



PLASTIC PACKAGING IN THE CIRCULAR ECONOMY

JILL MARTIN
DOW PACKAGING AND SPECIALTY PLASTICS

July 11, 2019

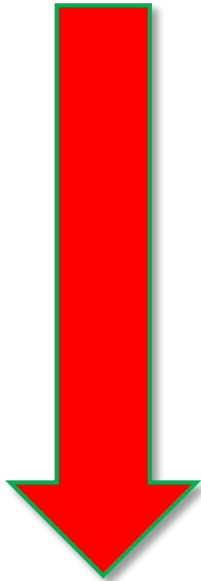
PLASTICS HAVE A GREAT SUSTAINABILITY STORY



THE JOURNEY CONTINUES...



2018 WAS A 'A TALE OF TWO WORLDS' FOR THE PLASTICS INDUSTRY



The Queen bans single-use plastic on Royal estates

Plastic straws will be phased out, biodegradable packaging will be used and water will be served in glass bottles

The Queen is banning single-use plastics

China: Scrap imports down 12 percent due to ban

Posted on March 20, 2018
by Colin Staub

China's top environmental official has quantified the reduction in scrap materials flowing into the country as a result of recent restrictions. He also spoke publicly about the market fallout and the criticism China has received for enacting its reforms.

Li Ganjie, China's minister of environmental protection, said imports of solid waste, which is usually understood to refer to scrap and waste materials, dropped by 12 percent in 2017. He offered the figure during a March 17 press conference held in conjunction with the 13th National People's Congress. It's the latest figure charting the global scrap movement shift away from China. It follows data released in January that shows Southeast Asian countries have boosted their imports in response.

Li Ganjie, China's minister of environmental protection

Maharashtra: Ban comes into force, dispose of all plastic materials in a month

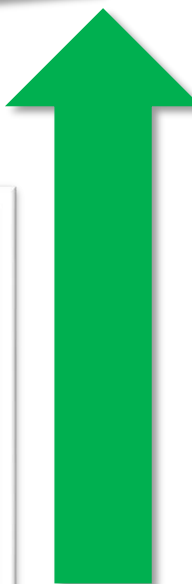
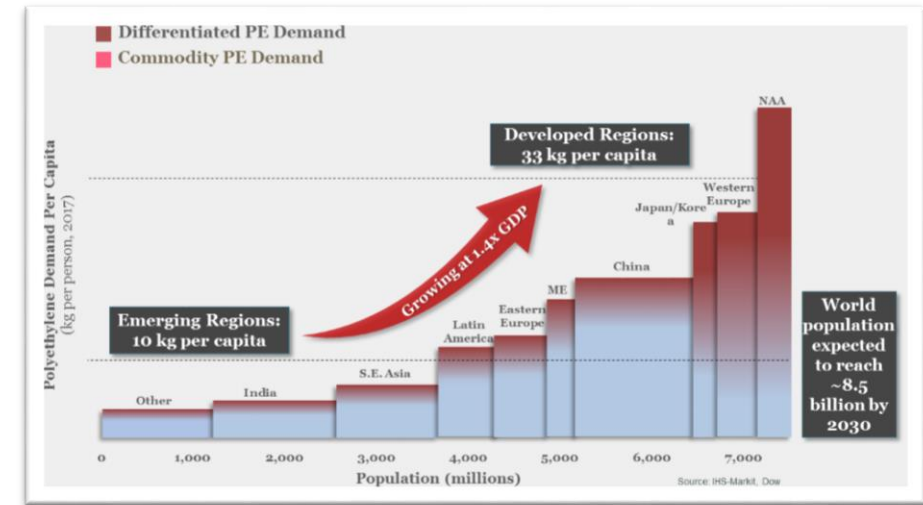
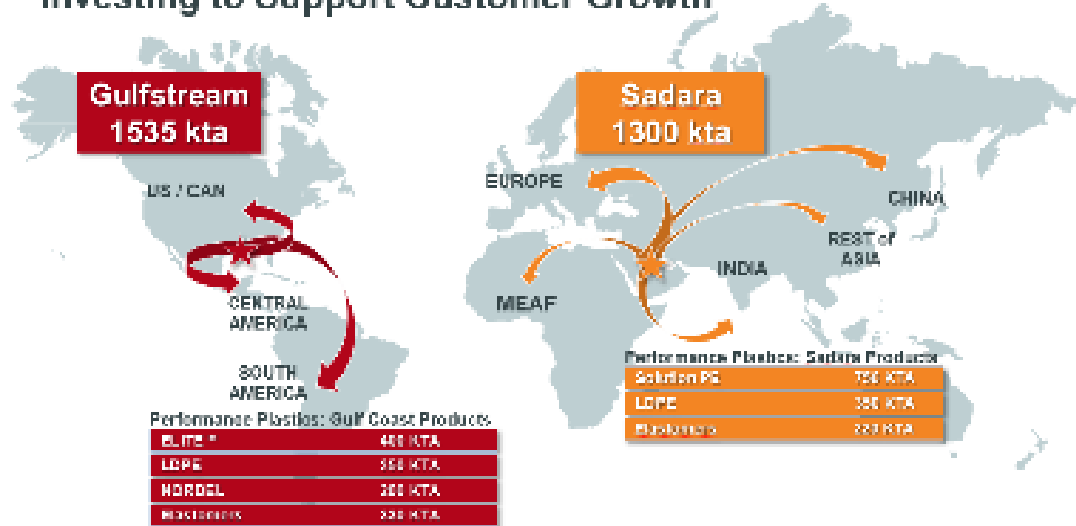
Thrive Leadrad Mar 24 2018 09:55 IST

