

Polyester Staple Fibre & Inter-Fibre Competition

PET Day 2008 – Artimino, Italy

Roger Lee 9 October 2008



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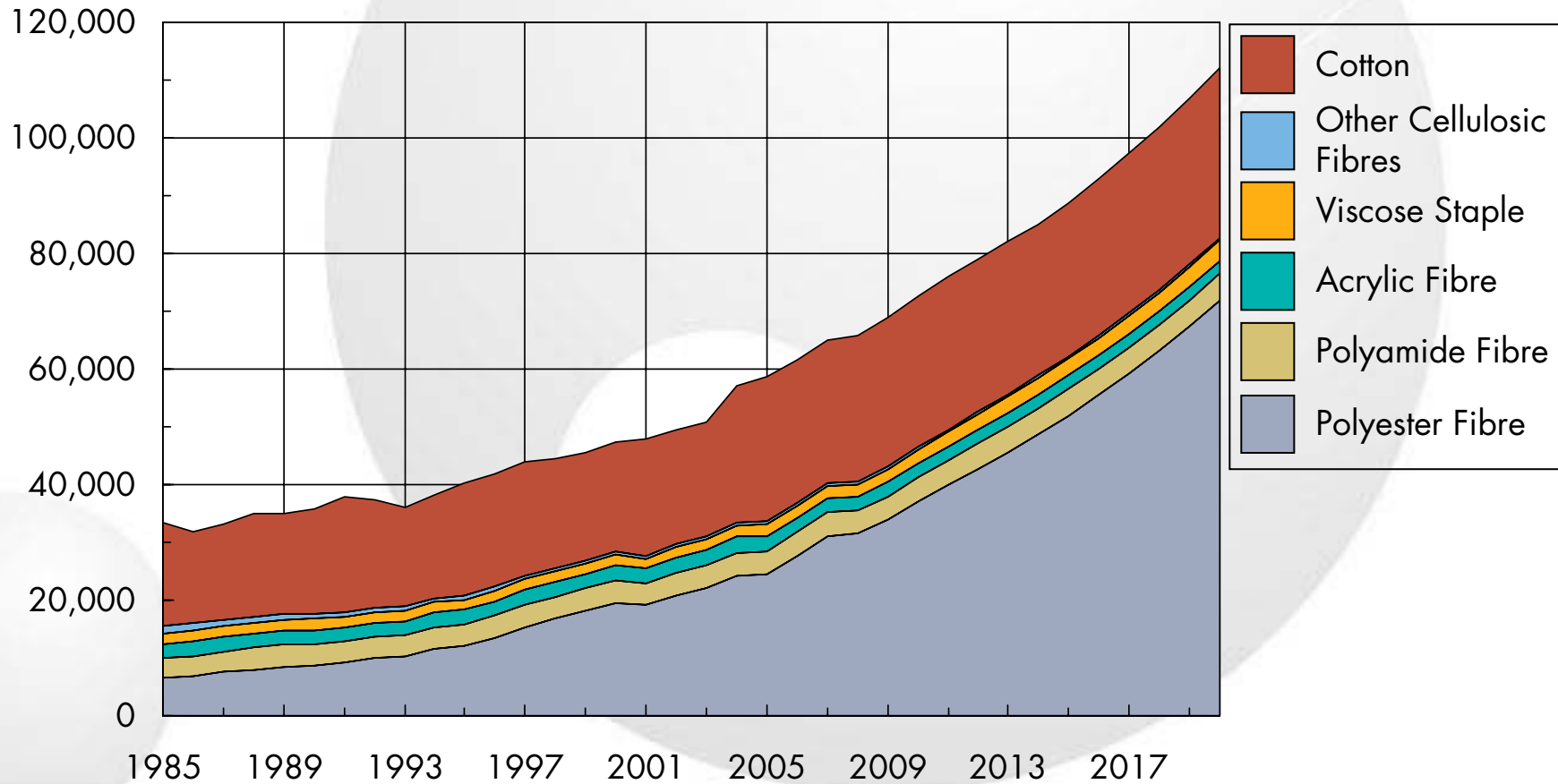
POLYESTER STAPLE FIBRE & INTER-FIBRE COMPETITION

- World Fibre Production
- Global Trade
- Inter-Fibre Competition
- Prices
- Polyester Cotton Substitution
- End Uses
- Global View and Future Prospects

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WORLD FIBRE PRODUCTION 1985-2020

Thousand Metric Tons



Source: Tecnon OrbiChem

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POLYESTER STAPLE INTER-REGIONAL TRADE 2007

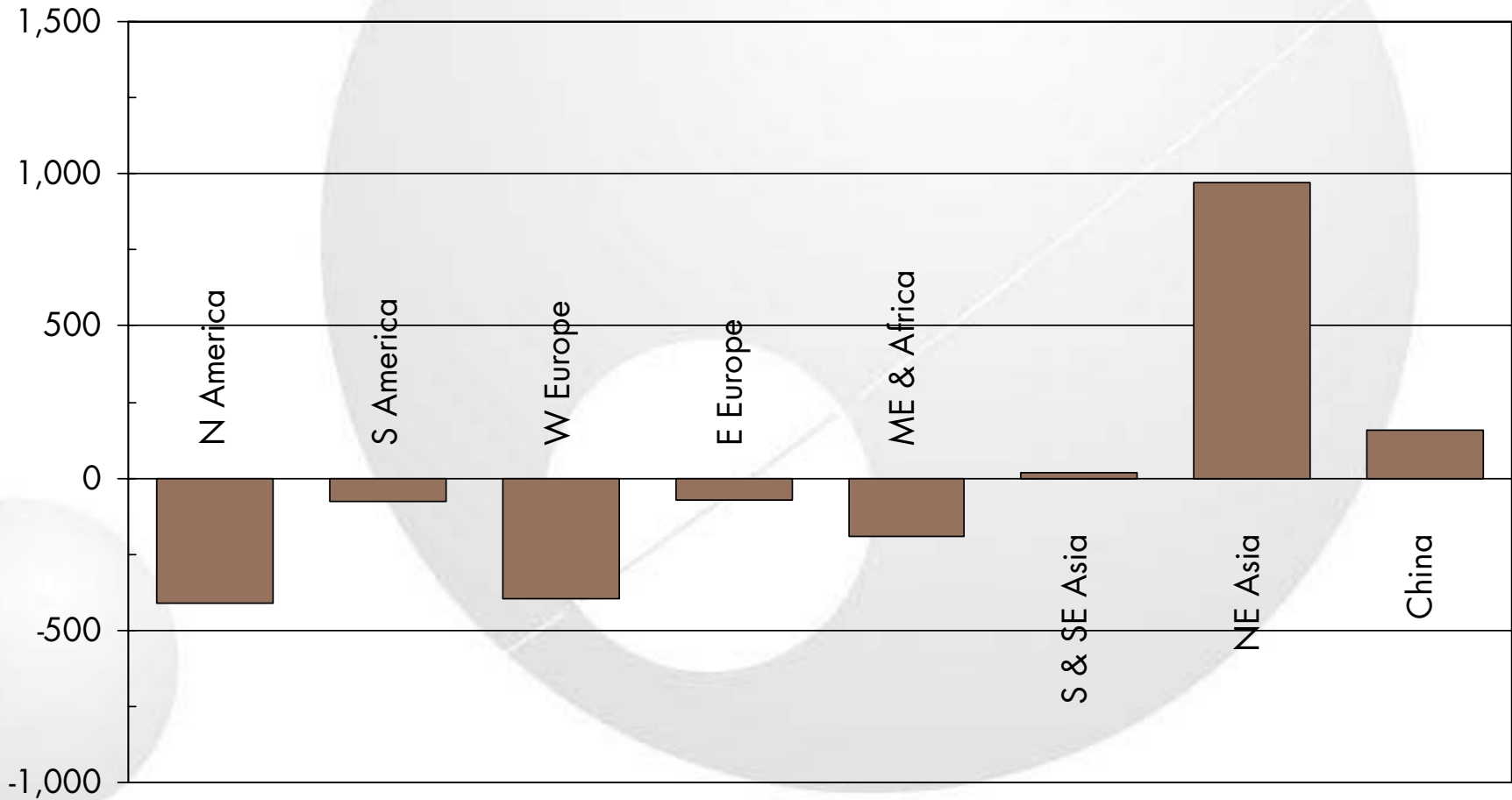
POLYESTER STAPLE INTER-REGIONAL TRADE 2007 (1,000 Metric Tons)		Exporting Regions								Total Imports
		North America	South America	West Europe	East Europe	Middle East & Africa	South & Southeast Asia	Northeast Asia	China	
Importing Regions	North America		4.0	12.0	3.0	-	73.0	237.0	113.0	442.0
	South America	11.0		-	-	-	6.0	40.0	25.0	82.0
	West Europe	17.0	-		15.0	53.0	103.0	221.0	24.0	433.0
	East Europe	-	-	4.0		1.0	-	59.0	9.0	73.0
	Middle East & Africa	-	-	4.0	-		62.0	110.0	68.0	244.0
	South & Southeast Asia	-	-	1.0	-	-		165.0	121.0	287.0
	Northeast Asia	-	-	1.0	-	-	5.0		9.0	15.0
	China	4.0	-	1.0	-	-	54.0	152.0		211.0
	Total Exports	32.0	4.0	23.0	18.0	54.0	303.0	984.0	369.0	1,787.0

