# **COMPASS** Comparative Packaging Assessment

#### Minal T. Mistry BizNGO webinar - 12 April 2013





# agenda

- Intro
- Background
- COMPASS model
- Data
- Streamlined LCA
- Material health
- Discussion / Q&A



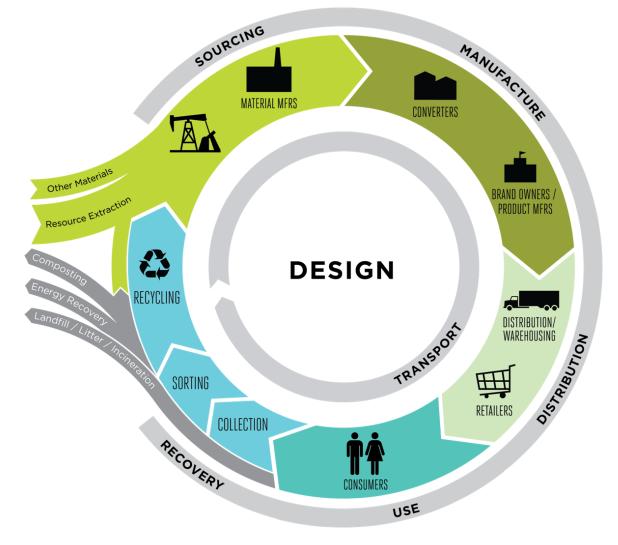


# leveraging the design process





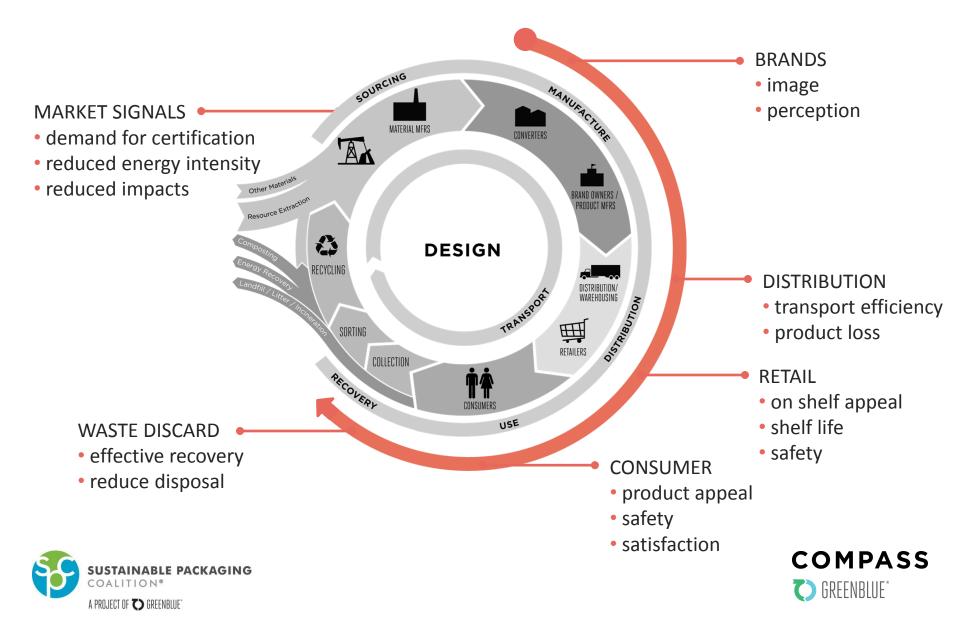
## the whole system perspective







# implications of design choices



# the model







a design-phase web application that provides

comparative environmental profiles of packaging alternatives based on life cycle assessment metrics and attributes