Non-veg Burger Recipes

MLA Wafar: You have just one month to dispose of all the plastic bags seen in every part of the state. If you have them at home, then you have at least one month to get rid of them as the ban comes into effect on Friday.

**1/3 of all food is wasted
200,000 new mouths to feed every day**







Investing to Support Customer Growth



GLOBAL BRANDS DRIVING NEED FOR SUSTAINABLE SOLUTIONS

Spring '19: 350+ Signatories to the Ellen MacArthur Foundation's New Plastics Economy

All CPG's, retail and packaging producing signatories (107) have committed to making 100% of their plastic packaging **reusable, recyclable or compostable by 2025**. And CPG's and retailers have committed to an average of **25% recycled content by 2025**

	Brand Owners												Retailers		Converters				
																			
Single-Use to Reusable	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓
Eliminate Unnecessary Plastic Packaging	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
100% Recyclable, Reusable, Compostable	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PCR Content	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Increase Recycle Rates	✓	✓	✓			✓	✓		✓	✓	✓	✓	✓	✓					✓
Downgauging						✓		✓								✓			✓
Bio-source/ based		✓				✓													
% PCR Committed	25	25	40	TBD	TBD	30	TBD	15	25	25	15	50	25	TBD	17	10	≤5%	25	30
Plastic Pkg Volume Metric tonnes	287 K	750 K	40 K	ND	ND	ND	129 K	1,7 MM	ND	90 K	ND	3,0 MM	610 K	ND	ND	ND	ND	ND	ND

