

## Published February 2013

## **Beer in PET vs Glass Bottles**

### **EE**<sup>s</sup>of Packaging<sub>m</sub> Research Series

**Beer in PET vs Glass Bottles** is our first published study within our **EE<sup>s</sup> of Packaging**<sub>TM</sub> research service. These studies focus on the **E**conomic impact and the **E**nvironmental impact of specific products, packages, and processes.

Undoubtedly, you have read or heard diametrically opposed economic and environmental claims about packaging from sources with equally good reputations. These opposing views have been highlighted in recent years by arguments about environmental claims, but economic claims have been argued for decades. Each source claims to utilize objective, quantitative analysis utilizing procedures that meet accepted standards. This common occurrence leaves industry participants, prospects, and customers frustrated and uncertain as to which results should be believed. <u>We solve this dilemma</u> <u>in this research series</u>.

Our SavvyPack<sup>®</sup> Index is at the heart of this solution. Our SavvyPack<sup>®</sup> Index compliments our SavvyPack<sup>®</sup> Analytical Service. Essentially, we analyze the economic and environmental impact of packaging through our Analytical Service and present the results utilizing our SavvyPack<sup>®</sup> Index.

#### With this new study you can:

- > Understand the points of view of competing industries
- > Learn, quantitatively, how competing claims are constructed by their sponsors
- > Break free from the stalemate caused by competing claims
- > Discover a powerful and independent service and methodology designed specifically for package industry issues

#### Sample Pages

<text><text><text><text><list-item><list-item><list-item><list-item><list-item><table-row></table-row></list-item></list-item></list-item></list-item></list-item></text></text></text></text>	Section II:		
	Econor	Economics	
			
			
		We selected here packaged in place bottles and PET bettles for the comparison	
	for	our first Allied Development funded EEs in Packaging study. The PET bottle	
	ind	lastry has been trying to take market share from glass bottles for many years. It	
	8.	huge market and a classic packaging battle.	
		For any economic or environmental analysis, it is necessary to derive	
	car	to be very different from one geographic region to the next. For this study, we	
	wi	I be doing a comparison based on data in the United States; however, we will	
	pre	sent the data in this study and all future <i>EE<sup>s</sup> of Packaging</i> studies in metric units or an to complete a similar study for Europa and other majors in the future.	
		press to compress a sense study for compression other regions in the result.	
			
		we generated six models to complete the economic analysis:     warndacture of class buttle	
		manufacture of metal closure	
		manufacture of PET bottle	
<text><text><text><text><figure><figure></figure></figure></text></text></text></text>		<ul> <li>manufacture of polymer closure</li> </ul>	
<text><text><text><figure></figure></text></text></text>		filling of glass bottle	
		<ul> <li>ming of PET bonie</li> </ul>	
			