## build scenarios using components



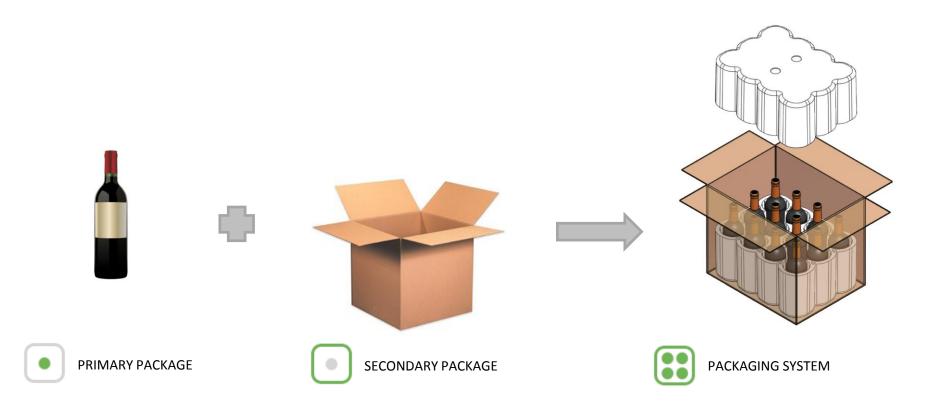
#### SIMPLE COMPONENTS

COMPOSITE COMPONENTS





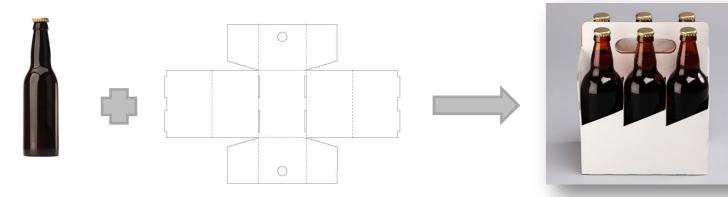
## packaging system







# multi-pack scenario



#### COMPONENT A x <u>6</u>

- Bottle
- Label
- Cap

COMPONENT B x 1 • Carry case



COMPONENT A x <u>6</u> • Can

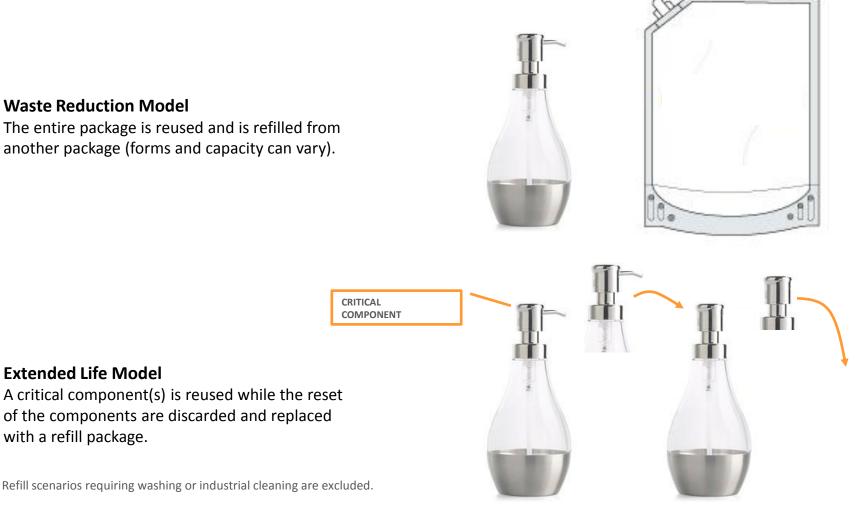


COMPONENT B x <u>1</u> • six-pack rings



# refill scenario

APPLICATIONS: liquid soap, cosmetics, wipes and cleansers, etc.







