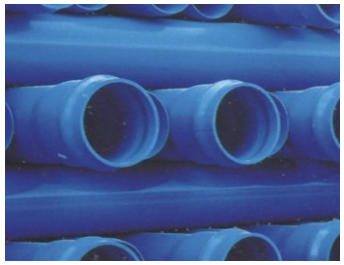


21st Century Sustainability & Plastics

Innovations & Technology Leading the Way to Zero Plastic Waste

Great Lakes Plastics Forum
October 11, 2018

Joe Hruska,

V.P. Sustainability

Association canadienne de l'Industrie des plastiques
since • depuis 1943
Canadian Plastics Industry Association

Todays Presentation

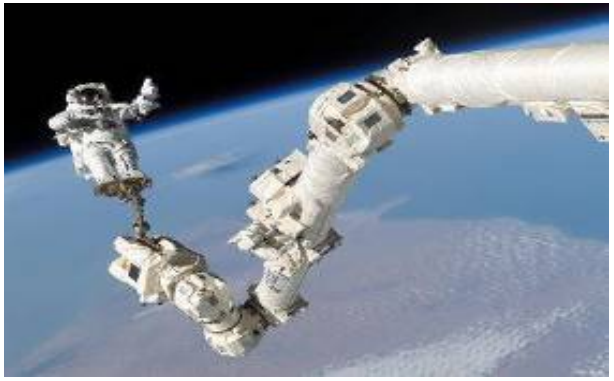
Plastics Circular Economy

- Achieving 100% plastics recovery through conventional recycling, advanced recycling and recovery technologies.
- Innovations now adding new diversion and resource efficiencies

Plastics & Sustainability:

A Valuation of Environmental Benefits, Costs and Opportunities for Continuous Improvement

Plastics' Contributions – Providing Many Benefits



Sustainable Plastics

Sustainability of plastics and economy is increased through the diversion of plastics from landfill and reducing marine litter by utilizing all 4R's.

Trucost Study – Plastics Sustainability

Key Findings

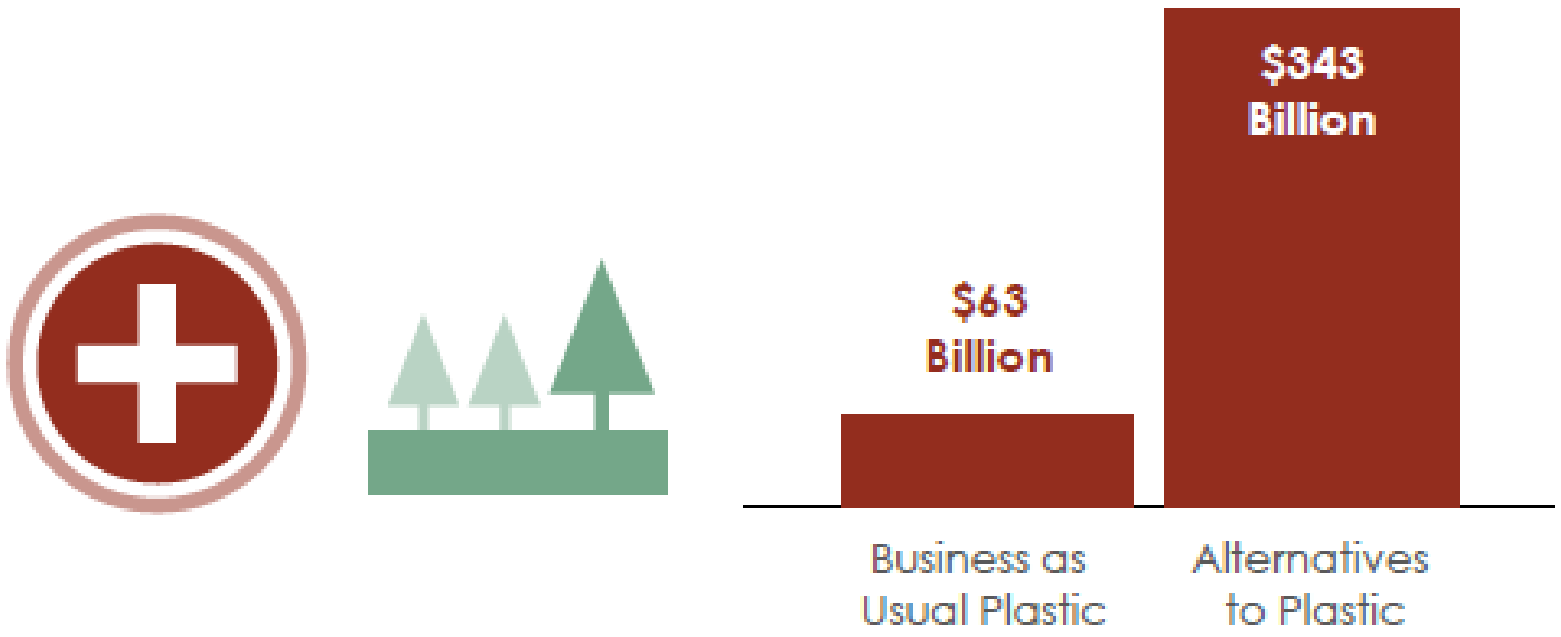
- Environmental cost of plastic in consumer goods is **3.8 times less** than the alternatives materials that would be needed to replace plastic.

