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# Exploring New Frontiers in Polyolefin Applications

APIC Committee Meeting

16 May 2025

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**APIC**  
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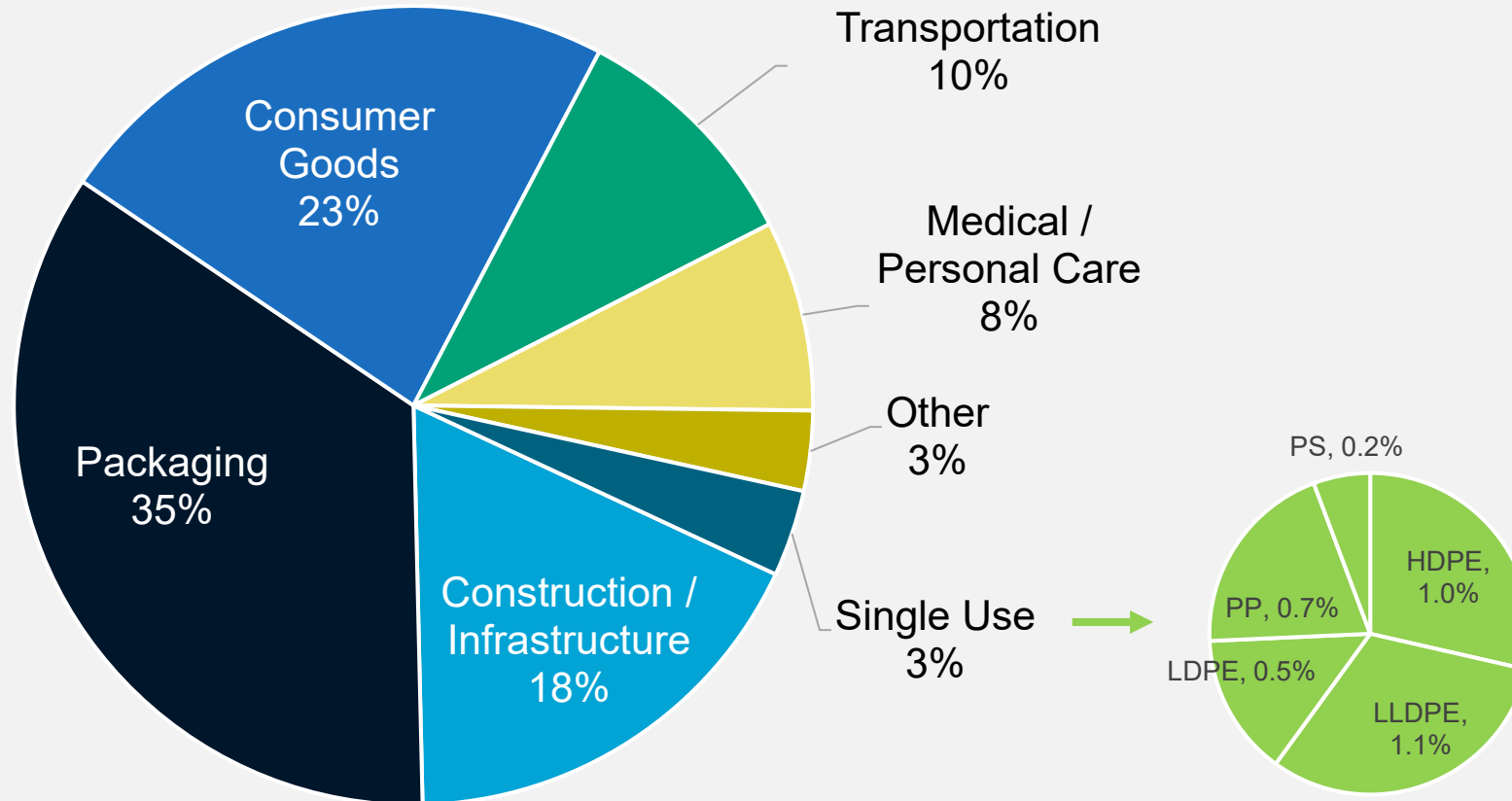
Asia Petrochemical Industry Conference  
Bangkok, Thailand

Plastics has a very negative image



While the world looks at just the single use plastics consumption, and thus a polluter, application of plastics is much more diverse

### Global demand for volume plastics



Source: Chemical Market Analytics by OPIS

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● Other includes wide range of durable and non-durable industrial applications

## Robust Momentum to boost the demand growth

- Convenience, Delicious taste
- Higher effectiveness, cost savings
- Gaining popularity amid in fast-paced modern life
- Policy Support introduced to energize the market
- Technology-Driven Development