Source: Tecnon OrbiChem

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POLYESTER STAPLE REGIONAL NET TRADE 2007

Thousand Metric Tons



Source: Tecnon OrbiChem

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POLYESTER FILAMENT INTER-REGIONAL TRADE 2007

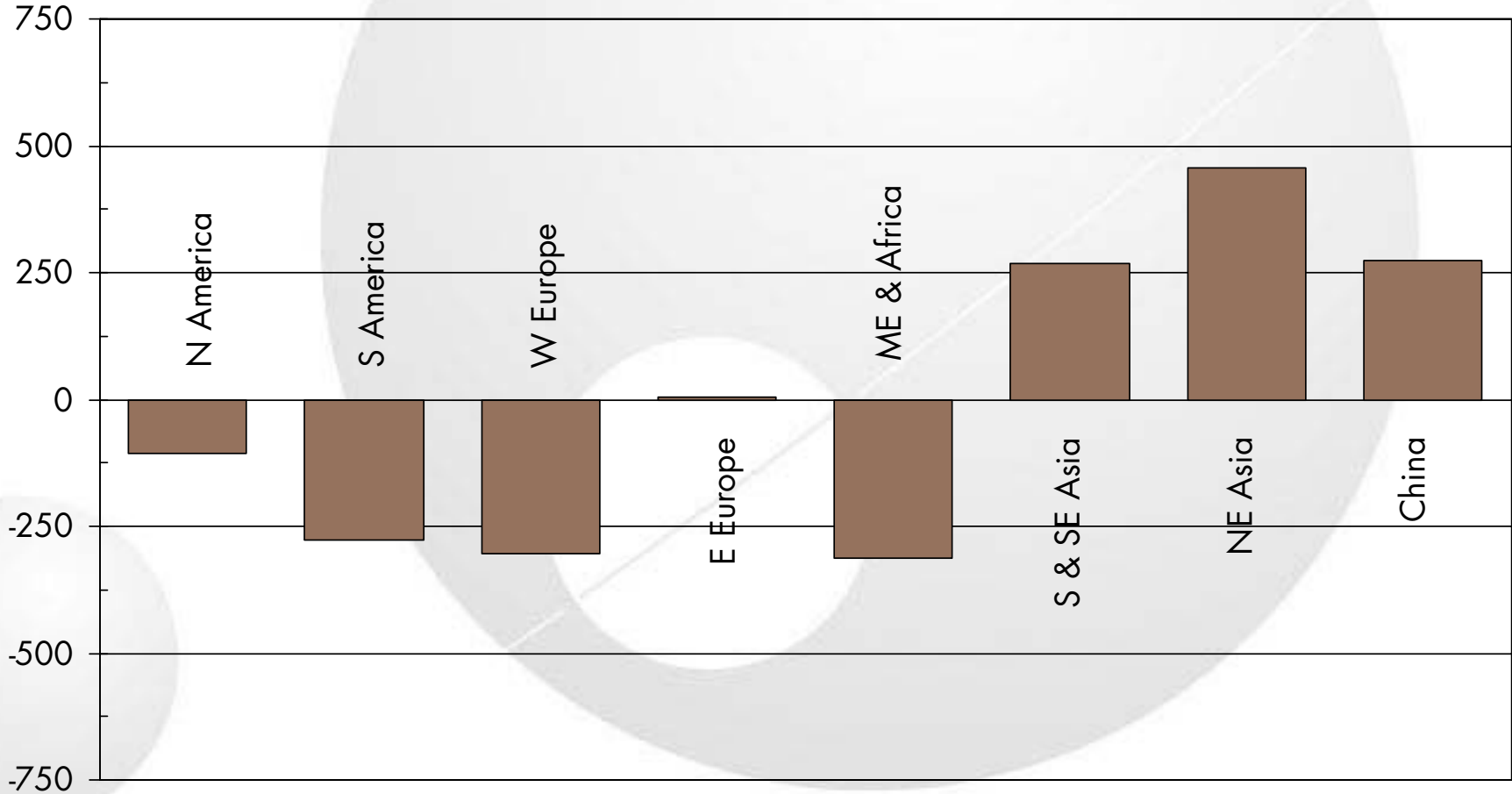
POLYESTER FILAMENT INTER-REGIONAL TRADE 2007 (1,000 Metric Tons)		Exporting Regions								Total Imports
		North America	South America	West Europe	East Europe	Middle East & Africa	South & Southeast Asia	Northeast Asia	China	
Importing Regions	North America		-	10.0	-	2.0	43.0	63.0	28.0	146.0
	South America	16.0		2.0	-	1.0	156.0	36.0	66.0	277.0
	West Europe	7.0	-		14.0	37.0	81.0	107.0	99.0	345.0
	East Europe	-	-	1.0		1.0	2.0	2.0	1.0	7.0
	Middle East & Africa	1.0	-	21.0	-		146.0	54.0	136.0	358.0
	South & Southeast Asia	2.0	-	3.0	-	3.0		85.0	135.0	228.0
	Northeast Asia	1.0	-	-	-	-	50.0		69.0	120.0
	China	13.0	-	-	-	-	17.0	229.0		259.0
Total Exports		40.0	-	37.0	14.0	44.0	495.0	576.0	534.0	1,740.0

Source: Tecnon OrbiChem

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POLYESTER FILAMENT REGIONAL NET TRADE 2007

Thousand Metric Tons



Source: Tecnon OrbiChem

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ACRYLIC FIBRE INTER-REGIONAL TRADE 2007