Source:
https://plastics.americanchemistry.com/Plastics-and-Sustainability.pdf

Trucost Study

The costs to society and the economy:

Damage to the health of humans and ecosystems



Example – reduces food waste

Fresh for 14 days

40%+ thrown out; plastics keep food fresh longer

Grapes in-store wastage
DOWN by 20%

New potatoes
in-store wastage
DOWN to <1%

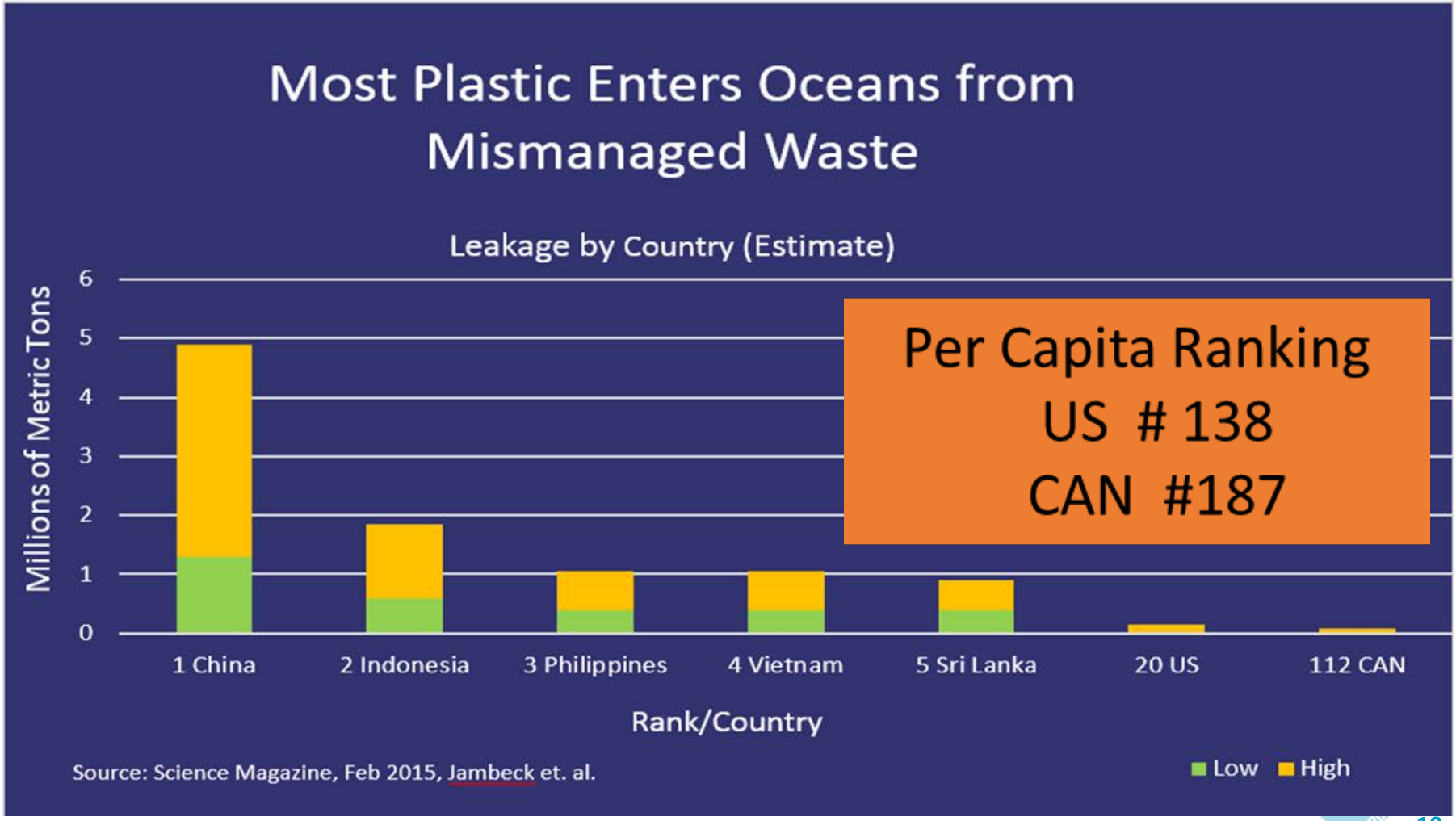
Bunches of identical bananas stored for 7 days loose and in a modified atmosphere bag

Source: Packaging in Perspective, Advisory Committee on Packaging, Supported by INCPEN
http://www.thefactsabout.co.uk/files/98201010542packaginginperspective.pdf

Why so much plastic in our environment

Photo: AfriramPOE / Shutterstock.com
https://www.fairobserver.com/more/environment/plastic-pollution-environment-climate-change-innovation-news-18726/

Where does marine litter come from?