### CATEGORIZATION OF READY-TO-EAT MEALS IN CHINA



#### READY-TO-EAT (RTE)

These dishes require no further preparation and can be consumed directly after opening the package. Examples include canned dishes, salads, and snacks



#### READY-TO-HEAT (RTH)

These dishes need be heated before consumption, usually in a microwave or oven. Examples include frozen meals and self-heating hot pots



#### READY-TO-COOK (RTC)

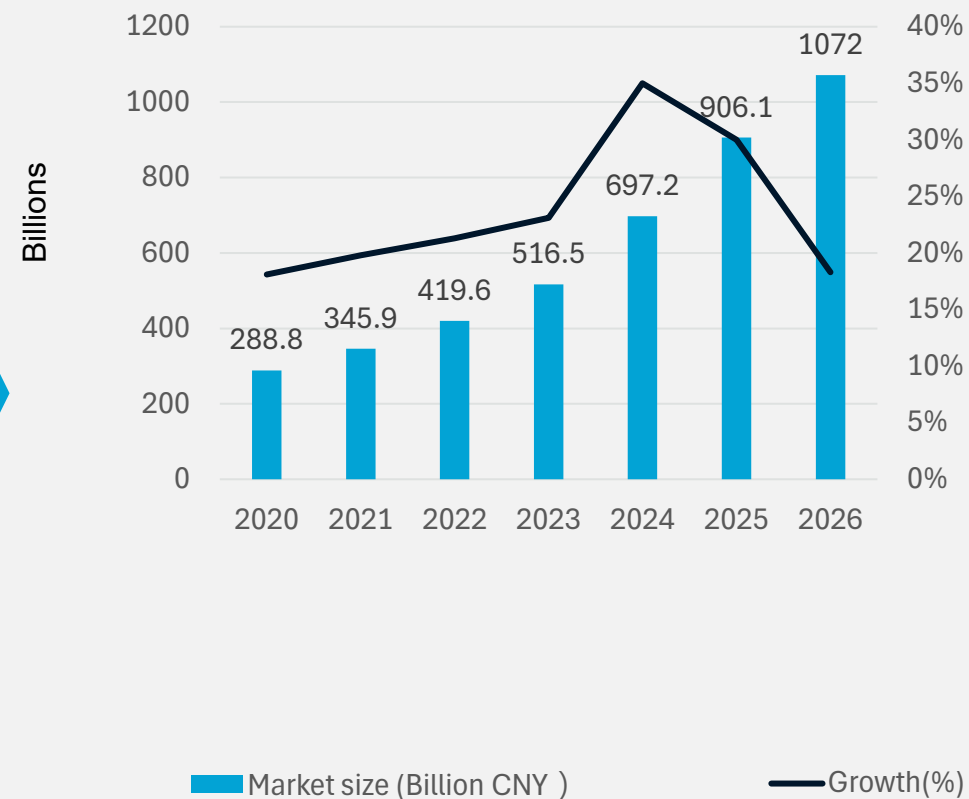
These dishes require some level of cooking, such as stir-frying or baking. They often come with pre-portioned ingredients and seasonings. Examples include



#### READY-TO-MIX (RTM)

These are the most basic form, providing raw ingredients that need to be combined and cooked. This category is ideal for those who want to maintain a hands-on approach to their meals

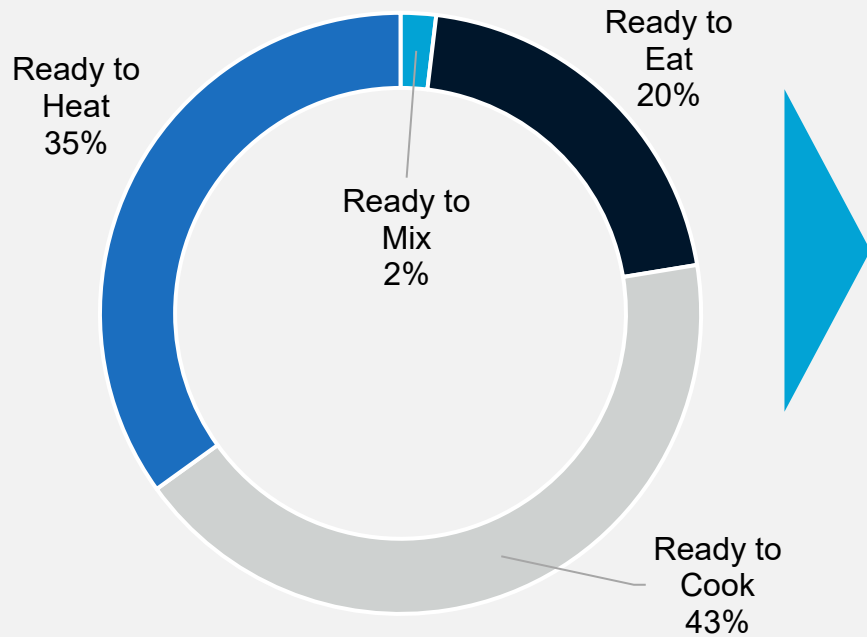
## Market Size and Growth Potential of China's Ready-to-Eat Meals



