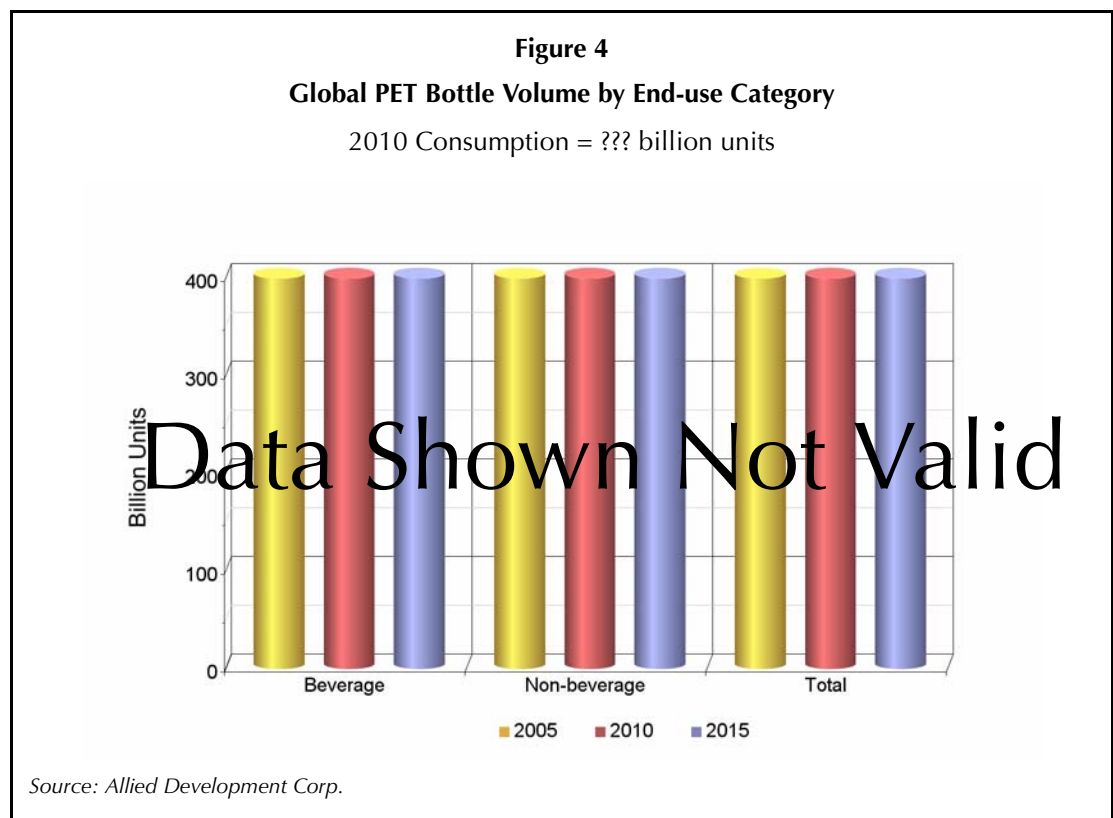


D. Market analysis – statistics and projections

We provide key PET bottle industry projections in the following paragraphs.

1. PET bottle volume segmented by end-use category

We start with market projections by segmenting the PET bottle market into beverage and non-beverage end-use categories. Figure 4 provides global PET bottle market volume measured in units, segmented by end-use category.



The beverage industry dominates PET bottle consumption (Figure 4). It accounts for over ???% of the unit volume for PET bottles globally.

Logically, the activities of large companies in the beverage industry such as Coca-Cola and PepsiCo of the United States and Nestle Waters of Switzerland set the direction for the PET bottle industry around the

Figure 23 pictures traditional reinforcement panels on the left and three alternative designs, all of which are currently used in the market.



In addition to bottle shape, the PET bottle industry has developed other improvements for hot filling. The neck is particularly vulnerable to distortion so processing techniques were developed to add material to the neck without adding more material (and cost) to the rest of the bottle.

Most PET bottles are blown into cold molds to cool the bottle as fast as possible. Cold molds prevent crystallization that can destroy clarity, and they increase output. However, processing techniques with hot molds have been developed for bottles destined for hot filling. When a PET bottle is formed in a hot mold, more crystallization takes place in the bottle, which increases its strength and its resistance to hot filling.

1. Energy

Table 10 provides the energy consumption results for the lightweight PET water bottle.

Table 10				
Case 9: Lightweight PET Water Bottle – Energy Results				
CATEGORY	MJ	%	MJ/kg	MJ/unit
Raw Materials				
Raw Materials Packaging				
RM & Pack Transport				
Process	Data Removed			
Distribution Packaging				
DP Transport				
Transport to Customer				
Total Energy				

Source: Allied Development Corp.

2. Greenhouse gas releases

Table 11 provides the greenhouse gas releases for the lightweight PET water bottle.

Table 11				
Case 9: Lightweight PET Water Bottle – GHG Releases				
CATEGORY	kg/year	%	kg GHG/kg	kg GHG/unit
Raw Materials				
Raw Materials Packaging				
RM & Pack Transport				
Process	Data Removed			
Distribution Packaging				
DP Transport				
Transport to Customer				
Total Greenhouse Gas				

Source: Allied Development Corp.

traditional containers, and the volume of PET bottles used in the beer market has remained relatively low.

One application of PET bottles for beer has gained global acceptance and generated significant volume for PET bottles. PET bottles have found acceptance at public events such as sporting events, concerts, and similar events. Safety is a major driver of this application; more specifically, PET bottles are lighter than glass bottles and cause much less damage if thrown by event attendees. In addition, the short shelf-life of beer in PET bottles can be managed for these large events. Finally, consumers accept the PET bottle in this environment.

Table 7 provides global PET bottle consumption for beer, segmented by geographic region.

Table 7 Global PET Bottle Volume – Beer (billion units)					
GEOGRAPHIC REGION	2005	2010	CAGR	2015	CAGR
Asia					
Europe	Data Removed				
North America					
Rest of world					
Total					

Source: Allied Development Corp.

Europe leads the use of PET bottles for beer, primarily due to a market that has developed for beer in large volume PET bottles in Russia and Eastern Europe. In these countries, beer is sold in PET bottles that are one liter and larger in size. The beer is relatively inexpensive, and consumers do not demand the product quality and feel of a glass bottle.

PET bottles are also used for beer at public events throughout Europe.

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Ownership	Private
Annual Sales	
PET Bottle Resin Sales	
PET Bottle Products	Data Removed
Product Brandnames	
End-use Markets	

Source: Company financial data and Allied Development estimates

Company

DAK Americas LLC (DAK) is a subsidiary of Alpek, the petrochemicals and synthetic fibers business of Alfa S.A.B de C.V. of Mexico. DAK originated in 2001 with three business units – fibers, monomers, and resins. The company has grown through expansions and acquisitions, which as made it one of the largest global PET resin producers.

Note that the company annual sales reported in the profile table reflects DAK's 2010 annual sales. PET Bottle resin sales reflects 2010 sales of resins for bottle applications.