From: Plastics Sustainability Coalition; July 2018

CPIA commitment + G7 Plastics Charter – opportunity for positive change

CPIA Shared Societal Sustainability Goals:

- **100% of plastics packaging is re-used, recycled and recovered by 2040**

Interim Goal:

- 100% of plastics packaging is recyclable or recoverable by 2030

G7 Commitment:

- Work with G7 countries' global plastic commitment

Our View

- Plastic and other litter in the environment is unacceptable
- Plastics deliver significant societal benefits, including:
  - Energy, GHG, climate change mitigation & resource savings
  - Innovations that improve health care, reduce food spoilage & improve quality of life
- Benefits are threatened if plastic litter harms our natural environment
- The plastics value chain is a partner to reduce waste

Plastics & Circular Economy

Sustainability & Plastics Recovery – Utilize all 4R's

Reduce

Reuse

21st Century Recycling
molecule-to-molecule

Recycle

Recover

Circular Economy about recycling, composting, reuse

- Restorative & regenerative by design
- Keeps products, components, & materials at highest utility & value
- Distinguishes between technical & biological cycles."[1]

But recycling, composting, reuse can't get it all!

[1] PacNext

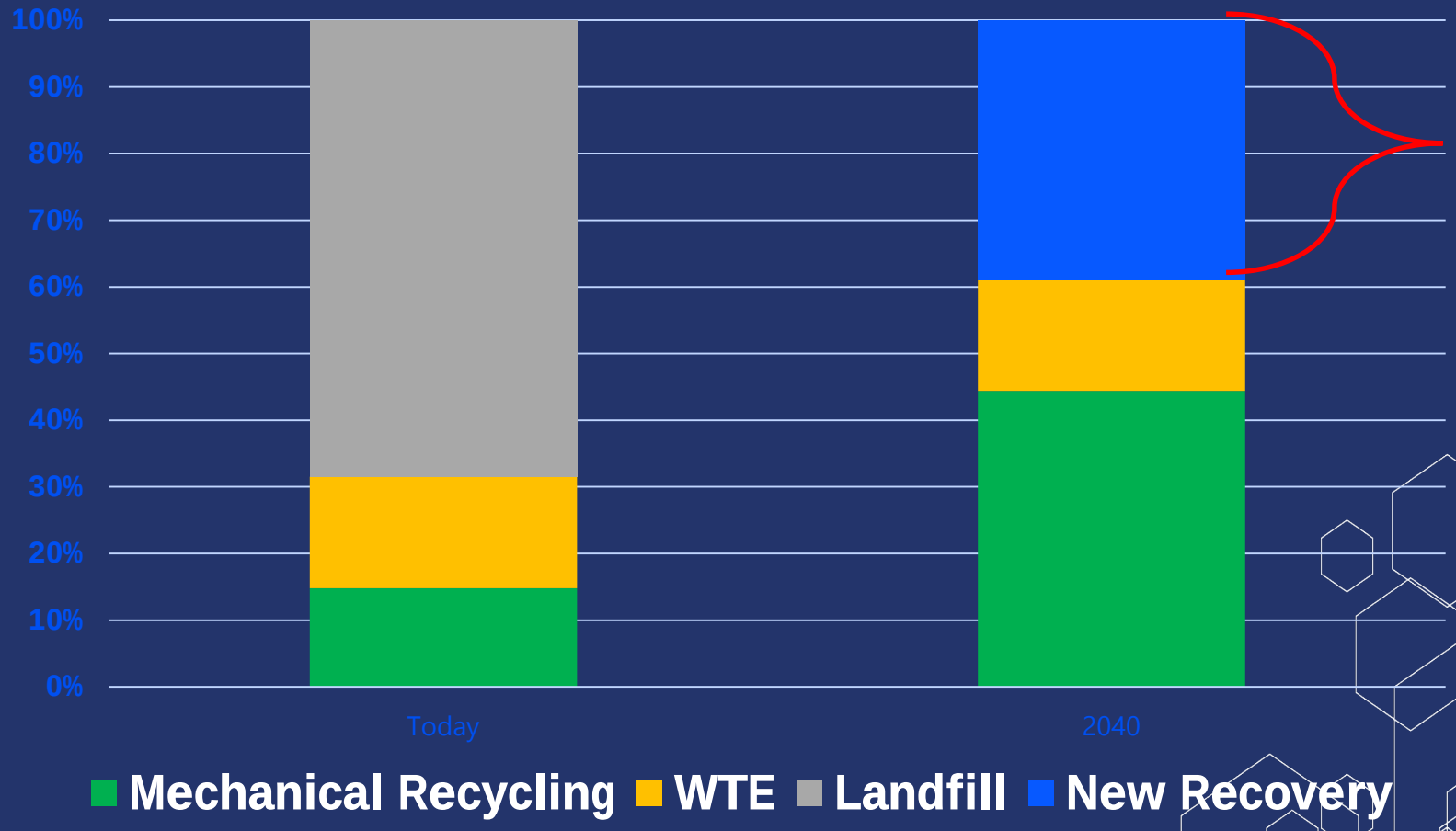
Sustainable Materials Management – holistic approach adds "Recovery"