# account for distribution legs

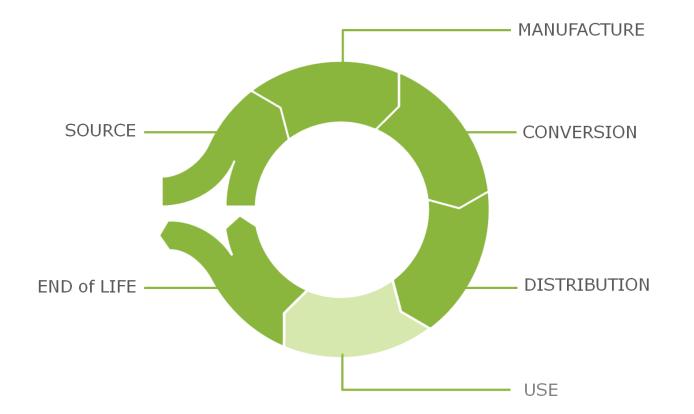
MODE	VEHICLE	DISTANCE: km and m
Road Rail Sea Air	<ul> <li>relevant trucks to the region</li> <li>freight train</li> <li>barge and transoceanic freight ship</li> <li>cargo plane</li> </ul>	FUEL: diesel, gasoline, kerosene , other as available DATA: USLCI and ecoinvent







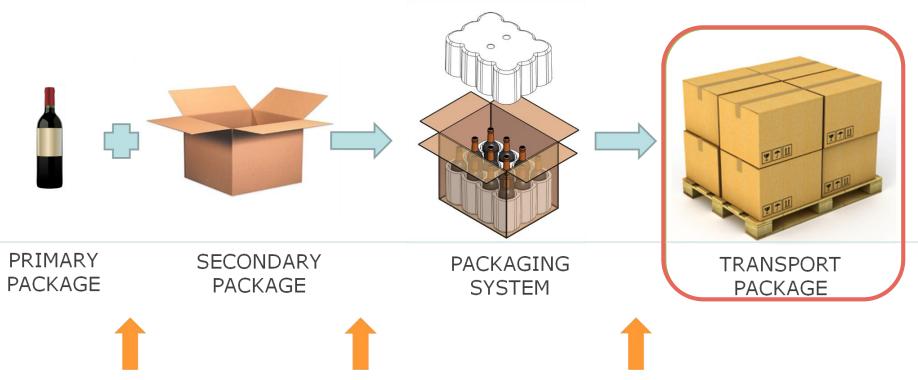
# life cycle coverage in COMPASS







### transport model (being developed)



Add distribution related transport for components, packages and shipping the system to the DC





#### DATA





## data

- Consistent background data modeling for common packaging materials and processes
- Apples to apples comparisons based on common functional unit
- Region specific solid waste profiles for US, CA, EU
- Verified by industry and external reviewers





### data sets

- Data sets for U.S., Canada, Europe
  - Background data from ecoinvent and USLCI
- End of Life (EoL) treatments for packaging
   Landfill, WtE, compost, incineration, litter
- EoL solid waste profile
  - Regional recover and discard information from USEPA, EuroStat, StewardEdge Canada





# materials and processes

- Polymers
  - HDPE, LDPE, LLDPE, PET, PP, PS, EPS, PVC, PVDC, PLA, EVA, Nylon 6, PC, Modified starch (Mater-bi)
  - PU, SAN, ABS
- Fibers
  - Solid Bleached and unbleached Sulfate Board (SBS and SUS), Recycled Folding Boxboard, Corrugated, Supercalendered Paper, Bleached and Unbleached Kraft Paper, Liquid Packaging Board
  - Jute, Kenaff, Cotton (coming soon)
- Metals
  - Steel, stainless steel and aluminum
- Container glass

- Polymers
  - Blow molding
  - Extrusion, plastic film
  - Foaming, expanding
  - Injection molding
  - Stretch blow molding
  - Thermoforming, with calendaring
- Fibers
  - Production of paper bags
  - Production of carton
  - Production of corrugated boxes
  - Cutting
  - Weaving (coming soon)
- Metals
  - Sheet rolling
  - Production of steel can