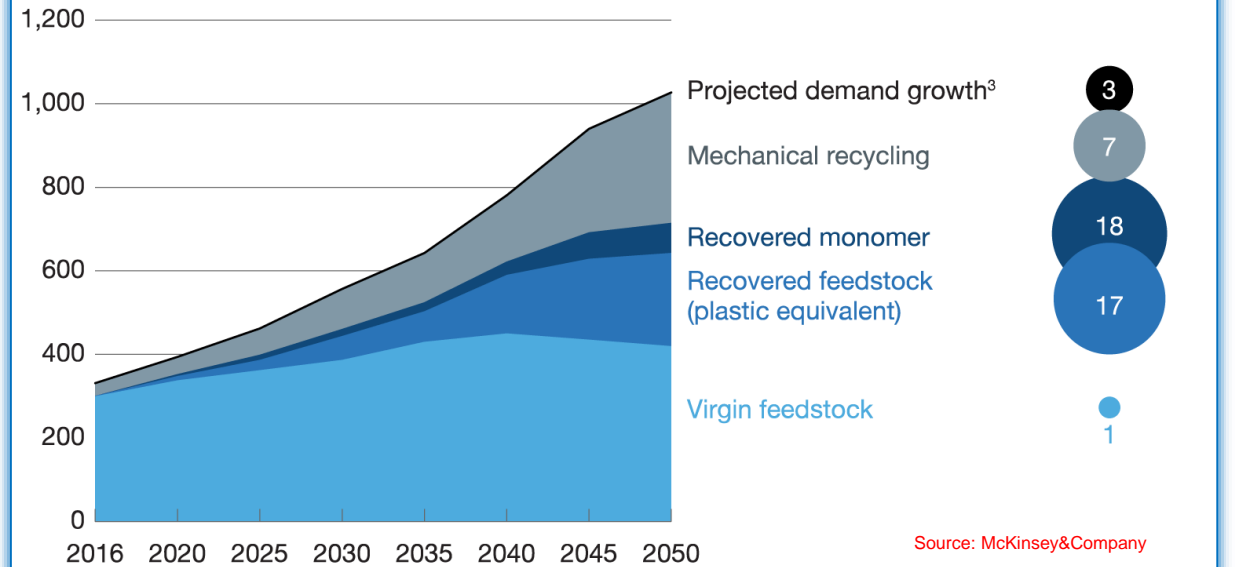


BALANCE IN MATERIALS MOVING FORWARD CREATES OPPORTUNITY

- Sustainability drivers and market demands for recycled materials slow growth of virgin
- Virgin growth is reduced by recycled materials – a participation strategy shift for PE manufacturers
- Large scale and positive economics should accelerate feedstock recycling

By 2050, nearly 60 percent of plastics production could be based on plastics reuse and recycling.

Global polymer demand 2016–50 and how it could be covered, millions of metric tons¹

