

EUROPEAN CARTON PROSPECTS 2023 EDITION

INCLUDING A CHAPTER ON THE GREEN TRANSITION



Prepared by NOA-PRISM for the European Carton Makers Association (ECMA)



EUROPEAN
CARTON MAKERS
ASSOCIATION



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1.0 FOREWORD

We are delighted to bring you the latest edition of the European Carton Prospects Report 2023. As the most in-depth study of its kind for our industry, the aim is to give our members a deeper understanding of the elements that have been influencing our industry over the last 2 years. For the first time in this study, we have included information on the growing transition from plastic to fibre packaging.

Since our last European Carton Prospects report in 2021, this report covers the post-Covid 19 challenges on our sector, highlighting the current sentiments on the market and a forecast of what the future may look like. The results are a combination of primary interviews from ECMA members, associated industry influencers, market trend reports and data from other sources.

I am sure you will see the value in this report, which is supplied free of charge to all fee-paying members and associate national members. In the interest of continuous improvement, we would welcome your feedback.

The results of the study clearly show that our sector has a continued bright future.

Jean-Francois Roche
President of the European Carton Makers Association



2.0 EUROPEAN CARTON PROSPECTS 2023

2.1 European Folding Carton Market Forecasts

European Forecasts – Sales (€) 2022 & 2023

Estimates & Forecasts of European Cartonboard Purchases Adapted from Feedback from the European Board Mills, Folding Carton Output & Sales Turnover - All Countries – 2017 to 2027 - 000 Tonnes & € Million

Year	Purchases Adapted for Feedback from the European Board Mills			Carton Output			GDP Index	Carton Sales		
	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100
2017	6167	4.0	100	5749	3.4	100	100.0	11342	2.8	100
2018	6268	1.6	102	5806	1.0	101	102.2	11390	0.4	101
2019	6555	4.6	106	6077	4.7	106	103.9	11913	4.0	105
2020	6784	3.5	110	6312	3.9	110	98.1	12155	2.0	107
2021	7055	4.0	112	6524	3.4	113	104.2	13071	7.5	115
2022	7479	6.0	122	6624	1.5	115	108.1	15001	14.8	132
2023	6776	-9.4	111	6371	-3.8	111	109.0	14260	-4.9	126
2024	6911	2.0	109	6500	2.0	113	110.8	13826	-3.0	122
2025	7188	4.0	116	6707	3.2	117	113.2	14234	3.0	125
2026	7375	2.6	120	6806	3.1	120	115.6	14647	2.9	129
2027	7586	2.9	123	7009	2.9	124	117.7	15046	2.7	133
Average % p.a.17 to 22	3.9			3.7			1.6	5.8		
Average % p.a. 23 to 27	0.3			1.5			1.7	0.1		

Forecasting issues

- o Sales data- trends for past years is shown using actual numbers, for future years is stated using constant pricing. Not good for comparison purposes when prices fluctuate significantly.



- Stock increases – these have been notable between 2021 and 2023, masking the true demand for FC volumes.
- Base Year – a lot of volatility in demand during covid and for the 2 to 3 years following. Which year to use for this project’s base year?

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2026	7375	2.6	120	6916	3.1	120	115.6	14647	2.9	129
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- Base Year – a lot of volatility in demand during covid and for the 2 to 3 years following. Which year to use for this project’s base year?

European Forecast Comparisons – Purchases (& Stocks)

Estimates & Forecasts of European Cartonboard Purchases Adapted for Feedback from the European Board Mills, Folding Carton Output & Sales Turnover - All Countries – 2017 to 2027 - 000 Tonnes & € Million										
Year	Purchases Adapted for Feedback from the European Board Mills			Cartonboard Purchases reported by the NAs			GDP Index 17=100	Carton Output		
	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100		000 Tonnes	% p.a.	Index 17=100
2017	6167	4.0	100	6167	4.0	100	100.0	5749	3.4	100
2018	6268	1.6	102	6268	1.6	102	102.2	5806	1.0	101
2019	6555	4.6	106	6555	4.6	106	103.9	6077	4.7	106
2020	6784	3.5	110	6784	3.5	110	98.1	6312	3.9	110
2021	7055	4.0	112	6915	1.9	112	104.2	6524	3.4	113
2022	7479	6.0	122	7521	8.8	122	108.1	6624	1.5	115
2023	6776	-9.4	111	6833	-9.2	111	109.0	6371	-3.8	111
2024	6915	2.0	109	6697	-2.0	109	110.7	6500	2.0	113
2025	7188	4.0	116	7158	6.9	116	113.7	6707	3.2	117
2026	7375	2.6	120	7375	3.0	120	117.0	6916	3.1	120
2027	7586	2.9	123	7586	2.9	123	117.7	7119	2.9	124
Average % p.a. 17 to 22	3.9			4.1			1.6	2.9		
Average % p.a. 23 to 27	0.3			0.2			1.7	1.5		

Forecasts for Purchases & Stocks

- Ghost orders and “panic” ordering has happened ever since covid and had placed a large “buffer” stock of board into the system by the end of 2022/start of 2023.



- NOA estimate that Purchases have exceeded Output by nearly **1,800kt** over the last 3 years.
- The equivalent of **25%** of European FC Output for 1 year needs to be used up now to reduce the existing stock board mountain!

Consideration of where “Stock” is within the supply chain

- Board Mills - Sold more in 2022 than was consumed.
- Board Merchants- Have significant stocks, even today.
- Converters- Many warehouses are still full of FC board.
- Brand Owners/Packer-fillers- Food stuffs, still in date, are in warehouses.
- Retailers- Some are in dispute with BOs over SKU stocks.
- Consumers- Changing SKU demands due to C of L crisis mean that some finished goods stocks are out of date and redundant.



European Forecasts – Sales (€m)

Estimates & Forecasts of European Cartonboard Purchases Adapted for Feedback from the European Board Mills, Folding Carton Output & Sales Turnover - All Countries – 2017 to 2027 - 000 Tonnes & € Million

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Average % p.a.17 to 22	3.9			2.9			1.6	5.8		
Average % p.a. 23 to 27	0.3			1.5			1.7	0.1		

Forecasts in Sales (Euros M)

- Most National Associations report FC data in Euros for each ECP.
- In the past this has been a great method for analysing data and predicting future trends.
- Between 2021 and 2023 Sales prices rose significantly due to price recovery (+17.4%), while tonnage rose more modestly at (+1.1%).
- Tonnage is therefore a better metric to use for ECP'23 as the main form of measurement.



European Forecasts – Output (Tonnage)

Estimates & Forecasts of Carton Output Analysed by Market – Total Europe – 2017, 2022, 2023 & 2027 – 000 Tonnes												
	2017		2022		2023		2027 Growth		17 to 22	22 to 27		
SECTOR	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	% p.a.	Mkt Growth % p.a.	GT Growth % p.a.	Combined Growth % p.a.
Food												
Breakfast cereal products	290	5.0	314	4.7	286	4.5	283	4.0	1.6	-2.0	0.8	-1.2
Cakes, biscuits, baked products	352	6.1	406	6.1	384	6.0	449	6.3	2.9	2.0	2.5	4.5
Chocolate & sugar confectionery	464	8.1	534	8.1	498	7.8	548	7.7	2.8	0.5	1.0	1.5
Chilled foods	235	4.1	306	4.6	291	4.6	343	4.8	5.4	2.3	5.5	7.8
Dry beverages	141	2.5	169	2.5	160	2.5	190	2.7	3.6	2.4	0.8	3.2
Food to go	191	3.3	232	3.5	220	3.5	262	3.7	3.9	2.5	3.0	5.5
Frozen food	658	11.4	840	12.7	796	12.5	935	13.1	5.0	2.2	1.4	3.6
Soft drinks & beer	313	5.4	417	6.3	424	6.7	465	6.5	5.9	2.2	1.6	3.8
Wines & spirits	179	3.1	212	3.2	202	3.2	244	3.4	3.4	2.8		2.8
Other foods	523	9.1	656	9.9	617	9.7	707	9.9	4.6	1.5	0.8	2.3
Sub total Food	3347	58.2	4085	61.7	3879	60.9	4425	62.2	4.1	1.6	1.7	3.3
Non-Food												
Cigarettes, tobacco, accessories	390	6.8	370	5.6	367	5.8	348	4.9	-1.0	-1.3		-1.3
Cleaning & laundry products	242	4.2	266	4.0	268	4.2	272	3.8	2.0	0.4	2.0	2.4
Cosmetics & beauty	209	3.6	241	3.6	230	3.6	282	4.0	2.9	3.2		3.2
Misc household products	226	3.9	245	3.7	228	3.6	250	3.5	1.6	0.4	1.0	1.4



Paper, stationery & related goods	120	2.1	127	1.9	117	1.8	124	1.7	1.0	-0.4	0.2	-0.1
Personal care	178	3.1	206	3.1	200	3.1	227	3.2	3.0	2.0		2.0
Pharmaceuticals & medical prods.	556	9.7	583	8.8	610	9.6	658	9.2	1.0	2.5		2.5
Other non foods	481	8.4	502	7.6	471	7.4	533	7.5	0.8	1.2	0.8	2.0
Sub total Non-food	2402	41.8	2539	38.3	2492	39.1	2694	37.8	1.1	1.2	0.5	1.7
TOTAL	5749	100.0	6624	100.0	6371	100.0	7119	100.0	2.9	1.5	1.2	2.7

Forecasts in Volume

- The European FC market grew from 5749Kt in 2017 to 6624Kt in 2022 or by **+2.9%** cagr.
- Forecast output is anticipated to grow to 7119Kt in 2027 or by a combined growth of **+2.7%** cagr for the next 5 years.
- This growth consists of Market Growth of **+1.5%** cagr, with an additional **+1.2%** cagr due to plastic substitution.



2.2 End Use Market Forecasts

End Use Market Forecasts – Output (Tonnage)

Estimates & Forecasts of Carton Output Analysed by Market – Total Europe – 2017, 2022, 2023 & 2027 – 000 Tonnes												
SECTOR	2017		2022		2023		2027 Market Growth		17 to 22	22 to 27		
	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	% p.a.	Mkt Growth % p.a.	GT Growth % p.a.	Combined Growth % p.a.
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Forecasts in Volume

- The 5 largest EUMs above 350kt in Food are:-
 - Bakery (384Kt)
 - Confectionery (498Kt)
 - Frozen Foods (796Kt)
 - Soft Drinks + Beer (424Kt)
 - Other Foods (617Kt)
- The 3 largest non-Food EUMs above 350kt are:-
 - Pharmaceutical (610Kt)
 - Other non-Foods (471Kt)
 - Tobacco (367Kt)



End Use Market Forecasts – Output (Tonnage)

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TOTAL	5749	100.0	6624	100.0	6371	100.0	7119	100.0	2.9	1.5	1.2	2.7

Forecasts in Volume

- The best prospects for growth are Chilled Foods (+7.8%), Food-To-Go (+5.5%), Bakery (+4.5%), Soft Drinks + Beer (+3.8%), Frozen Foods (+3.6%) & Dry Beverages (+3.2%) within Food.
- For non-Foods then growth opportunities are predicted to be good for Cosmetics & Beauty (+3.2%).
- Food (+3.3%) shows better signs for growth than non-Foods (+1.7%).



End Use Market Forecasts – Country Forecast

Estimates & Forecasts of Carton Output – Total Europe Analysed by Country – 2017, 2022, 2023 & 2027 – 000 Tonnes

SECTOR	2017		2022		2023		2027		% p.a.	% p.a.
	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	17 to 22	22 to 27
Austria	133	2.3	167	2.5	159	2.5	166	2.3	4.7	-0.2
Belgium	115	2.0	134	2.0	129	2.0	133	1.9	3.2	-0.2
France	580	10.1	602	9.1	578	9.1	619	8.7	0.7	0.5
Germany	1104	19.2	1192	18.0	1138	17.9	1215	17.1	1.5	0.4
Italy	662	11.5	733	11.1	708	11.1	753	10.6	2.0	0.5
Netherlands	303	5.3	352	5.3	340	5.3	364	5.1	3.0	0.7
Spain	352	6.1	398	6.0	387	6.1	419	5.9	2.5	1.1
Switzerland	90	1.6	87	1.3	86	1.4	83	1.2	-0.7	-0.7
Turkey	573	10.0	630	9.5	567	8.9	730	10.2	1.9	3.0
U.K.	606	10.5	695	10.5	668	10.5	718	10.1	2.8	0.7
Other Western Europe	200	3.5	234	3.5	227	3.6	241	3.4	3.1	0.6
Sub total West Europe	4719	82.1	5223	78.8	4988	78.3	5440	76.4	2.1	0.8
Nordic	163	2.8	176	2.7	169	2.7	182	2.6	1.5	0.7
Poland	515	9.0	765	11.6	763	12.0	967	13.6	8.3	4.8
Other Central Europe	353	6.1	460	6.9	452	7.1	530	7.4	5.4	2.9
Sub total Central Europe	867	15.1	1225	18.5	1214	19.1	1497	21.0	7.1	4.1
Total Europe	5749	100.0	6624	100.0	6371	100.0	7119	100.0	2.9	1.5

Forecasts for Top 5 countries for Output volume by 2027 are:-

- Germany (1215Kt)
- Poland (967Kt)
- Italy (753Kt)
- Turkey (730Kt)
- UK (718Kt)



End Use Market Forecasts – Forecast (€m)

Estimates & Forecasts of Carton Sales – Total Europe Analysed by Country – 2017, 2022, 2023 & 2027 – € Million										
	2017		2022		2023		2027		% p.a.	% p.a.
SECTOR	€M	%	€M	%	€M	%	€M	%	17 to 22	22 to 27
Austria	297	2.6	395	2.6	370	2.6	358	2.4	5.9	-1.9
Belgium	217	1.9	324	2.2	306	2.1	298	2.0	8.3	-1.7
France	1370	12.1	1669	11.1	1585	11.1	1613	10.7	4.0	-0.7
Germany	2215	19.5	2598	17.3	2449	17.2	2464	16.4	3.2	-1.1
Italy	1282	11.3	1743	11.6	1667	11.7	1685	11.2	6.3	-0.7
Netherlands	625	5.5	808	5.4	775	5.4	790	5.2	5.3	-0.5
Spain	715	6.3	1012	6.7	977	6.8	1019	6.8	7.2	0.1
Switzerland	342	3.0	415	2.8	405	2.8	353	2.3	4.0	-3.2
Turkey	859	7.6	1323	8.8	1161	8.1	1446	9.6	9.0	1.8
U.K.	1317	11.6	1759	11.7	1678	11.8	1735	11.5	6.0	-0.3
Other Western Europe	385	3.4	528	3.5	509	3.6	520	3.5	6.5	-0.3
Sub total West Europe	9625	84.9	12573	83.8	11883	83.3	12281	81.6	5.5	-0.5
Nordic	330	2.9	373	2.5	356	2.5	370	2.5	2.5	-0.2
Poland	826	7.3	1253	8.4	1240	8.7	1512	10.1	8.7	3.8
Other Central Europe	561	4.9	801	5.3	781	5.5	882	5.9	7.4	2.0
Sub total Central Europe	1387	12.2	2054	13.7	2021	14.2	2395	15.9	8.2	3.1
Total Europe	11342	100.0	15001	100.0	14260	100.0	15046	100.0	5.8	0.1

Forecasts for Top 5 countries for Sales by 2027 are:-

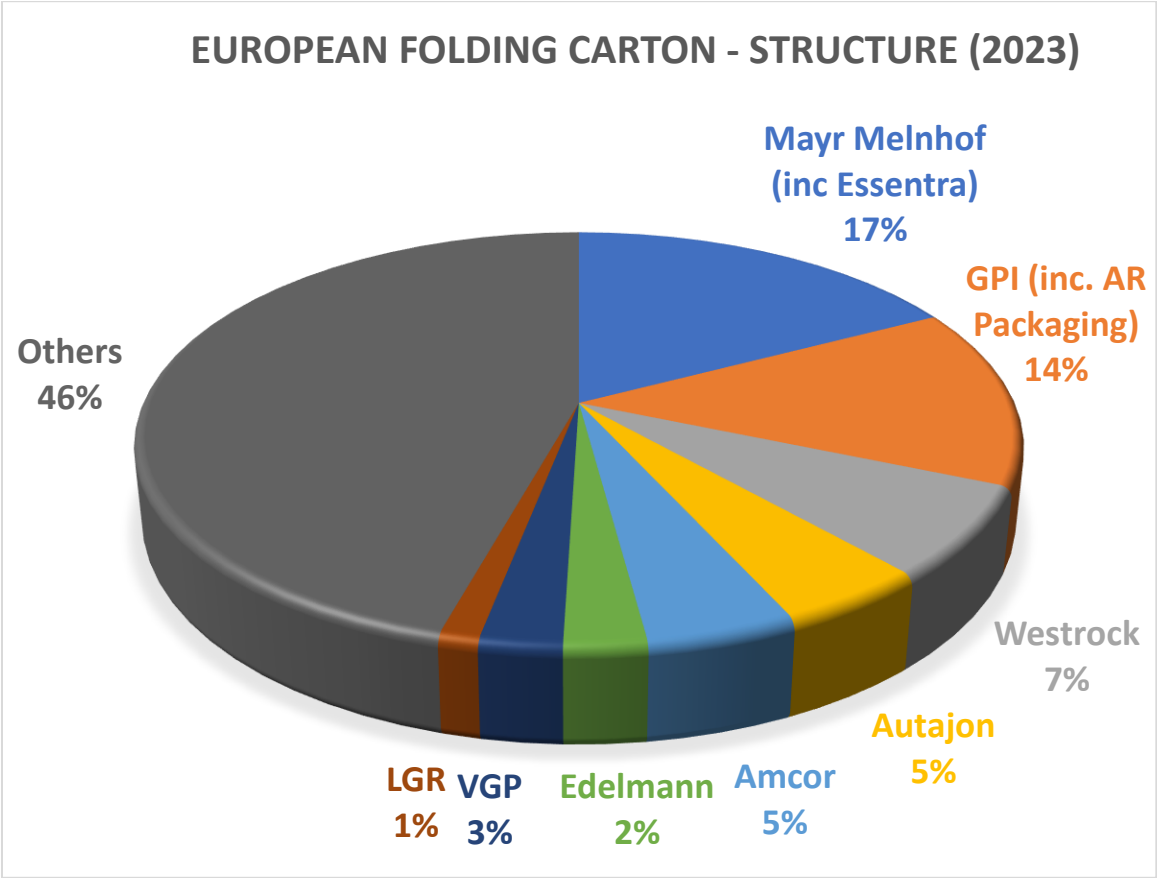
- Germany
- UK
- Italy
- France



- Poland
- Exchange rates having a significant impact on sales values.
- Currency deflation having a major impact on sales values too.



2.3 European Folding Carton Industry- Structure



- Significant M&A activity has happened over the last 2 years. Main ones being:
 - Essentra joins MM
 - AR Pkg joins GPI
- Impact of the last 2 years from a volatile supply chain, slower cost recovery and more recent demands price reductions by Brand Owners.
- Acquisition activity may increase as the vulnerable smaller FC companies comes back into focus.



2.4 Plastic Substitution Opportunities & the Green Transition

Assumptions when assessing the Green Transition

- Substitution by specifications that can easily be run on existing equipment at Brand Owner factories or on existing packing & filling lines = “Stage One”
- Substitution using “next generation” specifications that feature tray forming features & barrier coating technologies = “Stage Two”
- This study has focussed its research, analysis and conclusions on assessing “Stage One” changes, as the conditions and opportunities to convert to fibre for this group are known, recognised and readily exist.
- Opportunities in both Stages One and Two exist for many forms of fibre, including:
 - Folding Cartons
 - New Generation Barrier Folding Carton Formats (*see later details*)
 - Corrugated Specifications (*including Microflute*)
 - Moulded Fibre Packs
 - Liquid Cartons

Sustainability and Plastic Substitution

- Post-covid, consumer and retailer demand has been moving away from plastics and towards more sustainable packaging formats.
- Folding cartons and corrugated remain popular formats for this change.
- Announced legislation from the EU for single use plastic (and single use packaging) has caused confusion & concern; including the definition of plastics packaging too!
- Confusion from EU impacting on coated pack options and subsequent delays by Brand Owners over decision making for some new pack variants.
- Significant substitution of plastics by fibre could happen over the next 5 years.
- How much substitution is this likely to be?



Top Down- Plastics & the green transition

- Total size of the European Plastics supply market = **49m tonnes**.
- Plastic Packaging represents approx. **22m tonnes**. (corrugated, cartons & other fibre = c.40m tonnes).
- The Plastics supply market breaks down into 4 parts:
(1) Flexibles formats, (2) Thermo-formed containers, (3) Blow moulded (for Milk, Juices, etc.) and (4) Injection moulded.
 - Some flexibles formats offer good “substitution” opportunities for fibre, however many flexibles formats are very cost-effective and offer great value to brand owners.
 - Injection, blow-moulded & thermo-formed formats require complex technical solutions or high investment costs (or both!) to convert into a paper-based format.
 - Our estimate is that between 1.5% and 3.5% of existing plastic packaging could convert into fibre over the next 5 years.
 - This could equate to approx. **0.5m tonnes** of plastics, with a conversion into approx. **1.5m tonnes of fibre** (i.e. a tonnage volume equal to approx. **24%** of the annual volume of the European FC market if all of it was converted to FCs!).
 - Credible estimates need to be made (i.e. going through EUM by EUM) based on what the most susceptible formats for plastics substitution are; hence a granular, bottom-up approach was needed.....



A few key factors to consider

- Changing views and attitudes towards REUSE vs RECYCLING and bio-degradability.
- Brand Owners feedback, post covid.
- Pressure increasing for paper packaging suppliers to offer savings and packaging cost reduction initiatives **OR** to pay a small premium for an ecological solution.
- Growing interest for applications using Microflute and Finer flutes.

Changing attitudes- REUSE vs RECYCLING

- EU green deal – determined to drive through significant changes.
- PPWR – heavily favours REUSE over RECYCLING.
- DRS & EPR schemes across Europe (esp in the UK) have been either delayed, semi-implemented or scrapped. Pilot schemes have identified the massive costs involved!
- Brand Owner motivation = response is to listen and react to **consumer** demand (even in advance of PPWR final position and implementation).



Case study #1



Proctor & Gamble (Europe-wide)

- ECOCLIC® box
 - Sustainable
 - Intuitive
 - Child safe
 - Has the “iPhone open” appeal too!
- P&G approach to innovation
 - Part of the culture
 - Responding to consumer feedback
 - Investment in new end of line technology was “justified” due to sustainability pressures
 - Innovation continues (see Navilens QR code).



Case study #2



PepsiCo (UK & Ireland)

- Multi-packs for Crisps (20, 22 & 24 packs)
 - Remove 250 tonnes of virgin plastic from the supply chain
 - £14m investment
 - Child safe
- Walkers approach to innovation
 - Responded to consumer feedback during 2018
 - Started by conducting a national trial with empty crisp packets, however then invested in end of line equipment.
 - Further investment in making crisps healthier



“We are constantly exploring new scalable solutions and this investment marks an important step forward, delivering a huge reduction in virgin plastic across some of our best-selling ranges, while also helping to tackle our carbon footprint”.

Simon Devaney, sustainable packaging director

“Reducing virgin plastic across our supply chain is a key part of our commitment to creating a world where packaging never becomes waste.”

Case study #3

Gone from this...



... to this...



= a built up coated cartonboard container....

....due to consumer pressure!

Unilever (Europe-wide)

- Carte D'Or ice cream
 - Remove 900 tonnes of virgin plastic from the supply chain
 - QR code for more information
- Unilever's approach to innovation
 - Response as a result of consumer feedback in 2018/19 – **“Plastic waste is currently the number one environmental concern for shoppers.”**
 - Unilever then invested in end of line equipment.
 - Now claiming **“93% less plastic”** as a key response to and message for consumer concerns.

“For over 40 years, Carte D'Or has been committed to crafting delicious desserts made with some of the finest quality ingredients, which we strive to source in a sustainable way. Now, we're proud to have made this move to paper tubs, saving over 900 tonnes of virgin plastic in the UK every year and helping shoppers to reduce their plastic packaging footprint at home”

Horacio Cal, Ice Cream Marketing Director Unilever UK&I



Case study #4

PIZZA BASES for ambient and chilled pizzas (across Europe)



Driven by legislation both within the EU & globally for reducing and eradicating use of polystyrene.....



2.5 Factors for and against fibre over the next 3 to 5 years

Factors influencing a switch to folding cartons

POSITIVES

- A drive for plastic substitution.
- Brand Owners are making changes to fibre with the message *“Using Much Less Plastic”*.
- Conversion from plastics to fibre more easily facilitated at Brand Owners’ factories through using existing machinery & equipment (e.g. Drinks Multi-packs in cartonboard) or onto existing packing & filling lines (e.g. Fruit & Vegetables).
- Folding Cartons has new Mill capacity coming onboard (where this has been restricted in recent years)...

CONCERNS

- Competitive cost differences between FCs and Plastics leads to a slower move out of plastics.
- A move back to flexible plastics recently to reduce short term inflationary pressures on SKU pack costs.
- Capex investment needed to make the conversion into FCs may be delayed due to current trading downturn.
- Barrier properties of FCs not yet technically adequate to make conversion to fibre a success.
- Reduced numbers of NDAs in the last 2 years suggests a reduction in BO innovation.
- We **DO NOT** have the unhindered breeze in our sails with plastic transition and there are still some headwinds; some minor moves away from fibre towards plastics still happening due to benefits of plastic providing lighter weight packaging.
- Additionally, the plastics sector is fighting back with chemical recycling, etc.



Estimates for a switch to folding cartons

Pack Substitution Trends for Folding Cartons for Product Packed into Primary & Multi-packs in Europe - 2017, 2022, 2023 & 2027 - % of Units					
	2017	2022	2023	2027	23 v 27
Pack Type	% Share	% Share	% Share	% Share	% Chg
Folding Cartons	28.8	31.6	33.2	36.0	2.8
Flexible Pack	42.2	39.4	37.8	35.8	-2.0
Other Primary Packs	29.0	29.0	29.0	28.2	-0.8
TOTAL	100.0	100.0	100.0	100.0	0.0

Estimates covered:

- Updating of previous studies covering size, scale and units packed in plastics.
- An extensive shop observation project undertaken across 5 Western European countries entailing 11 different European retailers during 2023.
- In-depth analysis using retail data of 5 key EUMs
 - Bakery
 - Chilled Foods
 - Frozen Foods
 - Soft Drinks & Beer
 - Cleaning & Laundry
- Assessments of all other EUMs to reach our conclusions.



Estimates for a switch to folding cartons

Primary Pack Substitution & Green Transition Trends in Folding Cartons for Product Packed in Primary & Multi-packs in Europe - 2017, 2022, 2023 & 2027 - % of Units					
	2017	2022	2023	2027	23 v 27
Pack Type	% Share	% Share	% Share	% Share	% Chg
Folding Cartons	28.8	31.6	33.2	36.0	2.8
Flexible Pack	42.2	39.4	37.8	35.8	-2.0
Other Primary Packs	29.0	29.0	29.0	28.2	-0.8
TOTAL	100.0	100.0	100.0	100.0	0.0

Estimates revealed:

- Share growth for FCs in all 5 identified EUMs.
- Significant share growth for FCs in Chilled Foods, Food-To-Go & Bakery.
- Significant volume growth for FCs in Chilled (103Kt), Frozen Foods (67Kt), Soft Drinks & Beer (48Kt) and Bakery (43Kt).
- Additional growth identified for Breakfast cereals, Confectionery, Dry Beverages, Other Foods (e.g. Pasta, Rice, etc.), Misc household products & Other non-Foods (e.g. Pet Foods).



End Use Market Forecasts – Output (Tonnage)- Bottom, Up

Estimates & Forecasts of Carton Output Analysed by Market – Total Europe – 2022 & 2027 – 000 Tonnes - % Change & Incremental Business Forecasts												
	2022		2027						22 to 27			
	Total Growth		Market Growth			GT Growth	Total Growth Combined			Market Growth	GT Growth	Total Growth Combined
SECTOR	000 Tonnes	%	000 Tonnes	%	Incr. 000 Tonnes	Incr. 000 Tonnes	000 Tonnes	%	Incr. 000 Tonnes	% p.a.	% p.a.	% p.a.
Food												
Breakfast cereal products	314	4.7	283	4.0	-30	11.7	295	3.4	-18.6	-2.0	0.8	-1.2
Cakes, biscuits, baked products	406	6.1	449	6.3	43	56.8	505	5.1	99.4	2.0	2.5	4.5
Chocolate & sugar confectionery	534	8.1	548	7.7	14	26.5	574	7.7	40.2	0.5	1.0	1.5
Chilled foods	306	4.6	343	4.8	37	103.4	446	4.8	140.1	2.3	5.5	7.8
Dry beverages	169	2.5	190	2.7	21	7.5	197	2.1	28.9	2.4	0.8	3.2
Food to go	232	3.5	262	3.7	30	40.9	303	3.5	71.3	2.5	3.0	5.5
Frozen food	840	12.7	935	13.1	95	67.3	1002	10.6	162.1	2.2	1.4	3.6
Soft drinks & beer	417	6.3	465	6.5	48	38.0	503	6.6	85.5	2.2	1.6	3.8
Wines & spirits	212	3.2	244	3.4	32		244	3.3	31.9	2.8		2.8
Other foods	656	9.9	707	9.9	51	28.1	735	8.5	78.9	1.5	0.8	2.3
Sub total Food	4085	61.7	4425	62.2	340	380.2	4805	55.6	719.8	1.6	1.7	3.3
Non-Food												
Cigarettes, tobacco, accessories	370	5.6	348	4.9	-23		348	4.7	-22.8	-1.3		-1.3



Cleaning & laundry products	266	4.0	272	3.8	5	28.5	300	3.0	33.7	0.4	2.0	2.4
Cosmetics & beauty	241	3.6	282	4.0	42		282	5.9	41.6	3.2		3.2
Misc household products	245	3.7	250	3.5	5	12.1	263	3.3	17.5	0.4	1.0	1.4
Paper, stationery & related goods	127	1.9	124	1.7	-2	1.5	126	1.8	-0.8	-0.4	0.2	-0.1
Personal hygiene	206	3.1	227	3.2	21		227	3.5	21.4	2.0		2.0
Pharmaceuticals & medical prods.	583	8.8	658	9.2	75		658	13.4	75.0	2.5		2.5
Other non foods	502	7.6	533	7.5	32	21.3	554	8.7	53.0	1.2	0.8	2.0
Sub total Non-food	2539	38.3	2694	37.8	155	63.4	2758	44.4	218.7	1.2	0.5	1.7
TOTAL	6624	100.0	7119	100.0	495	443.6	7563	100.0	938.5	1.5	1.2	2.7

Forecasts in Volume

- Tonnage is offered as a better method for analysing and predicting future trends in FCs.
- Overall incremental growth between 2022 and 2027 is predicted to be 939kt (or **+2.7%** cagr).
- Incremental growth due to substitution is predicted to be 444Kt (or **+1.2%** cagr).



Cakes, Biscuits & Bakery

Packaging share estimates (analysing GT growth from 2023 to 2027)				
Cakes, Biscuits & Bakery	2017 (est.)	2022 (est.)	2023 Shop Observations	Estimated share changes - 2027
Packaging type				3% inc in FCs
Folding cartons	28	28	27	30
Flexible Packaging	67	66	65	63
Others (inc thin-walled trays)	5	6	8	7
Total	100	100	100	100

C, B & B opportunities cover:

- Covid saw less “personal selection” or “bagging” of cakes & bakery products = a rise in pre-packed SKUs.
- A significant rise in consumption of bakery products during covid & the period of WFH; carrying on into the “Hybrid working” era.
- Changing attitude by consumers favouring products using more ecological packs (note recent UK experience).



Chilled Foods

Chilled Foods	2017 (est.)	2022 (est.)	2023 Shop Observations	Estimated share changes - 2027
Packaging type				4% inc in FCs
Folding cartons	9	11	12	16
Flexible Packaging	26	28	28	26
Others (inc trays, pots & tubs)	65	61	60	58
Total	100	100	100	100

NB Folding cartons includes sleeves for RM

NB2 Main applications are for Fresh & chilled F&V, Fresh & Chilled Meat, Poultry & Fish + Ready Meals

Chilled Food opportunities cover:

- Ready Meals trays (already reviewed in ECMA addendum report in 2021) replacing C-PET trays.
- Corner glued trays for Ambient & Chilled Produce (mainly Fruit & Vegetables)
- Fresh Meats trays (using existing coatings/barriers + formed trays)



Fresh Produce – Fruit & Vegetables

PUNNETS for ambient and chilled produce (across Europe)



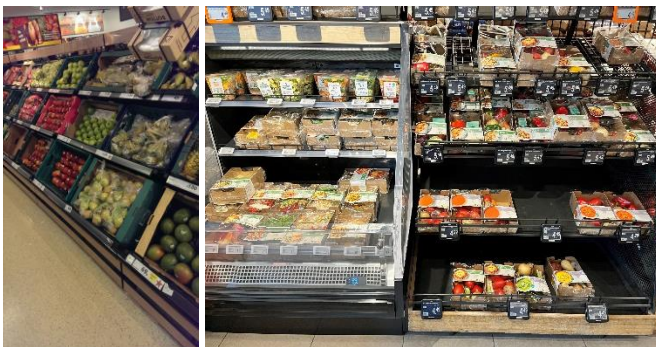
Moving from packs like these

to packs like these

... and like these



Driven across Europe by a desire for improved visual display, improved packing of product and the opportunity for improved added value.....



Frozen Foods

Frozen Foods	2017 (est.)	2022 (est.)	2023 Shop Observations	Estimated share changes - 2027
Packaging type				3% inc in FCs
Folding cartons	35	35	36	38
Flexible Packaging	54	54	55	53
Others (inc Containers & trays)	11	11	9	9
Total	100	100	100	100

Frozen Food opportunities cover:

- Ready Meals (also reviewed in ECMA addendum report in 2021)
- Packs for multiple ice creams and lollies.

PLUS

- Ice Cream Containers & Tubs (new solutions still to come or be adopted by BOs).



Beer & Soft Drinks

Shelf space gone from this in 2015.....



...to this in 2022.....



“From the start of 2021 and for the next 24 months or so we have seen a huge increase in demand for fibre packaging in the drinks market for multipacks”

Head of Region, Drinks Packaging FC Converter



Beer & Soft Drinks

Soft Drinks & Beer	2017 (est.)	2022 (est.)	2023 Shop Observations	Estimated share changes - 2027
Packaging type		Main volume change	between 2021 & 2023	2% inc in FCs
Folding cartons (inc.LLMF)	33	43	48	50
Flexible Packaging	53	40	34	31
Others (inc. Corrugated)	14	17	18	19
Total	100	100	100	100

Soft Drinks & Beer opportunities cover:

- Multi-Packs
- Carry-home Packs
- Connectors/FC Rings
- Most of the volumes have been converted into fibre between 2021 and 2023 using Brand Owner's existing equipment.
- Switch from S/W & Hi-Cones to Folding Carton solutions able to be done swiftly.
- Microflute corrugated has taken a small share in Beer.



Cleaning & Laundry

Shelf space gone from this in 2015.....



....to this in 2022.....



“We have been working with P&G for some years now; they were delighted with the innovations that we were able to offer and the end result has been some ground-breaking SKUs for the laundry market”

Head of Design, FC Converter



Cleaning & Laundry

Cleaning & Laundry Products	2017 (est.)	2022 (est.)	2023 Shop Observations	Estimated share changes - 2027
Packaging type		Growth of LL MF packs vs Pod tubs	Growth of spiral packs coming too	3% inc in FCs
Folding cartons	39	41	43	46
Flexible Packaging	11	9	7	6
Others (inc. PP bottles mainly & liquid packaging)	50	50	50	48
Total	100	100	100	100

Cleaning & Laundry opportunities cover:

- Recent initiative by P&G to invest in Litho Laminated Microflute solutions to replace plastic tubs for laundry “Pods” or capsules.
- Unilever had to respond with their own “Cardboard” solution to stop losing market share.

PLUS

- More packs expected for replacement of PP bottles (either with FCs or liquid packaging formats).



Cleaning & Laundry



Procter & Gamble

7,747,439 followers

1w • 🌐

+ Follow

Our home care brand Fairy has released a new cardboard refill for Fairy Max Power that brings comfort in the kitchen and helps reduce the carbon footprint of plastic at home.

By reusing the Fairy Max Power bottle, 85%* of plastic is reduced. #PGInnovation

*Comparison g/mL vs. bottles of Fairy Max Power. Available in European stores.



More opportunities for conventional FC to gain increased share in the future too



Plastics Substitution – Top EUM Opportunities

- Cakes, Biscuits & Baked Products
- Chilled Foods
 - Ready Meal Trays
 - Fresh Produce Punnet Packs (e.g. Tomato punnets, Packs for Oranges, Kiwi Fruit punnets, Apple packs, etc.)
 - Fresh Meat Trays (e.g. Pre-packed meats, poultry and fish- included under FF definition and not under chilled foods)

Long term, a potential for significant volume growth within the dairy sector by replacing Tubs, Pots and Ice Cream Containers

- Frozen Foods
- Beer & Soft Drinks (e.g. Various multi-pack wraparounds + Top holders that replace Hi-Cone 6 ring plastic packs)

Long term, a possible threat from returnable crates (like RPCs with Produce) may impact negatively on volumes.....

- Detergents (e.g. the “iPad-esque” POD pack in microflute)



Plastics Substitution – other EUMs with Potential

FRESH FOODS

- Breakfast Cereals (i.e. to replace Granola bags with innovative carton solutions)
- Confectionery (i.e. replacing flexible bags)
- Dry Beverages (e.g. Tea and Coffee bags)
- Food-to-Go (e.g. Home deliveries for restaurants in FC cartons & Microflute cartons)
- Other Foods (e.g. Pasta, Rice, etc.)

NON-FOOD CONSUMABLES

- Cosmetics & Beauty Products (e.g. Sun care products, some cosmetic creams, etc.)
- Miscellaneous household products (e.g. Garden products, Clothing, DIY, etc.)
- Other non-foods (e.g. Petfood bags)



Plastics Substitution – the BIG Potential

....for this pack type



....or these pack types.....



....to replace these...



If “Stage One” Green Transition = 0.444m tonnes for Folding Cartons.....

Could “Stage Two” be worth 1.1m tonnes of fibre a year?



Conclusions

- Good growth opportunities for lie within selected market sectors shown in detail in NOA's "Green Transition" tables for:
 - Bakery
 - Chilled Foods
 - Frozen Foods
 - Soft Drinks & Beer, and
 - Cleaning & laundry
- The competitive advantage to fall to those companies who embrace new technologies, offer innovative design skills, and who pioneer technical solutions to Brand Owners (and steal a march on other converters) offering microflute conversion, coating technologies, and conversion equipment for handling grease and barrier applications and packs.
- This will require investment commitments by Board Mills as well as by FC Converters.



Summary

- Demand for folding cartons has dropped back in 2023 after a huge leap in 2021 & 2022.
- 2021 & 2022 were buoyant years for folding carton volumes due to supply chain issues; a period of overall consumption of folding cartons of +4.9% over this 2 year period.
- When “panic buying” slowed at the end of 2022, so BO demand for FCs slipped back and is now forecast to be -3.8% for all of 2023.
- Once both filled and flat pack stocks have been used up....
- Good growth opportunities for the future come from both Market Growth (+1.5%) as well as from the Green Transition of +1.2% from within those selected market sectors (mainly Food & Drink) shown in our statistical tables.
- The next BIG opportunity is destined to come from Dairy & Meat, with the support of Brand Owners, embracing new innovations in design and coatings resulting in “Next Generation” FC trays.



Neil Osment – NOA-PRISM

Some background to NOA-PRISM...

- Formed in 2005 after a career working for Smurfit, SAICA, ALCOA and DS Smith.
- Focussed on researching European and Global paper packaging trends.
- Commissioned by several associations (including FEFCO, ICCA and ECMA) as well as private, global packaging client companies.
- NOA purchased PRISM from Simon Southern in 2013.
- NOA purchased the HPC database from Henry Poole in 2023.
- Committed to analysing and identifying important trends and supporting the strategic planning for industry associations and many global paper packaging companies.
- Contactable on www.noa.uk.net



3.0 APPENDICES

3.1 STATISTICS

Europe Overview

1	GDP by Country - Annual % Change											
Country/Region	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	
Austria	2.3	2.4	1.5	-6.5	4.6	5.0	0.4	1.1	1.8	1.7	1.7	
Belgium	1.6	1.8	2.2	-5.4	6.1	3.1	0.7	1.1	1.2	1.2	1.2	
France	2.4	1.8	1.9	-7.9	6.8	2.6	0.7	1.3	1.9	1.8	1.6	
Germany	2.7	1.0	1.1	-3.7	2.6	1.8	-0.1	1.1	2.0	1.8	1.2	
Italy	1.7	0.9	0.5	-9.0	7.0	3.7	0.7	0.8	1.2	1.1	1.0	
Netherlands	2.9	2.4	2.0	-3.9	4.9	4.5	1.0	1.2	1.5	1.6	1.5	
Spain	3.0	2.3	2.0	-11.3	5.5	5.5	1.5	2.0	2.0	1.7	1.7	
Switzerland	1.4	2.9	1.2	-2.5	4.2	2.1	0.8	1.8	1.2	1.8	1.2	
Turkey	7.5	3.0	0.8	1.9	11.4	5.6	2.7	3.6	3.0	3.0	3.0	
United Kingdom	2.4	1.7	1.6	-11.0	7.6	4.0	0.4	1.0	2.2	2.0	1.8	
Other Western Europe	2.4	2.3	2.3	-8.6	6.9	6.3	1.8	1.6	1.8	1.7	1.6	
Sub total West Europe	3.0	1.8	1.4	-6.2	6.3	3.7	0.9	1.5	2.0	1.9	1.7	
Nordic	2.7	1.6	1.5	-2.0	4.5	2.9	0.3	1.4	1.9	1.8	1.7	
Poland	5.1	5.9	4.5	-2.0	6.8	4.9	0.3	2.4	3.7	3.4	3.1	
Other Central Europe	5.3	4.5	3.7	-4.2	6.0	3.7	1.0	3.0	3.3	3.2	3.1	
Sub total Central Europe	5.2	5.0	4.0	-3.4	6.3	4.2	0.8	2.8	3.4	3.3	3.1	
Total Europe	3.2	2.2	1.7	-5.6	6.2	3.7	0.8	1.7	2.2	2.1	1.9	

Source: IMF WEO



2	GDP by Country - Index 2017 = 100											
	Country/Region	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
	Austria	100.0	102.4	104.0	97.3	101.7	106.8	107.3	108.4	110.3	112.2	114.1
	Belgium	100.0	101.8	104.1	98.5	104.5	107.8	108.5	109.7	111.0	112.4	113.7
	France	100.0	101.8	103.7	95.5	102.0	104.7	105.4	106.7	108.8	110.7	112.4
	Germany	100.0	101.0	102.0	98.3	100.9	102.7	102.5	103.7	105.8	107.7	109.1
	Italy	100.0	100.9	101.4	92.3	98.8	102.4	103.1	103.9	105.1	106.3	107.4
	Netherlands	100.0	102.4	104.4	100.3	105.2	109.9	111.1	112.4	114.2	115.9	117.7
	Spain	100.0	102.3	104.3	92.5	97.6	102.9	104.5	106.6	108.7	110.6	112.4
	Switzerland	100.0	102.9	104.1	101.5	105.7	108.0	108.9	110.8	112.2	114.2	115.6
	Turkey	100.0	103.0	103.8	105.8	117.8	124.4	127.7	132.3	136.3	140.3	144.6
	United Kingdom	100.0	101.7	103.3	91.9	98.9	102.9	103.3	104.3	106.6	108.7	110.6
	Other Western Europe	100.0	102.3	104.7	95.6	102.2	108.7	110.6	112.4	114.4	116.3	118.2
	Sub total West Europe	100.0	101.8	103.2	96.8	102.9	106.6	107.6	109.2	111.4	113.5	115.3
	Nordic	100.0	101.6	103.1	101.1	105.7	108.7	109.1	110.7	112.8	114.8	116.8
	Poland	100.0	105.9	110.7	108.4	115.8	121.5	121.9	124.9	129.4	133.9	138.1
	Other Central Europe	100.0	104.5	108.3	103.8	110.0	114.1	115.3	118.7	122.6	126.5	130.4
	Sub total Central Europe	100.0	105.0	109.2	105.5	112.2	116.9	117.8	121.0	125.2	129.3	133.3
	Total Europe	100.0	102.2	103.9	98.1	104.2	108.1	109.0	110.8	113.2	115.6	117.7

Source: IMF WEO

3	Currency Movements - Average Exchange Rates for Selected Currencies versus the Euro - 2017 to 2023							
	Country/Region	2017	2018	2019	2020	2021	2022	2023*
	Nordic Average	8.803	9.108	9.303	9.561	9.252	9.392	9.981
	Swiss Franc	1.112	1.155	1.113	1.071	1.081	1.005	0.990
	Turkish Lira	4.120	5.697	6.363	8.054	10.489	17.359	20.654
	UK £Sterling	0.877	0.885	0.878	0.890	0.860	0.853	0.882
	Polish Zloty	4.257	4.262	4.298	4.447	4.565	4.685	4.668
	Other Central Europe Average	26.359	26.265	26.483	26.891	26.979	27.149	27.007

Source: www.ofx.com. * indicates incomplete year

NB1 Nordic average comprises average for Danish Krone, Norwegian Kroner & Swedish Krona

NB2 Other Central Europe average exchange comprises weighted average exchange for Euro & non Euro Zone countries

NB3 CE weights take account of currency & GDP differences (fixed weights based on 10yr average by country)

NB4 Currency weights are based on reference currency for comparison being the Czech Koruna



4	Currency Movements - Average Exchange Rates for Selected Currencies versus the Euro - 2017 to 2023 - % Change on Previous Year							
	Country/Region	2017	2018	2019	2020	2021	2022	2023*
	Nordic Average	0.8	3.5	2.1	2.8	-3.2	1.5	6.3
	Swiss Franc	2.0	3.9	-3.6	-3.8	1.0	-7.0	-1.5
	Turkish Lira	23.3	38.3	11.7	26.6	30.2	65.5	19.0
	UK £Sterling	7.1	0.9	-0.8	1.4	-3.4	-0.9	3.5
	Polish Zloty	-2.4	0.1	0.9	3.4	2.7	2.6	-0.4
	Other Central Europe	-0.3	-0.4	0.8	1.5	0.3	0.6	-0.5

Source: www.ofx.com. * indicates incomplete year

NB1 Nordic average comprises average for Danish Krone, Norwegian Kroner & Swedish Krona

NB2 Other Central Europe average exchange comprises weighted average exchange for Euro & non Euro Zone countries

NB3 CE weights take account of currency & GDP differences (fixed weights based on 10yr average by country)

NB4 Currency weights are based on reference currency for comparison being the Czech Koruna

5	Currency Movements - Average Exchange Rates for Selected Currencies versus the Euro - 2017 to 2022 - Index 2017 = 100						
	Country/Region	2017	2018	2019	2020	2021	2022
	Nordic Average	100.0	103.5	105.7	108.6	105.1	106.7
	Swiss Franc	100.0	103.9	100.1	96.3	97.3	90.4
	Turkish Lira	100.0	138.3	154.4	195.5	254.6	421.3
	UK £Sterling	100.0	100.9	100.1	101.5	98.1	97.3
	Polish Zloty	100.0	100.1	101.0	104.5	107.2	110.1
	Other Central Europe	100.0	99.6	100.5	102.0	102.4	103.0

Source: www.ofx.com. * indicates incomplete year

NB1 Nordic average comprises average for Danish Krone, Norwegian Kroner & Swedish Krona

NB2 Other Central Europe average exchange comprises weighted average exchange for Euro & non Euro Zone countries

NB3 CE weights take account of currency & GDP differences (fixed weights based on 10yr average by country)

NB4 Currency weights are based on reference currency for comparison being the Czech Koruna



6 Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - All Countries – 2017 to 2027 - 000 Tonnes & € Million											
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100	
2017	6167	4.0	100	5749	3.4	100	100.0	11342	2.8	100	
2018	6268	1.6	102	5806	1.0	101	102.2	11390	0.4	100	
2019	6555	4.6	106	6077	4.7	106	103.9	11913	4.6	105	
2020	6784	3.5	110	6312	3.9	110	98.1	12155	2.0	107	
2021	6915	1.9	112	6524	3.4	113	104.2	13071	7.5	115	
2022	7521	8.8	122	6624	1.5	115	108.1	15001	14.8	132	
2023	6833	-9.2	111	6371	-3.8	111	109.0	14260	-4.9	126	
2024	6697	-2.0	109	6500	2.0	113	110.8	13826	-3.0	122	
2025	7158	6.9	116	6707	3.2	117	113.2	14234	3.0	125	
2026	7375	3.0	120	6916	3.1	120	115.6	14647	2.9	129	
2027	7586	2.9	123	7119	2.9	124	117.7	15046	2.7	133	
Average % p.a.17 to 22	4.1			2.9			1.6	5.8			
Average % p.a. 22 to 27	0.2			1.5			1.7	0.1			

NB1 Purchases reported via NAs.

7 Summary Estimates & Forecasts of European Carton Output – 2017, 2022, 2023 & 2027 – 000 Tonnes & € Million								
		2017	2022	2023	2027	17 to 22	22 to 27	22 to 27
						% p.a.	Market Growth % p.a.	MG & GT Combined % p.a.
Cartonboard Purchases: 000 Tonnes		6167	7521	6833	7586	4.1	0.2	1.4
Carton Output: 000 Tonnes		5749	6624	6371	7119	2.9	1.5	2.7
Sales by European Cartonmakers: € Million		11342	15001	14260	15046	5.8	0.1	1.1

N.B. purchases reported via NAs.



8	Estimates & Forecasts of European Cartonboard Purchases Adapted for Feedback from the European Board Mills, Folding Carton Output & Sales Turnover - All Countries – 2017 to 2027 - 000 Tonnes & € Million										
		Purchases Adapted for Feedback from the European Board Mills			Carton Output			GDP Index	Carton Sales		
	Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100
	2017	6167	4.0	100	5749	3.4	100	100.0	11342	2.8	100
	2018	6268	1.6	102	5806	1.0	101	102.2	11390	0.4	100
	2019	6555	4.6	106	6077	4.7	106	103.9	11913	4.6	105
	2020	6784	3.5	110	6312	3.9	110	98.1	12155	2.0	107
	2021	7055	4.0	112	6524	3.4	113	104.2	13071	7.5	115
	2022	7479	6.0	122	6624	1.5	115	108.1	15001	14.8	132
	2023	6776	-9.4	111	6371	-3.8	111	109.0	14260	-4.9	126
	2024	6911	2.0	109	6500	2.0	113	110.8	13826	-3.0	122
	2025	7188	4.0	116	6707	3.2	117	113.2	14234	3.0	125
	2026	7375	2.6	120	6916	3.1	120	115.6	14647	2.9	129
	2027	7586	2.9	123	7119	2.9	124	117.7	15046	2.7	133
	Average % p.a.17 to 22	3.9			2.9			1.6	5.8		
	Average % p.a. 23 to 27	0.3			1.5			1.7	0.1		

NB1 Estimates by NOA from Mill feedback. 2024 estimate based on that medium term tonnage will reflect output as stocks are balanced.

NB2 Purchases & Output balance between 2020 and 2025 @ 10.1% and 10.2% growth respectively as totals.

NB3 estimates of purchases including imports



9 Summary Estimates & Forecasts of European Carton Output Including European Purchases Adapted for Feedback from the European Board Mills– 2017, 2022, 2023 & 2027 – 000 Tonnes & € Million								
		2017	2022	2023	2027	17 to 22	22 to 27	22 to 27
						% p.a.	Market Growth % p.a.	MG & GT Combined % p.a.
	Cartonboard Purchases Adapted for Feedback from the European Board Mills: 000 Tonnes	6167	7479	6776	7586	3.9	0.3	1.5
	Carton Output: 000 Tonnes	5749	6624	6371	7119	2.9	1.5	2.7
	Sales by European Cartonmakers: € Million	11342	15001	14260	15046	5.8	0.1	1.1

NB. purchases estimated by NOA.

10 Primary Pack Substitution Trends in Folding Carton Primary Pack Markets in Europe - 2017, 2022, 2023 & 2027 - % of Units					
	Pack Type	2017	2022	2023	2027
	Folding Cartons	26.2	27.9	28.5	30.8
	Flexible Pack	56.6	55.9	55.7	54.8
	Other Primary Packs	17.3	16.2	15.8	14.4
	TOTAL	100.0	100.0	100.0	100.0

Table refers to folding carton markets, not FMCG markets and excludes canned bottled foods and drinks packaging

Estimates for folding cartons excludes multiple packaging. (i.e. refers to primary packs only)

Folding cartons adjusted to include additional CTA packaging and hybrid pack formats for chilled food trays (e.g. Halo pack)



11 Primary Pack Substitution & Green Transition Trends in Folding Cartons for Product Packed in Primary & Multi-packs in Europe - 2017, 2022, 2023 & 2027 - % of Units						
		2017	2022	2023	2027	23 v 27
Pack Type		% Share	% Share	% Share	% Share	% Chg
Folding Cartons		28.8	31.6	33.2	36.0	2.8
Flexible Pack		42.2	39.4	37.8	35.8	-2.0
Other Primary Packs		29.0	29.0	29.0	28.2	-0.8
TOTAL		100.0	100.0	100.0	100.0	0.0

NB1 This data is from independent sources & NOA shop observations.

NB2 This data reflects all markets (including FMCG)

NB3 Other packaging formats includes cans, glass & corrugated

12 Estimates & Forecasts of Folding Carton Primary Pack Output – Total Europe Analysed by Barrier & Non-barrier Applications – 2017, 2022, 2023 & 2027 – 000 Tonnes													
		2017		2022		2023		2027		% p.a.	Mkt Growth % p.a.	GT Growth % p.a.	Combined Growth % p.a.
	SEC TO R	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	17 to 22	22 to 27	22 to 27	22 to 27
	Barrier	432	7.5	554	8.4	568	8.9	617	8.7	5.1	2.2	2.6	4.8
	Non barrier	5317	92.5	6070	91.6	5803	91.1	6502	91.3	2.7	1.4	1.1	2.5
	TOTAL	5749	100.0	6624	100.0	6371	100.0	7119	100.0	2.9	1.5	1.2	2.7

NB1 Barrier cartons includes cartons produced from coated and laminated cartonboard grades

NB2 Future growth only reflects market growth & excludes green transition growth.



13 Prospects for the Main Carton Constructions – Total Europe – 2017, 2022, 2023 & 2027 – 000 Tonnes													
		2017		2022		2023		2027		% p.a.	Mkt Growth % p.a.	GT Growth % p.a.	Combined Growth %
	CARTON CONSTRUCTION	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	17 to 22	22 to 27	22 to 27	22 to 27
	Consumer primary packs	3611	62.8	4130	62.4	4027	63.2	4460	62.6	2.7	1.5	1.7	3.2
	Display outers / multi packs	854	14.9	1094	16.5	1005	15.8	1197	16.8	5.1	1.8	1.1	2.9
	Sub total Cartonboard Packs	4465	77.7	5224	78.9	5032	79.0	5657	79.5	3.2	1.6	1.5	3.2
	Litho printed corrugated containers	1284	22.3	1400	21.1	1339	21.0	1461	20.5	1.8	0.9	0.0	0.9
	TOTAL	5749	100.0	6624	100.0	6371	100.0	7119	100.0	2.9	1.5	1.2	2.7



14	Summary Estimates & Forecasts of Carton Output, Cartonboard Purchases, & Carton Sales - Main European Regions - 2017, 2022, 2023 & 2027 - 000 Tonnes, € Million										
	2017		2022		2023		2027		% p.a.	% p.a.	
	Vol/Val	%	Vol/Val	%	Vol/Val	%	Vol/Val	%	17 to 22	22 to 27	
	Cartonboard Purchases - 000 Tonnes										
	Western Europe	4962	80.5	5762	77.1	5190	76.6	5697	75.1	3.0	-0.2
	Nordic Region	176	2.9	203	2.7	185	2.7	197	2.6	2.9	-0.6
	Central Europe	1029	16.7	1513	20.2	1401	20.7	1692	22.3	8.0	2.3
	TOTAL	6167	100.0	7479	100.0	6776	100.0	7586	100.0	3.9	0.3
	Carton Production - 000 Tonnes										
	Western Europe	4719	82.1	5223	78.8	4988	78.3	5440	76.4	2.1	0.8
	Nordic Region	163	2.8	176	2.7	169	2.7	182	2.6	1.5	0.7
	Central Europe	867	15.1	1225	18.5	1214	19.1	1497	21.0	7.1	4.1
	TOTAL	5749	100.0	6624	100.0	6371	100.0	7119	100.0	2.9	1.5
	Carton Sales - € Million										
	Western Europe	9625	84.9	12573	83.8	11883	83.3	12281	81.6	5.5	-0.5
	Nordic Region	330	2.9	373	2.5	356	2.5	370	2.5	2.5	-0.2
	Central Europe	1387	12.2	2054	13.7	2021	14.2	2395	15.9	8.2	3.1
	TOTAL	11342	100.0	15001	100.0	14260	100.0	15046	100.0	5.8	0.1

NB1 Past sales values are at current prices

NB2 2023 sales includes downward price adjustment of -1% assuming lower prices through the year.

NB3 2024 sales includes a further downward price adjustment of -5% as new lower cost materials feed through.

NB4 Past sales are at actual prices, while forecasts for 2025 to 2027 are at constant prices.



15	Estimates & Forecasts of Cartonboard Purchases – Total Europe Analysed by Country – 2017, 2022, 2023 & 2027 – 000 Tonnes										
		2017		2022		2023		2027		% p.a.	% p.a.
	SECTOR	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	17 to 22	22 to 27
	Austria	155	2.5	193	2.6	183	2.7	192	2.5	4.5	-0.1
	Belgium	109	1.8	134	1.8	113	1.7	125	1.7	4.2	-1.3
	France	605	9.8	739	9.9	578	8.5	643	8.5	4.1	-2.8
	Germany	1188	19.3	1371	18.3	1240	18.3	1311	17.3	2.9	-0.9
	Italy	649	10.5	782	10.5	687	10.1	736	9.7	3.8	-1.2
	Netherlands	322	5.2	378	5.1	362	5.3	386	5.1	3.2	0.4
	Spain	375	6.1	421	5.6	408	6.0	446	5.9	2.3	1.1
	Switzerland	101	1.6	109	1.5	96	1.4	94	1.2	1.5	-2.9
	Turkey	599	9.7	651	8.7	585	8.6	756	10.0	1.7	3.0
	U.K.	654	10.6	732	9.8	707	10.4	764	10.1	2.3	0.8
	Other Western Europe	204	3.3	252	3.4	229	3.4	245	3.2	4.3	-0.5
	Sub total West Europe	4962	80.5	5762	77.1	5190	76.6	5697	75.1	3.0	-0.2
	Nordic Region	176	2.9	203	2.7	185	2.7	197	2.6	2.9	-0.6
	Poland	514	8.3	804	10.7	754	11.1	966	12.7	9.3	3.7
	Other Central Europe	514	8.3	710	9.5	647	9.5	726	9.6	6.6	0.5
	Sub total Central Europe	1029	16.7	1513	20.2	1401	20.7	1692	22.3	8.0	2.3
	Total Europe	6167	100.0	7479	100.0	6776	100.0	7586	100.0	3.9	0.3



16	Estimates & Forecasts of Carton Output – Total Europe Analysed by Country – 2017, 2022, 2023 & 2027 – 000 Tonnes										
	SECTOR	2017		2022		2023		2027		% p.a	% p.a
		000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	17 to 22	22 to 27
	Austria	133	2.3	167	2.5	159	2.5	166	2.3	4.7	-0.2
	Belgium	115	2.0	134	2.0	129	2.0	133	1.9	3.2	-0.2
	France	580	10.1	602	9.1	578	9.1	619	8.7	0.7	0.5
	Germany	1104	19.2	1192	18.0	1138	17.9	1215	17.1	1.5	0.4
	Italy	662	11.5	733	11.1	708	11.1	753	10.6	2.0	0.5
	Netherlands	303	5.3	352	5.3	340	5.3	364	5.1	3.0	0.7
	Spain	352	6.1	398	6.0	387	6.1	419	5.9	2.5	1.1
	Switzerland	90	1.6	87	1.3	86	1.4	83	1.2	-0.7	-0.7
	Turkey	573	10.0	630	9.5	567	8.9	730	10.2	1.9	3.0
	U.K.	606	10.5	695	10.5	668	10.5	718	10.1	2.8	0.7
	Other Western Europe	200	3.5	234	3.5	227	3.6	241	3.4	3.1	0.6
	Sub total West Europe	4719	82.1	5223	78.8	4988	78.3	5440	76.4	2.1	0.8
	Nordic	163	2.8	176	2.7	169	2.7	182	2.6	1.5	0.7
	Poland	515	9.0	765	11.6	763	12.0	967	13.6	8.3	4.8
	Other Central Europe	353	6.1	460	6.9	452	7.1	530	7.4	5.4	2.9
	Sub total Central Europe	867	15.1	1225	18.5	1214	19.1	1497	21.0	7.1	4.1
	Total Europe	5749	100.0	6624	100.0	6371	100.0	7119	100.0	2.9	1.5



17	Estimates & Forecasts of Carton Sales – Total Europe Analysed by Country – 2017, 2022, 2023 & 2027 – € Million										
	SECTOR	2017		2022		2023		2027		% p.a	% p.a
		€M	%	€M	%	€M	%	€M	%	17 to 22	22 to 27
	Austria	297	2.6	395	2.6	370	2.6	358	2.4	5.9	-1.9
	Belgium	217	1.9	324	2.2	306	2.1	298	2.0	8.3	-1.7
	France	1370	12.1	1669	11.1	1585	11.1	1613	10.7	4.0	-0.7
	Germany	2215	19.5	2598	17.3	2449	17.2	2464	16.4	3.2	-1.1
	Italy	1282	11.3	1743	11.6	1667	11.7	1685	11.2	6.3	-0.7
	Netherlands	625	5.5	808	5.4	775	5.4	790	5.2	5.3	-0.5
	Spain	715	6.3	1012	6.7	977	6.8	1019	6.8	7.2	0.1
	Switzerland	342	3.0	415	2.8	405	2.8	353	2.3	4.0	-3.2
	Turkey	859	7.6	1323	8.8	1161	8.1	1446	9.6	9.0	1.8
	U.K.	1317	11.6	1759	11.7	1678	11.8	1735	11.5	6.0	-0.3
	Other Western Europe	385	3.4	528	3.5	509	3.6	520	3.5	6.5	-0.3
	Sub total West Europe	9625	84.9	12573	83.8	11883	83.3	12281	81.6	5.5	-0.5
	Nordic	330	2.9	373	2.5	356	2.5	370	2.5	2.5	-0.2
	Poland	826	7.3	1253	8.4	1240	8.7	1512	10.1	8.7	3.8
	Other Central Europe	561	4.9	801	5.3	781	5.5	882	5.9	7.4	2.0
	Sub total Central Europe	1387	12.2	2054	13.7	2021	14.2	2395	15.9	8.2	3.1
	Total Europe	11342	100.0	15001	100.0	14260	100.0	15046	100.0	5.8	0.1



18	Estimates of Carton Sales Analysed by Market – Total Europe – 2022 – 000 Tonnes, € Million, € per Tonne					
	SECTOR	000 Tonnes	%	€ M	%	€ per Tonne
	Food					
	Breakfast cereal products	314	4.7	620.7	3.5	1979
	Cakes, biscuits, baked products	406	6.1	695.6	4.8	1713
	Chocolate & sugar confectionery	534	8.1	1213.4	7.7	2272
	Chilled foods	306	4.6	562.6	3.9	1836
	Dry beverages	169	2.5	309.3	2.2	1835
	Food to go	232	3.5	455.7	3.2	1968
	Frozen food	840	12.7	1512.7	10.4	1800
	Soft drinks & beer	417	6.3	938.2	6.5	2250
	Wines & spirits	212	3.2	486.2	3.5	2295
	Other foods	656	9.9	1290.9	8.6	1968
	Sub total Food	4085	61.7	8085.1	54.1	1979
	Non-Food					
	Cigarettes, tobacco, accessories	370	5.6	856.2	5.0	2312
	Cleaning & laundry products	266	4.0	457.5	2.9	1717
	Cosmetics & beauty	241	3.6	862.3	6.3	3581
	Misc household products	245	3.7	530.1	3.3	2164
	Paper, stationery & related goods	127	1.9	301.6	1.8	2381
	Personal care	206	3.1	537.9	3.7	2612
	Pharmaceuticals & medical prods.	583	8.8	2026.5	14.1	3479
	Other non foods	502	7.6	1343.3	8.8	2679
	Sub total Non-food	2539	38.3	6915.5	45.9	2724
	TOTAL	6624	100.0	15000.6	100.0	2265

NB1 Soft drinks & beer includes multipacks

NB2 Cigarettes, tobacco & accessories includes vaping & tobacco substitutes

NB3 Food to Go includes Convenience 'On the Move' (including sandwiches, wraps, baguettes, salads, single portion savoury bakery, other savoury & sweet RTE foods.) & Quick Serve Fast food/Takeaways (including french fries/chips, burger boxes, other fast food containers)



19	Estimates & Forecasts of Carton Sales Analysed by Market – Total Europe – 2017, 2022, 2023 & 2027 – € Million										
	SECTOR	2017		2022		2023		2027		% p.a.	% p.a.
		€M	%	€M	%	€M	%	€M	%	17 to 22	22 to 27
	Food										
	Breakfast cereal products	495	4.4	621	4.1	556	3.9	522	3.5	4.6	-3.4
	Cakes, biscuits, baked products	520	4.6	696	4.6	647	4.5	715	4.8	6.0	0.6
	Chocolate & sugar confectionery	910	8.0	1213	8.1	1113	7.8	1158	7.7	5.9	-0.9
	Chilled foods	372	3.3	563	3.8	525	3.7	586	3.9	8.6	0.8
	Dry beverages	224	2.0	309	2.1	289	2.0	324	2.2	6.7	1.0
	Food to go	324	2.9	456	3.0	426	3.0	480	3.2	7.0	1.0
	Frozen food	1021	9.0	1513	10.1	1410	9.9	1566	10.4	8.2	0.7
	Soft drinks & beer	608	5.4	938	6.3	939	6.6	972	6.5	9.1	0.7
	Wines & spirits	354	3.1	486	3.2	456	3.2	520	3.5	6.6	1.4
	Other foods	888	7.8	1291	8.6	1195	8.4	1294	8.6	7.8	0.0
	Sub total Food	5715	50.4	8085	53.9	7558	53.0	8136	54.1	7.2	0.1
	Non-Food										
	Cigarettes, tobacco, accessories	778	6.9	856	5.7	836	5.9	748	5.0	1.9	-2.7
	Cleaning & laundry products	358	3.2	458	3.1	453	3.2	434	2.9	5.0	-1.1
	Cosmetics & beauty	645	5.7	862	5.7	811	5.7	941	6.3	6.0	1.8
	Misc household products	422	3.7	530	3.5	486	3.4	504	3.3	4.7	-1.0
	Paper, stationery & related goods	247	2.2	302	2.0	274	1.9	275	1.8	4.1	-1.8
	Personal care	400	3.5	538	3.6	514	3.6	552	3.7	6.1	0.5
	Pharmaceuticals & medical prods.	1666	14.7	2027	13.5	2087	14.6	2128	14.1	4.0	1.0
	Other non foods	1111	9.8	1343	9.0	1241	8.7	1329	8.8	3.9	-0.2
	Sub total Non-food	5627	49.6	6915	46.1	6702	47.0	6910	45.9	4.2	0.0
	TOTAL	11342	100.0	15001	100.0	14260	100.0	15046	100.0	5.8	0.1

NB1 Soft drinks & beer includes multipacks

NB2 Cigarettes, tobacco & accessories includes vaping & tobacco substitutes

NB3 CTA shares increased due to uplift in estimated sales to this sector.

NB4 Includes GT substitution activity currently occurring but not anticipated additional substitution from GT opportunities shown in the Green Transition table set.



20	Comparison of Downside, Likely Outcome & Upside Folding Carton Output Forecasts - Total Europe - 2022 & 2023 - 000 Tonnes, % pa.			
		2022	2023	22 to 23
	Forecast	000 Tonnes	000 Tonnes	% p.a.
	Downside	6624	6052	-5.8
	Likely Outcome	6624	6371	-3.8
	Upside	6624	6689	-2.3

NB1: High low estimates for sales- High +1.5%, Low-2% above and below likely outcome forecast.

NB2 The 3 key short term issues are Price Inflation, Stock Changes & Green Transition.

Using tonnes and not Euros is a better way for NOA to show these factors.



21 Estimates & Forecasts of Carton Output Analysed by Market – Total Europe – 2017, 2022, 2023 & 2027 – 000 Tonnes													
		2017		2022		2023		2027		% p.a.	Mkt Growth % p.a.	GT Growth % p.a.	Combined Growth % p.a.
	SEC TO R	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	17 to 22	22 to 27	22 to 27	22 to 27
	Food												
	Breakfast cereal	290	5.0	314	4.7	286	4.5	283	4.0	1.6	-2.0	0.8	-1.2
	Cakes, biscuits,	352	6.1	406	6.1	384	6.0	449	6.3	2.9	2.0	2.5	4.5
	Chocolate & sugar	464	8.1	534	8.1	498	7.8	548	7.7	2.8	0.5	1.0	1.5
	Chilled foods	235	4.1	306	4.6	291	4.6	343	4.8	5.4	2.3	5.5	7.8
	Dry beverages	141	2.5	169	2.5	160	2.5	190	2.7	3.6	2.4	0.8	3.2
	Food to go	191	3.3	232	3.5	220	3.5	262	3.7	3.9	2.5	3.0	5.5
	Frozen food	658	11.4	840	12.7	796	12.5	935	13.1	5.0	2.2	1.4	3.6
	Soft drinks & beer	313	5.4	417	6.3	424	6.7	465	6.5	5.9	2.2	1.6	3.8



	Wines & spirits	179	3.1	212	3.2	202	3.2	244	3.4	3.4	2.8		2.8
	Other foods	523	9.1	656	9.9	617	9.7	707	9.9	4.6	1.5	0.8	2.3
	Sub total Food	3347	58.2	4085	61.7	3879	60.9	4425	62.2	4.1	1.6	1.7	3.3
	Non-Food												
	Cigarettes, tobacco,	390	6.8	370	5.6	367	5.8	348	4.9	-1.0	-1.3		-1.3
	Cleaning & laundry	242	4.2	266	4.0	268	4.2	272	3.8	2.0	0.4	2.0	2.4
	Cosmetics & beauty	209	3.6	241	3.6	230	3.6	282	4.0	2.9	3.2		3.2
	Misc household	226	3.9	245	3.7	228	3.6	250	3.5	1.6	0.4	1.0	1.4
	Paper, stationery &	120	2.1	127	1.9	117	1.8	124	1.7	1.0	-0.4	0.2	-0.1
	Personal care	178	3.1	206	3.1	200	3.1	227	3.2	3.0	2.0		2.0
	Pharmaceuticals &	556	9.7	583	8.8	610	9.6	658	9.2	1.0	2.5		2.5
	Other non foods	481	8.4	502	7.6	471	7.4	533	7.5	0.8	1.2	0.8	2.0



	Sub total Non-food	2402	41.8	2539	38.3	2492	39.1	2694	37.8	1.1	1.2	0.5	1.7
	TOTAL	5749	100.0	6624	100.0	6371	100.0	7119	100.0	2.9	1.5	1.2	2.7

NB1 Soft drinks & beer includes multipacks

NB2 Cigarettes, tobacco & accessories includes vaping & tobacco substitutes

NB3 CTA shares increased due to uplift in estimated sales to this sector.

NB4 Includes GT substitution activity currently occurring with standard specifications on standard packing machinery and listed in "Market Growth" column.

22	Estimates & Forecasts of Litho Laminated Container Sales Analysed by Market – 2022 – € Million		
	SECTOR	€ M	% Share
	Food		
	Confectionery	257.0	11.3
	Frozen Foods	44.6	2.0
	Drinks	419.9	18.4
	Other Foods	229.5	10.1
	Sub Total Food	951.1	41.6
	Other Non Foods	0.0	0.0
	Cleaning & Laundry	224.3	9.8
	Misc. Household	375.6	16.4
	Other Non Foods	375.6	16.4
	Sub Total Non Foods	975.5	42.7
	Others		
	Gifts & Presentation Packaging	167.9	7.4
	POS & Display	189.3	8.3
	Sub Total Others	357.2	15.6
	TOTAL	2283.7	100.0



23	Folding Carton Sales Value per Tonne Analysed by Market Sector - 2022 € per Tonne	
	SECTOR	€ per Tonne
	Food	
	Breakfast cereal products	1979
	Cakes, biscuits, baked products	1713
	Chocolate & sugar confectionery	2272
	Chilled foods	1836
	Dry beverages	1835
	Food to go	1968
	Frozen food	1800
	Soft drinks & beer	2250
	Wines & spirits	2295
	Other foods	1968
	Sub total Food	1979
	Non-Food	
	Cigarettes, tobacco, accessories	2312
	Cleaning & laundry products	1717
	Cosmetics & beauty	3581
	Misc household products	2164
	Paper, stationery & related goods	2381
	Personal care	2612
	Pharmaceuticals & medical prods.	3479
	Other non foods	2679
	Sub total Non-food	2724
	TOTAL	2265

NB1 Soft drinks & beer includes multipacks

NB2 Cigarettes, tobacco & accessories includes vaping & tobacco substitutes



24	Trends in Average Value per Tonne - Total Europe - 2017 to 2022 - € per Tonne			
	Year	€ per Tonne	% p.a.	Index 17=100
	2017	1973	-0.6	100
	2018	1962	-0.6	99
	2019	1960	-0.1	99
	2020	1926	-1.8	98
	2021	2004	4.0	102
	2022	2265	13.0	115
	Average % p.a. 17 to 22	2.8		

25	Estimates of Waste % - Analysed by Market - Total Europe - 2022	
	SECTOR	%
	Food	
	Breakfast cereal products	10.0
	Cakes, biscuits, baked products	14.2
	Chocolate & sugar confectionery	15.2
	Chilled foods	15.2
	Dry beverages	12.1
	Food to go	15.2
	Frozen food	15.2
	Soft drinks & beer	14.2
	Wines & spirits	14.2
	Other foods	14.2
	Sub total Food	14.3
	Non-Food	
	Cigarettes, tobacco, accessories	11.0
	Cleaning & laundry products	18.9
	Cosmetics & beauty	22.4
	Misc household products	22.4
	Paper, stationery & related goods	14.2
	Personal hygiene	17.5
	Pharmaceuticals & medical prods.	28.5
	Other non foods	20.4
	Sub total Non-food	21.0
	TOTAL	17.0

NB1 Soft drinks & beer includes multipacks

NB2 Cigarettes, tobacco & accessories includes vaping & tobacco substitutes



26	Estimates of Waste % - Analysed by Country - 2022	
	COUNTRY	%
	Austria	17.6
	Belgium	17.4
	France	16.3
	Germany	16.3
	Italy	16.6
	Netherlands	16.5
	Spain	16.5
	Switzerland	16.5
	Turkey	20.0
	U.K.	16.0
	Other Western Europe	16.5
	Sub total West Europe	16.9
	Nordic Region	15.9
	Poland	17.5
	Other Central Europe	17.5
	Sub total Central Europe	17.5
	Total Europe	17.0



27	Average Sales Price per Tonne of Carton Output - Analysed by Country - 2022 - €	
	COUNTRY	€ per Tonne
	Austria	2361
	Belgium	2407
	France	2772
	Germany	2180
	Italy	2379
	Netherlands	2298
	Spain	2543
	Switzerland	4802
	Turkey	2099
	U.K.	2531
	Other Western Europe	2260
	Sub total West Europe	2407
	Nordic Region	2121
	Poland	1637
	Other Central Europe	1742
	Sub total Central Europe	1677
	Total Europe	2265

NB Value per tonne influenced by pattern of end use demand in each country and changing currency parities in non Euro countries



28	Comparison of Forecast Growth in Carton Output & Carton Sales by Country - Average % p.a 2022 to 2027			
	COUNTRY	Carton Output	Carton Sales	Difference
	Austria	-0.2	-1.9	-1.7
	Belgium	-0.2	-1.7	-1.4
	France	0.5	-0.7	-1.2
	Germany	0.4	-1.1	-1.4
	Italy	0.5	-0.7	-1.2
	Netherlands	0.7	-0.5	-1.1
	Spain	1.1	0.1	-0.9
	Switzerland	-0.7	-3.2	-2.5
	Turkey	3.0	1.8	-1.2
	U.K.	0.7	-0.3	-0.9
	Other Western Europe	0.6	-0.3	-0.9
	Sub total West Europe	0.8	-0.5	-1.3
	Nordic Region	0.7	-0.2	-0.9
	Poland	4.8	3.8	-0.9
	Other Central Europe	2.9	2.0	-0.9
	Sub total Central Europe	4.1	3.1	-1.0
	Total Europe	1.5	0.1	-1.4



29	Forecasts of Carton Output Analysed by Country – 2022 & 2027 – 000 Tonnes - % p.a. & Incremental Business Forecasts						
		2022		2027		22 to 27	
	COUNTRY	000 Tonnes	%	000 Tonnes	%	% p.a.	Incr. 000 Tonnes
	Austria	167	2.5	166	2.3	-0.2	-1.6
	Belgium	134	2.0	133	1.9	-0.2	-1.7
	France	602	9.1	619	8.7	0.5	16.7
	Germany	1192	17.9	1215	17.1	0.4	23.5
	Italy	733	11.1	753	10.6	0.5	20.0
	Netherlands	352	5.3	364	5.1	0.7	11.7
	Spain	398	6.1	419	5.9	1.1	21.5
	Switzerland	87	1.4	83	1.2	-0.7	-3.0
	Turkey	630	8.9	730	10.2	3.0	99.4
	U.K.	695	10.5	718	10.1	0.7	23.0
	Other Western Europe	234	3.6	241	3.4	0.6	7.3
	Sub total West Europe	5223	78.3	5440	76.4	0.8	216.8
	Nordic Region	176	2.7	182	2.6	0.7	6.3
	Poland	765	12.0	967	13.6	4.8	201.1
	Other Central Europe	460	7.1	530	7.4	2.9	70.6
	Central Europe	1225	19.1	1497	21.0	4.1	271.8
	Total Europe	6624	100.0	7119	100.0	1.5	494.9

30	Forecasts of Incremental Carton Output Generated by Each Country Ranked by Size of Increment - 2022 to 2027 - 000 Tonnes		
	COUNTRY	000 Tonnes	%
	Poland	201.1	40.6
	Turkey	99.4	20.1
	Other Central Europe	70.6	14.3
	Germany	23.5	4.8
	U.K.	23.0	4.6
	Spain	21.5	4.3
	Italy	20.0	4.0
	France	16.7	3.4
	Netherlands	11.7	2.4
	Other Western Europe	7.3	1.5
	Nordic Region	6.3	1.3
	Austria	-1.6	-0.3
	Belgium	-1.7	-0.3
	Switzerland	-3.0	-0.6
	Total Europe	494.9	100.0



31	Forecasts of Carton Sales Analysed by Country – 2022 & 2027 – € Million - % p.a. & Incremental Business Forecasts						
	COUNTRY	2022		2027		22 to 27	
		€M	%	€M	%	% p.a.	Incr. €M
	Austria	395	2.6	358	2.6	-1.9	-36.5
	Belgium	324	1.9	298	2.2	-1.7	-26.1
	France	1669	12.1	1613	11.1	-0.7	-55.3
	Germany	2598	19.5	2464	17.3	-1.1	-133.9
	Italy	1743	11.3	1685	11.6	-0.7	-58.3
	Netherlands	808	5.5	790	5.4	-0.5	-18.6
	Spain	1012	6.3	1019	6.7	0.1	7.2
	Switzerland	415	3.0	353	2.8	-3.2	-62.1
	Turkey	1323	7.6	1446	8.8	1.8	123.2
	U.K.	1759	11.6	1735	11.7	-0.3	-23.9
	Other Western Europe	528	3.4	520	3.5	-0.3	-7.9
	Sub total West Europe	12573	84.9	12281	83.8	-0.5	-292.2
	Nordic Region	373	2.9	370	2.5	-0.2	-3.0
	Poland	1253	7.3	1512	8.4	3.8	259.2
	Other Central Europe	801	4.9	882	5.3	2.0	81.8
	Central Europe	2054	12.2	2395	13.7	3.1	341.0
	Total Europe	15001	100.0	15046	100.0	0.1	45.8

32	Forecasts of Incremental Value Of Carton Sales Generated By Each Country Ranked by Size of Increment – 2022 to 2027 – € Million		
	2022 to 2027		
	COUNTRY	€ M Incr	%
	Poland	259.2	566.1
	Turkey	123.2	269.2
	Other Central Europe	81.8	178.6
	Spain	7.2	15.8
	Nordic Region	-3.0	-6.5
	Other Western Europe	-7.9	-17.3
	Netherlands	-18.6	-40.7
	U.K.	-23.9	-52.2
	Belgium	-26.1	-56.9
	Austria	-36.5	-79.6
	France	-55.3	-120.8
	Italy	-58.3	-127.4
	Switzerland	-62.1	-135.7
	Germany	-133.9	-292.4
	Total Europe	45.8	100.0



33	Forecasts of Carton Sales Analysed by Generic Market – Total Europe – 2022 & 2027 – € Million - % Change & Incremental Business Forecasts						
		2022		2027		22 to 27	
	SECTOR	€M	%	€M	%	% p.a.	Incr. €M
	Food	6661	44.4	6644	44.2	-0.1	-17.2
	Drinks	1424	9.5	1493	9.9	0.9	68.3
	Non Food Consumables	5652	37.7	5664	37.6	0.0	11.7
	Sub total FMCG	13738	91.6	13800	91.7	0.1	62.8
	Durables & Household	1263	8.4	1246	8.3	-0.3	-17.0
	TOTAL	15001	100.0	15046	100.0	0.1	45.8

34	Forecasts of Incremental Carton Sales Generated By Each Market – 2022 to 2027 – € Million		
	SECTOR	€ M Incr	%
	Food	-17.2	-37.6
	Drinks	68.3	149.1
	Non Food Consumables	11.7	25.6
	Sub total FMCG	62.8	137.1
	Durables & Household	-17.0	-37.1
	TOTAL	45.8	100.0



35	Estimates & Forecasts of Carton Sales Analysed by Market – Total Europe – 2022 & 2027 – € Million - % Change & Incremental Business Forecasts						
		2022		2027		22 to 27	
	SECTOR	€M	%	€M	%	% p.a.	Incr. €M
	Food						
	Breakfast cereal products	621	3.9	522	3.5	-3.4	-99.1
	Cakes, biscuits, baked products	696	4.5	715	4.8	0.6	19.4
	Chocolate & sugar confectionery	1213	7.8	1158	7.7	-0.9	-55.7
	Chilled foods	563	3.7	586	3.9	0.8	23.3
	Dry beverages	309	2.0	324	2.2	1.0	15.0
	Food to go	456	3.0	480	3.2	1.0	23.9
	Frozen food	1513	9.9	1566	10.4	0.7	53.1
	Soft drinks & beer	938	6.6	972	6.5	0.7	34.1
	Wines & spirits	486	3.2	520	3.5	1.4	34.2
	Other foods	1291	8.4	1294	8.6	0.0	2.9
	Sub total Food	8085	53.0	8136	54.1	0.1	51.1
	Non-Food						
	Cigarettes, tobacco, accessories	856	5.9	748	5.0	-2.7	-108.7
	Cleaning & laundry products	458	3.2	434	2.9	-1.1	-23.7
	Cosmetics & beauty	862	5.7	941	6.3	1.8	78.3
	Misc household products	530	3.4	504	3.3	-1.0	-26.2
	Paper, stationery & related goods	302	1.9	275	1.8	-1.8	-26.1
	Personal hygiene	538	3.6	552	3.7	0.5	14.5
	Pharmaceuticals & medical prods.	2027	14.6	2128	14.1	1.0	101.3
	Other non foods	1343	8.7	1329	8.8	-0.2	-14.8
	Sub total Non-food	6915	47.0	6910	45.9	0.0	-5.3
	TOTAL	15001	100.0	15046	100.0	0.1	45.8

NB1 Soft drinks & beer includes multipacks

NB2 Cigarettes, tobacco & accessories includes vaping & tobacco substitutes



36	Forecasts of Incremental Carton Sales Generated By Each Market Ranked by Size of Increment – 2022 to 2027 – € Million		
	COUNTRY	€ M Incr	%
	Pharmaceuticals & medical prods.	101.3	221.2
	Cosmetics & beauty	78.3	171.1
	Frozen food	53.1	116.1
	Wines & spirits	34.2	74.8
	Soft drinks & beer	34.1	74.4
	Food to go	23.9	52.1
	Chilled foods	23.3	50.9
	Cakes, biscuits, baked products	19.4	42.3
	Dry beverages	15.0	32.8
	Personal hygiene	14.5	31.7
	Other foods	2.9	6.4
	Other non foods	-14.8	-32.4
	Cleaning & laundry products	-23.7	-51.7
	Paper, stationery & related goods	-26.1	-56.9
	Misc household products	-26.2	-57.1
	Chocolate & sugar confectionery	-55.7	-121.7
	Breakfast cereal products	-99.1	-216.5
	Cigarettes, tobacco, accessories	-108.7	-237.5
	TOTAL	45.8	100.0

NB1 Soft drinks & beer includes multipacks

NB2 Cigarettes, tobacco & accessories includes vaping & tobacco substitutes

NB3 Impact of COVID year 2020 is affecting the above growth estimates within and between sectors



37	Output of Cartonboard Cartons & Litho Laminated Microflute Cartons - Analysed by Country - 2022 - 000 Tonnes						
	COUNTRY	Cartonboard Cartons		Litho Laminated Printed Microflute Cartons		Total	
		000 Tonnes	%	000 Tonnes	%	000 Tonnes	%
	Austria	155	3.0	12	0.9	167	2.5
	Belgium	85	1.6	49	3.5	134	2.0
	France	491	9.4	111	7.9	602	9.1
	Germany	997	19.1	195	13.9	1192	18.0
	Italy	476	9.1	256	18.3	733	11.1
	Netherlands	293	5.6	59	4.2	352	5.3
	Spain	243	4.7	155	11.1	398	6.0
	Switzerland	74	1.4	13	0.9	87	1.3
	Turkey	431	8.3	199	14.2	630	9.5
	U.K.	642	12.3	53	3.8	695	10.5
	Other Western Europe	181	3.5	52	3.7	234	3.5
	Sub total West Europe	4069	77.9	1154	82.5	5223	78.8
	Nordic Region	138	2.6	38	2.7	176	2.7
	Poland	643	12.3	123	8.8	765	11.6
	Other Central Europe	374	7.2	85	6.1	460	6.9
	Central Europe	1017	19.5	208	14.8	1225	18.5
	Total Europe	5224	100.0	1400	100.0	6624	100.0



38	Comparison of Carton Output Index & GDP Index - 2017 to 2022 - 2017=100		
	COUNTRY	Carton Output Index	GDP Index
	Austria	126	107
	Belgium	117	108
	France	104	105
	Germany	108	103
	Italy	111	102
	Netherlands	116	110
	Spain	113	103
	Switzerland	97	108
	Turkey	110	124
	U.K.	115	103
	Other Western Europe	117	109
	Sub total West Europe	111	107
	Nordic Region	108	109
	Poland	149	121
	Other Central Europe	130	114
	Central Europe	141	117
	Total Europe	115	108



Green Transition

A	Primary Pack Substitution & Green Transition Trends in Folding Carton for Primary & Multi-Packs in Europe - 2017, 2022, 2023 & 2027 - % of Units					
	Pack Type	2017	2022	2023	2027	% '23 to '27
	Folding Cartons	28.8	31.6	33.2	36.0	2.8
	Flexible Pack	42.2	39.4	37.8	35.8	-2.0
	Other Primary Packs	29.0	29.0	29.0	28.2	-0.8
	TOTAL	100.0	100.0	100.0	100.0	0.0

NB1 This data is from independent MR sources & from NOA's shop observations.

NB2 This data reflects all markets (including FMCG)



B Estimates & Forecasts of Carton Output Analysed by Market – Total Europe – 2017, 2022, 2023 & 2027 – 000 Tonnes													
		2017		2022		2023		2027 Market Growth		17 to 22	22 to 27		
	SEC TOR	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	000 Tonnes	%	% p.a.	Mkt Growth % p.a.	GT Growth % p.a.	Combined Growth % p.a.
	Food												
	Breakfast cereal	290	5.0	314	4.7	286	4.5	283	4.0	1.6	-2.0	0.8	-1.2
	Cakes, biscuits,	352	6.1	406	6.1	384	6.0	449	6.3	2.9	2.0	2.5	4.5
	Chocolate & sugar	464	8.1	534	8.1	498	7.8	548	7.7	2.8	0.5	1.0	1.5
	Chilled foods	235	4.1	306	4.6	291	4.6	343	4.8	5.4	2.3	5.5	7.8
	Dry beverage	141	2.5	169	2.5	160	2.5	190	2.7	3.6	2.4	0.8	3.2
	Food to go	191	3.3	232	3.5	220	3.5	262	3.7	3.9	2.5	3.0	5.5
	Frozen food	658	11.4	840	12.7	796	12.5	935	13.1	5.0	2.2	1.4	3.6
	Soft drinks & beer	313	5.4	417	6.3	424	6.7	465	6.5	5.9	2.2	1.6	3.8
	Wines & spirits	179	3.1	212	3.2	202	3.2	244	3.4	3.4	2.8		2.8



	Other foods	523	9.1	656	9.9	617	9.7	707	9.9	4.6	1.5	0.8	2.3
	Sub total Food	3347	58.2	4085	61.7	3879	60.9	4425	62.2	4.1	1.6	1.7	3.3
	Non-Food												
	Cigarettes, tobacco,	390	6.8	370	5.6	367	5.8	348	4.9	-1.0	-1.3		-1.3
	Cleaning & laundry	242	4.2	266	4.0	268	4.2	272	3.8	2.0	0.4	2.0	2.4
	Cosmetics & beauty	209	3.6	241	3.6	230	3.6	282	4.0	2.9	3.2		3.2
	Misc household	226	3.9	245	3.7	228	3.6	250	3.5	1.6	0.4	1.0	1.4
	Paper, stationery	120	2.1	127	1.9	117	1.8	124	1.7	1.0	-0.4	0.2	-0.1
	Personal care	178	3.1	206	3.1	200	3.1	227	3.2	3.0	2.0		2.0
	Pharmaceuticals &	556	9.7	583	8.8	610	9.6	658	9.2	1.0	2.5		2.5
	Other non foods	481	8.4	502	7.6	471	7.4	533	7.5	0.8	1.2	0.8	2.0
	Sub total Non-food	2402	41.8	2539	38.3	2492	39.1	2694	37.8	1.1	1.2	0.5	1.7
	TOTAL	5749	100.0	6624	100.0	6371	100.0	7119	100.0	2.9	1.5	1.2	2.7



NB1 Soft drinks & beer includes multipacks

NB2 Cigarettes, tobacco & accessories includes vaping & tobacco substitutes

NB3 CTA shares increased due to uplift in estimated sales to this sector.

NB4 Includes GT substitution activity currently occurring with standard specifications on standard packing machinery and listed in "Market Growth" column



C Estimates & Forecasts of Carton Sales Analysed by Market – Total Europe – 2022 & 2027 – € Million - % Change & Incremental Business Forecasts													
		2022		2027						22 to 27			
		Total Growth		Market Growth			GT Growth	Total Growth Combined			Market Growth	GT Growth	Total Growth Combined
SECTOR	€M	%	€M	%	Incr. €M	Incr. €M	€M	%	Incr. €M	% p.a.	% p.a.	% p.a.	
Food													
Breakfast cereal products	621	4.1	283	4.0	-99	22	543	3.4	-77.6	-3.4	0.8	-2.6	
Cakes, biscuits, baked	696	4.6	449	6.3	19	90	805	5.1	109.9	0.6	2.4	3.0	
Chocolate & sugar confection	1213	8.1	548	7.7	-56	56	1214	7.7	0.3	-0.9	0.9	0.0	
Chilled foods	563	3.8	343	4.8	23	177	763	4.8	200.0	0.8	5.5	6.3	
Dry beverages	309	2.1	190	2.7	15	13	337	2.1	27.8	1.0	0.8	1.7	
Food to go	456	3.0	262	3.7	24	75	554	3.5	98.7	1.0	3.0	4.0	
Frozen food	1513	10.1	935	13.1	53	113	1679	10.6	165.9	0.7	1.4	2.1	
Soft drinks & beer	938	6.3	465	6.5	34	79	1052	6.6	113.5	0.7	1.6	2.3	



	Wines & spirits	486	3.2	244	3.4	34		520	3.3	34.2	1.4		1.4
	Other foods	1291	8.6	707	9.9	3	51	1345	8.5	54.4	0.0	0.8	0.8
	Sub total Food	8085	53.9	4425	62.2	51	676	8812	55.6	727.0	0.1	1.6	1.7
	Non-Food												
	Cigarettes, tobacco, accessories	856	5.7	348	4.9	-109		748	4.7	-108.7	-2.7	0.0	-2.7
	Cleaning & laundry products	458	3.1	272	3.8	-24	46	479	3.0	21.9	-1.1	2.0	0.9
	Cosmetics & beauty	862	5.7	282	4.0	78		941	5.9	78.3	1.8		1.8
	Misc household products	530	3.5	250	3.5	-26	24	528	3.3	-1.8	-1.0	0.9	-0.1
	Paper, stationery & related	302	2.0	124	1.7	-26	3	279	1.8	-22.7	-1.8	0.2	-1.6
	Personal hygiene	538	3.6	227	3.2	15		552	3.5	14.5	0.5		0.5
	Pharmaceuticals & medical	2027	13.5	658	9.2	101		2128	13.4	101.3	1.0		1.0
	Other non foods	1343	9.0	533	7.5	-15	53	1382	8.7	38.2	-0.2	0.8	0.6
	Sub total Non-food	6915	46.1	2694	37.8	-5	126	7036	44.4	121.0	0.0	0.4	0.3
	TOTAL	15001	100.0	7119	100.0	46	802	15849	100.0	848.0	0.1	1.0	1.1



NB1 Soft drinks & beer includes multipacks

NB2 Cigarettes, tobacco & accessories includes vaping & tobacco substitutes

NB3 GT Growth % p.a. = Combined Growth % p.a. less Market Growth % p.a.

D	Estimates & Forecasts of Additional Carton Sales & Output From Green Transition Only - Analysed by Market – Total Europe – 2022 & 2027 – € Million, 000 Tonnes - Incremental Business Forecasts				
	SECTOR	€M	%	000 Tonnes	%
	Food				
	Chilled foods	176.7	22.0	103.4	23.3
	Frozen food	112.7	14.1	67.3	15.2
	Cakes, biscuits, baked products	90.5	11.3	56.8	12.8
	Food to go	74.8	9.3	40.9	9.2
	Soft drinks & beer	79.4	9.9	38.0	8.6
	Other foods	51.5	6.4	28.1	6.3
	Chocolate & sugar confectionery	56.0	7.0	26.5	6.0
	Breakfast cereal products	21.5	2.7	11.7	2.6
	Dry beverages	12.8	1.6	7.5	1.7
	Wines & spirits				
	Sub total Food	675.9	84.3	380.2	85.7
	Cleaning & laundry products	45.5	5.7	28.5	6.4
	Other non foods	53.0	6.6	21.3	4.8
	Misc household products	24.4	3.0	12.1	2.7
	Paper, stationery & related goods	3.3	0.4	1.5	0.3
	Non-Food				
	Cigarettes, tobacco, accessories				
	Cosmetics & beauty				
	Personal hygiene				
	Pharmaceuticals & medical prods.				
	Sub total Non-food	126.3	15.7	63.4	14.3
	TOTAL	802.2	100.0	443.6	100.0

NB1 Soft drinks & beer includes multipacks

NB2 Cigarettes, tobacco & accessories includes vaping & tobacco substitutes

NB3 Excludes gains forecast in main European table set.

NB4 Total growth for GT represents 6.4% of total annual European FC volume in tonnes by 2027



E					
NOA's Estimates of Share of Shelf Space by Each Pack Type Analysed by 5 Main Target Sectors for Substitution - 2023					
		Folding Cartons	Flex-ibles	Others	Total
	EUM				
	Cakes, Biscuits & Bakery	27	65	8	100
	Chilled Foods	12	28	60	100
	Frozen Foods	35	55	10	100
	Beer & Soft Drinks	48	34	18	100
	Cleaning & Laundry	43	7	50	100

F					
NOA's Estimates of Share of Shelf Space by Each Pack Type Analysed by 5 Main Target Sectors for Substitution - 2027					
		Folding Cartons	Flex-ibles	Others	Total
	EUM				
	Cakes, Biscuits & Bakery	30	63	7	100
	Chilled Foods	16	26	58	100
	Frozen Foods	38	54	8	100
	Beer & Soft Drinks	50	31	19	100
	Cleaning & Laundry	46	4	50	100



Country Overview

1 Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - Total Europe – 2017 to 2027 - 000 Tonnes & € Million											
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100	
2017	6167	4.0	100.0	5749	3.4	100.0	100.0	11342	2.8	100.0	
2018	6268	1.6	101.6	5806	1.0	101.0	102.2	11390	0.4	100.4	
2019	6555	4.6	106.3	6077	4.7	105.7	103.9	11913	4.6	105.0	
2020	6784	3.5	110.0	6312	3.9	109.8	98.1	12155	2.0	107.2	
2021	6915	1.9	112.1	6524	3.4	113.5	104.2	13071	7.5	115.2	
2022	7521	8.8	122.0	6624	1.5	115.2	108.1	15001	14.8	132.3	
2023	6833	-9.2	110.8	6371	-3.8	110.8	109.0	14260	-4.9	125.7	
2024	6697	-2.0	108.6	6500	2.0	113.1	110.8	13826	-3.0	121.9	
2025	7158	6.9	116.1	6707	3.2	116.7	113.2	14234	3.0	125.5	
2026	7375	3.0	119.6	6916	3.1	120.3	115.6	14647	2.9	129.1	
2027	7586	2.9	123.0	7119	2.9	123.8	117.7	15046	2.7	132.7	
Average % p.a. 17 to 22	4.1			2.9			1.6	5.8			
Average % p.a. 22 to 27	0.2			1.5			1.7	0.1			



2	Estimates & Forecasts of European Cartonboard Purchases Adapted for Feedback from the European Board Mills, Folding Carton Output & Sales Turnover - All Countries – 2017 to 2027 - 000 Tonnes & € Million										
	Purchases Adapted for Feedback from the European Board Mills			Carton Output			GDP Index	Carton Sales			
	Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100
2017	6167	4.0	100	5749	3.4	100	100.0	11342	2.8	100	
2018	6268	1.6	102	5806	1.0	101	102.2	11390	0.4	100	
2019	6555	4.6	106	6077	4.7	106	103.9	11913	4.6	105	
2020	6784	3.5	110	6312	3.9	110	98.1	12155	2.0	107	
2021	7055	4.0	112	6524	3.4	113	104.2	13071	7.5	115	
2022	7479	6.0	122	6624	1.5	115	108.1	15001	14.8	132	
2023	6776	-9.4	111	6371	-3.8	111	109.0	14260	-4.9	126	
2024	6911	2.0	109	6500	2.0	113	110.8	13826	-3.0	122	
2025	7188	4.0	116	6707	3.2	117	113.2	14234	3.0	125	
2026	7375	2.6	120	6916	3.1	120	115.6	14647	2.9	129	
2027	7586	2.9	123	7119	2.9	124	117.7	15046	2.7	133	
Average % p.a.17 to 22	3.9			2.9			1.6	5.8			
Average % p.a. 23 to 27	0.3			1.5			1.7	0.1			

NB1: 2022 and 2023 based loosely on CEPI data (and knowledge of increase of other non-CEPI imports). 2024 estimate based on that medium term tonnage will reflect output as stocks are balanced.

NB2 Purchases & Output balance between 2020 and 2025 @6% growth in total.

NB3 2022- Purchases- Was growing at +8% in h1 and negative in H2 for HE; growing until Q3 for SE



3 Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - Austria – 2017 to 2027 - 000 Tonnes & € Million											
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100	
2017	155	9.2	100.0	133	9.0	100.0	100.0	297	8.0	100.0	
2018	158	1.9	101.9	136	2.3	102.3	102.4	294	-1.0	99.0	
2019	170	7.6	109.6	146	7.4	109.9	104.0	310	5.4	104.3	
2020	171	0.6	110.3	147	0.7	110.6	97.3	307	-1.0	103.3	
2021	185	8.2	119.4	159	8.2	119.7	101.7	340	10.7	114.4	
2022	194	4.9	125.2	167	5.0	125.7	106.8	395	16.2	132.9	
2023	185	-4.7	119.3	159	-4.7	119.8	107.3	370	-6.2	124.7	
2024	186	0.5	119.9	160	0.5	120.4	108.4	352	-5.0	118.4	
2025	188	1.4	121.6	162	1.2	121.8	110.3	354	0.7	119.2	
2026	190	1.0	122.8	164	1.1	123.1	112.2	356	0.6	119.9	
2027	192	1.0	124.0	166	1.1	124.5	114.1	358	0.6	120.6	
Average % p.a. 17 to 22	4.6	0.0	0	4.7	0.0	0	1.3	5.9	0.0	0	
Average % p.a. 22 to 27	-0.2	0.0	0	-0.2	0.0	0	1.3	-1.9	0.0	0	

NB1 Past sales values are at current prices

NB2 2023 sales includes downward price adjustment of -1% assuming lower prices through the year.

NB3 2024 sales includes a further downward price adjustment of -5% as new lower cost materials feed through.

NB4 Past sales are at actual prices, while forecasts for 2025 to 2027 are at constant prices.



4 Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - Belgium – 2017 to 2027 - 000 Tonnes & € Million											
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100	
2017	109	0.0	100.0	115	1.0	100.0	100.0	217	0.8	100.0	
2018	113	3.3	103.3	119	3.6	103.6	101.8	223	3.0	103.0	
2019	113	0.8	104.1	121	1.3	104.9	104.1	225	0.6	103.6	
2020	115	1.0	105.2	122	1.0	106.0	98.5	226	0.4	104.0	
2021	143	25.2	131.6	127	4.0	110.2	104.5	263	16.5	121.1	
2022	135	-6.0	123.8	134	6.0	116.9	107.8	324	23.2	149.2	
2023	114	-15.2	104.9	129	-4.2	111.9	108.5	306	-5.4	141.2	
2024	105	-8.1	96.5	130	0.7	112.7	109.7	292	-4.5	134.8	
2025	124	17.6	113.4	131	0.8	113.6	111.0	294	0.6	135.6	
2026	124	0.7	114.2	132	0.8	114.5	112.4	296	0.6	136.5	
2027	125	0.7	115.0	133	0.8	115.4	113.7	298	0.6	137.2	
Average % p.a. 17 to 22	4.4			3.2			1.5	8.3			
Average % p.a. 22 to 27	-1.5			-0.2			1.1	-1.7			

NB1 Past sales values are at current prices

NB2 2023 sales includes downward price adjustment of -1% assuming lower prices through the year.

NB3 2024 sales includes a further downward price adjustment of -5% as new lower cost materials feed through.

NB4 Past sales are at actual prices, while forecasts for 2025 to 2027 are at constant prices.



5 Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - France – 2017 to 2027 - 000 Tonnes & € Million											
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100	
2017	605	0.6	100.0	580	0.6	100.0	100.0	1370	1.1	100.0	
2018	605	0.0	100.0	581	0.1	100.1	101.8	1372	0.1	100.1	
2019	612	1.1	101.1	588	1.2	101.3	103.7	1388	1.2	101.3	
2020	617	0.8	101.9	593	0.9	102.2	95.5	1395	0.5	101.8	
2021	654	6.0	108.0	611	3.0	105.3	102.0	1423	2.0	103.8	
2022	744	13.8	122.9	602	-1.5	103.7	104.7	1669	17.3	121.8	
2023	583	-21.6	96.4	578	-4.0	99.6	105.4	1585	-5.0	115.7	
2024	509	-12.7	84.1	586	1.4	100.9	106.7	1527	-3.6	111.4	
2025	622	22.2	102.8	598	2.0	102.9	108.8	1558	2.0	113.7	
2026	633	1.8	104.6	609	1.9	104.9	110.7	1587	1.9	115.8	
2027	643	1.6	106.3	619	1.7	106.6	112.4	1613	1.7	117.7	
Average % p.a. 17 to 22	4.2			0.7			0.9	4.0			
Average % p.a. 22 to 27	-2.9			0.5			1.4	-0.7			

NB1 Past sales values are at current prices

NB2 2023 sales includes downward price adjustment of -1% assuming lower prices through the year.

NB3 2024 sales includes a further downward price adjustment of -5% as new lower cost materials feed through.

NB4 Past sales are at actual prices, while forecasts for 2025 to 2027 are at constant prices.



6 Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - Germany – 2017 to 2027 - 000 Tonnes & € Million											
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100	
2017	1188	1.0	100.0	1104	1.1	100.0	100.0	2215	1.4	100.0	
2018	1209	1.7	101.7	1115	1.0	101.0	101.0	2212	-0.1	99.9	
2019	1313	8.6	110.5	1212	8.7	109.8	102.0	2288	3.4	103.3	
2020	1353	3.1	113.9	1251	3.2	113.3	98.3	2289	0.1	103.4	
2021	1231	-9.0	103.6	1221	-2.4	110.6	100.9	2246	-1.9	101.4	
2022	1379	12.0	116.1	1192	-2.4	108.0	102.7	2598	15.7	117.3	
2023	1251	-9.3	105.3	1138	-4.5	103.1	102.5	2449	-5.7	110.6	
2024	1218	-2.6	102.5	1152	1.2	104.3	103.7	2351	-4.0	106.1	
2025	1271	4.4	107.0	1176	2.1	106.6	105.8	2396	1.9	108.2	
2026	1295	1.8	109.0	1199	1.9	108.6	107.7	2437	1.7	110.0	
2027	1311	1.2	110.3	1215	1.3	110.1	109.1	2464	1.1	111.3	
Average % p.a. 17 to 22	3.0			1.5			0.5	3.2			
Average % p.a. 22 to 27	-1.0			0.4			1.2	-1.1			

NB1 Past sales values are at current prices

NB2 2023 sales includes downward price adjustment of -1% assuming lower prices through the year.

NB3 2024 sales includes a further downward price adjustment of -5% as new lower cost materials feed through.

NB4 Past sales are at actual prices, while forecasts for 2025 to 2027 are at constant prices.



7 Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - Italy – 2017 to 2027 - 000 Tonnes & € Million											
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100	
2017	649	1.9	100.0	662	1.9	100.0	100.0	1282	3.0	100.0	
2018	655	0.9	100.9	668	0.9	100.9	100.9	1327	3.5	103.5	
2019	681	3.9	104.8	694	3.9	104.8	101.4	1393	5.0	108.6	
2020	679	-0.3	104.5	692	-0.3	104.5	92.3	1337	-4.0	104.3	
2021	713	5.1	109.8	740	6.9	111.7	98.8	1417	6.0	110.5	
2022	786	10.2	121.1	733	-1.0	110.6	102.4	1743	23.0	135.9	
2023	693	-11.8	106.7	708	-3.3	106.9	103.1	1667	-4.3	130.0	
2024	655	-5.5	100.8	717	1.3	108.3	103.9	1605	-3.7	125.2	
2025	715	9.2	110.1	730	1.7	110.2	105.1	1633	1.7	127.3	
2026	726	1.5	111.8	741	1.6	111.9	106.3	1659	1.6	129.4	
2027	736	1.4	113.4	753	1.5	113.6	107.4	1685	1.5	131.4	
Average % p.a. 17 to 22	3.9			2.0			0.5	6.3			
Average % p.a. 22 to 27	-1.3			0.5			1.0	-0.7			

NB1 Past sales values are at current prices

NB2 2023 sales includes downward price adjustment of -1% assuming lower prices through the year.

NB3 2024 sales includes a further downward price adjustment of -5% as new lower cost materials feed through.

NB4 Past sales are at actual prices, while forecasts for 2025 to 2027 are at constant prices.



8 Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - Netherlands – 2017 to 2027 - 000 Tonnes & € Million											
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100	
2017	322	-6.0	100.0	303	-5.8	100.0	100.0	625	-5.2	100.0	
2018	326	1.2	101.2	307	1.2	101.2	102.4	646	3.4	103.4	
2019	330	1.2	102.4	311	1.3	102.5	104.4	655	1.4	104.8	
2020	339	2.6	105.1	319	2.7	105.3	100.3	670	2.2	107.1	
2021	349	3.0	108.2	332	4.0	109.5	105.2	703	5.0	112.4	
2022	380	8.9	117.9	352	6.0	116.1	109.9	808	15.0	129.3	
2023	365	-3.9	113.3	340	-3.3	112.3	111.1	775	-4.2	123.9	
2024	369	0.9	114.4	345	1.4	113.9	112.4	748	-3.5	119.6	
2025	373	1.3	115.8	351	1.7	115.8	114.2	762	1.8	121.8	
2026	380	1.7	117.7	357	1.8	0.0	115.9	776	1.9	124.1	
2027	386	1.6	119.6	364	1.7	0.0	117.7	790	1.8	126.3	
Average % p.a. 17 to 22	3.3			3.0			1.9	5.3			
Average % p.a. 22 to 27	0.3			0.7			1.4	-0.5			

NB1 Past sales values are at current prices

NB2 2023 sales includes downward price adjustment of -1% assuming lower prices through the year.

NB3 2024 sales includes a further downward price adjustment of -5% as new lower cost materials feed through.

NB4 Past sales are at actual prices, while forecasts for 2025 to 2027 are at constant prices.



9	Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - Spain – 2017 to 2027 - 000 Tonnes & € Million										
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
	Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100
2017	375	3.3	100.0	352	2.8	100.0	100.0	715	2.9	100.0	
2018	386	2.9	102.9	362	2.8	102.8	102.3	737	3.1	103.1	
2019	388	0.5	103.5	365	0.8	103.7	104.3	756	2.5	105.7	
2020	392	1.0	104.5	368	0.8	104.5	92.5	728	-3.7	101.8	
2021	407	3.9	108.6	383	4.1	108.8	97.6	820	12.7	114.7	
2022	423	4.0	112.9	398	3.9	113.1	102.9	1012	23.4	141.5	
2023	412	-2.8	109.7	387	-2.8	109.9	104.5	977	-3.5	136.6	
2024	420	2.2	112.1	395	2.2	112.3	106.6	952	-2.5	133.2	
2025	430	2.3	114.7	404	2.2	114.8	108.7	976	2.5	136.5	
2026	438	1.8	116.8	412	1.9	117.0	110.6	998	2.2	139.5	
2027	446	1.8	118.8	419	1.9	119.2	112.4	1019	2.2	142.6	
Average % p.a. 17 to 22	2.5			2.5			0.6	7.2			
Average % p.a. 22 to 27	1.0			1.1			1.8	0.1			

NB1 Past sales values are at current prices

NB2 2023 sales includes downward price adjustment of -1% assuming lower prices through the year.

NB3 2024 sales includes a further downward price adjustment of -5% as new lower cost materials feed through

NB4 Past sales are at actual prices, while forecasts for 2025 to 2027 are at constant prices.



10	Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - Switzerland – 2017 to 2027 - 000 Tonnes & € Million										
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
	Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100
	2017	101	-3.8	100.0	90	-3.7	100.0	100.0	342	-5.2	100.0
	2018	98	-2.6	97.4	87	-2.5	97.5	102.9	319	-6.7	93.3
	2019	96	-2.0	95.4	86	-1.9	95.6	104.1	320	0.3	93.6
	2020	95	-1.7	93.8	84	-1.6	94.1	101.5	322	0.5	94.1
	2021	95	0.0	93.8	86	1.8	95.7	105.7	323	0.5	94.6
	2022	110	15.8	108.5	87	0.9	96.6	108.0	415	28.4	121.4
	2023	97	-11.3	96.3	86	-0.3	96.4	108.9	405	-2.5	118.4
	2024	88	-9.4	87.3	86	-0.6	95.8	110.8	377	-6.9	110.2
	2025	96	8.5	94.7	85	-1.1	94.7	112.2	368	-2.3	107.7
	2026	95	-0.6	94.1	84	-0.5	94.3	114.2	362	-1.7	105.8
	2027	94	-1.2	93.0	83	-1.1	93.3	115.6	353	-2.3	103.3
	Average % p.a. 17 to 22	1.7			-0.7			1.5	4.0		
	Average % p.a. 22 to 27	-3.0			-0.7			1.4	-3.2		

NB1 Past sales values are at current prices & average annual exchange rates

NB2 2023 sales includes downward price adjustment of -1% assuming lower prices through the year.

NB3 2024 sales includes a further downward price adjustment of -5% as new lower cost materials feed through.

NB4 Past sales are at actual prices, while forecasts for 2025 to 2027 are at constant prices & exchange rates.

Year	CHF FX	% Chg Parity	Local M Sales	% p.a.
2017	1.1116	2.0	380	-3.4
2018	1.1550	3.9	369	-3.0
2019	1.1132	-3.6	357	-3.3
2020	1.0706	-3.8	345	-3.4
2021	1.0813	1.0	350	1.5
2022	1.0052	-7.0	418	19.4
2023	1.0052		407	-2.5
2024	1.0052		379	-6.9
2025	1.0052		370	-2.3
2026	1.0052		364	-1.7
2027	1.0052		355	-2.3
Average % p.a. 17 to 22			1.9	
Average % p.a. 22 to 27			-3.2	



11 Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - Turkey – 2017 to 2027 - 000 Tonnes & € Million											
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
	Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100
	2017	599	16.3	100.0	573	16.9	100.0	100.0	859	16.9	100.0
	2018	561	-6.3	93.7	525	-8.4	91.6	103.0	761	-11.4	88.6
	2019	627	11.7	104.7	590	12.4	103.0	103.8	915	20.2	106.5
	2020	659	5.1	110.0	626	6.1	109.2	105.8	1096	19.8	127.6
	2021	664	0.8	110.9	639	2.1	111.5	117.8	1342	22.4	156.2
	2022	655	-1.4	109.3	630	-1.4	110.0	124.4	1323	-1.4	154.0
	2023	589	-10.0	98.4	567	-10.0	99.0	127.7	1161	-12.2	135.2
	2024	630	7.0	105.2	607	7.0	105.9	132.3	1189	2.4	138.4
	2025	670	6.3	111.8	645	6.4	112.6	136.3	1269	6.8	147.7
	2026	712	6.3	118.8	686	6.4	119.7	140.3	1355	6.8	157.7
	2027	756	6.3	126.2	730	6.4	127.3	144.6	1446	6.8	168.3
	Average % p.a. 17 to 22	1.8			1.9			4.5	9.0		
	Average % p.a. 22 to 27	2.9			3.0			3.1	1.8		

NB1 Past sales values are at current prices & average annual exchange rates

NB3 2024 sales includes a further downward price adjustment of -5% as new lower cost materials feed through.

NB4 Past sales are at actual prices, while forecasts for 2025 to 2027 are at constant prices & exchange rates.

Year	Tky Lira FX	% Chg Parity	Local M Sales	% p.a.
2017	4.1181	23.2	3537	44.0
2018	5.6973	38.3	4336	22.6
2019	6.3634	11.7	5823	34.3
2020	8.0542	26.6	8827	51.6
2021	10.4889	30.2	14071	59.4
2022	17.3588	65.5	22961	63.2
2023	17.3588		20160	-12.2
2024	17.3588		20633	2.4
2025	17.3588		22026	6.7
2026	17.3588		23513	6.7
2027	17.3588		25100	6.7
Average % p.a. 17 to 22			45.4	
Average % p.a. 22 to 27			1.8	



12	Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - UK – 2017 to 2027 - 000 Tonnes & € Million										
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
	Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100
	2017	654	8.1	100.0	606	4.1	100.0	100.0	1317	0.4	100.0
	2018	670	2.5	102.5	621	2.5	102.5	101.7	1322	0.3	100.3
	2019	662	-1.2	101.2	612	-1.5	101.0	103.3	1394	5.4	105.8
	2020	687	3.7	105.0	655	7.1	108.1	91.9	1398	0.3	106.1
	2021	695	1.2	106.2	662	1.0	109.3	98.9	1537	9.9	116.6
	2022	737	6.0	112.6	695	4.9	114.7	102.9	1759	14.5	133.5
	2023	713	-3.3	108.9	668	-3.9	110.2	103.3	1678	-4.6	127.4
	2024	723	1.5	110.5	674	1.0	111.3	104.3	1615	-3.7	122.6
	2025	734	1.5	112.2	689	2.2	113.7	106.6	1655	2.5	125.6
	2026	750	2.1	114.6	704	2.2	116.2	108.7	1697	2.5	128.8
	2027	764	1.9	116.7	718	2.0	118.5	110.6	1735	2.3	131.7
	Average % p.a. 17 to 22	2.4			2.8			0.6	6.0		
	Average % p.a. 22 to 27	0.7			0.7			1.5	-0.3		

NB1 Past sales values are at current prices & average annual exchange rates

NB2 2023 sales includes downward price adjustment of -1% assuming lower prices through the year.

NB3 2024 sales includes a further downward price adjustment of -5% as new lower cost materials feed through.

NB4 Past sales are at actual prices, while forecasts for 2025 to 2027 are at constant prices & exchange rates.

Year	UK £ FX	% Chg Parity	Local Currency Sales	% p.a.
2017	0.8767	7.1	1155	7.4
2018	0.8850	0.9	1170	1.3
2019	0.8779	-0.8	1223	4.6
2020	0.8899	1.4	1244	1.7
2021	0.8600	-3.4	1322	6.2
2022	0.8526		1500	13.5
2023	0.8526		1431	-4.6
2024	0.8526		1377	-3.7
2025	0.8526		1411	2.5
2026	0.8526		1446	2.5
2027	0.8526		1479	2.3
Average % p.a. 17 to 22			5.4	
Average % p.a. 22 to 27			-0.3	



13	Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - Other Western Europe – 2017 to 2027 - 000 Tonnes & € Million										
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
	Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100
	2017	204	1.7	100.0	200	1.6	100.0	100.0	385	2.2	100.0
	2018	208	1.6	101.6	204	1.6	101.6	102.3	393	1.9	101.9
	2019	212	2.2	103.8	208	2.3	104.0	104.7	403	2.6	104.6
	2020	216	1.9	105.8	212	2.0	106.0	95.6	409	1.5	106.1
	2021	226	4.7	110.8	225	5.9	112.3	102.2	437	7.0	113.5
	2022	253	11.8	123.9	234	3.9	116.6	108.7	528	20.6	137.0
	2023	231	-8.7	113.1	227	-2.9	113.2	110.6	509	-3.6	132.1
	2024	224	-3.2	109.5	230	1.4	114.9	112.4	492	-3.3	127.8
	2025	238	6.6	116.7	234	1.6	116.8	114.4	502	1.9	130.2
	2026	242	1.4	118.3	237	1.5	118.5	116.3	511	1.8	132.6
	2027	245	1.3	119.9	241	1.4	120.3	118.2	520	1.7	134.9
	Average % p.a. 17 to 22	4.4			3.1			1.7	6.5		
	Average % p.a. 22 to 27	-0.6			0.6			1.7	-0.3		

NB1 Past sales values are at current prices.

NB2 2023 sales includes downward price adjustment of -1% assuming lower prices through the year.

NB3 2024 sales includes a further downward price adjustment of -5% as new lower cost materials feed through.

NB4 Past sales are at actual prices, while forecasts for 2025 to 2027 are at constant p



14	Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - Total Western Europe – 2017 to 2027 - 000 Tonnes & € Million										
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
	Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100
	2017	4962	3.4	100.0	4719	3.0	100.0	100.0	9625	2.2	100.0
	2018	4989	0.5	100.5	4726	0.1	100.1	101.8	9607	-0.2	99.8
	2019	5204	4.3	104.9	4933	4.4	104.5	103.2	10047	4.6	104.4
	2020	5321	2.2	107.2	5071	2.8	107.5	96.8	10176	1.3	105.7
	2021	5363	0.8	108.1	5185	2.3	109.9	102.9	10850	6.6	112.7
	2022	5795	8.1	116.8	5223	0.7	110.7	106.6	12573	15.9	130.6
	2023	5234	-9.7	105.5	4988	-4.5	105.7	107.6	11883	-5.5	123.5
	2024	5127	-2.0	103.3	5082	1.9	107.7	109.2	11500	-3.2	119.5
	2025	5462	6.5	110.1	5204	2.4	110.3	111.4	11767	2.3	122.2
	2026	5584	2.2	112.5	5326	2.3	112.9	113.5	12032	2.3	125.0
	2027	5697	2.0	114.8	5440	2.1	115.3	115.3	12281	2.1	127.6
	Average % p.a. 17 to 22	3.2			2.1			1.3	5.5		
	Average % p.a. 22 to 27	-0.3			0.8			1.6	-0.5		



15	Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - Nordic – 2017 to 2027 - 000 Tonnes & € Million										
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
	Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100
	2017	176	1.7	100.0	163	1.7	100.0	100.0	330	1.3	100.0
	2018	178	1.3	101.3	165	1.3	101.3	101.6	321	-2.7	97.3
	2019	180	1.3	102.6	167	1.3	102.6	103.1	310	-3.5	94.0
	2020	182	1.0	103.6	169	1.0	103.6	101.1	299	-3.5	90.7
	2021	186	2.1	105.8	175	3.4	107.2	105.7	323	8.0	98.0
	2022	204	9.6	116.0	176	0.7	107.9	108.7	373	15.7	113.3
	2023	187	-8.4	106.3	169	-4.0	103.7	109.1	356	-4.6	108.1
	2024	183	-1.9	104.3	172	1.6	105.3	110.7	345	-3.0	104.8
	2025	189	3.2	107.6	176	2.1	107.6	112.8	354	2.5	107.4
	2026	193	2.0	109.7	179	2.0	109.7	114.8	362	2.3	109.9
	2027	197	1.9	111.8	182	1.9	111.8	116.8	370	2.3	112.4
	Average % p.a. 17 to 22	3.0			1.5			1.7	2.5		
	Average % p.a. 22 to 27	-0.7			0.7			1.4	-0.2		

NB1 Past sales values are at current prices & average annual exchange rates

NB2 2023 sales includes downward price adjustment of -1% assuming lower prices through the year.

NB3 2024 sales includes a further downward price adjustment of -5% as new lower cost materials feed through

NB4 Past sales are at actual prices, while forecasts for 2025 to 2027 are at constant prices & exchange rates.

Year	Nordic FX	% Chg Parity	Local Currency	% p.a.
2017	8.8022	0.8	2901	2.0
2018	9.1085	3.5	2922	0.7
2019	9.3032	2.1	2881	-1.4
2020	9.5608	2.8	2857	-0.8
2021	9.2516	-3.2	2987	4.6
2022	9.3917	1.5	3507	17.4
2023	9.3917		3345	-4.6
2024	9.3917		3244	-3.0
2025	9.3917		3325	2.5
2026	9.3917		3402	2.3
2027	9.3917		3479	2.3
Average % p.a. 17 to 22			3.9	
Average % p.a. 22 to 27			-0.2	



16	Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - Poland – 2017 to 2027 - 000 Tonnes & € Million										
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
	Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100
	2017	514	7.1	100.0	515	6.8	100.0	100.0	826	9.2	100.0
	2018	550	7.0	107.0	549	6.7	106.7	105.9	881	6.6	106.6
	2019	592	7.5	115.0	591	7.6	114.8	110.7	946	7.3	114.4
	2020	658	11.1	127.8	658	11.2	127.7	108.4	1024	10.6	123.9
	2021	715	8.8	139.1	722	9.8	140.2	115.8	1159	13.2	140.2
	2022	808	13.0	157.1	765	6.0	148.6	121.5	1253	8.2	151.7
	2023	760	-6.0	147.7	763	-0.4	148.1	121.9	1240	-1.1	150.0
	2024	754	-0.8	146.5	786	3.1	152.6	124.9	1219	-1.6	147.6
	2025	844	12.0	164.0	844	7.4	163.9	129.4	1313	7.7	158.9
	2026	904	7.2	175.7	904	7.2	175.6	133.9	1411	7.5	170.8
	2027	966	6.9	187.8	967	6.9	187.7	138.1	1512	7.2	183.0
	Average % p.a. 17 to 22	9.5			8.3			4.0	8.7		
	Average % p.a. 22 to 27	3.6			4.8			2.6	3.8		

NB1 Past sales values are at current prices & average annual exchange rates

NB2 2023 sales includes downward price adjustment of -1% assuming lower prices through the year.

NB3 2024 sales includes a further downward price adjustment of -5% as new lower cost materials feed through.

NB4 Past sales are at actual prices, while forecasts for 2025 to 2027 are at constant prices & exchange rates.

Year	Zloy FX	% Chg Parity	Local M Sales	% p.a.
2017	4.2570	-2.4	3518	6.5
2018	4.2619	0.1	3756	6.8
2019	4.2984	0.9	4064	8.2
2020	4.4465	3.4	4552	12.0
2021	4.5650	2.7	5289	16.2
2022	4.6851	2.6	5871	11.0
2023	4.6851		5808	-1.1
2024	4.6851		5713	-1.6
2025	4.6851		6152	7.7
2026	4.6851		6611	7.5
2027	4.6851		7086	7.2
Average % p.a. 17 to 22			10.8	
Average % p.a. 22 to 27			3.8	



17 Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - Other Central Europe – 2017 to 2027 - 000 Tonnes & € Million											
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
Year		000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100
2017		514	7.1	100.0	353	4.9	100.0	100.0	561	5.3	100.0
2018		550	7.0	107.0	366	3.8	103.8	104.5	581	3.5	103.5
2019		579	5.2	112.5	385	5.3	109.2	108.3	611	5.2	108.9
2020		623	7.6	121.0	415	7.7	117.6	103.8	656	7.4	117.0
2021		650	4.4	126.3	442	6.6	125.3	110.0	739	12.6	131.7
2022		714	9.8	138.7	460	4.0	130.4	114.1	801	8.3	142.7
2023		653	-8.6	126.8	452	-1.7	128.1	115.3	781	-2.4	139.2
2024		633	-3.0	123.0	461	2.1	130.7	118.7	760	-2.6	135.5
2025		663	4.8	128.9	484	4.9	137.2	122.6	800	5.2	142.7
2026		694	4.7	135.0	507	4.8	143.8	126.5	841	5.1	149.9
2027		726	4.5	141.1	530	4.6	150.4	130.4	882	4.9	157.3
	Average % p.a. 17 to 22	6.8			5.4			2.7	7.4		
	Average % p.a. 22 to 27	0.3			2.9			2.7	2.0		

NB1 Past sales values are at current prices & average annual exchange rates

NB2 2023 sales includes downward price adjustment of -1% assuming lower prices through the year.

NB3 2024 sales includes a further downward price adjustment of -5% as new lower cost materials feed through.

NB4 Past sales are at actual prices, while forecasts for 2025 to 2027 are at constant prices & exchange rates.

Year	OCE Wgtd FX	% Chg Parity	Local M Sales	% p.a.
2017	26.3587	-0.3	14788	5.0
2018	26.4757	0.4	15376	4.0
2019	26.4826	0.0	16180	5.2
2020	26.8915	1.5	17648	9.1
2021	26.9785		19936	13.0
2022	27.1487		21735	9.0
2023	27.1487		21205	-2.4
2024	27.1487		20644	-2.6
2025	27.1487		21728	5.2
2026	27.1487		22835	5.1
2027	27.1487		23955	4.9
	Average % p.a. 17 to 22		8.0	
	Average % p.a. 22 to 27		2.0	



18	Estimates & Forecasts of Cartonboard Purchases, Folding Carton Output & Sales Turnover - Total Central Europe – 2017 to 2027 - 000 Tonnes & € Million										
		Cartonboard Purchases			Carton Output			GDP Index	Carton Sales		
	Year	000 Tonnes	% p.a.	Index 17=100	000 Tonnes	% p.a.	Index 17=100	Index 17=100	€M	% p.a.	Index 17=100
	2017	1029	7.1	100.0	867	6.0	100.0	100.0	1387	7.6	100.0
	2018	1101	7.0	107.0	915	5.5	105.5	105.0	1462	5.4	105.4
	2019	1171	6.3	113.8	976	6.7	112.6	109.2	1556	6.5	112.2
	2020	1280	9.4	124.4	1072	9.8	123.6	105.5	1680	7.9	121.1
	2021	1365	6.6	132.7	1164	8.5	134.2	112.2	1898	13.0	136.8
	2022	1522	11.5	147.9	1225	5.2	141.2	116.9	2054	8.2	148.0
	2023	1412	-7.2	137.3	1214	-0.9	140.0	117.8	2021	-1.6	145.7
	2024	1386	-1.9	134.7	1247	2.7	143.7	121.0	1980	-2.0	142.7
	2025	1507	8.7	146.5	1328	6.5	153.1	125.2	2114	6.8	152.3
	2026	1599	6.1	155.4	1411	6.3	162.7	129.3	2252	6.6	162.3
	2027	1692	5.8	164.4	1497	6.1	172.5	133.3	2395	6.3	172.6
	Average % p.a. 17 to 22	8.1			7.1			3.2	8.2		
	Average % p.a. 22 to 27	2.1			4.1			2.7	3.1		



3.2 SHOP OBSERVATIONS

EUM

Cakes, Biscuits & Bakery





Flexibles (inc. bags, horizontal form, fill & seal containers + composites) = 65%, Cartons = 27%, Others (inc. thin wall plastic trays, glass & tins) = 8%

GT share growth rate – (Cartons grows to 30% share).



Chilled Foods

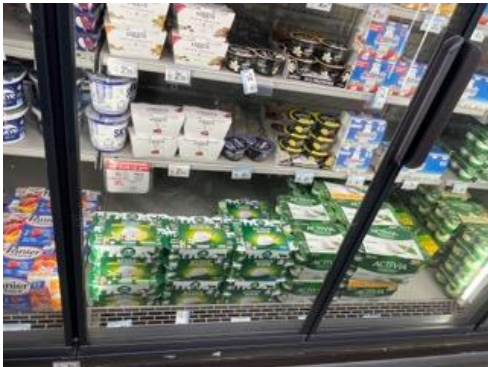


N.B. Meat = a potential for a formed coated carton solution.









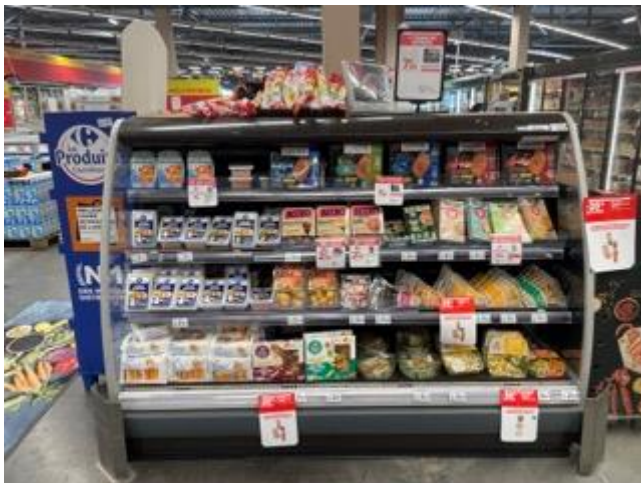


N.B. Dairy = a potential for built up coated formed tray with plastic lid to challenge the pots & tubs market.









Flexibles (including Form, Fill & Seal plastic) = 28%, Cartons = 12%, Others (Plastics Pots & Tubs) = 60%

GT share growth – (Cartons grows to 16% share).

N.B. Ready Meals plus F&V and meat, poultry & fish too BUT not for Dairy as not "converted on conventional equipment". Formed coated trays are a massive opportunity with innovative designs to take share away from pots & tubs (i.e. forecasts DO NOT include this "Carte D'Or"-type formed tub; those very specialised packs could be studied in a future report.



Frozen





Flexibles = 55% (inc. bags), Cartons = 35%, others (plastic pots & trays) = 10%

N.B. - Trends continues for more Frozen Ready Meals, Ice Cream (pots & tubs) & lollies (bags) to be substituted for FC specifications.

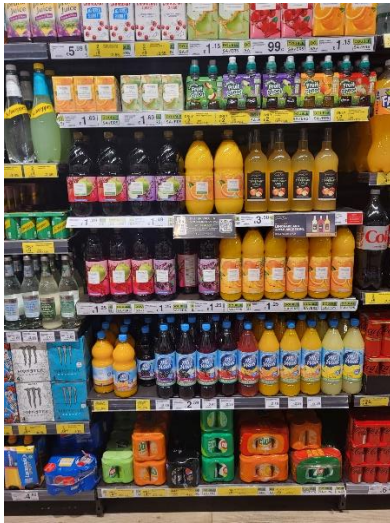
N.B.2- Continued growth for meat, poultry & fish (small share, however offering “massive” opportunity for FC moulded trays with coatings/barriers for meat, poultry & fish).

GT share growth rate – (Cartons grows to 38% share).



Beer & Soft Drinks

Sub-market- Soft Drinks





Sub-market = Flexibles (Hi-cone, S/W) = 50%, Cartons (MP sleeves & FC connectors) = 45%, others (mainly Corrugated packs, including connectors) = 5%



Sub-market- Beer









Sub-market = Flexibles (Hi-cone – 5%, S/W – 20%) = 25%, Cartons (MP sleeves & FC connectors) = 50%, others = (non-FC Microflute 20% & others @ 5%) = 25%

Total combined

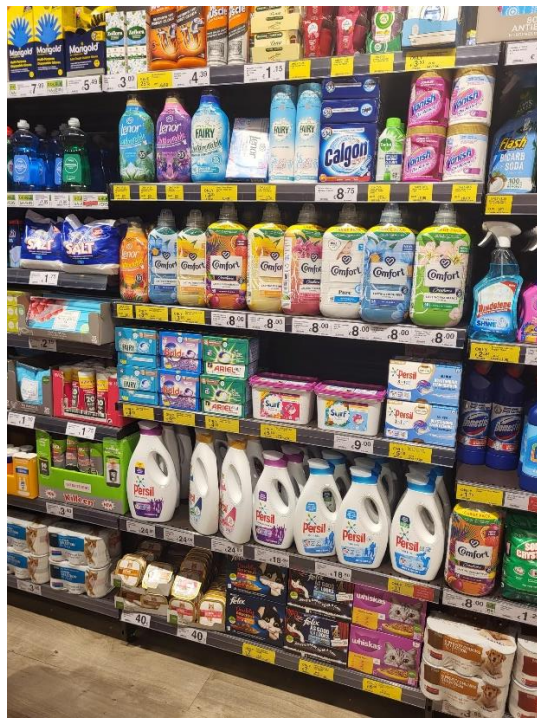
Flexibles (Hi-cone & S/W on cans, blown bottles & glass) = 34%, Folding Cartons (inc. LL MF) = 48%, Others (mainly Corrugated) = 18%. GT share growth – (Cartons grows to 50% share).

NB1 - SD = 33% & B = 67%.

NB2 - MP FC packs moved 2 to 3 years ago with significant growth.



Cleaning & Laundry





Flexibles (PP tubs & Pouches) = 7%, Folding Cartons (Cartons – 28%, LL MF – 15%) = 43%, others (includes Blown bottles – 38%, Tetra-packs – 9% & Paper Tubes – 3%) = 50%.

GT share growth – (Cartons grows to 46% share).



Other EUMs

Dry Beverages



Other Foods (inc. Pastas, Rice, etc.)

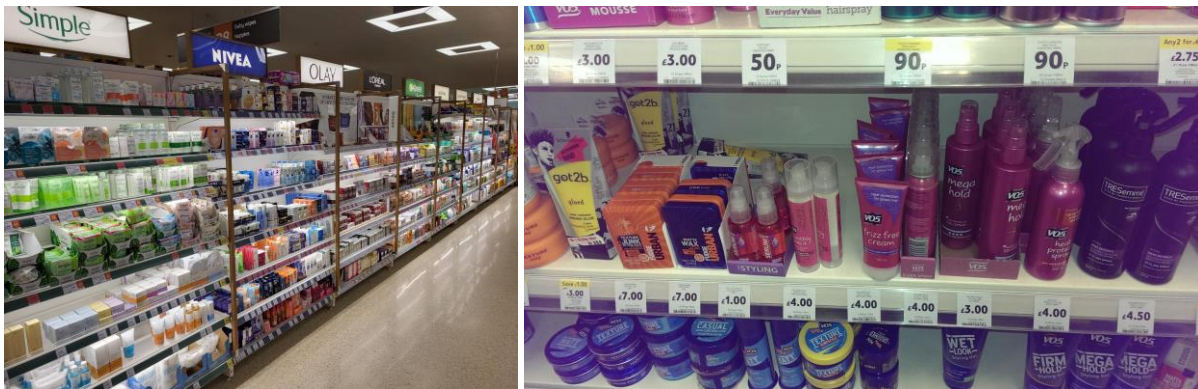




Snacks & Confectionery



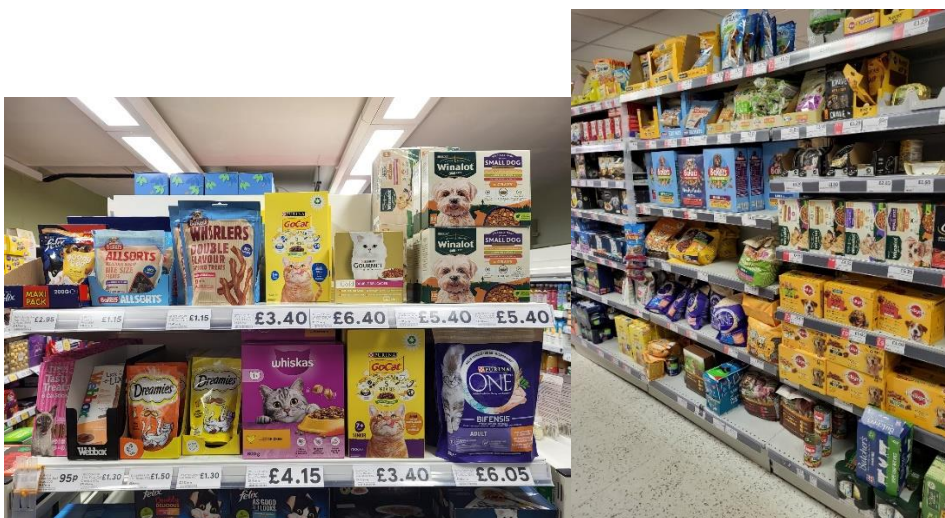
Cosmetics & toiletries



Wines & Spirits



Pet Foods



Canned Goods



Food-to-Go



Non-food consumables



3.3 INTERVIEW SUMMARY

Topics

FORECAST FOR 2023

Forecasts vary wildly. Ranges from Q1 ok, q2 lower, q3 lower, q4 better, with overall prediction of growth of +3-4% for. Others are expecting a decline, some 6% lower than in 2022. No-one really knows!

“This year down a lot vs last year”

“Not a normal situation last year, due to shortage of raw materials. Output will be lower this year by perhaps -10 to -15% versus a normal year”.

Numbers were very different for 2022 between different end markets as they were affected by the impact of different trends. e.g. sales of beverages went from crazy high to crazy low. A change in the mix of the portfolio within sectors. Beer was affected by off premises v on premises changes.

“See the market declining 1-2% this year and a flat 2024”.

FORECAST FOR 2024 (INC EUMs)

Forecast for 2024 is generally seen as less optimistic than for 2023.

When looking at each EUM then prospects are more mixed, with some showing good signs of recovery and other suggesting less reasons for optimism.

Pharma 5-10% p.a. – increasing market with, plus decision by government to produce more locally and gains in market share. One company supply Pharma and in 2023 are +10% up by volume.

Health continues to grow and expect it to increase 2-3% p.a.

Tobacco is a growing market. Smoking alternatives are providing for this. While many of these currently come from China there may be a shift east to west in production. 75% of the market for tobacco products is currently traditional cigarettes and 25% are alternatives.

Beverages will grow significantly past 2024. Growth driven by:

- 1) Belief that drinking in the home will continue with the squeeze on households
- 2) Driver for plastics replacement – this will continue to grow.

Beverage multi packs – 95% of fibre packs are folding carton board with only small volume for microflute.



“Effect of Covid at the time was a huge disruption but has now levelled off and will be resolved through 2023. Trends in 2024 will largely be back to 18/19 trends”.

“Inflation is impacting volumes. Interest rates impact financing and money is not cheap anymore. All size of customers are looking to extend terms”.

“Lower than last year but NPD (new product development) is helping a lot to drive growth”.

“All depends on influence from EU and when they push their packaging and packaging waste regulations (PPWR) into the market – then there could be a significant decline in the industry. It is such an uncertain area, so we don’t know what to forecast for 2024.

Vape products from China represent a 5% share. ‘Grey’ market products from SE Asia and China may decline. Vape products replacing cigarettes and movement of production to locations within Europe. There is a managed decline of the tobacco market. It is still a profitable business, so worth being in even if it is declining.

Mature products with lower growth prospects are confectionery, cosmetics and beauty (growth in the region of 3% p.a.).

“Slightly up monetary wise but volume will be much lower than 2023”.

BRAND OWNERS & RETAILERS

Consumer goods inflation discussion.....

If brands owners were getting 25-30% margins (e.g., pre-covid crisis) then when the supply chain disruption happened they sought to offset the price increases to compensate losses but believe some of the price increases went above what was needed (e.g. a pizza box represents 7-10% of the total product cost of a pizza); other materials going into making a pizza did not go up as much as the packaging cost. Looking at price increases, these seem to be above what was needed to compensate for the product cost increase rather than just the packaging element. Retailers seems to have benefitted.

Retailer statistics may show turnover falling in 2023 as private label is cheaper. However, you need to look at the volume of products still going to the end consumers; business remains at a good level. Due to compensation of inflation consumers shifted to private label but believe they are now going back a bit to branded products. It won’t be at the same level as before but believe the trend to private label has bottomed out and reversed a bit.

European consumers seem to accept this more than UK consumers who are more price sensitive. Consumers are willing to pay a higher price in Europe. There were some cases where branded products were taken off the shelves because of excessive price increases asked for in Europe and consumers were very unhappy about it.

Retailers now also must consider the part that recycling plays. In the past, for major European Retailers, the packaging was good until it hit the shelf then it was of no interest. In the future they will need to look for innovations, even for after the product has been



consumed; they will need help over recycling and manufacturing processes. Brand owners looking at replacement of plastics but also must consider recycling in the future too. Retailers are a lot ahead of brand owners with this.

“Retailers behave how the brand owners drive them towards. If brands are strong enough, then retailers will follow”.

“This year volumes down. Supply chain is very stable and over capacity has led to price pressure. Margins likely to decline as a result. Now that there is no supply chain pressure customers are not going to just accept what they are quoted”.

This year branded products have gone down a bit while private label has increased. The new normal will be private label share higher, but the rest will be more or less in terms of cartons volumes at the same level as 2019. Brand owners will fight to gain some share back but they will remain a bit lower than before.

PRICING & PRICE RECOVERY

Last 2 years saw improved success for cost recovery via Price Increases. 2022 proved a much better year for price increases sticking, seeing sales revenues up significantly.

“Believe that inflation in part is the result of years of drip inflation in the supply chain with small annual increases 1-2% in costs which could not be passed on and were absorbed. Then when prices went crazy suppliers saw it as a chance to get some of this back and use it as a catch up”.

“By value 19 to 21 saw growth of 10-12% while in 2022 +17 to 20%. Purchases were probably around 3-4% higher than output for 2022”.

“Prices have peaked and are now dropping. Customers and brand owners want everything now but the market needs everyone to hold their nerve and manage the process rather than panic and start dropping prices at steep rates”.

SUPPLY CHAIN, LOCALISATION & RE-SHORING

Covid made major customers look at their supply chains; recently there has been a significant move towards localisation – more so than pre covid (i.e. container prices jumped from \$2.5k to \$28k at their peak) and Brand Owner companies started to look at what they were doing around the world.

A move from East to West in production. Covid, carbon footprint focus, war in Ukraine – made people think more broadly than just cost; availability has become much more of an issue.

“Buyers were very worried about supply during covid; with the post-covid period, PLUS the green movement trend and plastics replacement plus carbon footprint and the biggest thing is transport. How you move things around”.



“10 years ago, there was a big drive-in production out to Poland. Eastern Europe opened up and 5-6 years ago the Germans stopped worrying so much about producing outside and opened their businesses up to this change”.

LABOUR

Labour availability is a significant issue, depending on where you are situated geographically in Europe. Biggest impact out of all factors – both white and blue collars is a lack of labour. Also, the cost of labour generally to attract people – especially in West Europe, less so in Central Europe.

Still labour availability is a challenge. Mostly in Western Europe. On average we are 5% uncovered for labour. Don't know if it will change. Extremely difficult. We are getting people training them up and then they go. Usually low skilled labour.

We are moving labour to plants which are short, moving people around Europe. We have all sorts of nationalities moving and working in plants all around Europe. The incentive for the workforce to move is to gain extra experience and an increase in their earnings.

COSTS

Pressure over last 2 or 3 years switched from “cost reduction” to one of “availability” of folding cartons (potentially at any cost!). The pressure on costs returned in the last few months once again as the market became quieter.

There is a tendering process which happens every 2-3 years when customers offer business to the market to compete for quotes. Start a new period now with some retenders coming through but huge amount comes through usually around the beginning of September.

“While energy costs are down, we have a contract price for 2 years which is double what we were paying in past years. Even if energy costs go down in the market we don't benefit. Energy companies have completely changed the way of selling their product and decided to put the risks on our shoulders. We are paying 2 x more than last year or 2 years ago.

One extra side to this is the imbalance between supply and demand. Wood availability to the virgin mills. Finland mills were importing wood from Russia – 15% of their needs. This impacted on the price of wood.

When recycled board cost went through the roof last year concerns over cost and availability saw customers start to shift from recycled to virgin board.

“We had huge difficulties last year with our energy supplier and were operating day to day in the market for energy”.



GREEN TRANSITION

Plastic replacement – single growth factor over 5-10 years. But when cost is important then you can see a move back to plastic and the numbers can take over. Costs 2-3x more for fibre and when cash is tight in the short term this affects things.

Beneficiaries expected are- soft drinks and beverages, Fresh/chilled food, ready meals (to some extent), beverages, home care (e.g., laundry), cosmetics & personal care (e.g., hair colours & hair straighteners packaging).

Food – very little except punnets/trays. Less saturated. See 5-10% p.a. growth for trays including punnets.

Fresh produce trays - what is the potential growth for this pack to replace plastic and other materials currently and in future? Seen as a growing market, where some strong converters are in and driving the volume up with new technologies (GPI, Seda, Huhtamaki, etc.)

Challenges = Trays and how to design so none of the juices soak through or spill out.

Key drivers are material reduction, increased convenience, and sustainable barriers with Polyethylene (PE) replacement. No one has yet announced a solution to replacing PE (but everyone is working on this subject).

“The last 3-4 years is the first-time cartons have not been on the defensive versus plastics. Over the years there has been a small steady loss as plastic is cheaper than fibre. For the first time this is not happening”.

“Generally folding cartons is a flat market but due to the shift from plastics to board we believe there will be growth of 5% p.a.”

“In beverages and food, plastic replacement is driving extra volumes and will continue to do so”.

“Investment decisions on automated lines can run into 100s or millions if you have multiple lines and many factories across the globe”.

“This is the core story after the shock and impacts of 2021 to 2023. Fibre presents a strong story. Plastic will still do a good job; however, cartons will continue to gain some share from plastic and that is all we need”.

The base market today is declining but the market itself (for carton packaging) is growing due to plastic replacement. 80% of growth is from NPD.



“Base FC business declined over the last few years while our new business acquisition has focused on plastic replacement; and that grew very well”.

Top clips is taking share from hi cone and shrink. Capex takes time at the beginning but good now the answer is there in drinks with multi-pack demand. Now aiming for PET replacement with this pack as an untapped market – soft drinks, water etc.

Medium term growth will come from plastic replacement. Fibre will have an important role for the next 10-20 years.

PPWR

See increasing complexity of packs depending on what happens with packaging and packaging waste regulation from EU. More formats possible for the different size ranges to avoid shipping air.

“Waste regs – recycling process is a core topic now. 2 years ago, it was about raw material only but today they need to look at what happens with recycling through the whole process – not just as far as getting the product onto the shelf in the retailer but what happens once the pack is taken home and discarded now affects retailers. Retailers are already looking at this”.

“Two years ago, 5% + p.a. Now I am more afraid to estimate the impact pending the new EU regulations and timing of their launch. Our customers are hesitating on their investments waiting for this”.

Retailers have the least understanding of this topic. Very little understanding and knowledge of PPWR at all.

SUBSTITUTION or NO PACKAGING

Seems to have had limited impact on total FC demand; restricted to a few, specific EUMs.

Watching the actions of Diageo and Pernod Ricard moving to naked bottles. This has been a success for them.

Toothpaste, spirits. Some toothpaste packs but brands like Colgate still favour cartons – they like to see their display of printed cartons on the shelf.

Toothpaste – made a lot of noise – has not done what was expected.

Mostly whiskey. There are gains and losses across sectors – Things always gaining a losing.



STRATEGIC

Likely to continue. Consolidation will produce opportunities for the stronger companies. GPI, MM and Westrock are strong and moving forward in driving consolidation.

OPERATIONAL

1 Order Book

Depend on which point in time last year you compare with. Last year gains significant q1 to q3 then stable over the last 6 months. (q4 22/q1 23)

This time last year there was a strong demand, but shortages held the industry back.

Investing over last couple of months has been significant so the order books have increased – due to acquisition and strong focus on business. Not normal market trend. For some, turnover is up 15% this year.

“Already last year had a lower intake. What I see dropped q2 last year. Coming from the other way now and slightly up. Helped by specific activities we have been doing since q2 to gain business again. 2022 v 21 was much lower – Sept/Oct last year was the worst”.

“2024 - Pre covid the market was growing 2-5% p.a. then we had 3 extra ordinary years. 2024 could be a tough year due to what people buy. Interest rates are not likely to come down to pre-covid low levels across Europe anytime soon”.

2 Future Orders/prospects for 2023

Looking at different segments and plastic converters are normally optimistic but less optimistic now.

Stabilizing at a lower level as a result of weaker order books and performance growth.

Once the inventory correction is over then expect to see some growth.

“Slightly more optimistic than our current order levels suggest due to brand owner and retailer destocking in the supply chain. Saw last week in particular French retailers ordering more”

“Currently the group is still able to weather the storm. It has strong foundations. Expect growth – enormous flexibility as a small company”.

“Changing so fast, expect to be back where we were in 2022 but started low this year”.

3 Capacity

More capacity due to investment. Several FC converters added notable additional capacity so utilisation lower vs last year, but higher overall output predicted; might be over-optimistic!



35% this year v 100% last year. We invested in additional capacity over the last year – contributes to lower utilisation. Wrong time to invest.

“Invested a lot in capacity and efficiency. Same with people, but machines produce more. Production working faster”.

“Completely sold-out last year. Still quite lively in 2023 but some effects of the Cost-of-Living Crisis showing in demand”.

4 Stock Levels

Stock levels – more raw materials stocks being held versus pre COVID. In 2022 stocks were built up as hard to foresee what was happening so converters had to order stock. Currently 50% higher than in previous years. Expect to be back on track by mid/end of this year.

Too much stock at the beginning 2022 but now stable. During 2022 converters only ordered board when customers sent orders and if they didn't, they had to prepay for the board.

Mid-year expected situation to stabilise and stocks to be down. Money is tied up in stock and rising interest rates on loans to finance it adds to cost.

“Over the last couple of years there has been dislocation of stock in the supply chain. Liken it to stockpiling during covid by consumers in 2020.”

“Overstocking in 2022 - During 2022 the result was overstocking in the supply chain with high inventories and imbalances. Now in a “use-it-up” phase this year drawing down inventory.”

“During 2022 estimate purchases were probably 5% to 10% higher than what went out the door, with inventories 50% to 100% higher in total”. 2023 - Stocks now being run down. Q1 was horrible, and maybe into Q2. Wait until after the 2 holiday months in the summer to see what happens. Not much going to happen now”.

“This year (2023) has been a year for consuming board from stock and not buying any. We have been 100% focussed on reducing stocks. Now costing more to hold stock in 2023 due to higher interest rates – money is expensive”.

“Decline this year is driven by customers destocking. Big growth in demand during 2022 due to panic and now the chain is all stocked up”.

“Difficult to identify what is real and what is the result of the massive distortion of 2022”.

“End of last year we had huge stocks; but now they are decreasing. Last year (2022) we were facing another crisis in delivery and lead times, so we placed large orders for product we didn't even know if we were going to sell to make sure we had stocks. Lead times and deliveries are now all back to normal”.

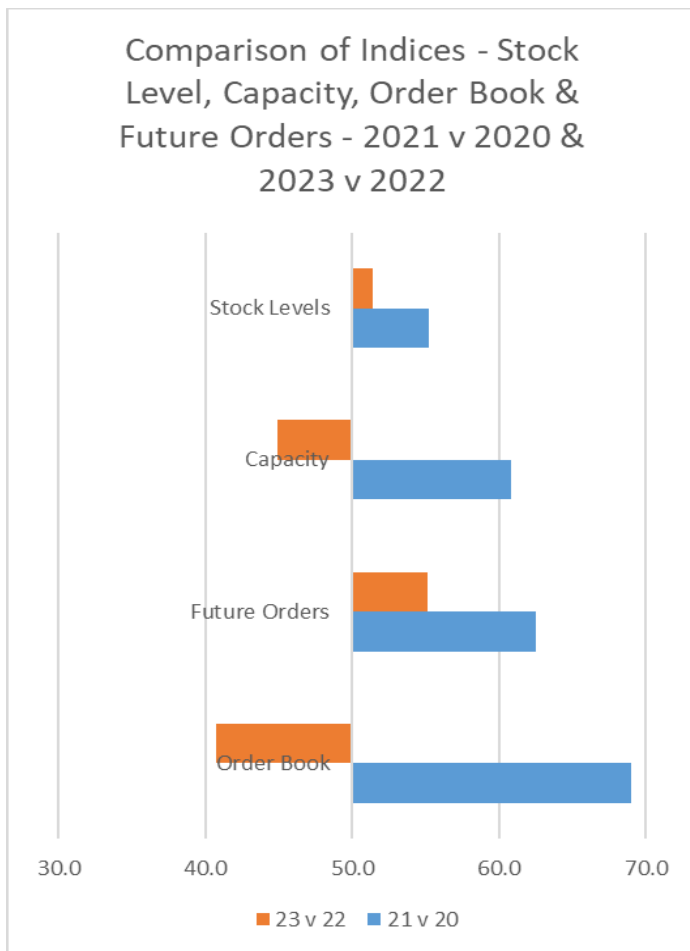
“Our main task this year – reduce inventory!”



“Stock is coming down. Anyone who says they don’t have higher stocks is not being truthful”.

“This time last year stocks were at their lowest level. Now holding more than we would normally. Finished goods probably at normal levels but raw materials are high. Customers panic ordered last year taking everything – way more than needed. Now customer results are terrible – Unilever Danone... From q3 22 all in massive cost cutting drive. Trying to get back to leaner supply chains. Warehouses are all full”.

“This year been consuming board from stock and not buying. Have been focused on reducing stocks”.



Comparison of Indices for Stock Level, Capacity, Order Book & Future Orders - 2021 v 2020 & 2023 v 2022		
Index	21 v 20	23 v 22
Order Book	69.0	40.7
Future Orders	62.5	55.1
Capacity	60.8	44.9
Stock Levels	55.2	51.4



CONFIDENCE & OPTIMISM

1- Optimism (Quotes to go with the table set)

4 - Last year completely overwhelmed with cost and production. This year not optimistic, lucky to be a financially solid company. But more optimistic than last year.

4 – Pharma gained from COVID.

4 - All these issues at the moment – there is an opportunity with every problem. Must catch it and work with it to make a success of ourselves.

3 - Reserved. Past year supply chain crisis shifted temporarily the power into our favour. The weaker market this year may lead to a high number of tenders.

3 - With bit more optimism but much the same

term 2 medium term 4. Inventory affect impact at the moment makes me less optimistic but after that I am more optimistic.

3 - Little optimistic as demand lower than last year but still hope for recovery in part.

3 – not much change

3 - Much the same – see the forecast and it hasn't changed my optimism

3 - Same – due to trend for petro polymer replacement.

2 - Compared with last year which was an exceptional year. So lower. Maybe a month ago it would have been 3-4 but now 2-3. Not that bad but with all that has happened recently.

2 - Can see movement down. I thought it would happen but not so fast and hard. Thought it would go back to normal June/July but not at the moment.

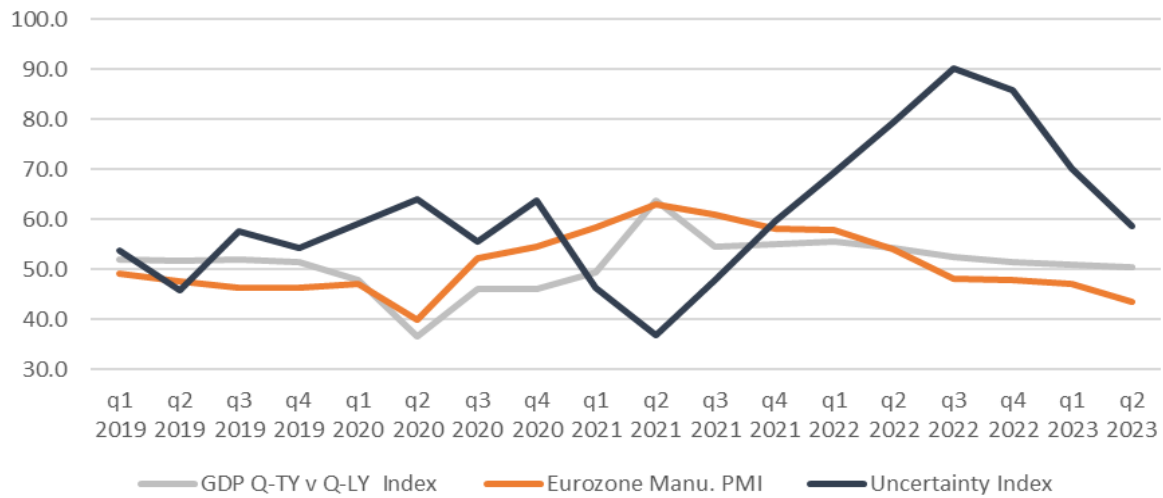
1 - Much lower. Perfect storm. Recession already here in every sector. DK why people don't recognise it

1 - If we are 5% down on volume – that is a bad year.

Last year not bad as demand came back. About the same.



European Indices for Quarterly GDP Growth, Manufacturing PMI & Uncertainty



Comparison of Indices for Eurostat Quarterly GDP Growth, Markit Eurozone Manufacturing PMI & European Policy Uncertainty Index - Quarterly Average Indices - Q1 2019 to Q2 2023

Quarter	GDP Q-TY v Q-LY % Change	GDP Q-TY v Q-LY Index	Eurozone Manu. PMI	Uncertainty Qtly Average	Uncertainty Index
q1 2019	2.1	52.1	49.1	245.1	53.8
q2 2019	1.8	51.8	47.7	208.5	45.8
q3 2019	2.0	52.0	46.4	263.0	57.8
q4 2019	1.4	51.4	46.4	246.8	54.2
q1 2020	-2.2	47.8	47.2	269.0	59.1
q2 2020	-13.3	36.7	40.1	291.4	64.0
q3 2020	-3.8	46.2	52.4	253.5	55.7
q4 2020	-3.8	46.2	54.6	290.0	63.7
q1 2021	-0.6	49.4	58.4	211.1	46.4
q2 2021	13.9	63.9	63.1	167.4	36.8
q3 2021	4.5	54.5	60.9	218.6	48.0
q4 2021	5.2	55.2	58.2	272.2	59.8
q1 2022	5.6	55.6	57.8	316.7	69.6
q2 2022	4.3	54.3	54.1	361.9	79.5
q3 2022	2.5	52.5	48.2	410.3	90.2
q4 2022	1.6	51.6	47.9	391.0	85.9
q1 2023	1.1	51.1	47.2	319.4	70.2
q2 2023	0.5	50.5	43.6	267.1	58.7



2 – Confidence (Quotes to go with the table set)

4 - Yes but based on fact we are focused on sustainable development and innovation. Expect long term development process/plans will come with opportunities but not normal for the markets in general.

4 - More visibility of demand versus last year. Due to panic element last year and customer behaviour. Think supply chain has learnt so more confident.

4 - Low but better than last year – last year was total darkness.

4 - Easier this year than last year. Last year very difficult.

3 – no change with all that is going on in the world.

3 – very difficult still.

3 - In the base market not even our customers have an understanding of what will happen. But with substitution trend and good idea of what is in the pipeline for npd I have confidence in this bit. Difficult to understand the base market.

2 - Quite difficult still regarding customers. We are facing huge variations and delays with no explanation. We have variations in customer orders and order mix between customers for a given volume adding to uncertainty. E.g., we will be running an order and the customer will ring us to put it on hold.

2 - Very difficult to forecast and know when inventory will be coming out of the system. Last year we were better – got used to the situation and understood it. 2020/21 we learnt a lot as things developed so by 2022 it became easier to predict.

2 - Lower – nobody is confident. Forecast starts with retailers. They don't want to forecast anything. My customers depend on retailers. When he can't get a reasonable forecast, we try to discuss it with them. Ask what we did last year and how can we support you. The supply chain is not working. Ones sitting with the most information not willing to share it. It is getting worse. See what happened to Mars – thrown out of Edeke a major retailer. Loss of €300m of business. This affects people – huge implications if Mars delisted.

2 - So many things happening in the market. Difficult to get customers input on their outlook. Stock/supply chain difficult to understand.

2 - Difficult to know. Quite stable despite more pessimistic but this is a temporary issue. Everything will get back on track.

2 – Last year a great year.

2 – more uncertainty.

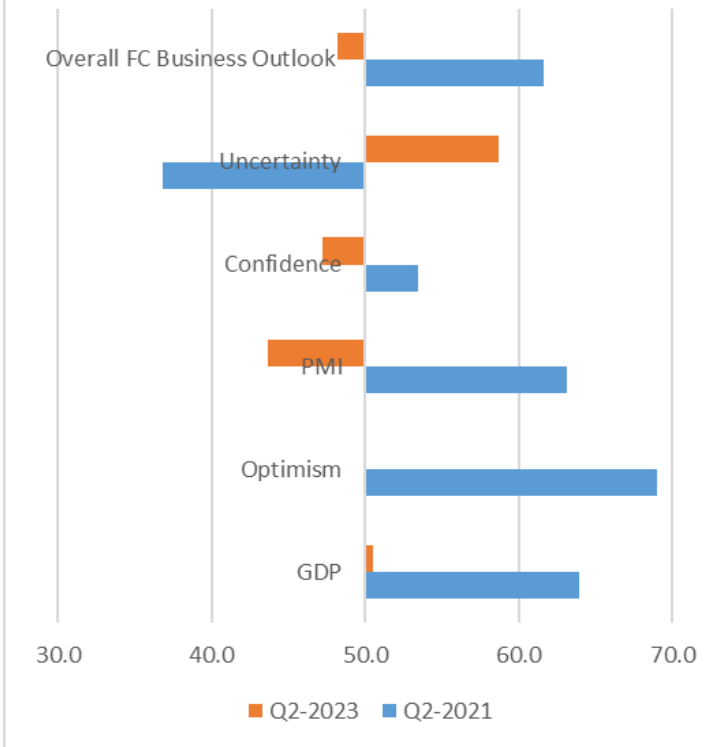
2 – Not so stable – changes may vary.

1 - Less confident in institutions like IMF and central banks forecasts makes us less confident.

Lower – less certainty.



Comparison of Indices - Optimism
& Confidence for 2021 & 2023
with GDP, Eurozone
Manufacturing PMI & Uncertainty
for Q2 2021 & Q2 2023



Comparison of Indices Optimism &
Confidence for Mid 2021 & Mid 2023 with
Yearly Average Indices for GDP, PMI &
Uncertainty q3 2020 to q2 2021 & q3
2022 to q2 2023

Index	Q2-2021	Q2-2023
GDP	63.9	50.5
Optimism	69.0	50.0
PMI	63.1	43.6
Confidence	53.4	47.2
Uncertainty	36.8	58.7
Overall FC Business Outlook	61.6	48.2



3.4 PACKAGING SHARE ESTIMATES

Packaging share estimates (analysing GT growth from 2023 to 2027)				
Cakes, Biscuits & Bakery	2017 (est.)	2022 (est.)	2023 Shop Observations	Estimated share changes - 2027
Packaging type				3% inc in FCs
Folding cartons	28	28	27	30
Flexible Packaging	67	66	65	63
Others (inc thin-walled trays)	5	6	8	7
Total	100	100	100	100

Chilled Foods	2017 (est.)	2022 (est.)	2023 Shop Observations	Estimated share changes - 2027
Packaging type				4% inc in FCs
Folding cartons	9	11	12	16
Flexible Packaging	26	28	28	26
Others (inc trays, pots & tubs)	65	61	60	58
Total	100	100	100	100

NB Folding cartons includes sleeves for RM

NB2 Main applications are for Fresh & chilled F&V, Fresh & Chilled Meat, Poultry & Fish + Ready Meals

Frozen Foods	2017 (est.)	2022 (est.)	2023 Shop Observations	Estimated share changes - 2027
Packaging type				3% inc in FCs
Folding cartons	35	35	36	38
Flexible Packaging	54	54	55	53
Others (inc Containers & trays)	11	11	9	9
Total	100	100	100	100

NB Folding cartons include sleeves for RM



Soft Drinks & Beer	2017 (est.)	2022 (est.)	2023 Shop Observations	Estimated share changes - 2027
Packaging type			Main growth between 21 & 23	2% inc in FCs
Folding cartons (inc.LLMF)	33	43	48	50
Flexible Packaging	53	40	34	31
Others (inc. Corrugated)	14	17	18	19
Total	100	100	100	100

NB Flexible packaging includes SW & Hi-Cone

Cleaning & Laundry Products	2017 (est.)	2022 (est.)	2023 Shop Observations	Estimated share changes - 2027
Packaging type			Impact of LL MF & spiral packs	3% inc in FCs
Folding cartons	39	41	43	46
Flexible Packaging	11	9	7	6
Others (inc.PP bottles mainly & liquid packaging)	50	50	50	48
Total	100	100	100	100

Calculation Table

Primary Pack Substitution & Green Transition Trends in Folding Carton for Primary & Multi-Packs in Europe - 2017, 2022, 2023 & 2027 - % of Units					
Pack Types	NOA & JC estimates		SO forecasts		23 vs 27
	2017	2022	2023	2027	
FC	28.8	31.6	33.2	36	2.8
Flexibles	42.2	39.4	37.8	35.8	-2
Other	29.0	29.0	29	28.2	-0.8
TOTAL	100	100	100	100	

NB This data from independent sources & NOA shop observations.

NB2 This data reflects all markets (including FMCG)





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