# informed prototyping





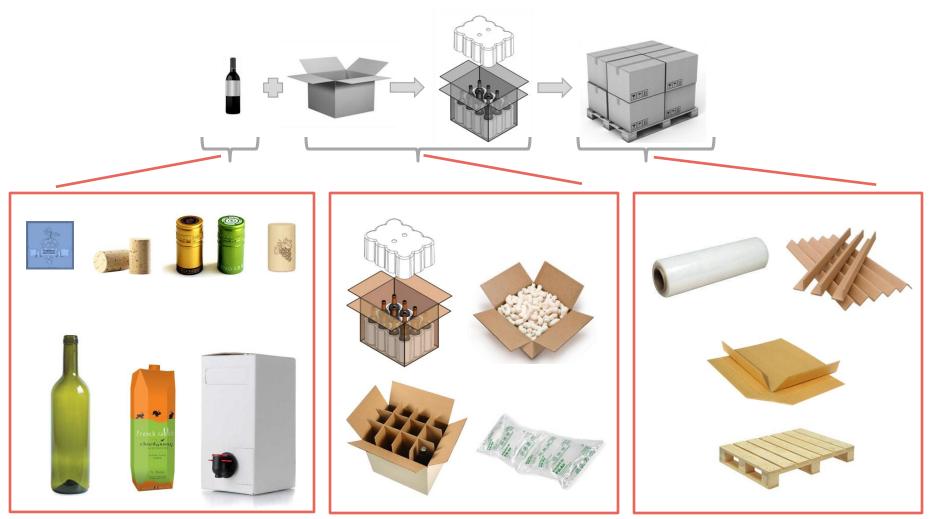
## comparative packaging assessment







### **COMPASS<sup>®</sup>** (comparative packaging assessment)

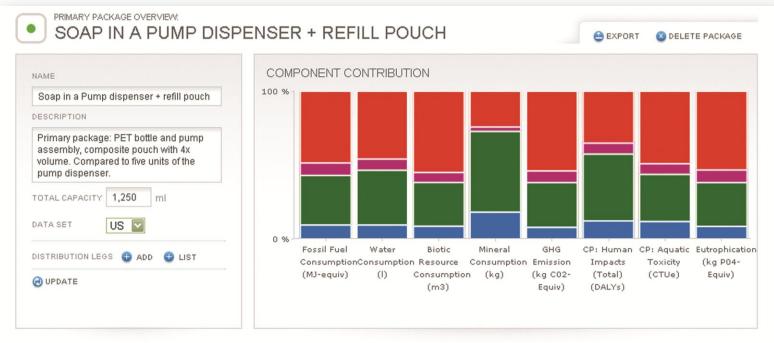


component level assessment during the concept and prototype stages to optimize the system





### component in relation to package



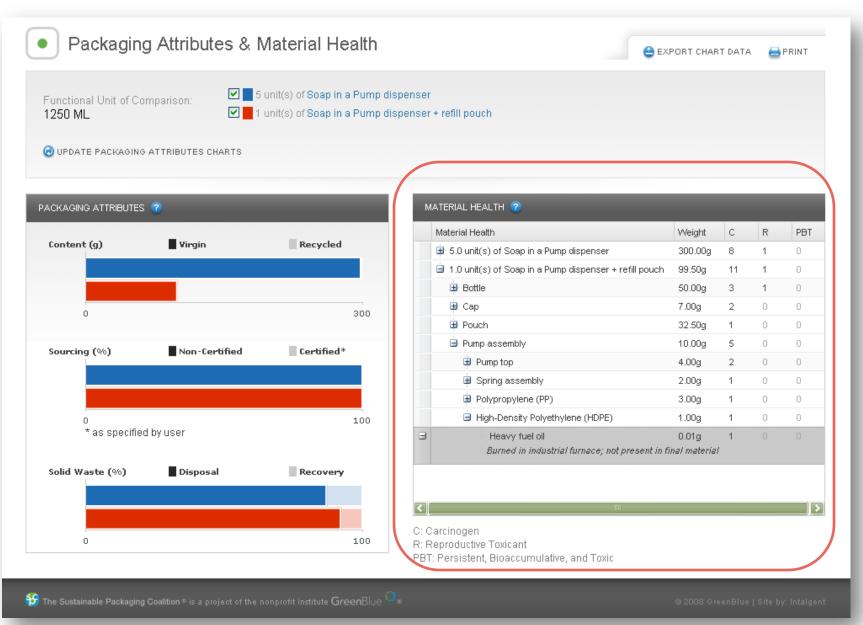
#### COMPONENT DETAILS 🙂 NEW 🙂 ADD EXISTING COMPONENT