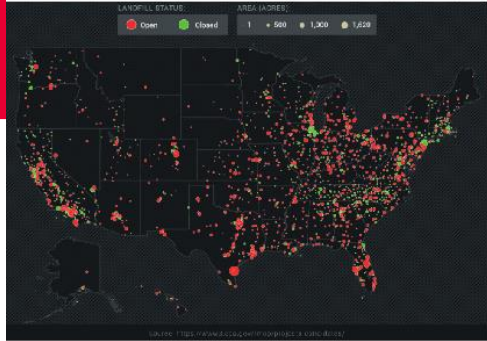
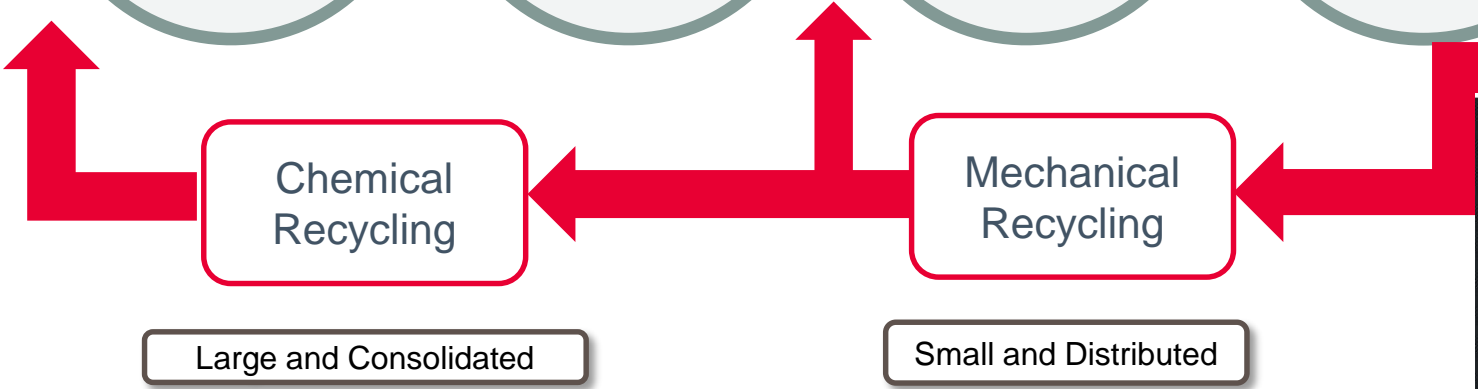
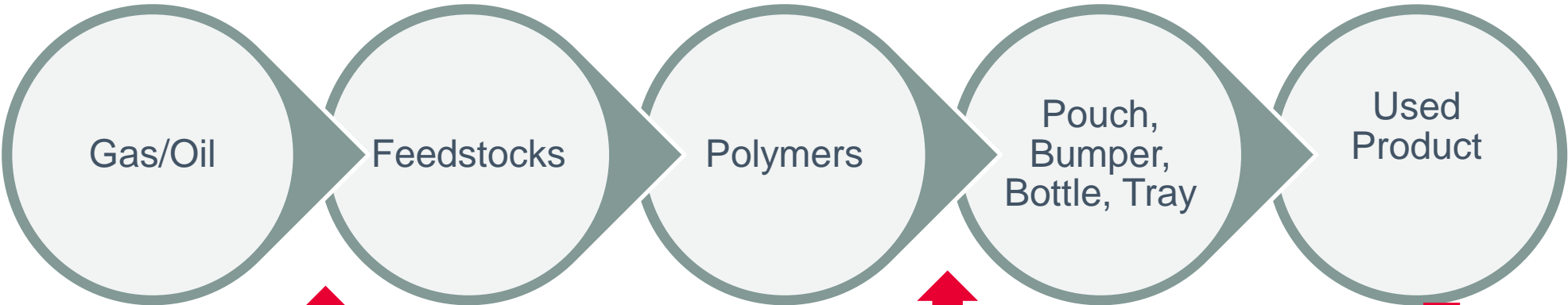
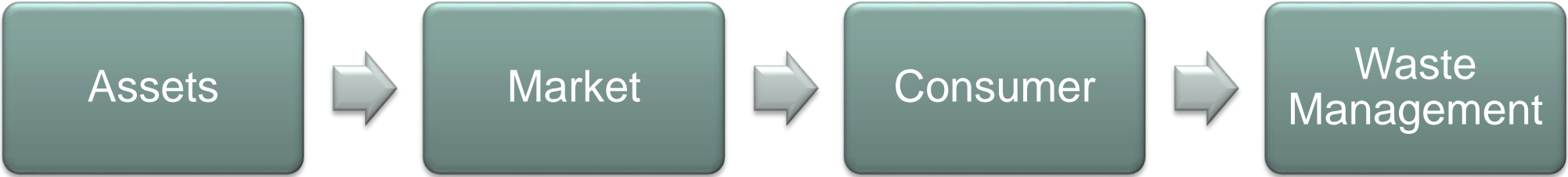


Source: McKinsey&Company

¹Scenario based on a multi-stakeholder push to boost recycling, regulatory measures to encourage recycling, consistent progress on technologies, and \$75-per-barrel oil price.
²Compound annual growth rate. Mechanical recycling limited by downcycling and applicable materials, monomerization limited by applicability to condensation polymers only, pyrolysis limited by likely rise in input costs.
³After demand reduction, assuming annual global GDP growth of 3.1%.



A PLASTICS CIRCULAR ECONOMY : SCOPE AND CHALLENGES



PLASTICS INDUSTRY RESPONSE TO THE CHALLENGE

- There's no "one size fits all" solution
- *But there are **many solutions** to handle **different needs***



PLASTICS INDUSTRY RESPONSE TO THE CHALLENGE

- Partnerships are key and creating opportunities across the value chain, including the waste management infrastructure
- Converting packages from hard-to-recycle to recyclable
- Adoption / piloting of technologies for chemical recycling / feedstock recovery
- Acquisition of recycling companies to increase both the quality as well as availability of materials to meet CPG company goals



U.S. PLASTIC RESIN PRODUCERS HELP PROMOTE RECYCLING AND KEEP PLASTIC WASTE OUT OF THE MARINE ENVIRONMENT



KEEPING PLASTIC VALUABLE

Designed for lowest environmental impact

Develop and support reuse formats

Invest & collaborate on global waste management infrastructure to improve recovery