- Use & reuse of materials in most productive & sustainable way across entire lifecycles by minimizing amount of materials involved & associated environmental impacts.[1]

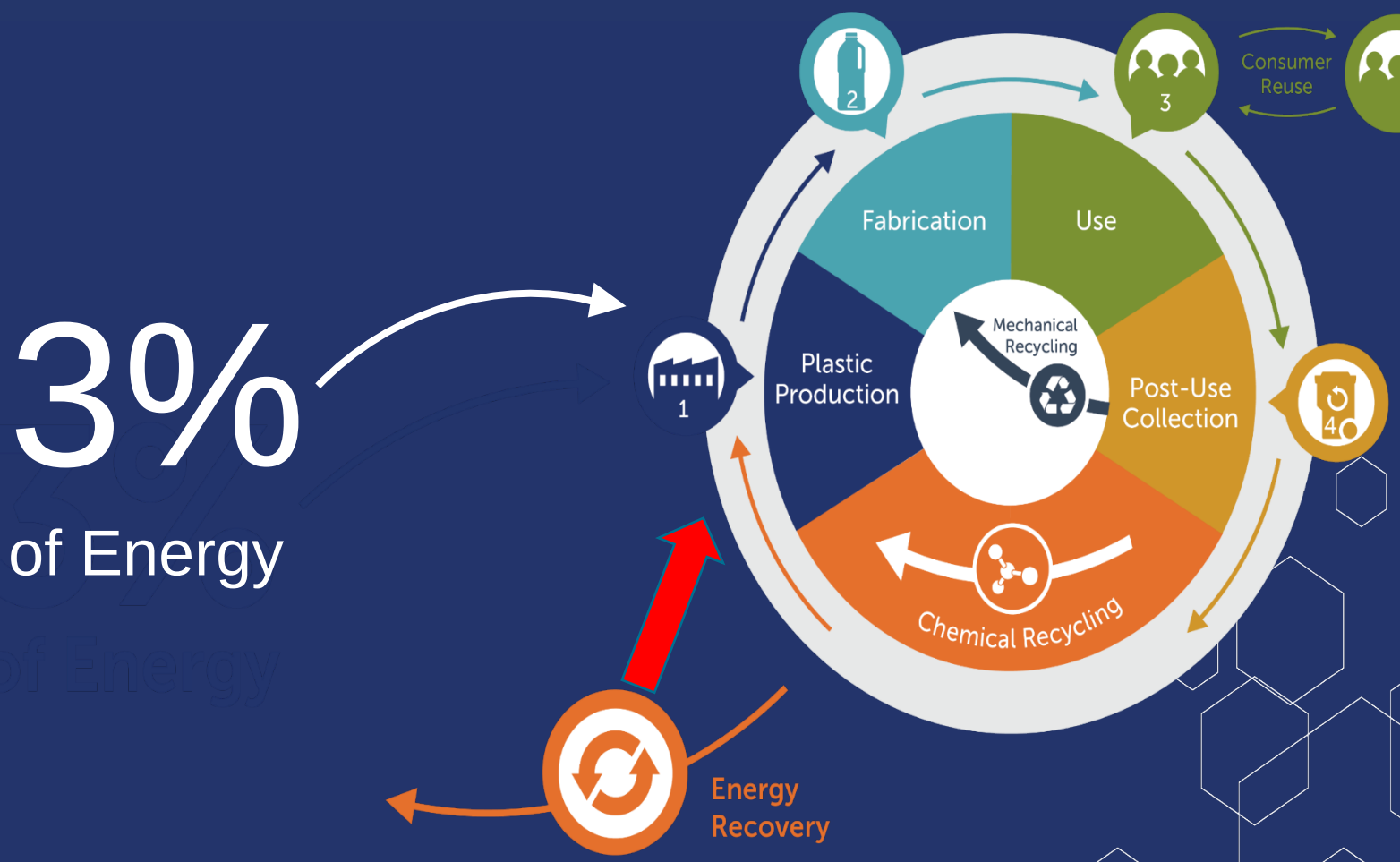
[1]US EPA. (Sept 2011). https://www.epa.gov/smm/sustainable-materials-management-basics

New Recycling & Recovery Solutions Are Essential

40% new recovery required, even with 3X existing plastics packaging recycling rate



Plastics | In A Circular Economy



Achieving 100% diversion goals

How do we achieve zero plastics to landfill?