NAME	MATERIAL AND CONVERSION	% PCR	% CERT.	DISTRIBUTION LEGS	COMPONENTS
Bottle	50.0 g of Polyethylene Terephthalate (PET) converted using Injection Molding	0.0	0.0	(None Yet) ADD FIRST	(None Yet) ADD FIRST
Cap EDIT   COPY   DELETE	7.0 g of Polystyrene (PS) converted using Injection Molding	0.0	0.0	(None Yet) ADD FIRST	(None Yet) ADD FIRST
Pouch EDIT   COPY   DELETE	Composite (total weight: 32.5 grams)	0.0	0.0	(None Yet) ADD FIRST	2 ¢ ADD ANOTHER
EDIT   COPY   DELETE	Composite (total weight: 10.0 grams)	3.5	0.0	(None Yet) ADD FIRST	4 ¢ ADD ANOTHER

### package to package comparison



## attributes and material health



### material health





#### **MATERIAL IQ GREENBLUE**<sup>\*</sup>

A business to business online registry that provides sustainability information about materials used in a variety of product and industrial sectors.





### C GREENBLUE

### Material profiles for product intelligence

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#### **Tools for Transparency**



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#### **Profiles in Sustainablility**



#### Nike→

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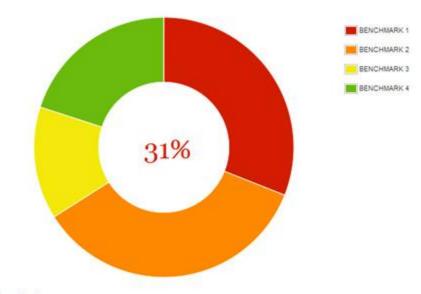


#### Login

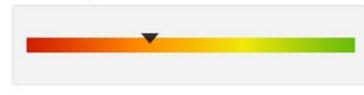
### TUB 121 Polyethylene Copolymer

#### **INEOS Olefins & Polymers USA**

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#### **Continuous Improvement Index**



#### Benchmark 1 Chemicals

Chemical	CAS#	5
Ethylene-Hexene-1 Copolymer (pure)	25213-02-9	25.00%
Carbon Black	1333-86-4	4.00%
Proprietary #2		1.00%
Anti-oxidant		1.00%

#### Ecolabels

				Banned/Restricted Substances		
Stan	adards		Ecolabels	Regulatory	Voluntary	
	BIFMA		NIKE MATURALS SUSUANABUTY BOEX	RoHS	Google	
LEED	BIFMA	EC0L000	NIKE SUS, INDEX	ROHS 1.5r 2	GOOGLE RED LIST	

## material health summary view

				COMPA
ROJECTS COMPON	NENTS		Logout (mtmilligreenblue.or	g) Account Help Downloads J
Refill Example - Hand	1 Soap -+ Analysis			
			ANALYZE: IL LIFE CYCLE METRICS	ACKAGING ATTRIBUTES & MATERIAL HEAI
Packagin	g Attributes & N	Vaterial Health		EXPORT CHART DATA
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PACKAGING ATTRIBUTES	s 🕫	16	MATERIAL HEALTH	
AUNAGING ATTRODUTES				
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	Uirgin	Recycled		
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Content (g)	Virgin		3	
Content (g)		300	a Benchmark 1 Chemicals	
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Content (g)	Non-Certified	300 Certified*	Benchmark 5 Chemicals     Chemical     Ditylene-Hexene-1 Copolymert (pure)	1% CALF * 25213-02-9 25.00%
Content (g) 0 Sourcing (%)	Non-Certified	300 Certified*	Fenchmark 5 Chemicals     Chemical     Chemical     Dhylene-Hexene-1 Copolymert (pure)     Carbon Black	1% CA1# % 25213-02-9 25.00% 1332-86-4 4.00%
Content (g) 0 Sourcing (%)	Non-Certified	300 Certified*	Benchmark 5 Chemicals     Chemical     Ditylene-Hexene-1 Copolymert (pure)	1% CALF * 25213-02-9 25.00%
Content (g) 0 Sourcing (%) 0 * as specifie	Non-Certified	300 Certified*	Eenchmark 5 Ovenicals     Ounnar     Dhylene: Hexene-1 Copolymer (pure)     Carbon Blink     Proprietary #3	1% CALO 25213-02-9 1333-86-4 1.00% 1.00%