Continue to increase recyclability and stimulate recycling markets

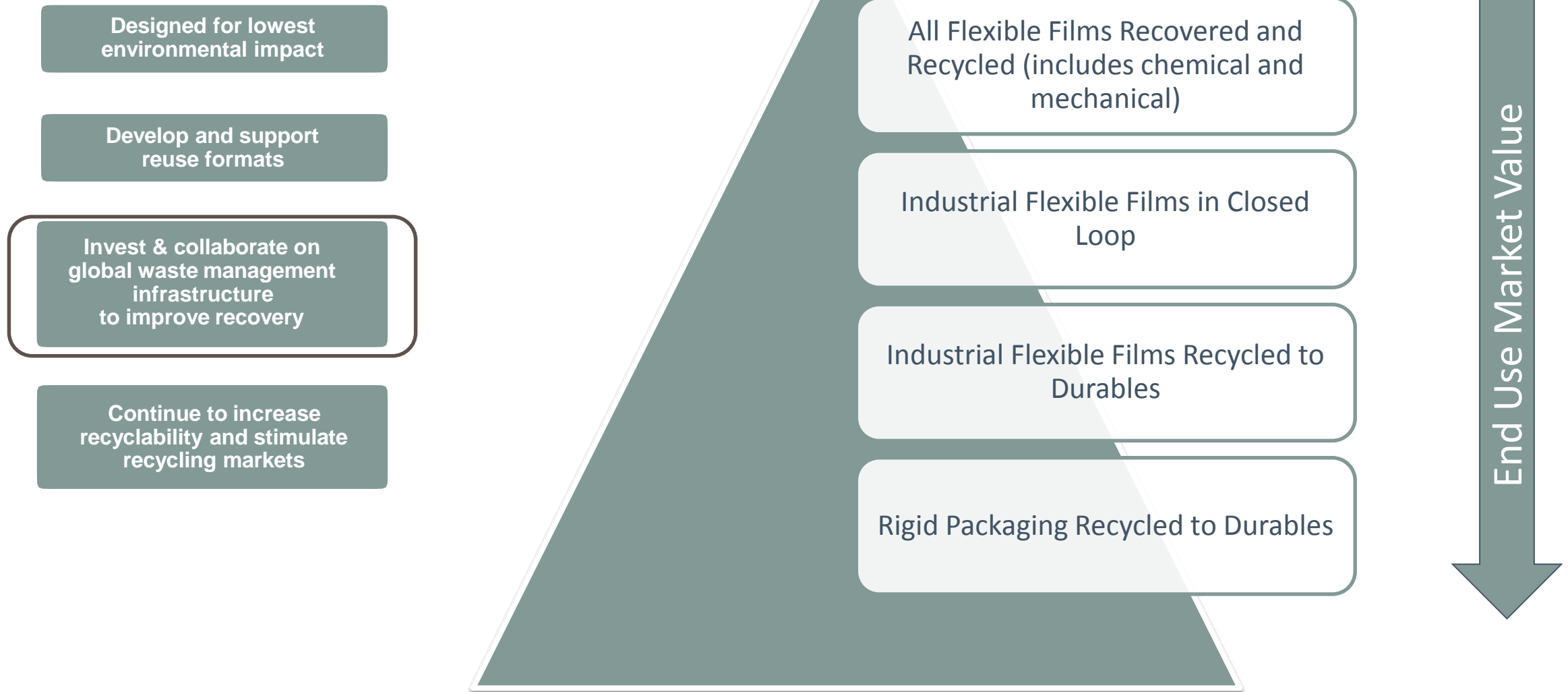


SUSTAINABLE PACKAGING COALITION®

A PROJECT OF GREENBLUE™



HIERARCHY OF PACKAGING RECYCLING



MATERIALS RECOVERY FOR THE FUTURE: A RESEARCH COLLABORATIVE

- Members of The Materials Recovery for the Future Collaborative share a simple vision:

“Flexible packaging is recovered, and the recovery community captures value from it.”