Reuse + Recycling + Recovery = 100%

Innovation & Technology To Achieve Zero Waste Goals

New definition of plastics recycling

Smelting

Melting

21st Century recycling molecule-to-molecule re-engineering

Photo courtesy of Green Mantra Technologies

Recycling Plastics on a Molecular – Future is Unfolding

POLYMERIZATION

DEPOLYMERIZATION

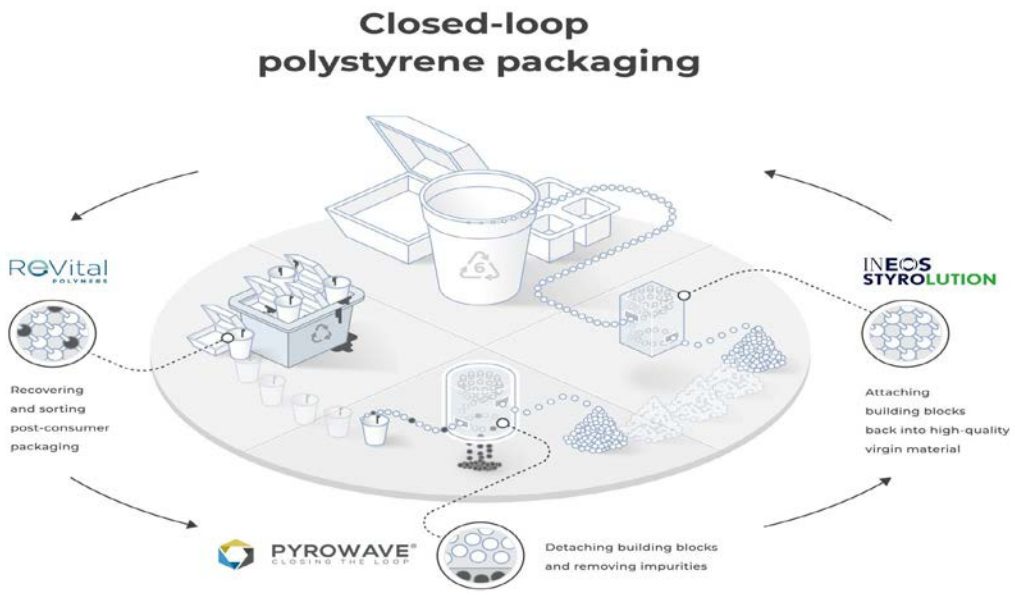
Technologies used to build plastic molecules can recycle and engineer new plastics and materials

Innovations – plastic management & recycling

Convert post consumer plastics into original state molecules to be reused in new products

Advanced 21st Century Plastics Recycling Creating New Opportunities – Pyrowave

ReVital Polymers, Pyrowave and INEOS Styrolution launch closed-loop North American polystyrene recycling



Driving Plastics Recycled Content
Roads & Asphalt

Green Mantra, Brantford Ontario

- Advanced recycling technology for polyethylene
  - Asphalt modifiers, roofing materials, waxes, oils
- Advanced dirty polystyrene recycling
  - Create valuable printing inks

Vancouver first city to use recycled plastic in asphalt

New materials for Circular Economy – highly sustainable

Source: https://www.cbc.ca/news/canada/british-columbia/vancouver-first-city-to-use-recycled-plastic-in-asphalt-1.1145071

Demand creates value. Value drives recycling.

- Commit to purchase PCR plastics through “work in process” (WIP) durable goods, or other applications for PCR
- Play prominent role in expanding the market for mixed residential plastics, driving investment, increasing supply and producing more high quality PCR.
- Includes any and all NEW applications for PCR.

Source: https://www.plasticsrecycling.org/recycling-demand-champions

Procter & Gamble launches Fairy Ocean Plastic bottle made with 100% recycled plastic

- 10% ocean plastic, collected from oceans and beaches around the world, and 90% post-consumer recycled plastic

Source: https://www.plasticstoday.com/packaging/procter-gamble-launches-fairy-ocean-plastic-bottle-made-100-recycled-plastic/198944615157640

Innovations like Energy Bag – collection innovation

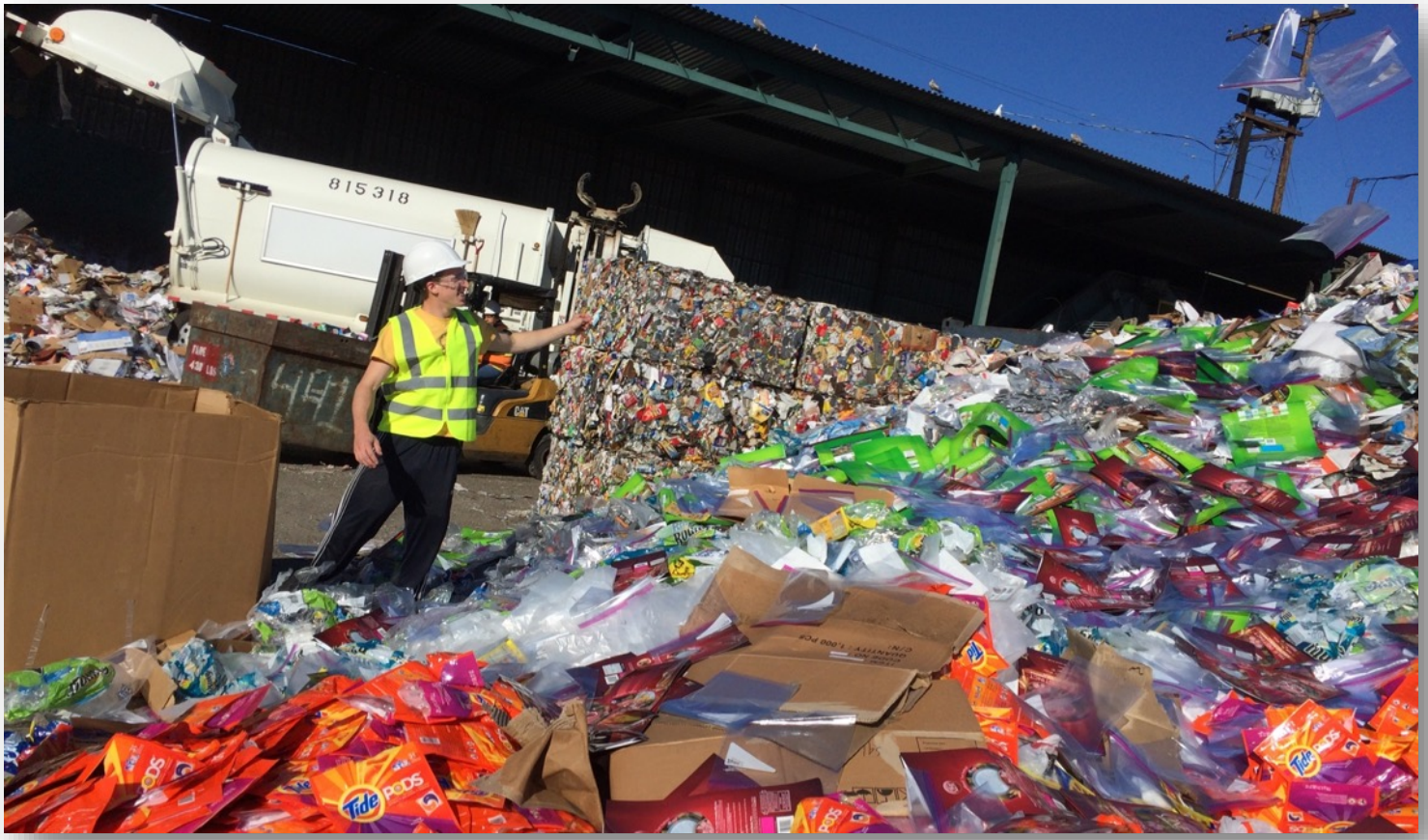
Dow's "Hefty Energy bag"

- Increase resource productivity of non-recyclable materials
- Making them into ethanol & other useful high valuable feedstocks such for waxes, oils & new plastics

https://www.kab.org/hefty-energy-bag-program/program-overview

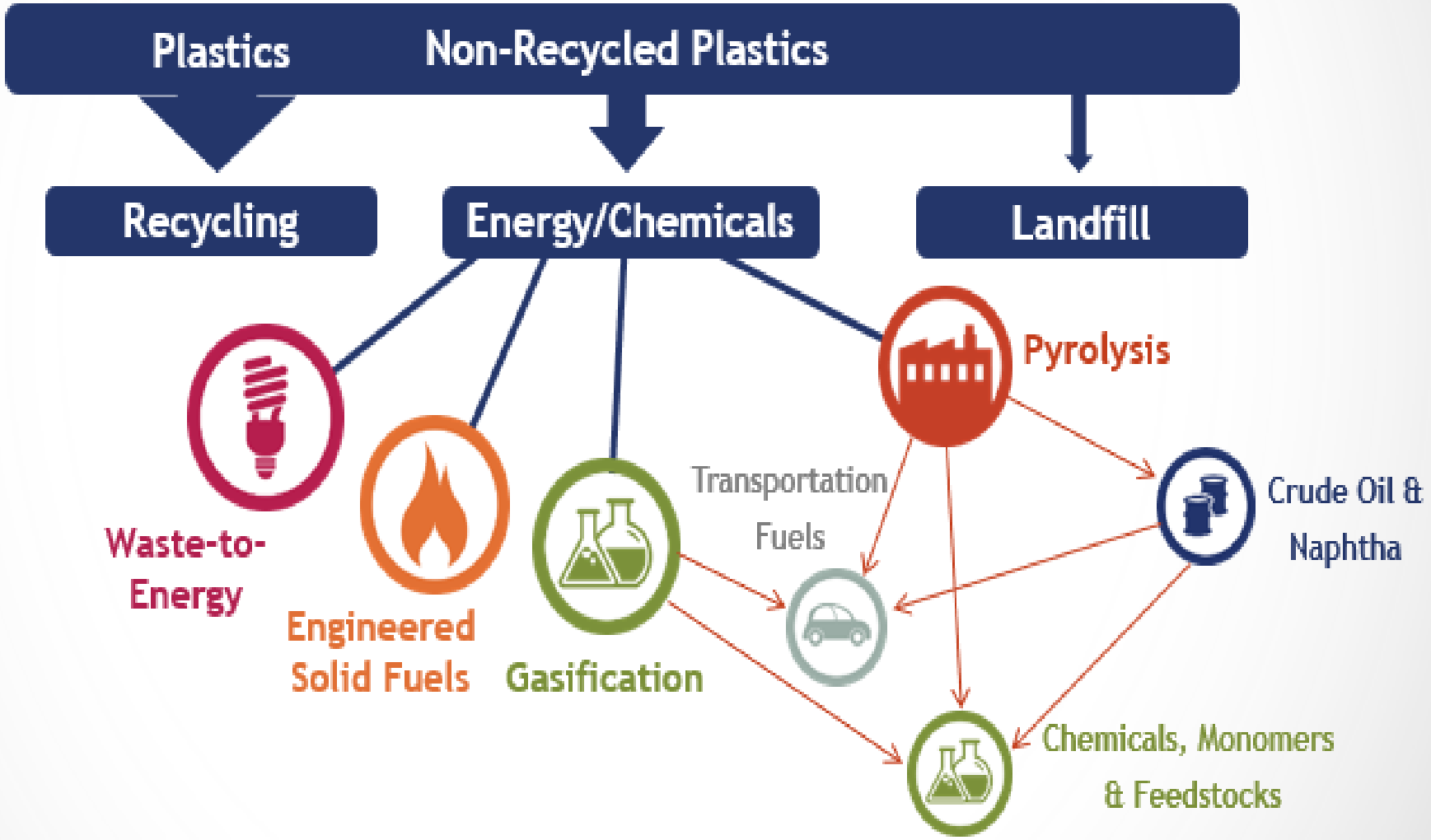
Innovations in plastic management & recycling – processing innovation

Materials Recovery for the Future Pilot



Source: https://www.materialsrecoveryforthefuture.com

Plastic recovery innovation: diverse yields



Plastics - valuable energy source

University of Waterloo - *Energy and Economic Values of Non-Recycled Plastics (NRP) Currently Landfilled in Canada*

- NRP = 2.8 million tonnes per year
- NRP converted by pyrolysis to fuel oil = 10.5 million barrels of oil per year