### material health detailed view

PROJECTS COMPON	ENTS			Logout (ntm@greenblue r	(23) Account Hep Downlog	
Refill Example - Hand	Soap -> Analysis					
			ANALYZE:	CYCLE METRICS	PACKAGING ATTRIBUTES & MATERI	AL HEAL
Packaging	g Attributes & N	Material Health			EXPORT CHART DATA	e PRIN
Functional Unit of Co	mpansun.	unit(s) of Soap in a Pump dis				
1250 ML	1	unit(s) of Soap in a Pump dis	spenser + refill pouch			
	ATTRIBUTES CHARTS					
PACKAGING ATTRIBUTES	0		MATERIAL HEALTH	2		
Content (g)	Virgin	Recycled	Expanded Material Profile		New York Theo	fam det
			Connector		ingen Despirit	
content (g)			Chanter	1010 1 1000 1 10	A A A AT TO A BAR AN AT AN CO.	
			Ethylene-Henne-L Capelyneer	25243-40-4 -25 I 🔳 📕		
			the start of the s	1525-02-9 -25 1 <b>8 8</b> 15987-58-7 -46 1 <b>8 8</b>		
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0		300	Ethylene-Danna-a Copolynov Polyethylone-Bohane Copolynov Carlon black Pyspelatory #1 Pyspelatory #3	1933/90-4 -13 1 1 1 2949/347 -16 1 1 1 1332/80-4 -14 1 1 1 -12 3 1 1 -1 4 1		
0			EDglote-Heatae i Capilytow Polyethylson Balane Capilytow Carlon Hack Proychtary st	1234390-4 -125 1 1 1 2568734-7 -165 1 1 1 123248-4 -14 1 1 -12 3 1 -1 4 1 1232-00-7 -11 4 1		
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0	Non-Certified		Elliphon-Batatar-L Capiljouw Poljetliphon-Batasar Capiljouw Carlon Black Proprinter #1 Progrinter #1 UV stabilitor Anti-scilunt Fluine retardant	2012/00-4         -425         6         6           25047/30-7         -60         4         6           0222/86-4         -64         6         6           -22         3         6         6           -10         -4         6         6           -10         -6         6         6           -10         -6         6         6           -10         -6         6         6           -10         -6         6         6           -10         -6         6         6           -10         -6         6         6           -10         -6         6         6           -10         -6         6         6           -10         -6         6         6           -10         -6         6         6           -10         -6         6         6           -10         -6         6         6		
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## next generation tools

- COMPASS + ArtiosCAD
  - Combine rapid virtual prototyping with environmental profile based on BOM
  - Baseline and track environmental changes performance over
- COMPASS + CAPE
  - Combine cube and vehicle load optimization with environmental implications associated with assets deployed
  - Investigate alternate solutions with expanded analytical data
- COMPASS + MIQ
  - Combine LCA with hazard screens for materials to allow a holistic view
  - Develop a lower cost entry into risk assessment for product development





# discussion

- Limitations
  - Current and representative life cycle inventory (LCI)
  - Data transparency and uncertainty
  - Methodologies
- Drivers
  - Retailer and corporate scorecards
  - Global Packaging Protocol for Sustainability (GPPS)
  - The Sustainability Consortium (TSC)
  - GS1 Global Data Standard
- Opportunities
  - Measurements ≠ Sustainability
  - Use LCA to improve environmental performance of package and product, DfE and/or DfR, not for making claims
  - Informing public policy





# Thank you!

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