- We are leading research to advance understanding of how flexible plastic packaging can be effectively sorted for recovery

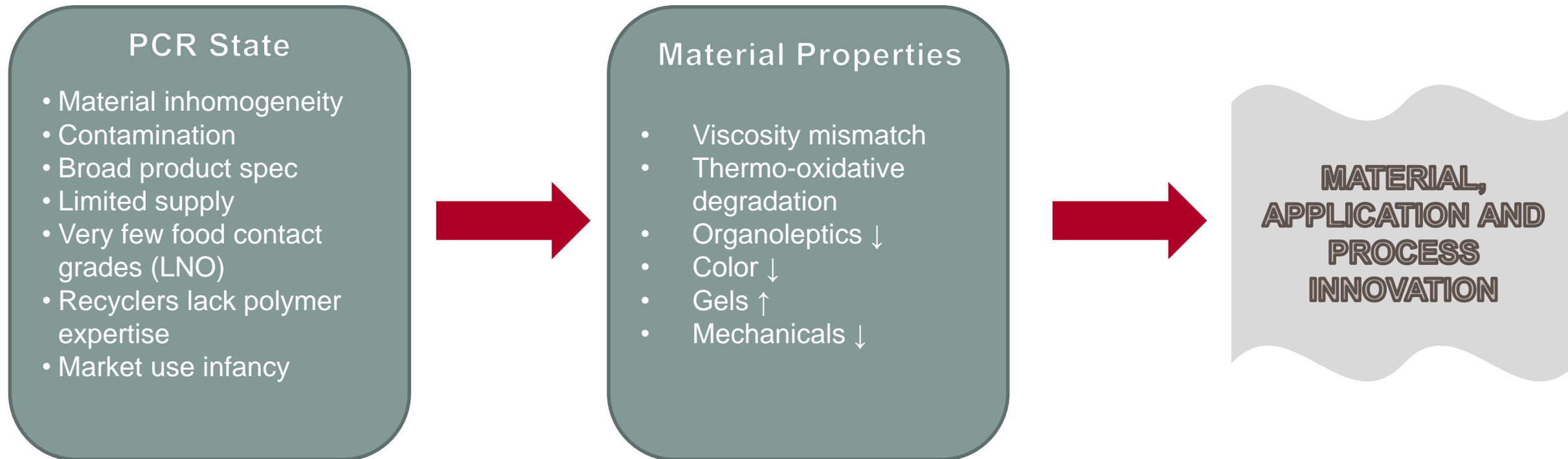


MATERIALS RECOVERY
FOR THE FUTURE



MATERIAL SCIENCE OF RECYCLED MATERIALS

- **Mechanical recycling:** method by which waste material is recycled into “new” raw material without changing the basic structure of the material
- **Waste materials:** Post Industrial Resin (PIR) and **Post Consumer Resin (PCR)**



DEVELOPING MARKETS FOR RECOVERED PLASTIC FILMS

Improving roads with recycled plastic

Paving a new way

Building and improving roads and infrastructure is critical in both emerging and developing regions. Dow is working with partners around the globe to construct polymer-modified asphalt roads with post-consumer recycled plastic.

Benefits:

1. Longer term performance in asphalt roads
2. Reduction in GHG emissions associated with traditional processes.
3. Broad applicability across states, cities, and counties.



TO DATE

56 MILES (90 KM)
OF ROADS BUILT IN

INDIA, INDONESIA AND THAILAND

~420,000 POUNDS
(190 MT)