Figr 1         SavyPack Index Soure for Fackage Manufacturing Cont         Image: SavyPack Index Soure for Fackage Manufacturing Cont         Image: SavyPack Index Soure for Fackage Manufacturing Cont         Memory Pack Index Soure for SavyPack Index Soure, For example, histore onto		Figure 1 illustrates the inverse relationship between package	
Figer 1 Snryfred blinds Science for Package Manufacturing Cond		manufacturing cost and the Savvyrack index score for package	
there the back in the large some and the large some	_	manufacturing cost and the suvyyrack index score for package manufacturing cost.	
but with the increase is further and the increase is furth	Г	manufacturing cost and the savyyrack index score for package manufacturing cost.	
beer which have been as the value increases is directly control to the Savardian target and the same same same same same same same sam		manulacturing cost and the SavyFack index score for package manulacturing cost. Figure 1 SavyPack Index Score for Package Manufacturing Cost	
here: Alter Devignment Care.		manufacturing cost and the savyriacx index score of package manufacturing cost. Figure 1 Sonyriack holes Score for Package Manufacturing Cost	
have: Ahrd Devalgement Corp.		manufacturing cost and the salvyPack index score for package manufacturing cost.  Figure 1 SonyPack Index Score for Package Manufacturing Cost	
A set of the set of		manufacturing cost and the savyrack more score for package manufacturing cost.  Figure 1 Savyrack holes Score for Package Manufacturing Cost	
buere Adred Devlayment Gays <b>C. Directly proportional</b> A metric Mark is more Rescale as its value increases is directly proportional to the SurvyAffect Index socie. For example, higher and		manufacturing cost and the alwyrack index score of package manufacturing cost.	
buere: Alter Development Corp.		manufacturing cost and the advyrack index score for package manufacturing cost.	
0         and         bits         b		manufacturing cost and the salvyPack index score for package manufacturing cost.	
Micholung cat service		manufacturing cost and the advyrack index score of package manufacturing cost. Figer 1 SanyRed helte Score for Package Manufacturing Cost	
Sauer Attri Dealgenet Cop.  Directly proportional  A metric that is more favorable as its value increases is directly proportional to the Savy/Rack Index score. For example, higher out		manufacturing cost and the advyrack index score for package manufacturing cost.	
2. Directly proportional A metric that is more favorable as its value increases is directly proportional to the SurvyPack Index score. For example, higher and		manufacturing cost and the salvy/fact index score for package manufacturing cost. Figur 1 Savy/fact block score for Package Manufacturing Cost $\int \int $	
<ol> <li>Directly proportional A metric that is more favorable as its value increases is directly proportional to the SavvyPack Index score. For example, higher post</li> </ol>		manufacturing cost and the Jahry Fack index score or package manufacturing cost. Figer 1 SanyRed Indio Score in Package Manufacturing Cost United Score in Package Manufacturing Cost Manufacturing Costavity Costavity Costavity Costavity Costavity Costavity Costavity	
<ol> <li>Directly proportional A metric that is more favorable as its value increases is directly proportional to the Savy/Pack Index score. For example, higher nost</li> </ol>	Sar	manufacturing cost and the advyrack index score of package manufacturing cost. Figer 1 SanyRed Index Score for Package Manufacturing Cost $\int \int $	
A metric that is more favorable as its value increases is directly proportional to the SavvyPack Index score. For example, higher post	54	manufacturing cost and the advyrace index score in package manufacturing cost. Figur 1 SanyPack black score in Package standardining Cost $M$ and $M$	
proportional to the SavvyPack Index score. For example, higher post	34	The advances is a subsystem of the source o	
user recycle rate is (averable: thus, the SavayPack Index score every	Sa	manufacturing cost and the advertace increases is directly requestion of the second s	
as the post user recycle rate goes up.	54	manufacturing cost and the salvy/face index score in package manufacturing cost $\mathbb{R}^{n}$ is $\mathbb{R}^{n}$ if $\mathbb{R}^{n}$ is $\mathbb{R}$	
	ia	manufacturing cost and the advertised noises score for package manufacturing cost. $Fgr \ 1 \\ Sneyflex links cost in Package standardning Cost u = \frac{1}{2} \frac$	
The calculation of the SavvyPack Index score for the glass bottle po	- In the second s	manufacturing cost and the salvy/fack index score for package manufacturing cost. $Figer 1$ Sanyfack heles Score for tookage Manufacturing Cost $\int \frac{1}{\sqrt{g}} \int \frac{1}{\sqrt{g}} \int$	
The calculation of the SavvyPack Index score for the glass bottle po user recycling rate is to divide the glass bottle metric value of 30% by	in	manufacturing cost and the adversarial cost accords score for package manufacturing cost. Figer 1 $for f cost for forkage standarding cost accords and the f$	

## **Beer in PET vs Glass Bottles**

### EE<sup>s</sup> of Packaging Research Series



Tables - 25

Figures - 2

#### Learn About:

- > Beer packaged in a glass bottle and a PET bottle
- > In-depth economic analysis for both
- > In-depth environmental analysis for both
- > The latest technology developments and the impact they have

#### Written for Decision Makers:

- > Converters
- > Raw Material Suppliers
- > Equipment and Machinery **Suppliers**
- > Brand Owners
- > Industry Analysts

#### What is included:

- > A value chain analysis of packaged beer
- > A corresponding life cycle analysis
- > A what-if evaluating the oxygen fuel furnace for glass bottle production
- > 12 metrics in the SavvyPack<sup>®</sup> Index

**Barrier Materials for Rigid** 

a comprehensive global analysis of barrier materials used in the

production of rigid packaging.

**Medical Device Packaging** 

U.S. Microwaveable Packaging an in-depth study of the U.S.

microwaveable packaging industry.

a global study of disposable medical

device packaging including volume

a global study of the pharmaceutical

and value of primary, secondary,

insert, and tertiary packaging.

**Pharmaceutical Packaging** 

packaging market.

Packaging

Savvy*Pack* 

Allied Development Studies include:

#### **Table of Contents:**

#### Section I:

- Introduction A. What is the purpose of this
- study?
- B. Key definitions
- Point of view
- SavvyPack Analysis Service
- SavvyPack Index
- (
- Study organization D
- Geographic considerations
- F. Study methodology
- Conventions

#### Section II:

- Economics
- A. Key assumptions
  - Bottle size
  - 2. Product waste Scope of the analysis 3.
  - 4 End-of-life
- B. Case 1a: Glass bottle
- Manufacturing cost
- 1. General assumptions
- Manufacturing cost results
- C. Case1b: Glass bottle Filling
  - cost
- General assumptions Filling cost results
- D. Case 2a: PET bottle
- Manufacturing cost
- 1. General assumptions
- Economic results E. Case 2b: PET bottle – Filling
- cost

of packaging.

an in-depth study of stand-up pouches

including volumes, values, trends,

emerging competitive products,

**Barrier Materials for Flexible** 

a comprehensive global analysis

production of flexible packaging.

a global analysis of the PET Bottle

**Oriented Films for Packaging** 

a global study of the oriented films

of barrier materials used in the

technologies, and economics.

