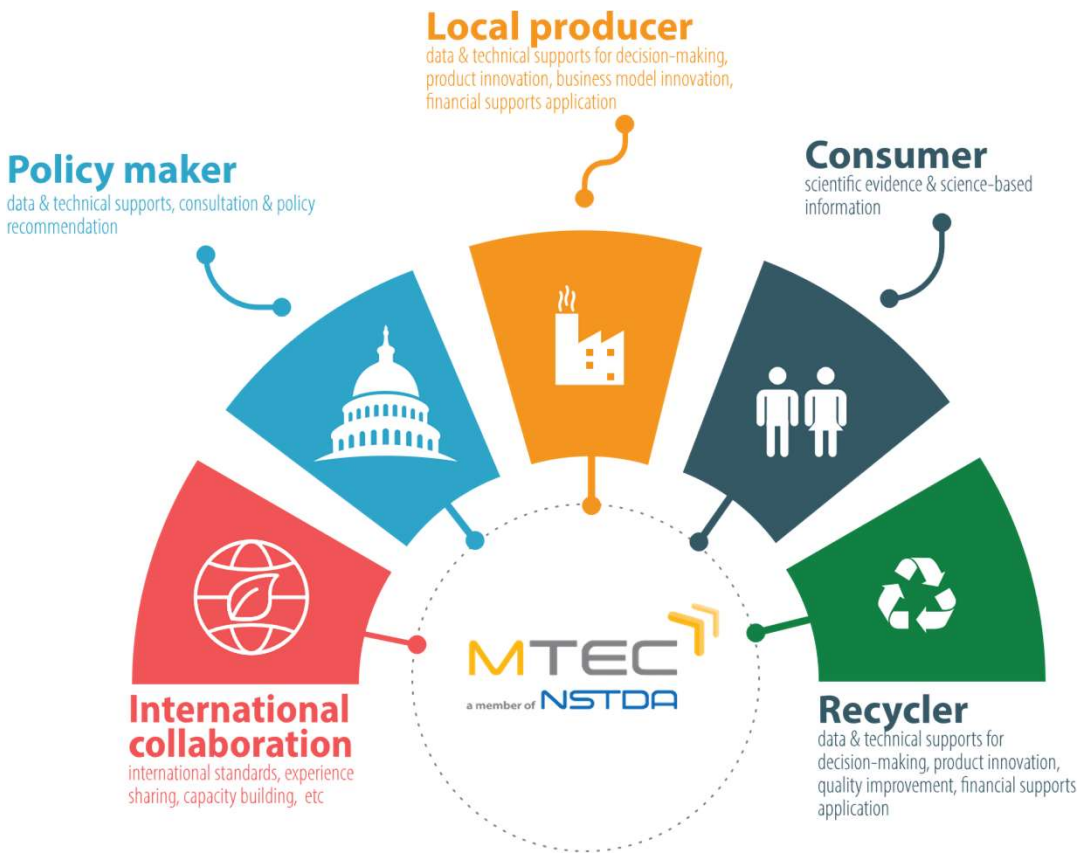


ATR-FTIR + Materials Analytics



Group of Plastic Products with High Detection Frequencies

Next Steps



- ❑ Take Control
  - Inform decision makers & stakeholders
  - Action plan & Guideline to segregate out contaminated materials
- ❑ Expand the Scope to Address Emerging Substances of Concern
  - Organophosphates, UV Stabilizers, BPA, etc.
- ❑ Collaborate to Speed Up the Process
  - ❑ Partner with industry, and research institutions to accelerate the development and implementation of safe recycling practices.
- ❑ Develop Strategies/Technologies to Remove Contaminated Materials from Domestic Circulation
  - Develop and adopt effective methods to ensure contaminated materials are safely disposed of or treated to prevent harm.

Thank you

Team (ENV RG & APT RG)
MTEC
https://www.mtec.or.th/

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