OF PLASTIC WASTE DIVERTED

2019 GOALS

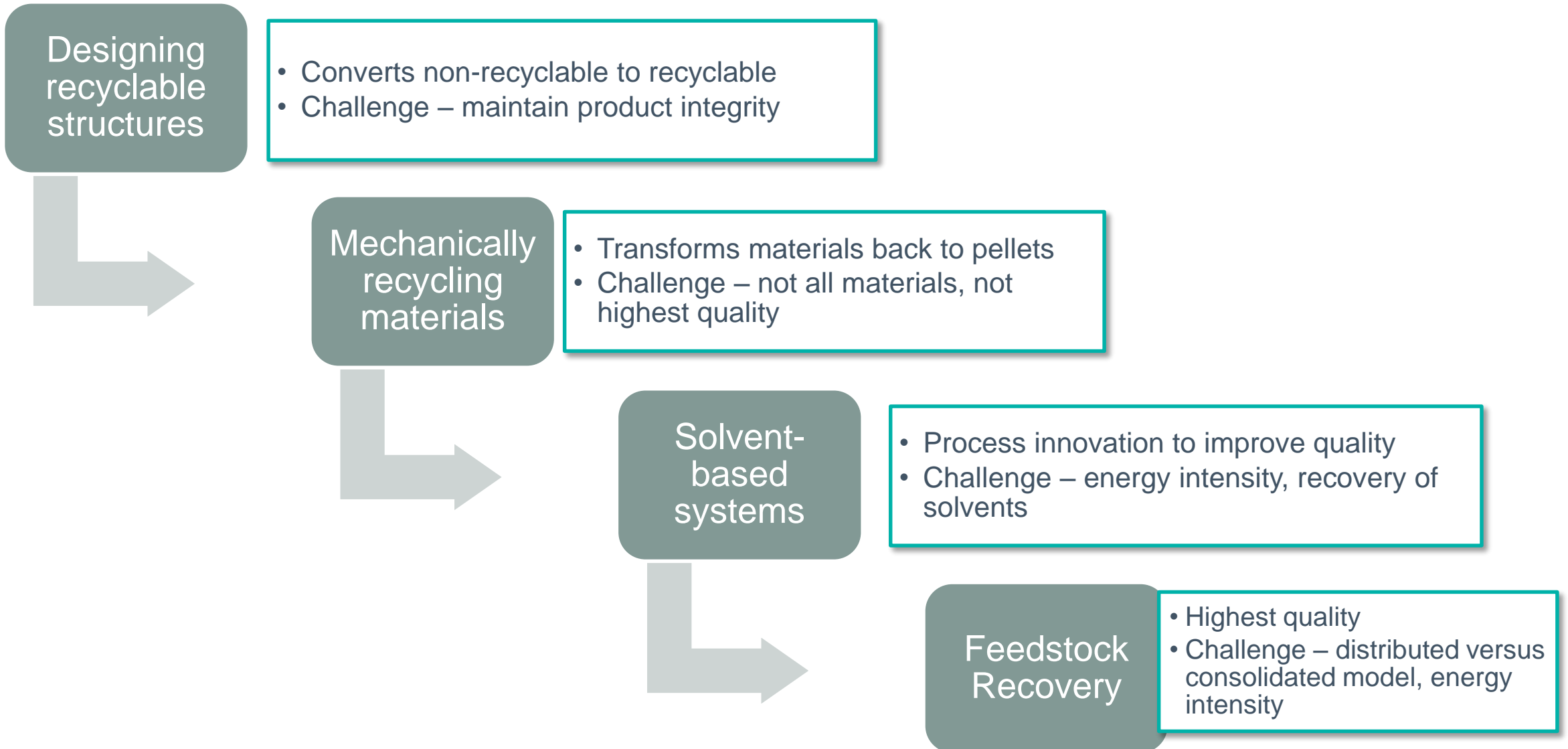
Expansion to
U.S. and Africa

77 tons of plastic waste
diverted for roads

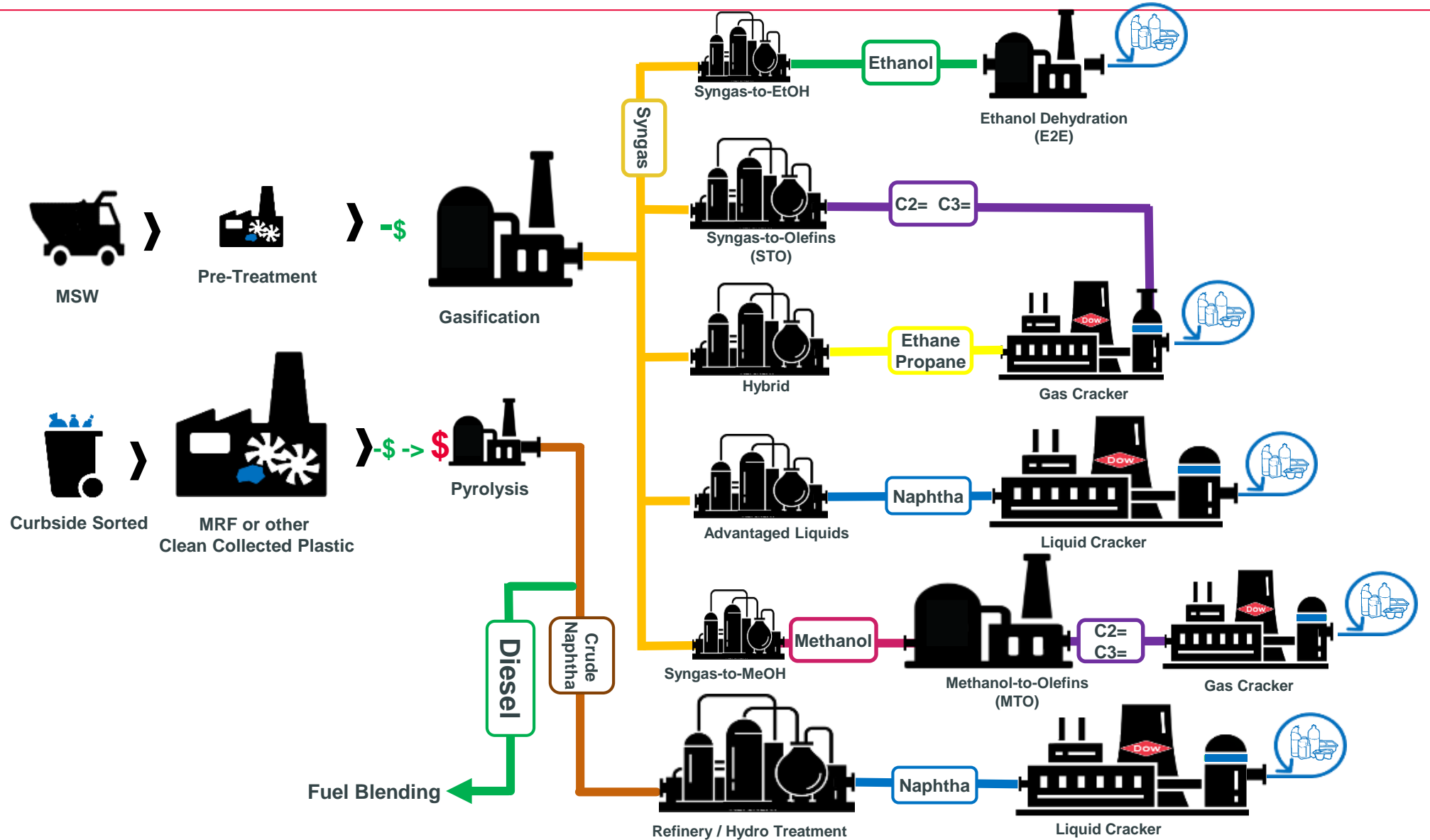
12 new road projects

2 parking lots

HIERARCHY OF SOLUTIONS



FEEDSTOCK RECYCLING



NEEDS FOR A PLASTICS CIRCULAR ECONOMY

- Funding is needed for fundamental Process R&D to facilitate scale-up of chemical transformation technologies such as pyrolysis and gasification, which can be used to convert used, otherwise non-recycled plastics into feedstocks for the manufacture of new basic materials. Improvements in reactor design and process control for improved heat transfer and reduced reactor fouling can allow larger conversion units to operate more reliably and economically.
- Regulatory support must be provided for these technologies to be classified as “recycling” so that facilities can be permitted and operated as manufacturing plants rather than as waste treatment facilities.
- Definitions for recycling and recycled content must include all types of recycling processes: traditional mechanical recycling (making pellets by chopping, washing, and pelletizing), chemical recycling (depolymerization to make polymers into feedstocks for re-polymerization), advanced cleaning (solvent dissolution, separation of polymers, removal of contaminations), and other future technologies.
- Goals and commitments should include the use of recycled content in products in addition to materials being designed as “recyclable” in order to assure that recyclable products actually get recycled after their initial use.





Seek

Together™