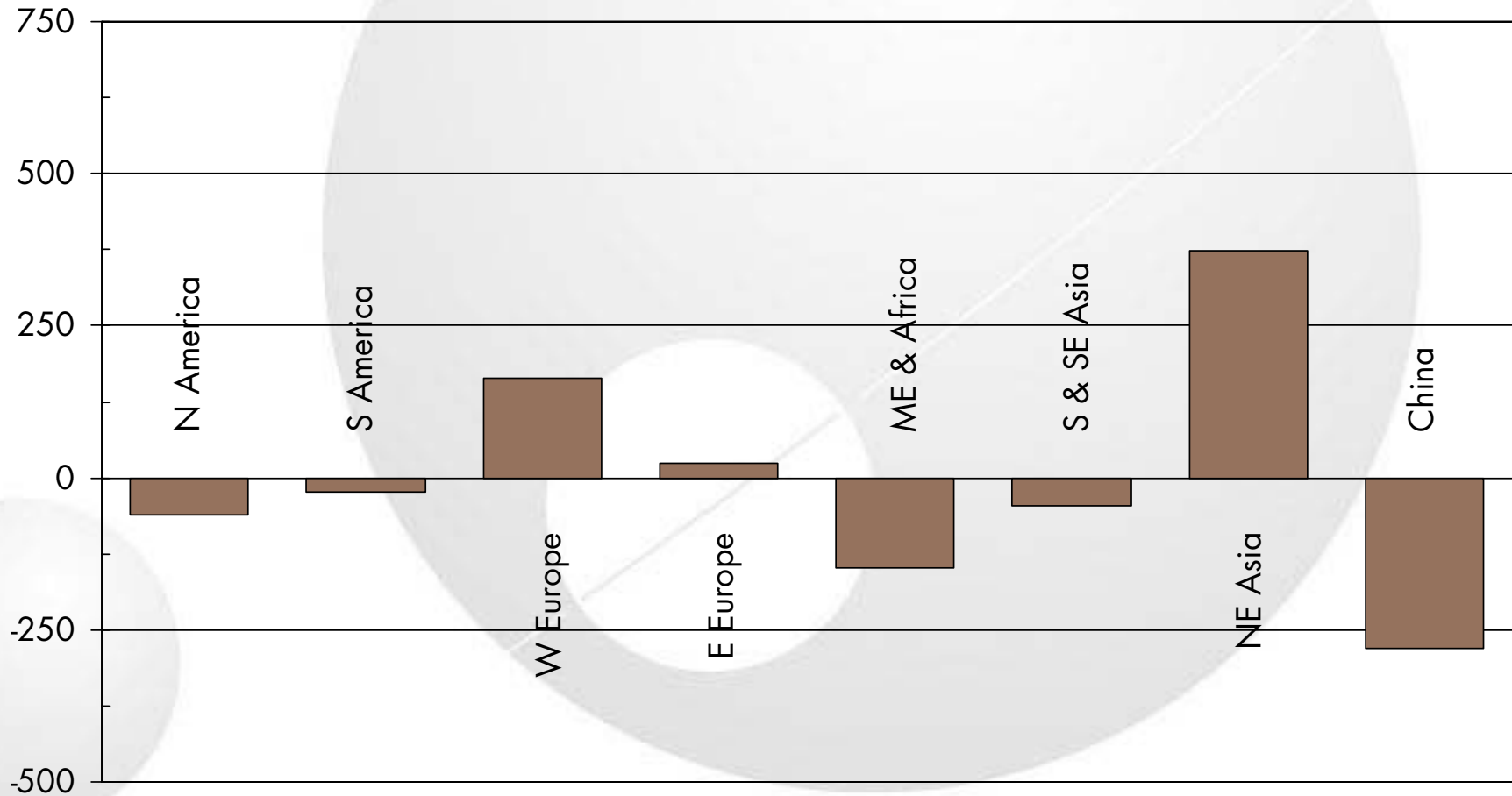
ACRYLIC FIBRE INTER-REGIONAL TRADE 2007 (1,000 Metric Tons)		Exporting Regions								Total Imports
		North America	South America	West Europe	East Europe	Middle East & Africa	South & Southeast Asia	Northeast Asia	China	
Importing Regions	North America		-	38.0	-	16.0	-	11.0	-	65.0
	South America	2.0		16.0	1.0	6.0	-	-	-	25.0
	West Europe	-	1.0		7.0	9.0	-	5.0	1.0	23.0
	East Europe	-	-	2.0		-	-	-	-	2.0
	Middle East & Africa	1.0	-	85.0	7.0		13.0	84.0	-	190.0
	South & Southeast Asia	-	-	26.0	2.0	-		49.0	-	77.0
	Northeast Asia	-	-	1.0	-	-	-		-	1.0
	China	1.0	1.0	17.0	9.0	11.0	18.0	225.0		282.0
Total Exports		4.0	2.0	185.0	26.0	42.0	31.0	374.0	1.0	665.0

Source: Tecnon OrbiChem

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ACRYLIC FIBRE REGIONAL NET TRADE 2007

Thousand Metric Tons



Source: Tecnon OrbiChem

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VISCOSE STAPLE INTER-REGIONAL TRADE 2007

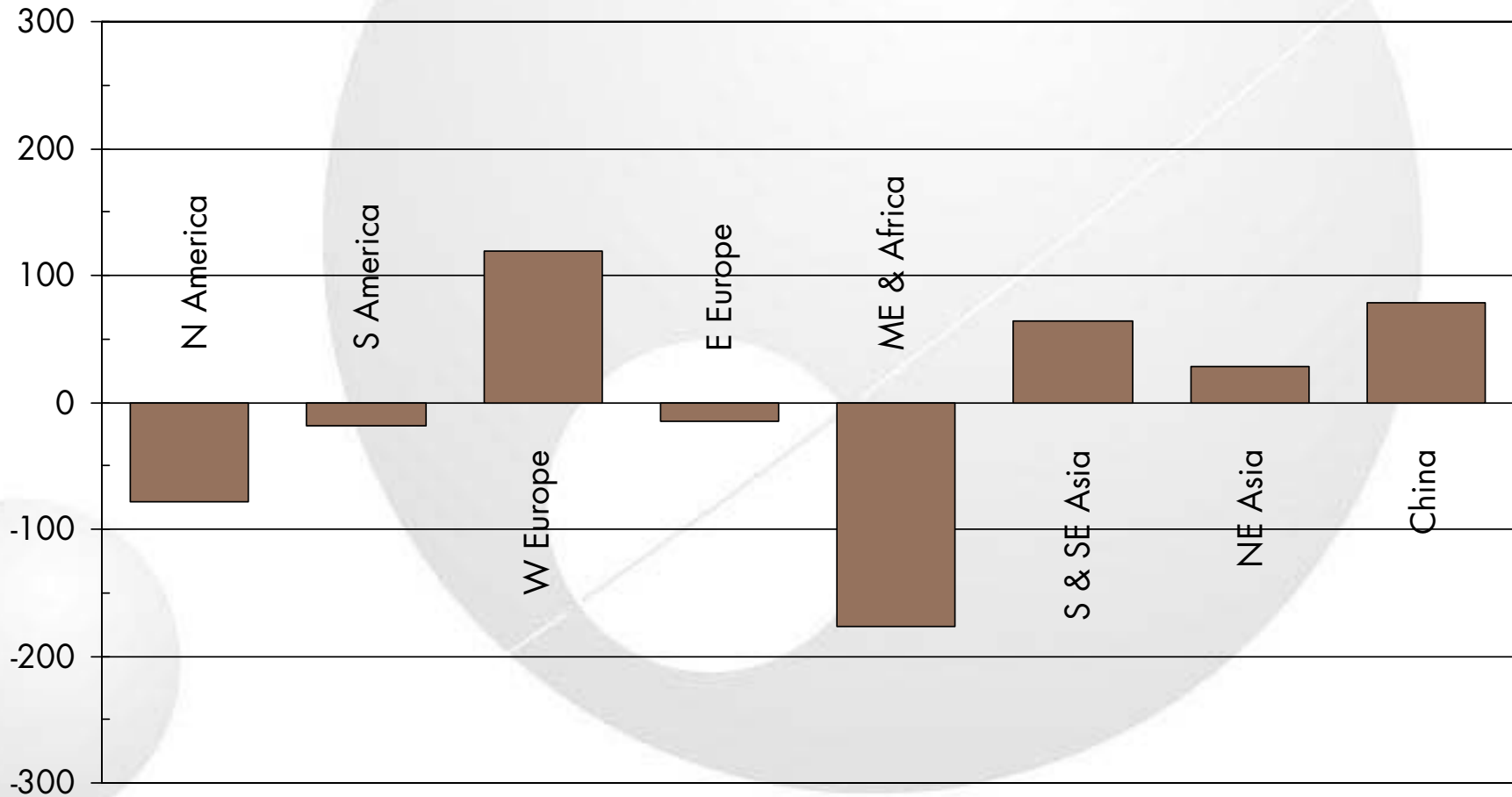
VISCOSE STAPLE INTER-REGIONAL TRADE 2007 (1,000 Metric Tons)		Exporting Regions								Total Imports
		North America	South America	West Europe	East Europe	Middle East & Africa	South & Southeast Asia	Northeast Asia	China	
Importing Regions	North America		1.0	38.0	-	-	5.0	17.0	17.0	78.0
	South America	-		5.0	-	-	7.0	7.0	6.0	25.0
	West Europe	-	2.0		3.0	-	20.0	-	12.0	37.0
	East Europe	-	-	21.0		-	2.0	-	4.0	27.0
	Middle East & Africa	-	3.0	42.0	-		46.0	19.0	67.0	177.0
	South & Southeast Asia	-	-	1.0	-	-		36.0	5.0	42.0
	Northeast Asia	-	-	29.0	9.0	-	22.0		3.0	63.0
	China	-	-	20.0	-	-	4.0	12.0		36.0
	Total Exports	0.0	6.0	156.0	12.0	0.0	106.0	91.0	114.0	485.0

Source: Tecnon OrbiChem

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VISCOSE STAPLE REGIONAL NET TRADE 2007

Thousand Metric Tons



Source: Tecnon OrbiChem

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INTER-FIBRE COMPETITION

- Formerly fibre choice in textile applications was based on easy care properties and price
- Now, although price remains important, aesthetics and performance are the primary concerns
 - Comfort
 - Softness
 - Optical properties
 - Insulation
 - Multilayer assemblies
- Until recently opportunities for substitution have been less widespread

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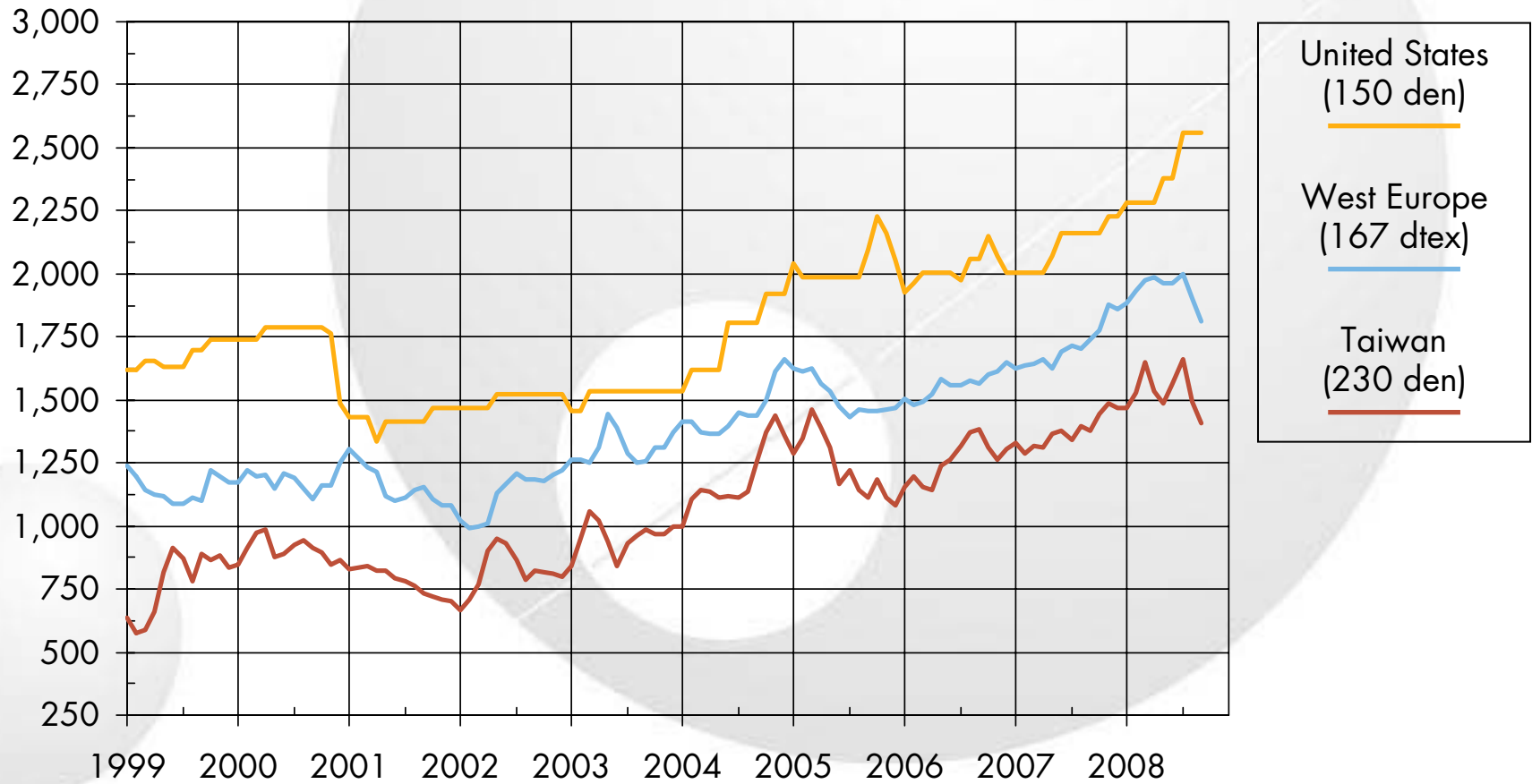
INTER-FIBRE COMPETITION

- Recently however, fibre shortages and rapid price rises have led to a change in the situation
 - Polyester staple has benefitted from shortages of viscose and cotton
 - High priced acrylic fibre is being replaced by polyester and viscose
 - Polyester filament and staple are replacing nylon and polypropylene in the US carpet market
- However, in the expanding nonwoven markets, fibre is highly specified
 - Fibre substitution is costly and rare

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US, WEST EUROPEAN and ASIAN POLYESTER POY FILAMENT PRICES

Dollars per Ton

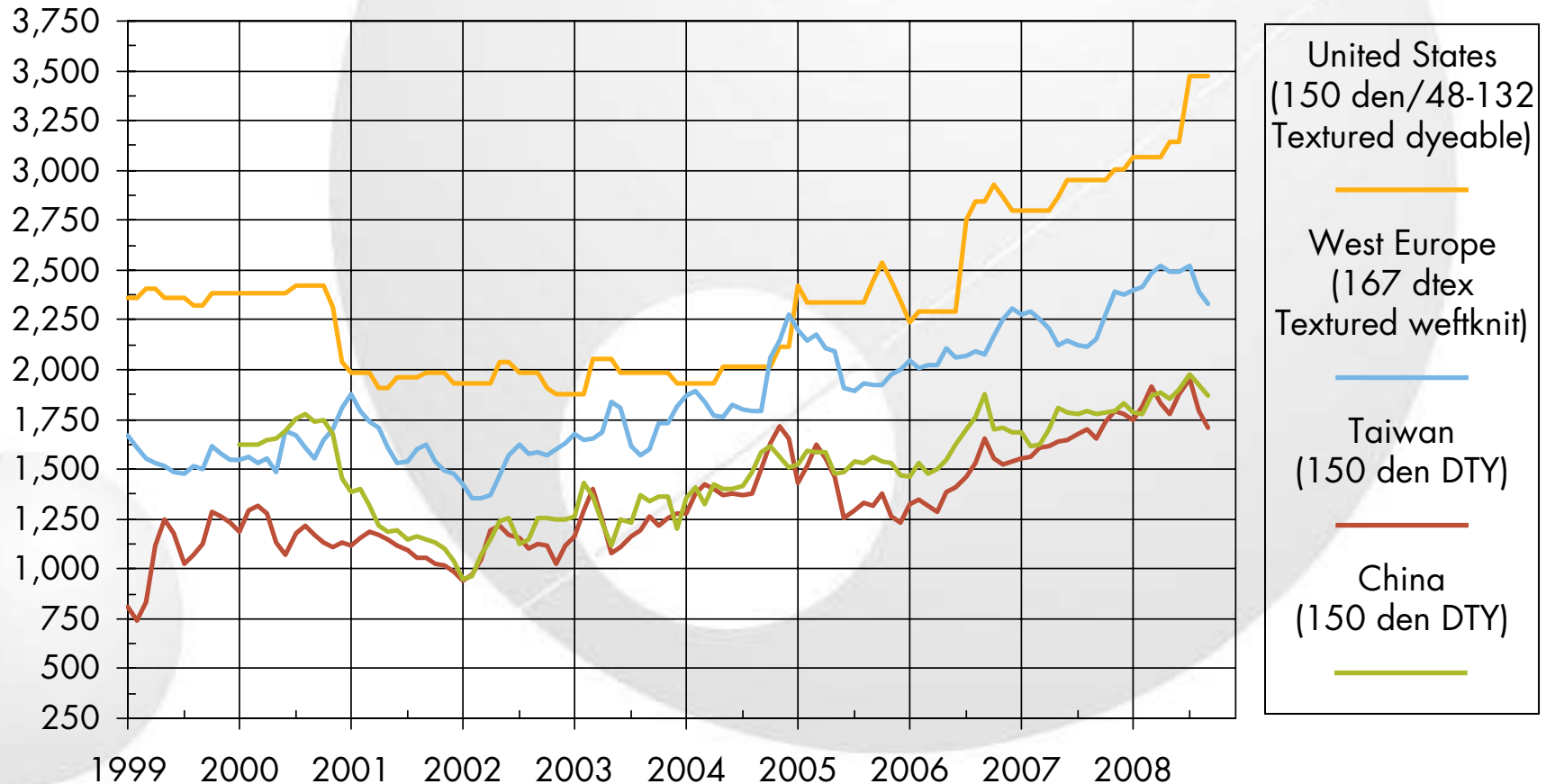


Source: Tecnon OrbiChem

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US, WEST EUROPEAN and ASIAN POLYESTER TEXTURED FILAMENT PRICES

Dollars per Ton

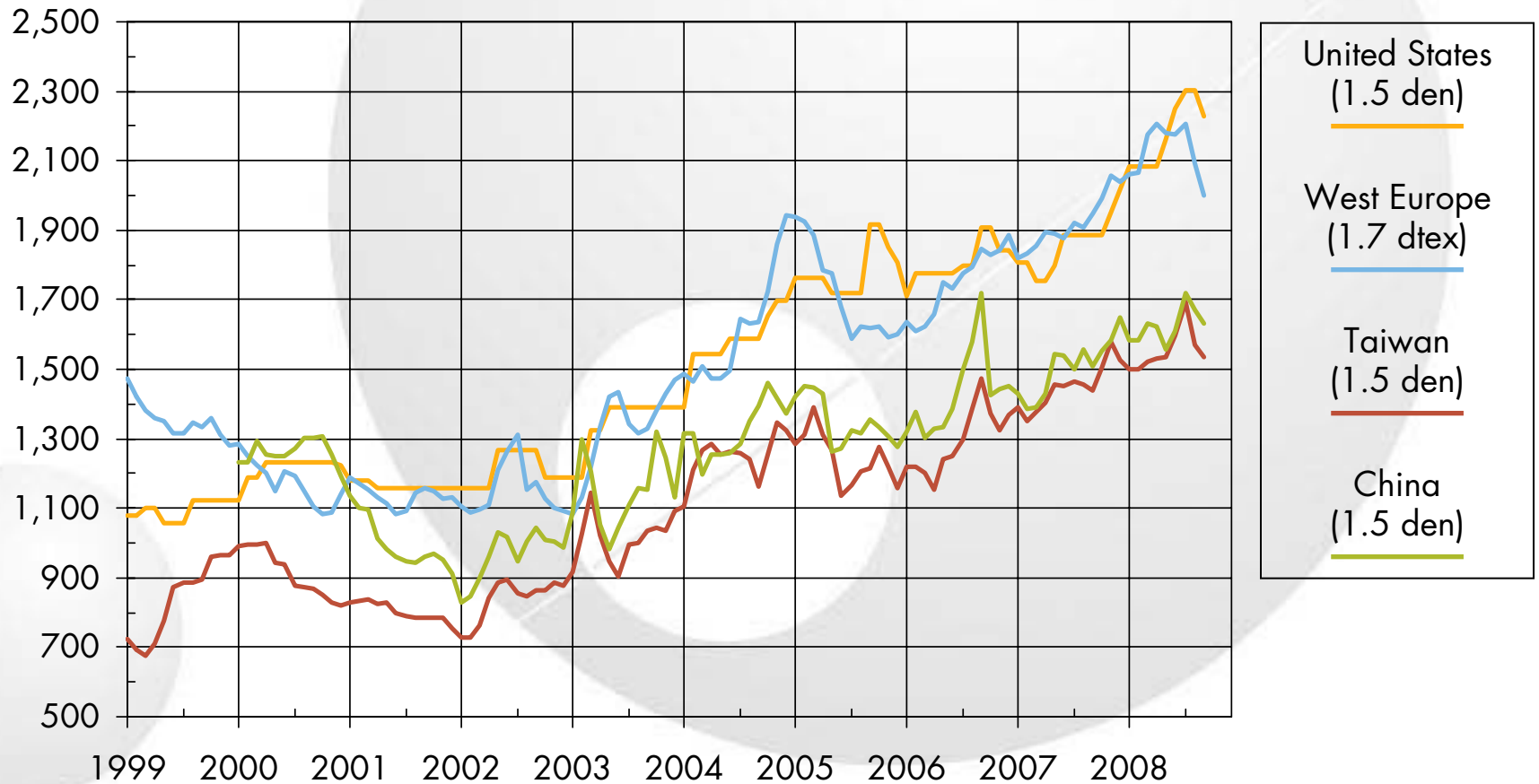


Source: Tecnon OrbiChem

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US, WEST EUROPEAN and ASIAN POLYESTER STAPLE (cotton type) PRICES

Dollars per Ton

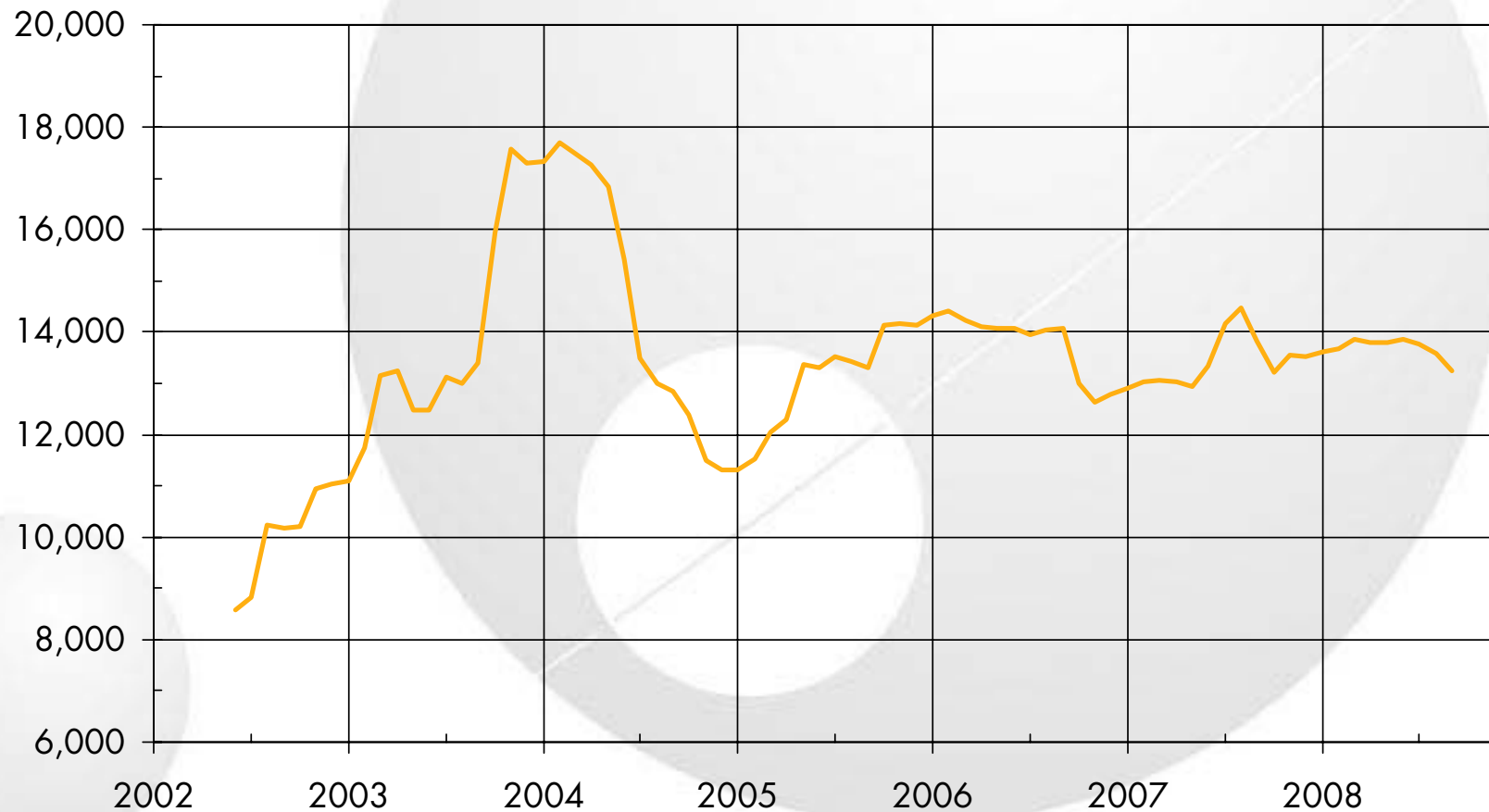


Source: Tecnon OrbiChem

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CHINESE COTTON PRICES

Renminbi per Ton



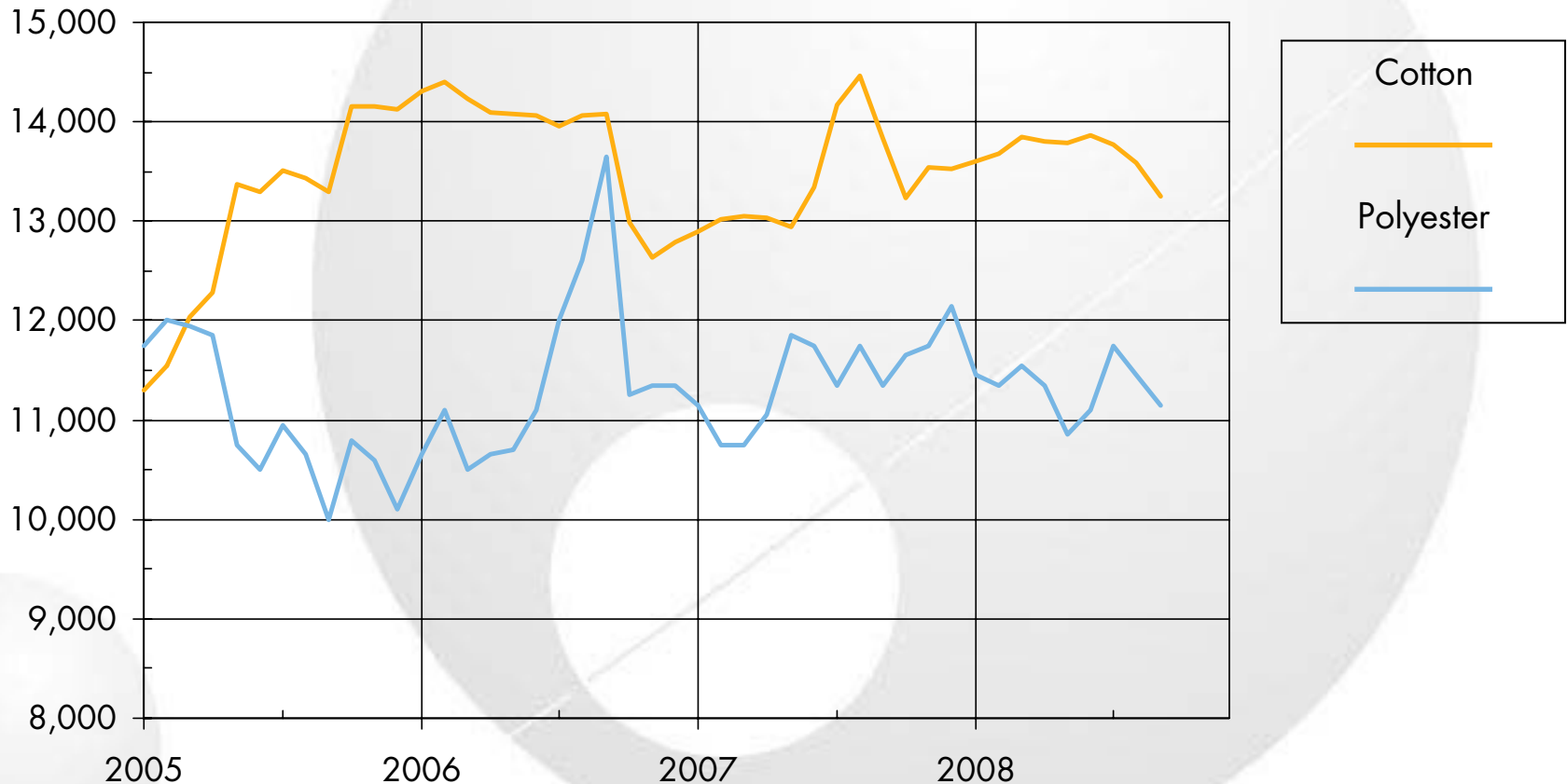
Source: Tecnon OrbiChem

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COTTON / POLYESTER INTERACTION - CHINA

Price of Grade 329 Cotton & 1.5 Denier Polyester Staple

Renminbi per Ton



- One of the factors affecting the substitution of Polyester with Cotton is the price differential - If differential is less than Rmb2000/ton, substitution becomes financially attractive

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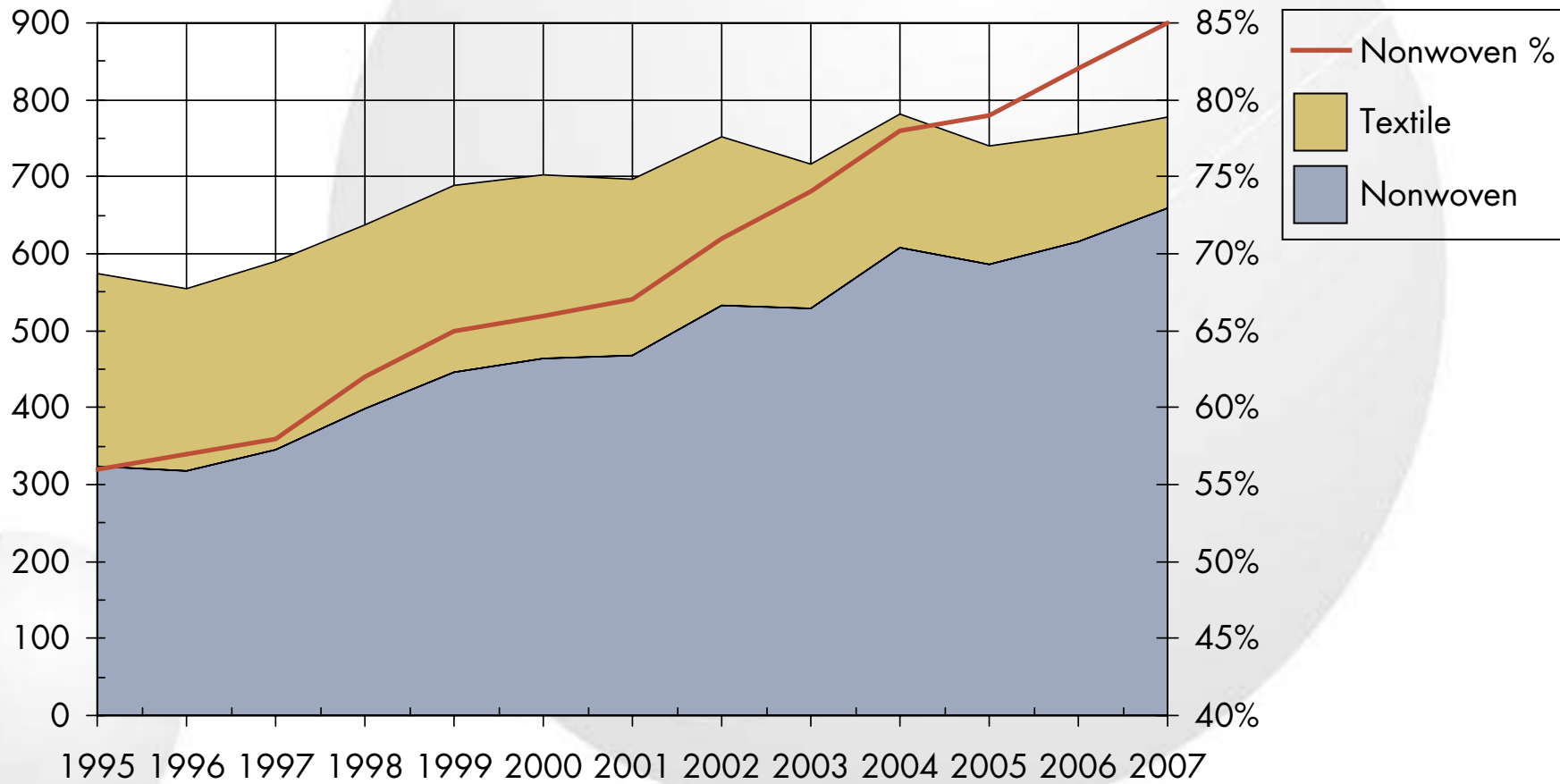
POLYESTER STAPLE APPLICATIONS - OVERVIEW

- Traditionally polyester staple has been used extensively in apparel, either in 100% form or more often in blends with other fibres
 - Men's and women's outerwear
 - Shirts and blouses
 - Leisurewear
 - Household textiles
- Increasingly polyester staple is being used in nonwoven applications
 - Wipes
 - Medical and hygiene products
 - Fibrefill
 - Automotive industry
 - Geotextiles

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POLYESTER STAPLE APPLICATIONS - WEST EUROPE

Thousand Metric Tons

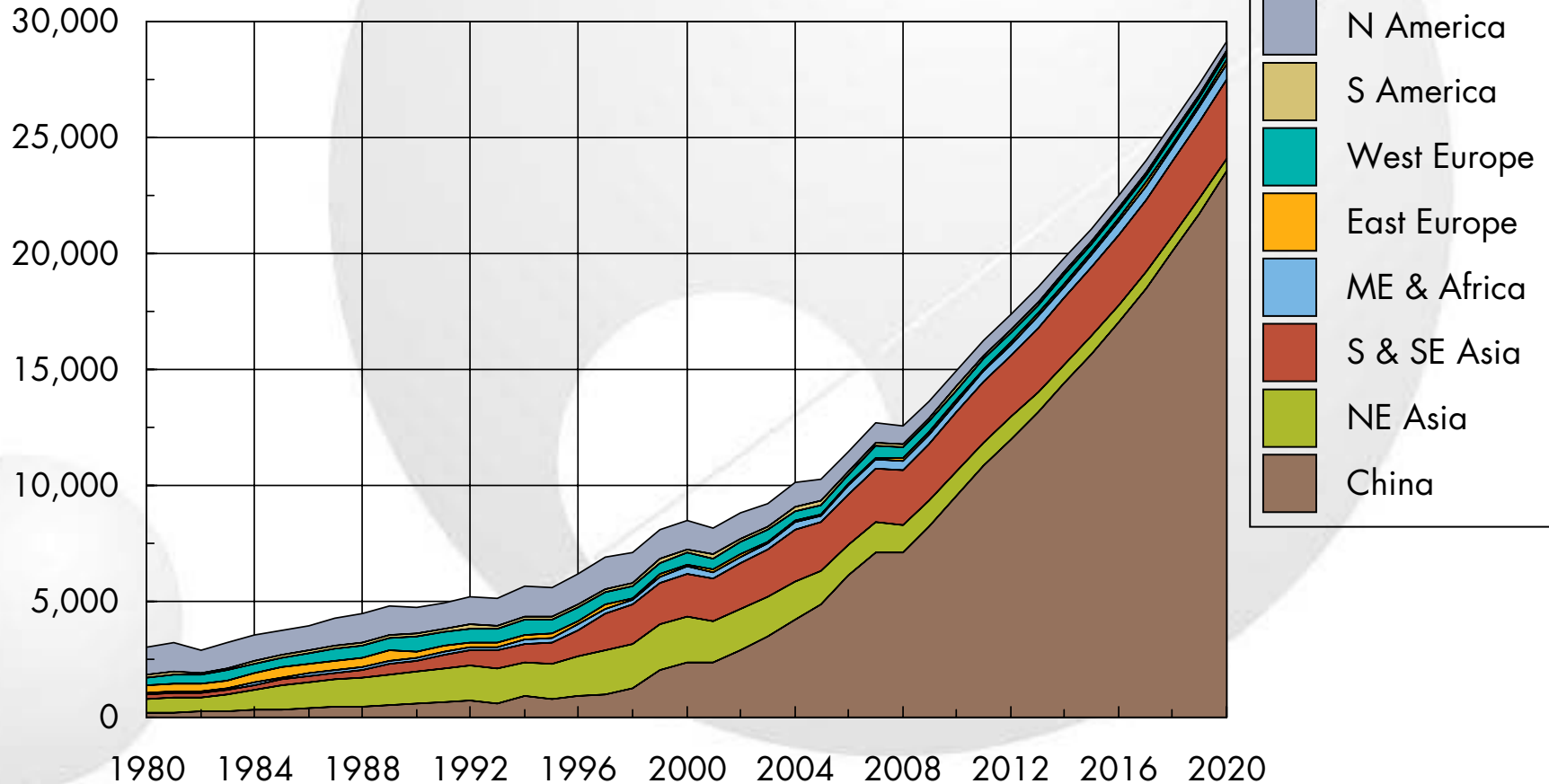


- Nonwoven applications dominate in the western world, though the reverse is true in Asia

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WORLD POLYESTER STAPLE PRODUCTION BY REGION 1980-2020

Thousand Metric Tons



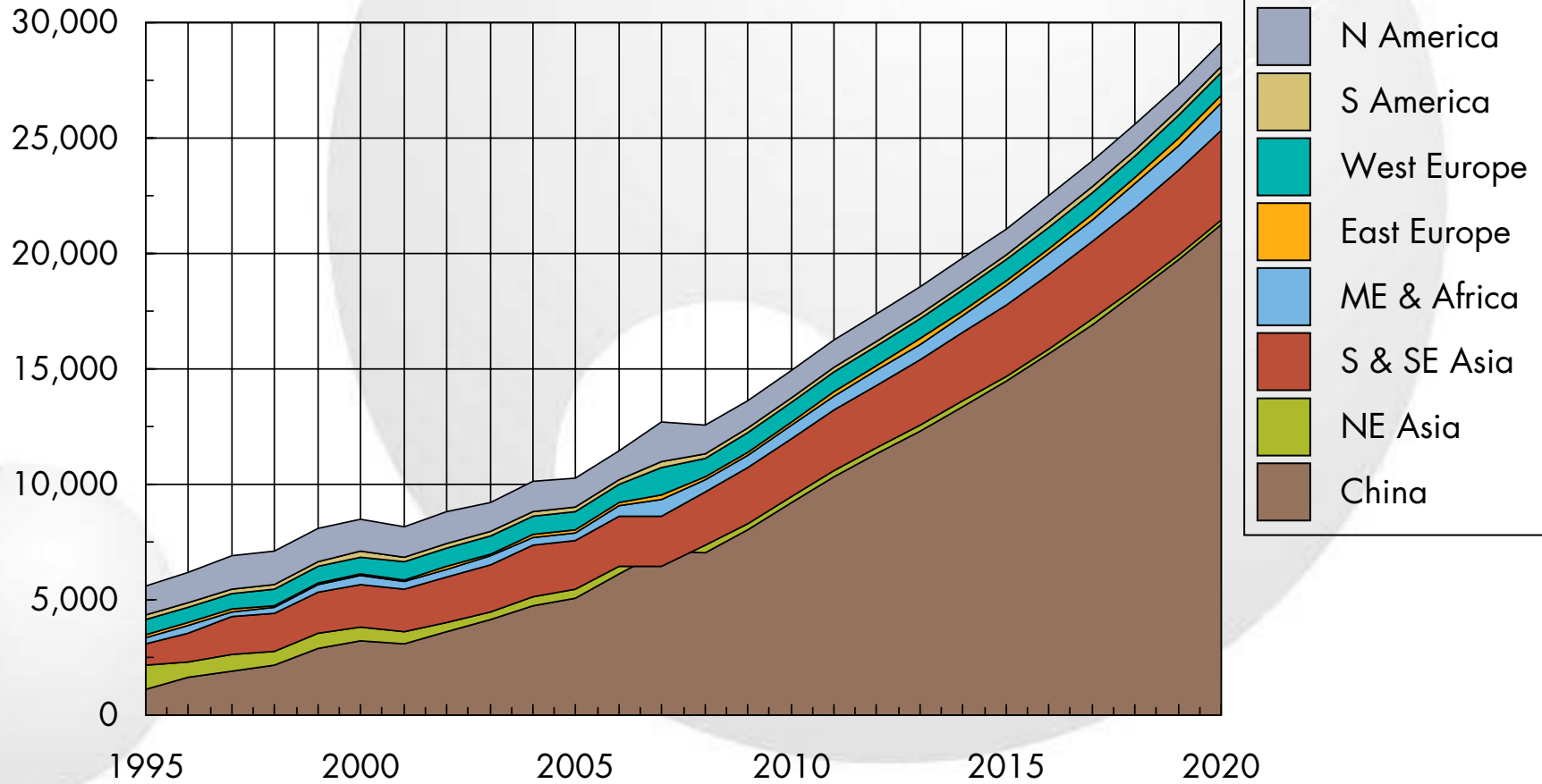
Source: Tecnon OrbiChem

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WORLD POLYESTER STAPLE

APPARENT MILL CONSUMPTION BY REGION 1995-2020

Thousand Metric Tons

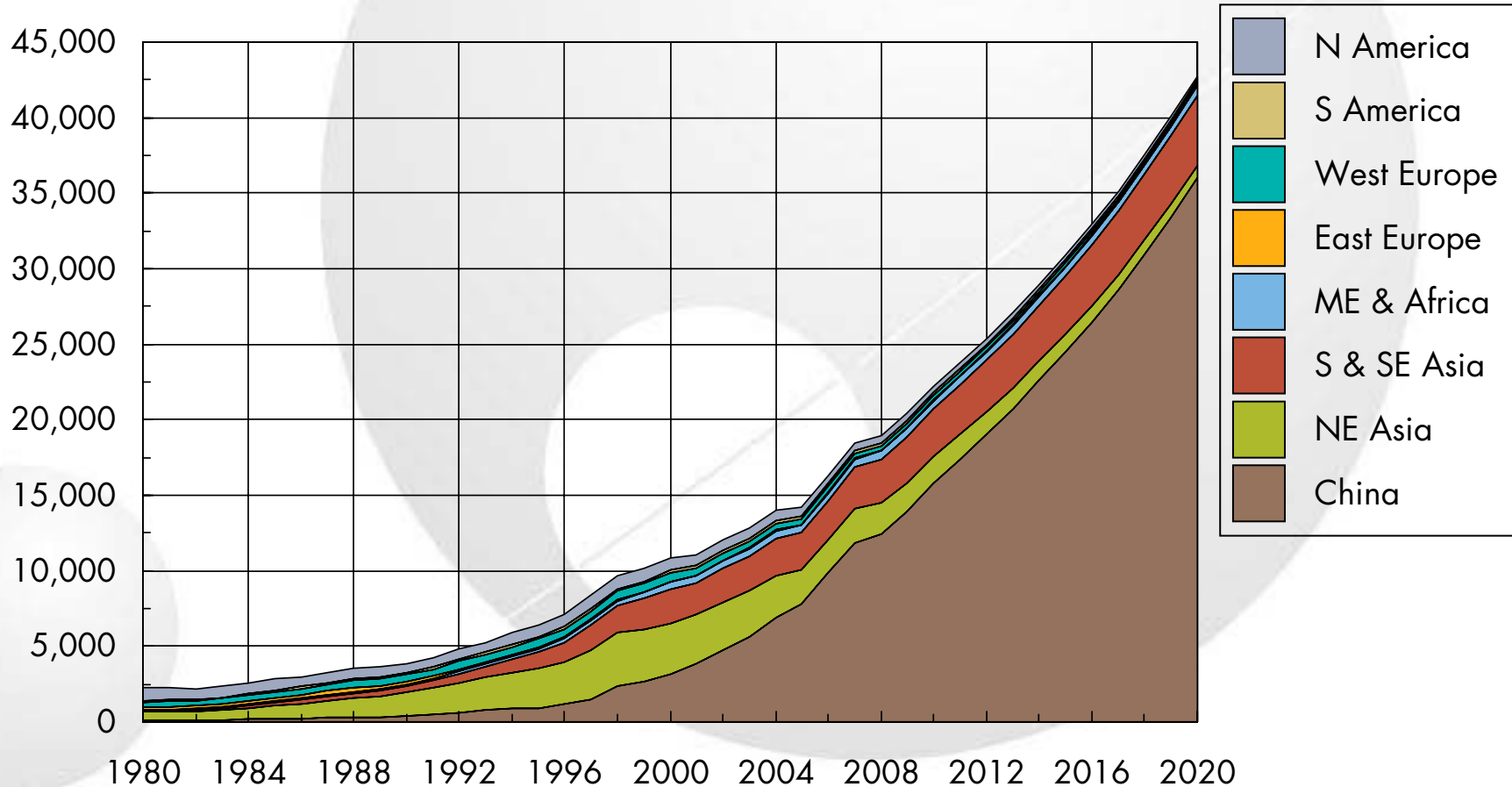


Source: Tecnon OrbiChem

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WORLD POLYESTER FILAMENT PRODUCTION BY REGION 1980-2020

Thousand Metric Tons

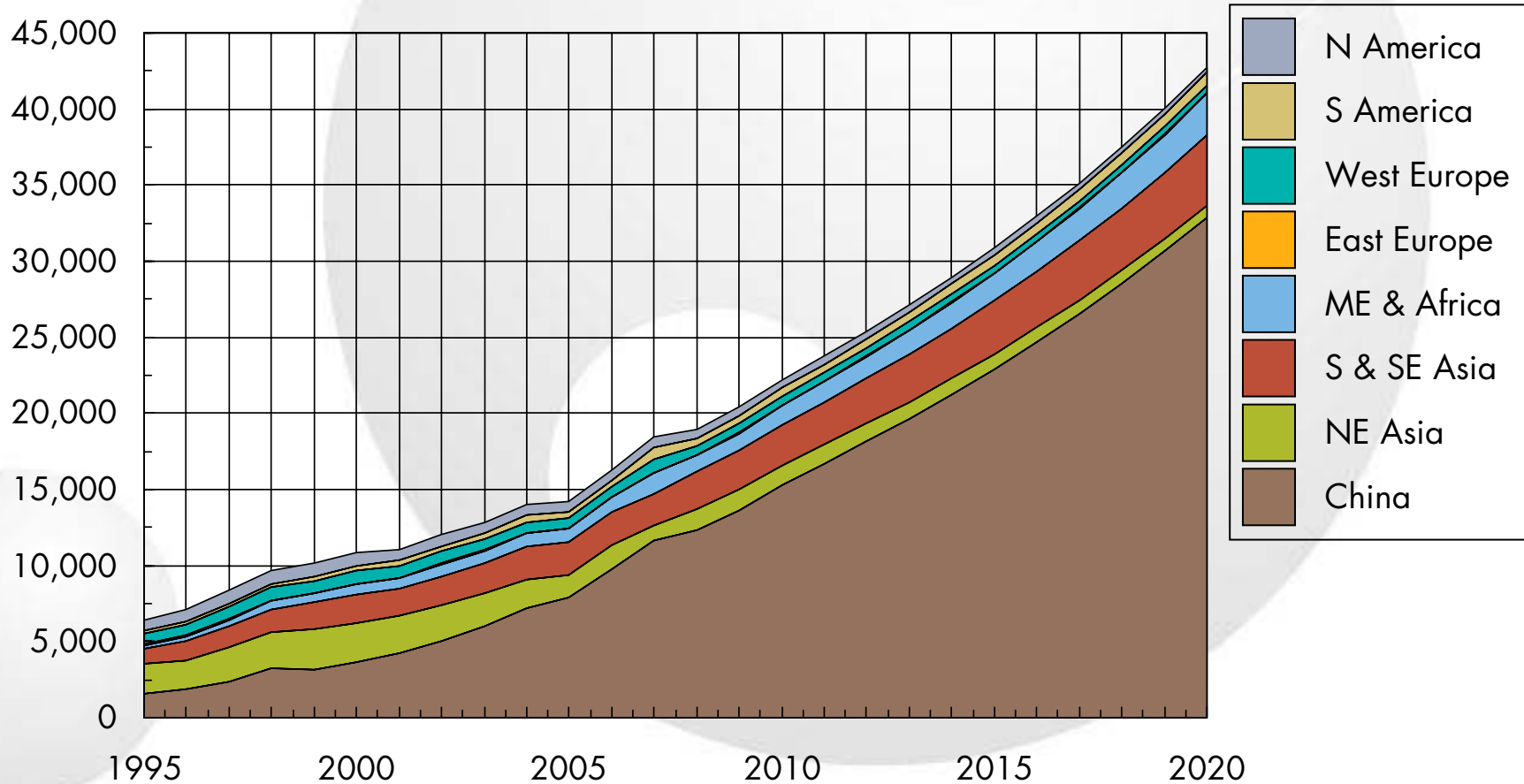


Source: Tecnon OrbiChem

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WORLD POLYESTER FILAMENT APPARENT MILL CONSUMPTION BY REGION 1995-2020

Thousand Metric Tons



Source: Tecnon OrbiChem



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GLOBAL VIEW AND FUTURE PROSPECTS

- Production is migrating to regions of high consumption
- Fibre consumption in higher cost regions is being stifled by increasing imports of textile goods
- Fibre export opportunities for western producers are being lost to Asian manufacturers

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SUMMARY

- Capacity and production of both polyester filament and staple has grown rapidly in recent years
 - Growth in capacity has outstripped demand, particularly for filament
 - Capacity utilisation is poor, <60% in China
- Growth in demand, although slowing in the short term, is expected to continue to grow
- But, production in other regions is in decline
 - Northeast Asia (Japan, Taiwan and South Korea)
 - West Europe
- To survive in these relatively high cost regions, producers must
 - Turn to specialities, for example flame retardant, antimicrobial
 - Service niche markets and new technologies, particularly in the nonwoven sector