Source: Chemical Market Analytics by OPIS

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## Market Size for China's Ready-to-Eat Meals



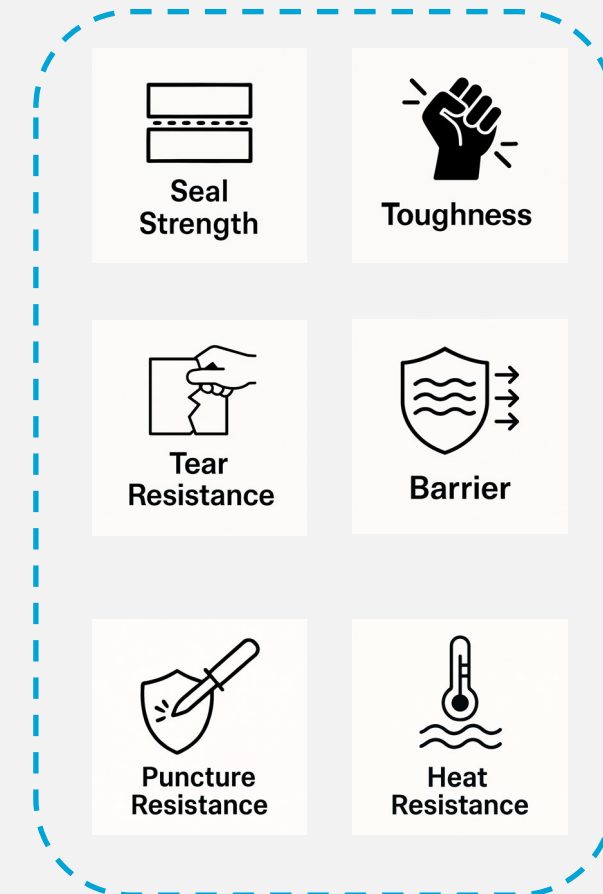
Source: Chemical Market Analytics by OPIS