**Additional Allied Development Capabilities** 

**Stand-up Pouches** 

Packaging

**PET Bottles** 

industry

industry.

Filling cost results F. Results Summary

General assumptions

#### Section III:

- Environmental
- A. Key assumptions
- Product waste
- Scope of the analysis End-of-life
- B. Case 3: Glass bottle LCA
- 1. Energy consumption
- 2.Greenhouse gas releases
- Water consumption 3.
- End of life 4
- C. Case 4: PET bottle LCA
  - 1. Energy consumption
  - Greenhouse gas releases
  - Water consumption 3.
- 4. End of life
- D. Results Summary

#### Section IV:

- SavvyPack Index
  - A. SavvyPack Index defined
  - B. Metric results
    - Package manufacturing cost 1.
    - Package filling cost 2.
    - 3. Greenhouse gas (GHG)
    - releases
    - 4 Energy consumption
    - 5. Water consumption
    - Material to landfill 6.
    - 7.Package efficiency
    - 8. Pallet efficiency

Allied Development's SavvyPack® Packaging Analysis Service is

the industry standard for economic and environmental analysis

Transparent Oxide-coated Films

oxide-coated films industry focused on

an in-depth global study of the retort

Labels in Packaging a global study of the label industry.

Packaging in India a detailed study of the packaging

**Pharmaceutical Blister Packaging** 

a global study of the pharmaceutical

blister packaging market.

a global study of the transparent

packaging.

**Retort Pouches** 

pouch industry.

industry in India.

- 10. Raw material recycled content 11. Product protection 12. Package safety
- C. Convert performance metric results to SavvyPack Index

9. Post user recycling rate

- scores
- 1. Inversely proportional
- 2. Directly proportional
- D. Glass bottle industry
  - PET bottle industry

E.

- F. Reconciliation
  - Package manufacturing cost
- Package filling cost
- Greenhouse gas (GHG) 3.
- releases
- 4. Energy consumption
- 5 Water consumption
- Material to landfill 6

11. Product protection

12. Package safety

G. Conclusion

Section V:

What-ifs

1

2

3 Results

A. What-ifs

B. Oxygen furnaces

Concept

**Biopolymers in Packaging** 

packaģing.

**Stick Pouches** 

pouch industry.

an in-depth global study of the

biopolymer industry, focusing on

an in-depth global study of the stick

**U.S.Foodservice Packaging** 

foodservice market.

1.952.898.2000

a detailed analysis of the U.S.

For further information visit:

www.allied-dev.com or call

Model adjustments

- Package efficiency
- 8. Pallet efficiency
- 9. Post consumer recycling rate 10. Raw material recycled content

Market Intelligence Study from Allied Development

# **Beer in PET vs Glass Bottle**

## **EE**<sup>s</sup>of Packaging<sub>m</sub> Research Series

### Order Form

To Order, Contact Us Directly, or Complete the Or	der Form below:
MAIL: Packaging Strategies   610 Willowbrook Lan	e   West Chester, PA 19382   U.S.A.
CALL: 1.610.436.4220 Ext 8511	FIV
FAX: 1.610.436.6277	WAYS
ONLINE: www.packstrat.com	C ORDE
eMAIL: orders@packstrat.com	
Contact Information	Payment Information
me:	Beer in PET vs Glass Bottle
tle:	- EE <sup>s</sup> of Packaging <sub>TM</sub> Research Series
mpany Name:	
reet Address:	OUS\$1,995 - Full Study - Corporate License     OPF Format and Web Browser access)
76	@US\$1,495 - Full Study - Single User License
y.	
ate/Province:	@US\$500 - Additional Copies - PDF Format \$
untry:	Shipping & Handling Per Printed Copy (US\$25 in the U.S., US\$50 elsewhere) \$
p/Postal Code:	Add \$250.00 for each study printed \$
lephone:	- TOTAL · \$
іх:	
Nail:	Payment Method
/eb Site:	Payment Endorsed (Payable to Packaging Strategies in U.S. funds on a U.S. Bank)
	Charge my Credit Card: VISA MasterCard American Express
Study License Choices	Card number: Expiration Dat
nale licer Licence is far one percent and dees not allow any conving	
ailing, or re-distribution.	Name on Card: Security Code
prporate License allows copying , emailing, and re-distribution within	
e purchasing company and its 100% owned subsidiaries.	Billing Address of Card

 Packaging Strategies
 T: 610-436-4220 ext. 8511

 610 Willowbrook Lane
 F: 610-436-6277

 West Chester, PA U.S.A. 19382
 www.packstrat.com

Signature: