



# KHS - Sustainable PET Packaging Solutions

Beverage & non-beverage applications



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## What are the Market Challenges?

### Packaging in between economic and ecological sustainability

#### Responsible production

- Resource-saving
- Energy-saving
- Cut CO<sub>2</sub> emissions

#### Time to market

- Fast and efficient packaging development
- Short lead times of equipment

#### Cost pressure

- Less material / lightweight
- Less media and energy consumption
- High efficiency and productivity
- High-speed solutions



#### Environment

- Water- and resource scarcity
- Marine litter reshapes packaging requirements – less & circular

#### Consumer

- Environmentally conscious
- Better for less – packaging to be convenient, individual & affordable
- Demand for high product variety

#### Legislation

- Recycling / recycle quota
- CO<sub>2</sub> emission regulations

## Extreme Lightweight - PET bottle “Factor 100”



- Developed in cooperation with Husky
- 0,5-liter water bottle
- 5,0 g only blowing, labeling, filling
- 6,5g suitable for line production
- Development tool: Simulation
- $\pm 5\%$  accuracy if wall thickness is known



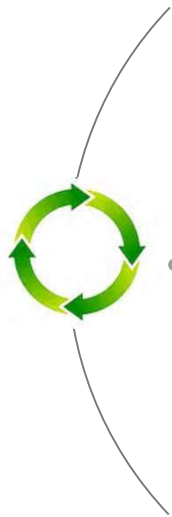
### Bottles made of 100% r-PET



- 0,5l & 1,0l premium water
- Weight: 23g / 32,5g
- Possible weight for 1,5l discounter bottle approx. 27g
- 100% r-PET underlines brand image of being socialable/sustainable



### Refillable PET



- Developed in cooperation with Alpla
- 1.0 l bottle weight reduction 65g -> down to 55 g
- Usage of PCO 1881 refill
- Lightweight thread, weight optimized preform by Alpla
- Lightweight base and optimized bottle shape by KHS
- Different PET grades including 35% rPET
- 25-30 loops possible



## Beyond Juice – Full circularity in bottle design



- Designed with recycling specialist Interseroh
- Made of 100% recyclate
- SiOx coating for optimum product protection
- 100% bottle-to-bottle recyclable
- Multipack without any shrink film



## KHS Circular PET Solutions: Market Examples

### Lightweight

- CSD: 500 ml / 9.9 g
- Water: 500 ml / 7 g

### Product protection

- CSD 250 ml/ PCO28, 14 g  
Shelf life > 180 days  
100% bottle to bottle recyclable
- Beer 500 ml, 22g  
Shelf life > 180 days  
100% bottle to bottle recyclable  
100% rPET

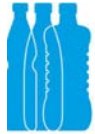
100% rPET

### refPET

- CC Embonor (Chile),  
2.0 l, 106.5 g
- PenBev (South Africa),  
1.5 l, 106 g

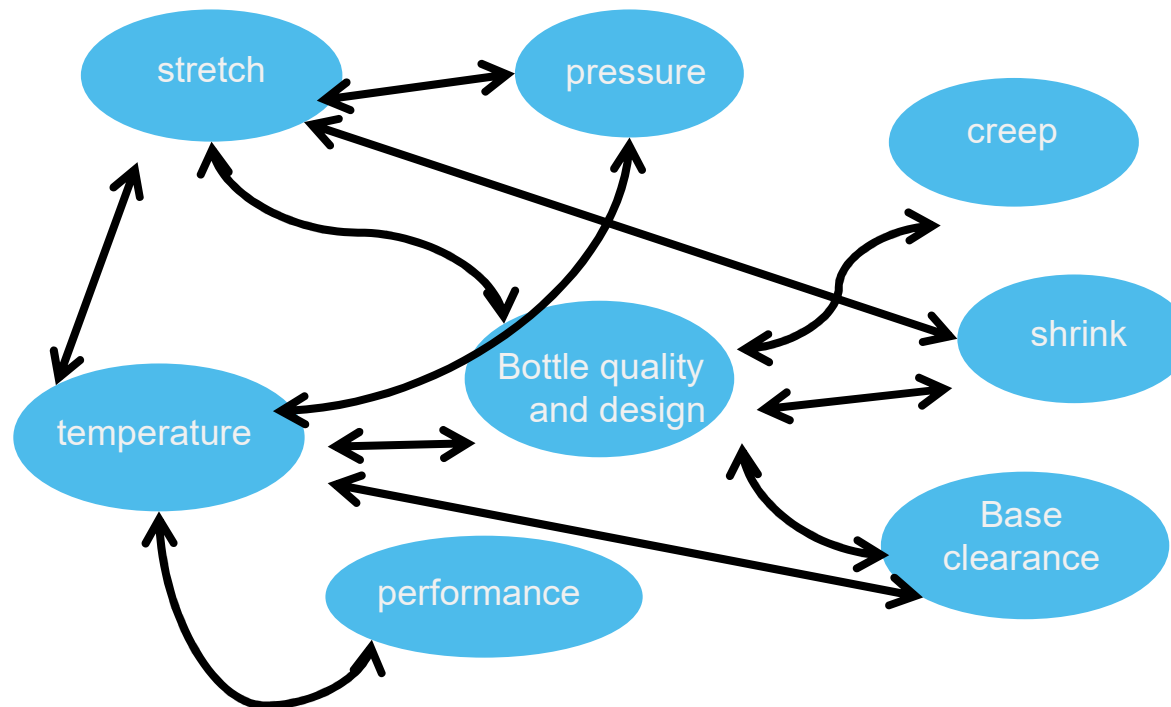
35-55% rPET



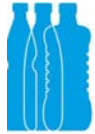


## What is Bottles & Shapes? – Trouble Free Processing in a line

### Bottles & Shapes™ is: Keeping everything in mind







## What is Bottles & Shapes? – Trouble Free Processing in a line

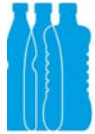
**Over 500 parameters for individual KHS machines identified to optimize the bottle design.**

Examples:

nine out of 500 criteria's to optimize on a CSD bottle:

- **Shoulder:**      headspace, handling diameters, shape
- **Body:**         label protection, consumer handling, stability
- **Base:**         pressure resistance, tilting stability, stack ability





## What is Bottles & Shapes? – PET eco profit!

### We reduce the consumption of material

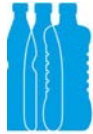
- Optimize material costs
- Reduce blow molding costs
- Reduce second packaging cost

#### Market proof result:

- 0,5 l Bottle, high carbonated water, 270 mio. Bottles / Year
- Weight reduction 12,5 g to 9,9 g
- Saving: ~1.050.000.- €/year\*

\*Eco-Profit: Commercial and environmental benefit | 1,5€/ KG PET





## What is Bottles & Shapes? – PET eco profit!



Filling and Packaging – Worldwide

### Make PET enviromently friendly

- Usage of rPET
  - Advise of production differences between virgin and rPET
  - Forecast of CO<sub>2</sub> reduction
- Compensate higher cost by weight reduction

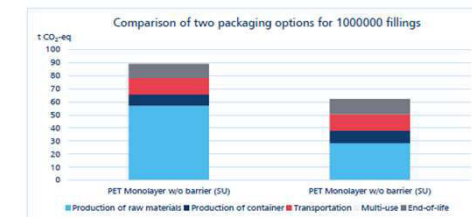
#### Market proof result:

- 1,5 l Bottle, high carbonated water, 100 mio. Bottles / Year
- Weight virgin: 26g, weight rPET 28g
- Saving: ~27 t CO<sub>2</sub> eq. /year\*

\*according to KHS Calculator, developed by IFU



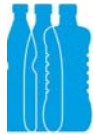
KHS Material Comparison Check			
Customer ID	Deutscher Discounter		
Quotation	0		
<b>Materials</b>	Recycling share [%]	Weight [g]	Fillings
Current option:	0%	26g	1.000.000
PET Monolayer w/o barrier (SU)			
New option:	100%	28g	1.000.000
PET Monolayer w/o barrier (SU)			
<b>Results</b>			
Life Cycle Stage	PET Monolayer w/o barrier (SU) [t CO <sub>2</sub> -eq]	PET Monolayer w/o barrier (SU) [t CO <sub>2</sub> -eq]	Difference new to current packaging option [%]
1. Production of main raw material	57	28	-50%
2. Production of layer raw material	-	-	0%
3. Transport: raw materials / preforms	1	1	0%
4. Production of container (if not included in 1)	9	10	8%
5. Transportation of packaging and container	11	11	0%
6. Filling pre-temperation (glass)	-	-	0%
7. Multi-use (cleaning)	-	-	0%
8. End-of-life	11	12	8%
<b>Sum</b>	<b>89</b>	<b>62</b>	<b>-30%</b>



The saving is equivalent to the CO<sub>2</sub> emissions of

- 13 cars in 1 year (12,000 km, medium size model)
- 11 energy use in average households in Germany in 1 year
- 8 flights from London to New York
- 3 German residents in 1 year
- 2 US-American residents in 1 year

This generic comparative consideration cannot replace a specific LCA. Estimation tool developed by: ifu hamburg



## What is Bottles & Shapes? – PET eco profit!

### Tethered cap

- By 2024 the SUP in Europe advises, that all caps need to be attached to the bottle
- KHS Scope of Supply
  - New parts for handling new caps
  - Thread change over to compensate for new caps

#### Market proof result:

- 0,5 l Bottle, high carbonated water, 270 mio. Bottles / Year
- Change over form PCO 1881 to 26/22
- Saving: ~211.500.- €/year\*

\*Eco-Profit: Commercial and environmental benefit | 1,5€/ KG PET





## What is Bottles & Shapes? – PET eco profit!

### We reduce the energy on PET lines.

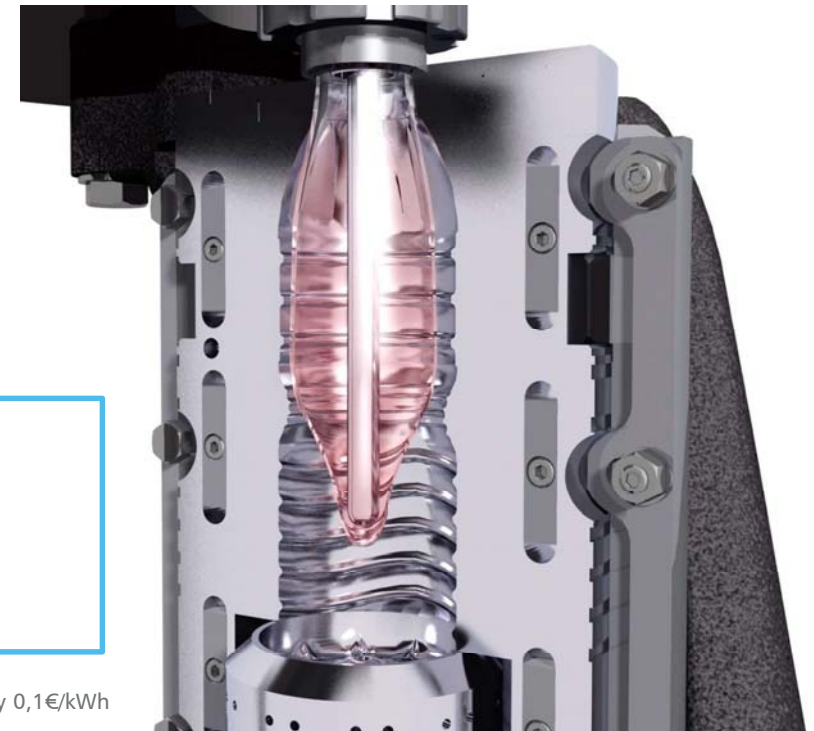
Reduction of pressurized air via optimization of

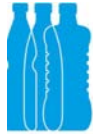
- Bottle shape
- Stretch ratios
- Material usage

#### Market proof result:

- 1,5 l bottle, 200 mio. bottles / year
- Pressurized air reduction 28 to 20 bar
- Saving: ~45.000.- €/year\*

\*Eco-Profit: Commercial and environmental benefit | 25KWh/KG PET; 0,19 KWh/m<sup>3</sup> Price of electricity 0,1€/kWh





## What is Bottles & Shapes? – PET eco profit!

### We reduce the consumption of energy on PET lines.

Reduction of Heating via optimization of

- Process optimization
- Bottle shape
- Stretch ratios

Market proof result:

#### Market proof result:

- 1,5 l bottle, 200 mio. bottles / year
- Up to 40% saving in Heating
- Saving: ~48.000.- €/year\*

\*Eco-Profit: Commercial and environmental benefit | 25KWh/KG PET; 0,19 KWh/m<sup>3</sup> Price of electricity 0,1€/kWh



# Our Approach – Reliable & Sustainable Packaging Solutions by KHS



## KHS PET portfolio



### InnoPET Blomax Series V

High-speed rotary and energy-efficient stretch blow molder

up to **90,000** bph



### InnoPET BloFill

Energy-efficient stretch blow molding/ filling/ capping machine

up to **82,000** bph



### InnoPET TriBlock

Compact blocked solution for stretch blow molding, labelling and filling machine

up to **82,000** bph



### InnoPET Plasmax

Internal PET bottle coating for maximum product protection

up to **46,000** bph



### InnoPET FreshSafe Block

Innovative stretch blow molding coating technology for maximum product protection

up to **46,000** bph



### InnoPET FreshSafe TriBlock

Compact blocked solution for stretch blow molding coating and filling machines

up to **46,000** bph

## Benchmark in stretch blow moulding - InnoPET Blomax Series V



### Key Facts

High-speed rotary stretch blow molder

Output: up to 2,800 bph / station

6 to 36 blowing stations

Energy-saving in preform heating, bottle blowing & cooling

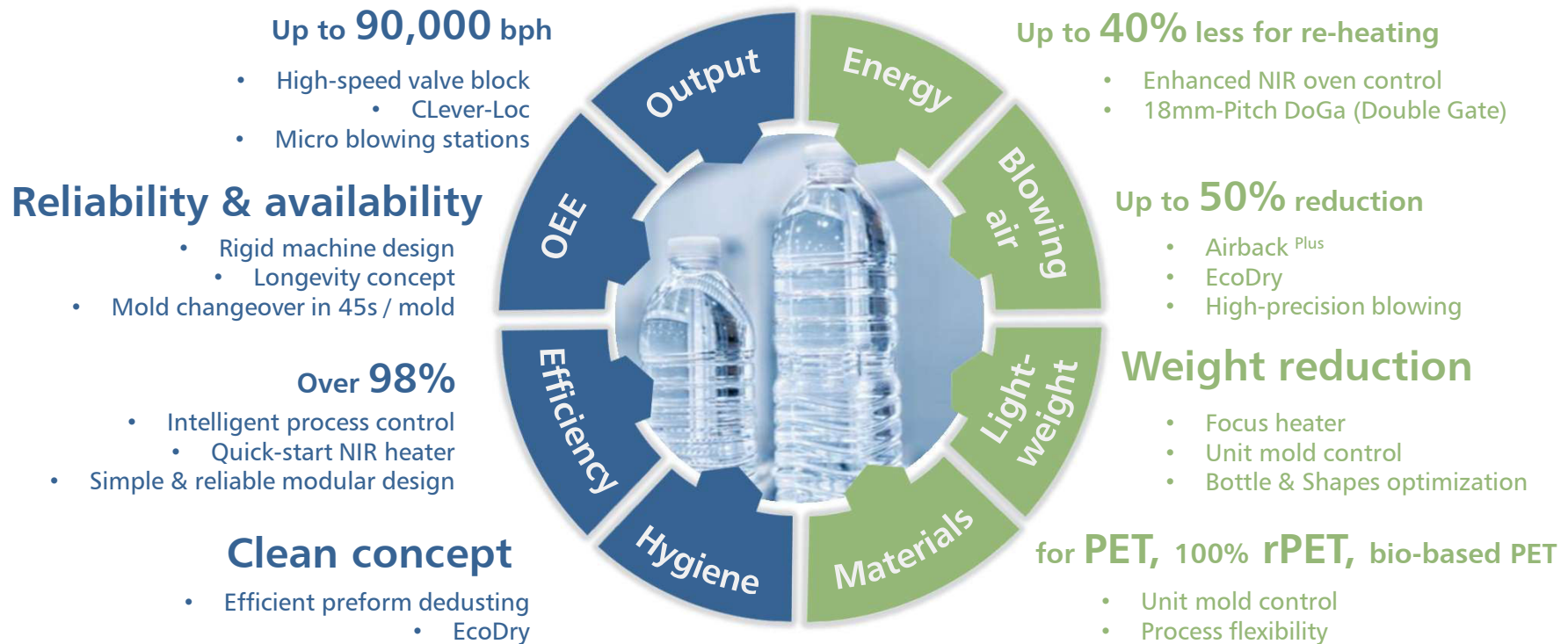
Up to 3.0-liter PET bottles

For still and carbonated beverages

Special solutions for home & personal care as well as food applications



# InnoPET Blomax Series V – Summary of Benefits



Note: Performances and savings stated here relate to market typical bottles & preforms and can differ in specific projects

# THANK YOU!



DEPARTMENT PET SALES –  
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