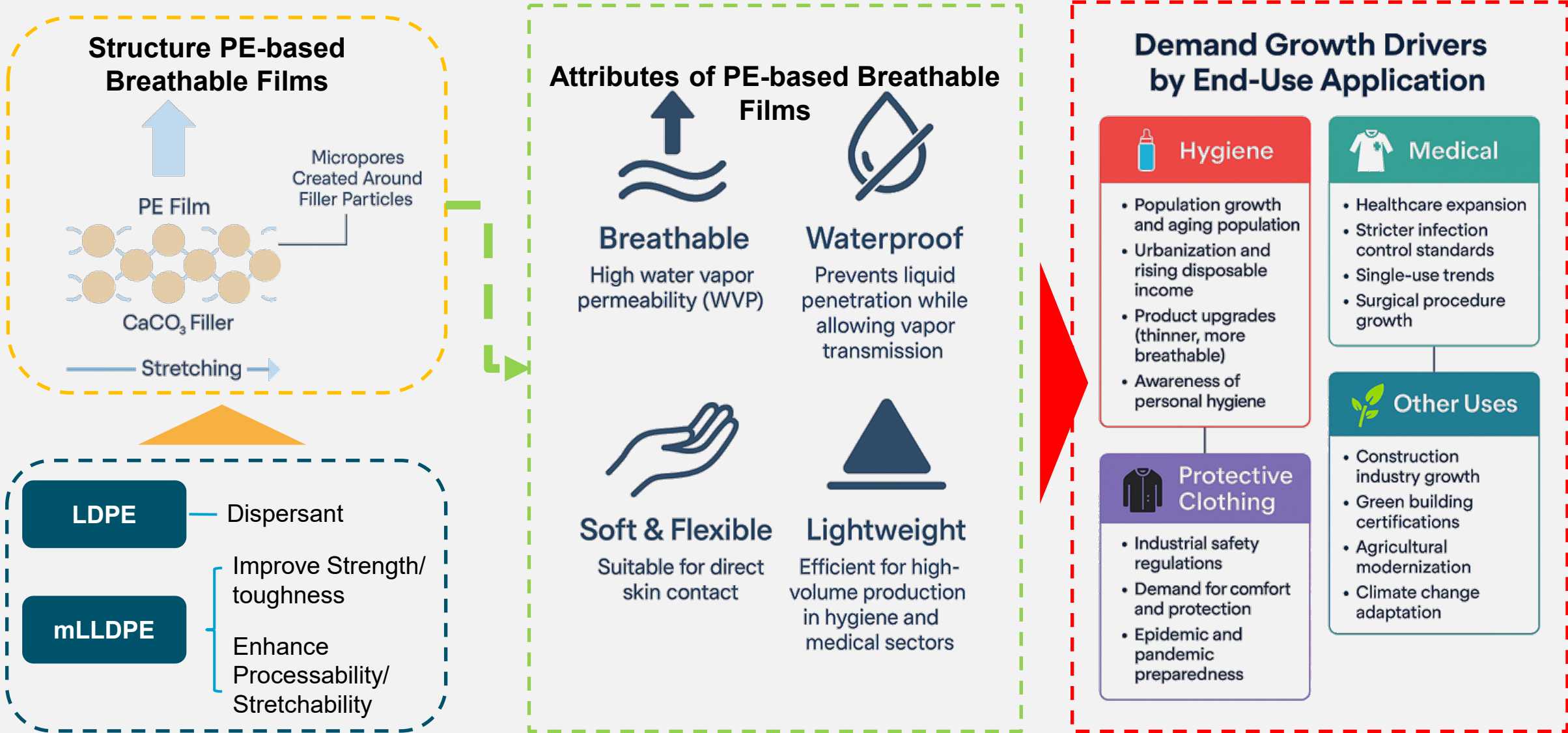
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## Examples for Flexible Packaging of RTE meals



## Key PE Properties for Ready-to-Eat Meal Packaging






**LDPE** — Dispersant


**mLLDPE** — Improve Strength/toughness

— Enhance Processability/Stretchability

# Evolving Frontiers in Polyolefins Application : Machine Direction Oriented (MDO) PE Film

## Superior Properties Delivered by MDO PE Films

 **Higher Stiffness**

 **Higher  
Tensile MD**

 **Better  
Clarity/Gloss**

 **Slightly  
Better Barrier**

 **Enables  
Downgauging**

 **Easy  
Recyclability**

## Benefits and Demand Growth Drivers of MDO PE Films

Polymer chains physically aligned in the machine direction, increasing stiffness, tensile strength, and clarity.

Using specially designed PE grades (like metallocene-based PE) improves toughness, processability, and optical appearance after MDO.

- Higher gloss, lower haze compared to traditional blown PE.
- Used in stand-up pouches, snacks, frozen foods, and healthcare packs where clarity and appearance matter.

Precise MDO process settings (temperature, stretching speed) optimize mechanical and barrier performance without damaging the film.

Enables thinner films and reduces resin use without losing mechanical properties

### Mono-material, Easy Recyclability Push

- Brandowners demanding recyclable flexible packaging (2025–2030 goals)
- Replacement of PET in Flexible Laminates

## Reasons Why MDO PE Films Outperform BOPE Films

MDO PE Film	BOPE Film
 <b>Mono-material recyclability</b> Can be laminated with PE layers or coatings for 100% PE packaging	 <b>Limited commercial production</b> Requires dedicated tenter-frame or double-bubble line
 <b>Manufacturing simplicity</b> Single-direction stretching on cast film line with MDO unit	 <b>Processing challenges</b> Biaxially stretching PE is more difficult, risk of defects higher
 <b>Sufficient property improvement</b> Enhanced properties in MD suitable for many packaging formats	 <b>Performance not always needed</b> Extra strength in TD often unnecessary for flexible packaging
 <b>Faster commercializa</b> Can retrofit existing assets, accelerating capacity growth	 <b>Cost and risk</b> High Capex with limited supply base and recyclability infrastructure

