



Innovation in Materials and Construction: (Bio-Films)

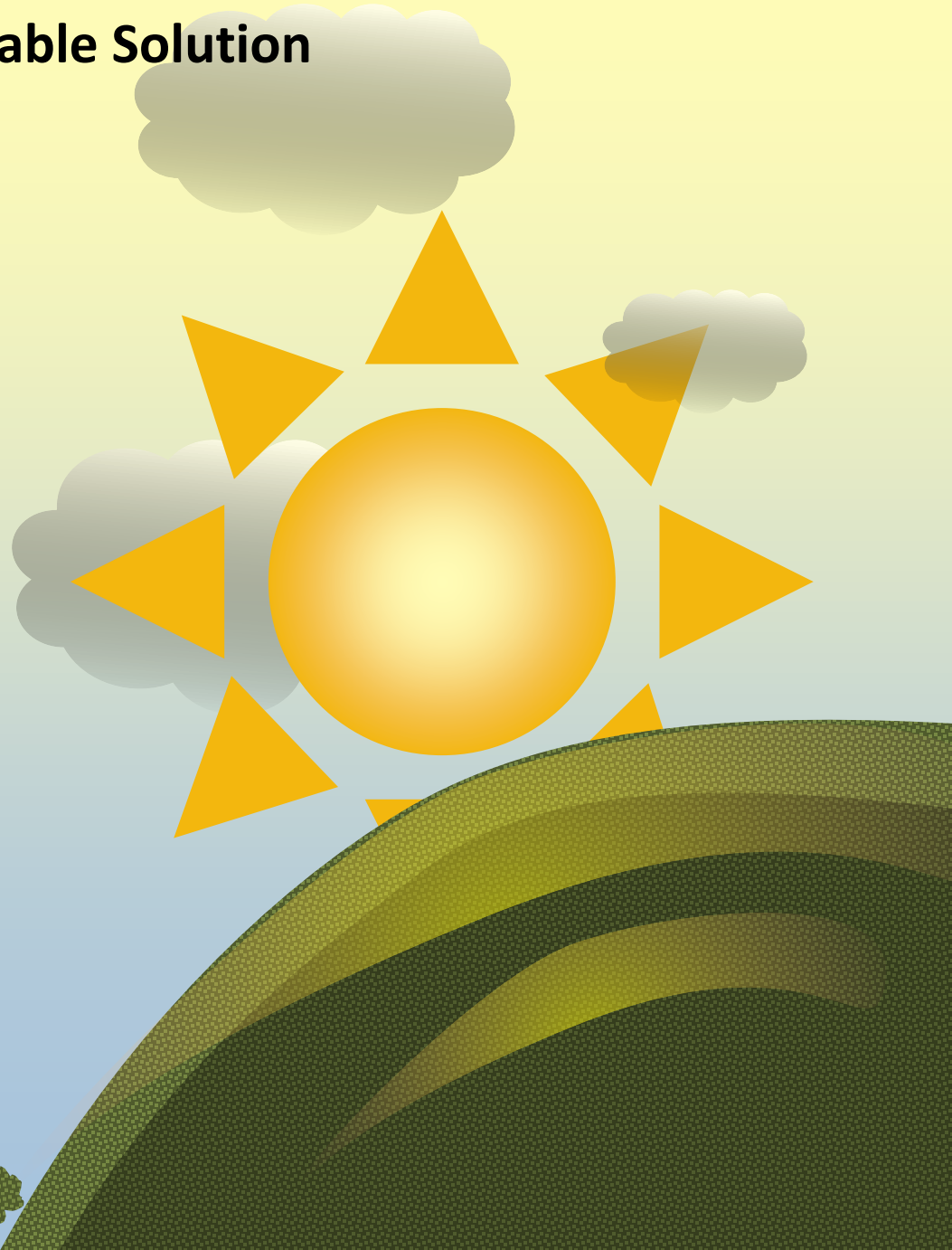
Western Plastics Association

June 23, 2016

Flexible packaging is a Sustainable Solution

Manufacturing, Distribution & Use

- Consumes less energy, fewer natural resources
- Generates less CO2 emissions
- Results in higher product to package ratio
- Requires fewer trucks to transport, using less fuel & creating less emissions
- Provides many consumer conveniences:
 - Extended shelf life
 - Easy storage
 - Microwaveability
 - Reclosability