$ ½ Billion

700,000 cars

Advanced clean thermal & energy recovery

Zero plastics to landfill

Closed system – no wind blown landfill plastic litter to enter the environment

Durham York Energy Centre

Source: https://www.durhamyorkwaste.ca/Home/Home.aspx

Importance of Partnerships – collaboration creates innovation

City of London & CPIA Partners MOU

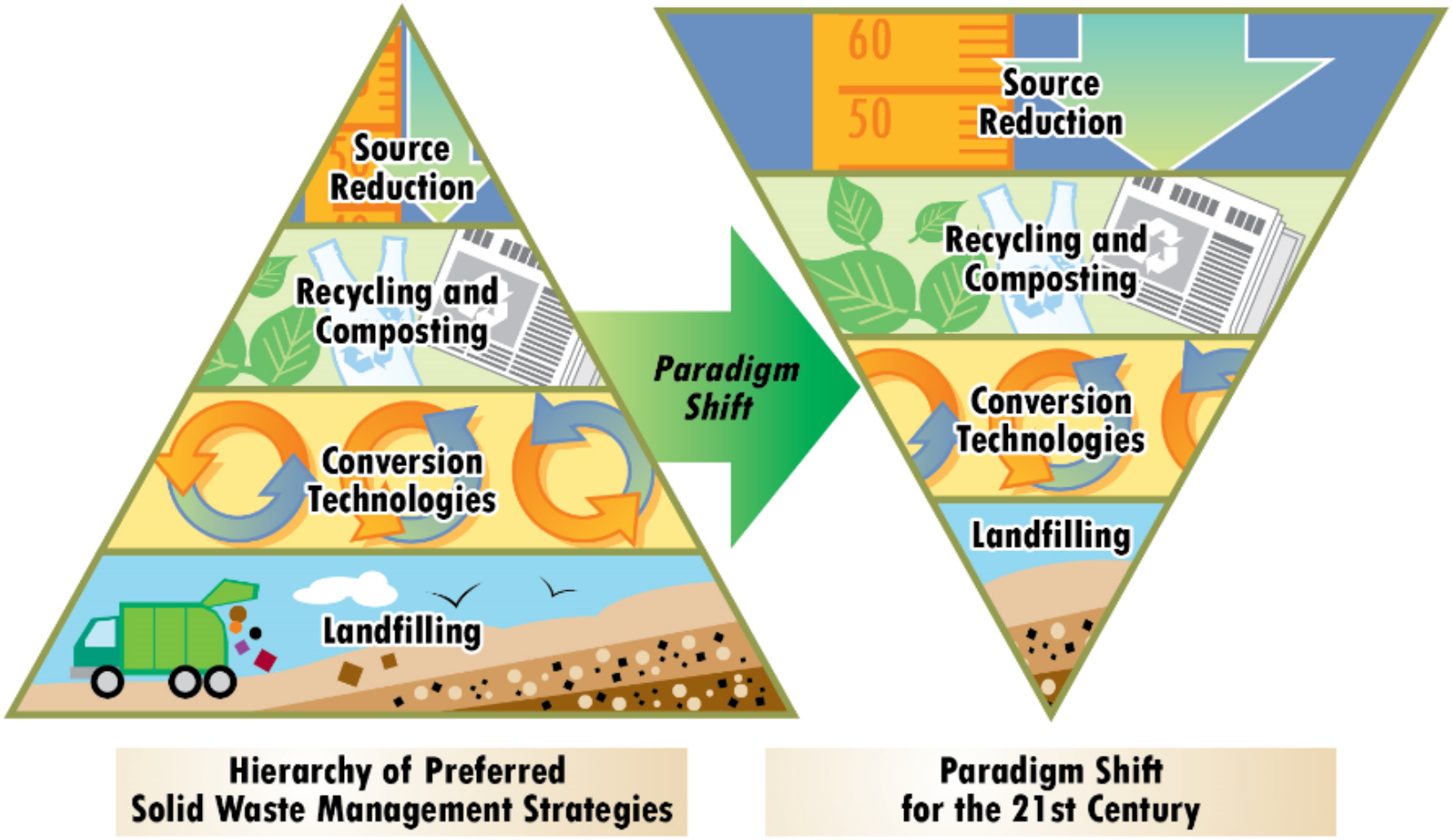
- Initiatives leading to a more sustainable economy
- Advance waste conversion, resource & energy recovery & policy objectives
- Collaboration – other municipalities, industry, academia, governments
- Broadly share information

Expanding Partner Opportunities

Institute for Chemicals and Fuels from Alternative Resources
Western University
icfar

Bioindustrial Innovation Canada®
A Sustainable Chemistry Alliance

Time for Greater Collaboration



Reproduced from Waste Advantage Magazine, August 15, 2014

Policies to support new technology and new goals

- Targets in tonnes or moving forward managing carbon?????
- Develop innovative policies to support new 21st Century technologies
- Most jurisdictions have not addressed these changes

Summary

1. Plastics immense benefits will be realized through advances in technology & innovation.
2. Plastics innovations, resource efficiency reduction benefits through the 1st R last 60 years – overlooked and not recognized.
3. Plastics fits into the Circular Economy framework than can be "supercharged" with a life cycle framework (SMM) that recognizes all 4 R's suite of options to manage all plastics
4. Promote "responsible use to reduce" – the crown jewel!

Questions

We welcome your thoughts and suggestions…

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Association canadienne de l'industrie des plastiques
since • depuis 1943
Canadian Plastics Industry Association

Sources & Resources

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2. Packaging in Perspective, Advisory Committee on Packaging, Supported by INCPEN http://www.thefactsabout.co.uk/files/98201010542packaginginperspective.pdf
3. Operation Clean Sweep https://www.opcleansweep.org/
4. Dow Hefty Energy Bag https://www.kab.org/hefty-energy-bag-program/program-overview
5. Materials Recovery for the Future https://www.materialsrecoveryforthefuture.com

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7. Circular Economy https://www.ellenmacarthurfoundation.org/circular-economy
8. Sustainable Material Management [1]US EPA. (Sept 2011). https://www.epa.gov/smm/sustainable-materials-management-basics
9. Maximizing the Benefits of Circular Economy and Sustainable Materials Management Models For Product-Packaging Systems https://recycleoftenrecycleright.com/wp-content/uploads/2018/04/Maximizing-the-Benefits-of-C.pdf