## Types of Polyolefins Used



### Sustainable

Significant lower environmental impact



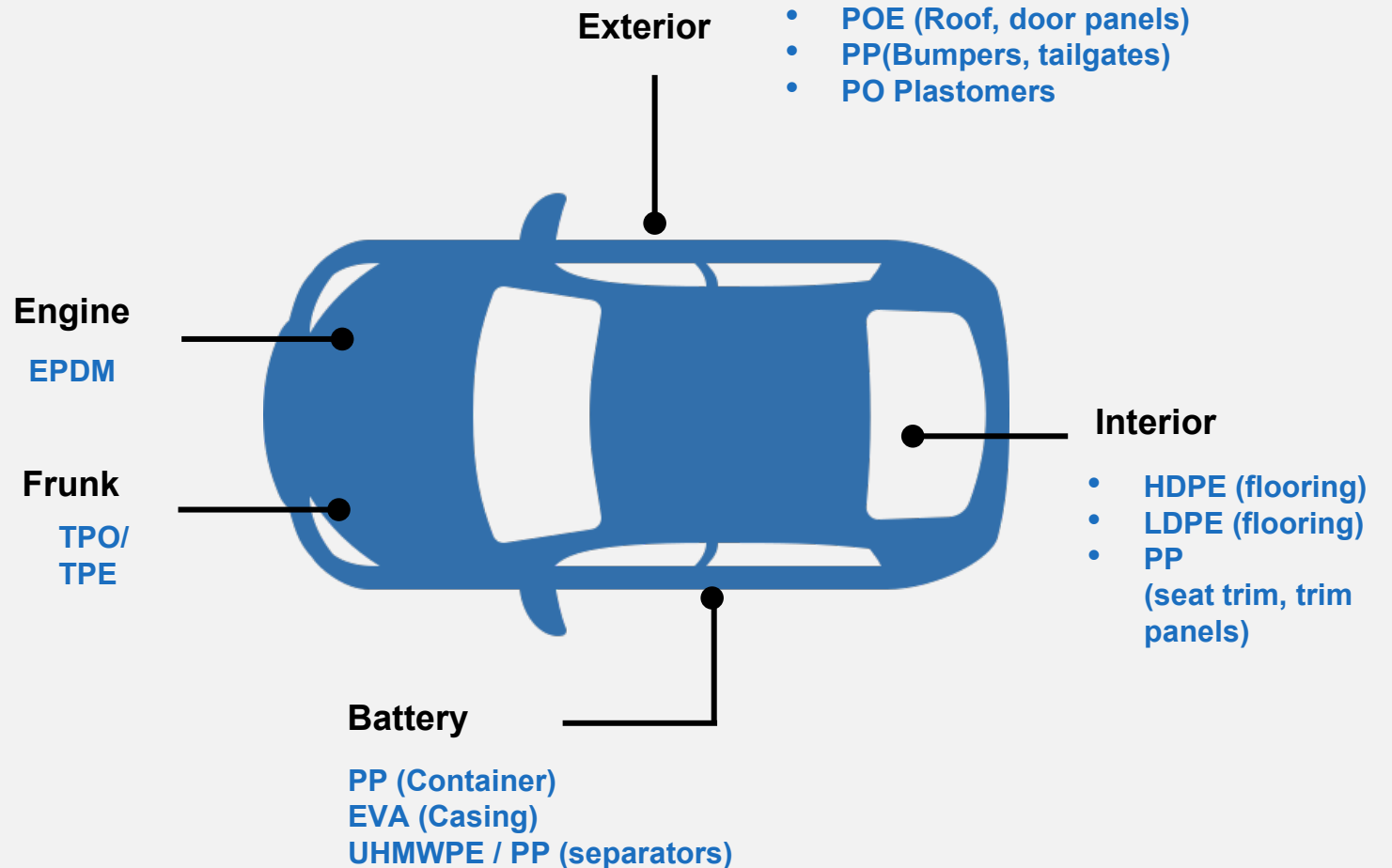
### Enhance performance

Improved technical performance to compensate loss of properties from recycling



### Efficiency

Advancements in lightweighting and manufacturing efficiency



Types of Polyolefins Used



**Proficient**

Use of less materials and energy during production with the number of manufacturing steps reduced from ten to two.



**Reduction**

Reduced need for stock fitting.



**Efficiency**

High productivity and cost savings for manufacturers with over 50% reduction in cycle time to assemble a shoe sole.



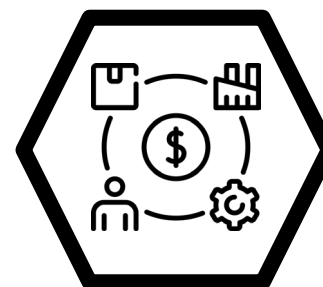
# Conclusion



Plastics is a versatile material with diverse applications



Plastics has significantly improved the quality of human life



Technological developments are enabled by new plastics application



New applications and processes will enable enhanced recyclability, thus reducing plastics waste menace

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