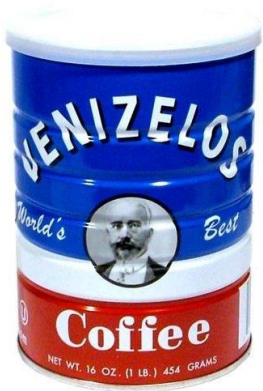


FUTAMURA

What does a sustainable package look like?



Coffee Evolution



Closing the Loop



Source: Sustainable Packaging Coalition
"Lifecycle Approach to Sustainability"



Closing the Loop



Source: Sustainable Packaging Coalition
“Lifecycle Approach to Sustainability”





Material Options

Poly Lactic Acid (PLA)

- High Clarity
- Very high Stiffness
- Good dead-fold
- Semi-permeable to moisture
- Resin can be blended to modify properties
- Renewable raw materials (Sugar)
- Industrially compostable



Starch-based films

- Hazy appearance
- Low stiffness (more like PE than PET)
- Highly permeable to moisture
- Resins can potentially be blended to modify properties
- Renewable raw materials (Corn, potatoes...)
- Industrially compostable
- Home compostable variants too



Novamont

Co-polyesters

- Hazy appearance
- Low stiffness (more like PE than PET)
- Highly permeable to moisture
- Oil-derived sources currently, but still industrially compostable
- Home compostable variants too
- Resins often blended to modify properties (e.g. BASF Ecoflex® becomes ECOVIO®, when blended with PLA)



Cellulosics



- Clarifoil® – Cellulose Acetate
- High stiffness & clarity
- Principally used in board lamination and window applications



- NatureFlex™ - Regenerated Cellulose
- Good stiffness & clarity
- Great dead-fold
- Moisture and Gas Barrier performance
- Principally used in food packaging & labelling
 - (single web and laminate form)



Emerging: PBS

- PBS
- Derived from oil and/or renewable resources
- Permeable, tear-resistant and low stiffness
- Improved optics versus many alternative biomaterials for sealant-web or bag applications
- Improved moisture resistance
- 4 resin suppliers moving from pilot scale to commercial scale over next couple of years



Image: PTTMCC



Renewable-Conventional

- Renewable PE
- Identical properties to standard PE, but derived from Sugar Cane
- Limited range of variants currently, but developing



Combining Strengths



High barrier Comparisons

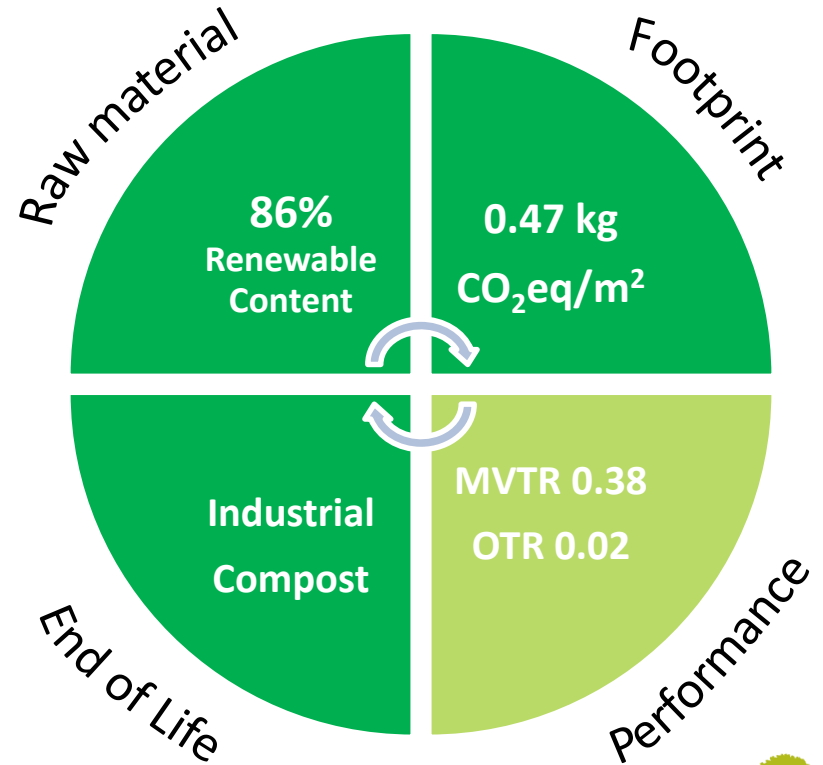
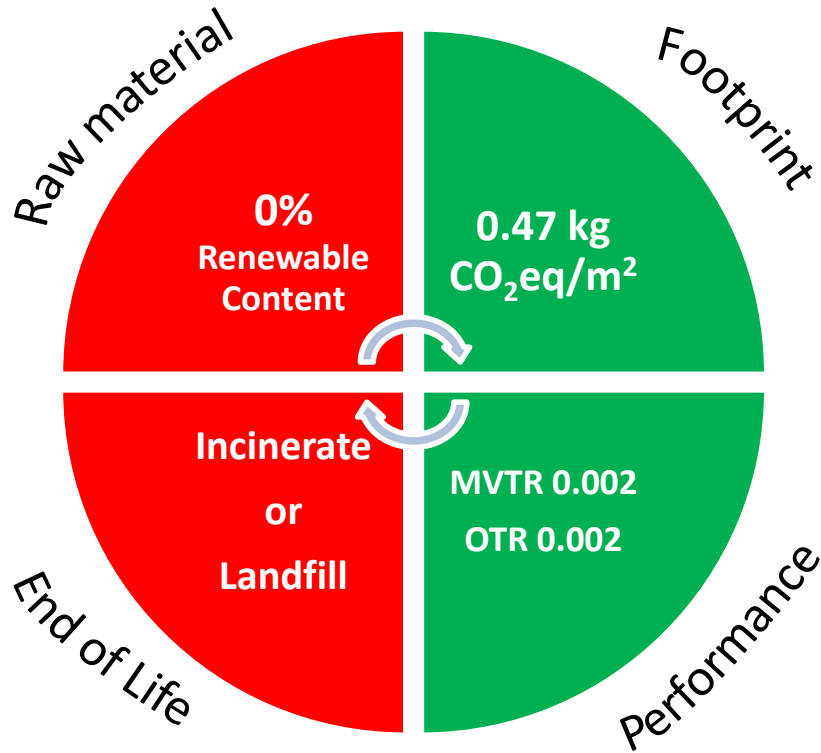


Conventional Pack:

PET/ Aluminium Foil/ Polyethylene

“Bio” Pack:

NatureFlex™/Metalized NatureFlex™/Evlon-Ingeo

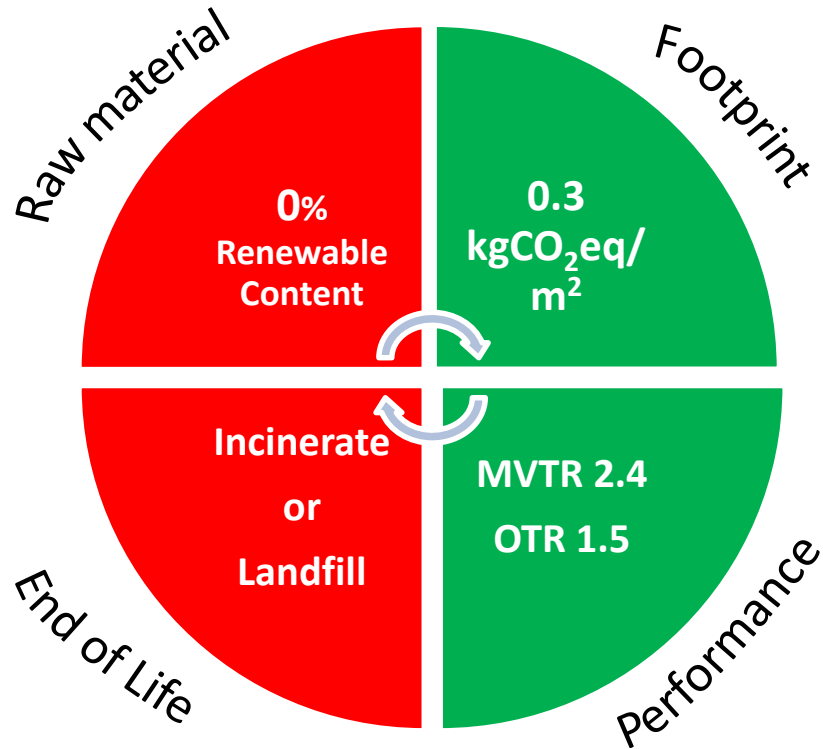


Clear Barrier Comparison



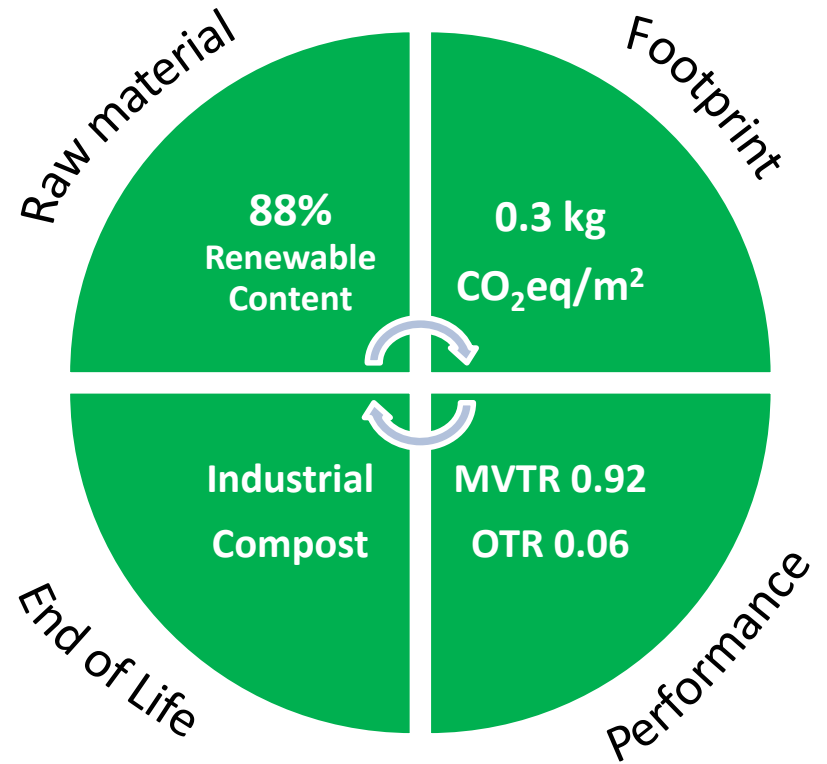
Conventional Pack:

Polyester/Polyethylene



“Bio” Pack:

NatureFlex™/Evlon-Ingeo



Potential Applications



	Stick pack	HFSS	VFFS	Pouches	Sachets	Lidding
Dry Beverages (Coffee/Tea)	Recommended	Recommended	Recommended	Recommended	Recommended	Evaluation needed
Dry Goods/ Breads	Not Applicable	Recommended	Recommended	Recommended	Recommended	Recommended
Nutritional Bars	Not Applicable	Recommended	Recommended	Recommended	Recommended	Not Applicable
Salted Snacks	Recommended	Recommended	Recommended	Recommended	Recommended	Recommended
Confections	Recommended	Recommended	Recommended	Recommended	Recommended	Not Applicable
Cultured Dairy/ Cheese	Recommended	Recommended	Recommended	Recommended	Not Applicable	Recommended
Pet Food/Treats	Not Applicable	Recommended	Recommended	Recommended	Not Applicable	Not Applicable
Liquid Applications	Evaluation needed	Evaluation needed	Evaluation needed	Evaluation needed	Evaluation needed	Evaluation needed



Recommended



Evaluation needed



Not Applicable

Collaboration: Aligning the Package With Brand Objectives





Thank you!
Questions?