

# Polyamide & Intermediates Markets

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Synthetic Fibres Raw Materials Committee Meeting at APIC 2013  
Taipei, 10 May 2013

(Grace) Shen Hong

# **APIC 2013 AGENDA**

## **Polyamide 6 Intermediates**

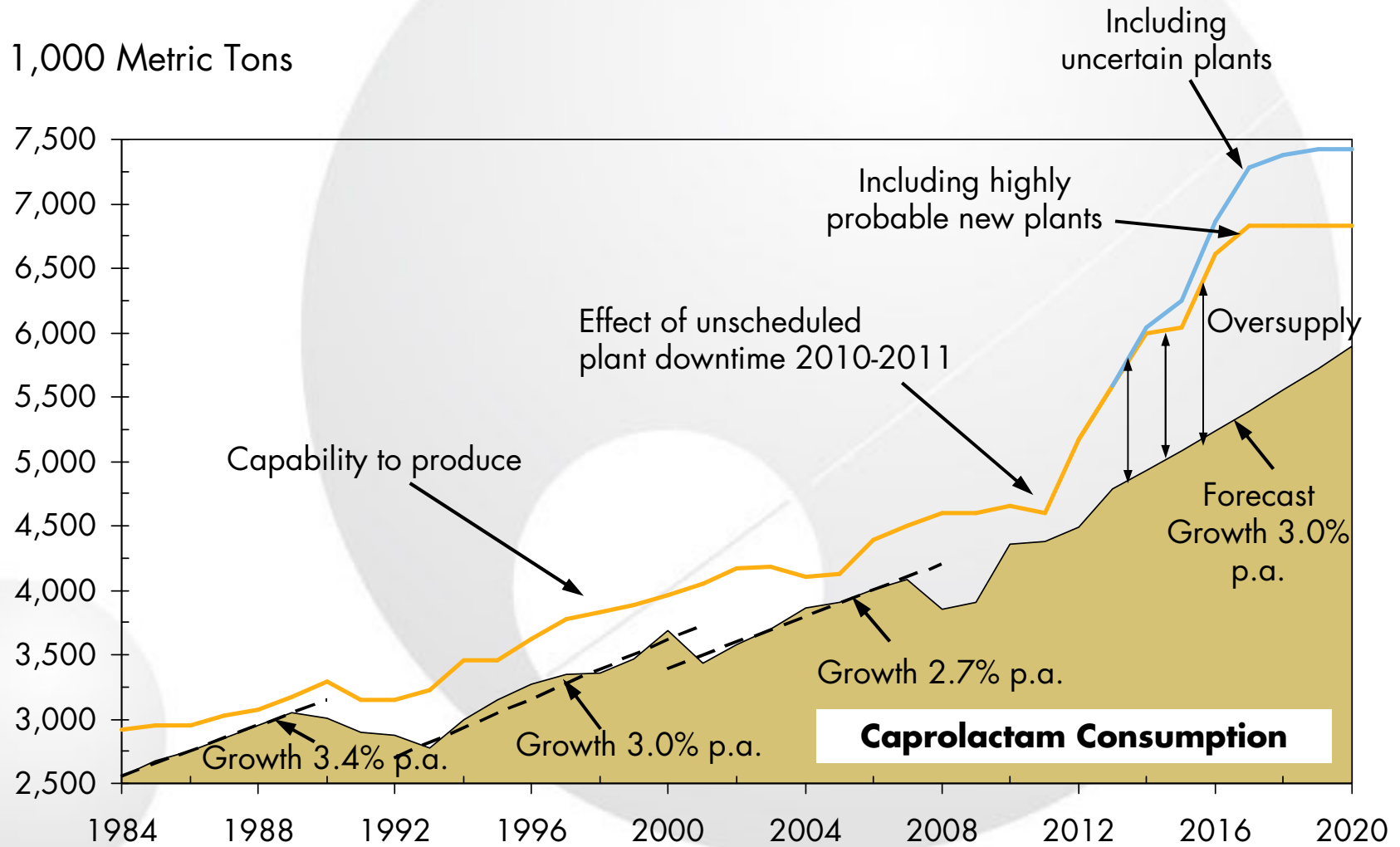
- World Caprolactam Supply and Demand
- Polyamide 6 Demand
- Economic Analysis
- Conclusion

## **Polyamide 66 Intermediates**

- World Adipic Acid Supply and Demand
- World Adiponitrile Supply and Demand
- Polyamide 66 Demand
- Conclusion

# APIC 2013

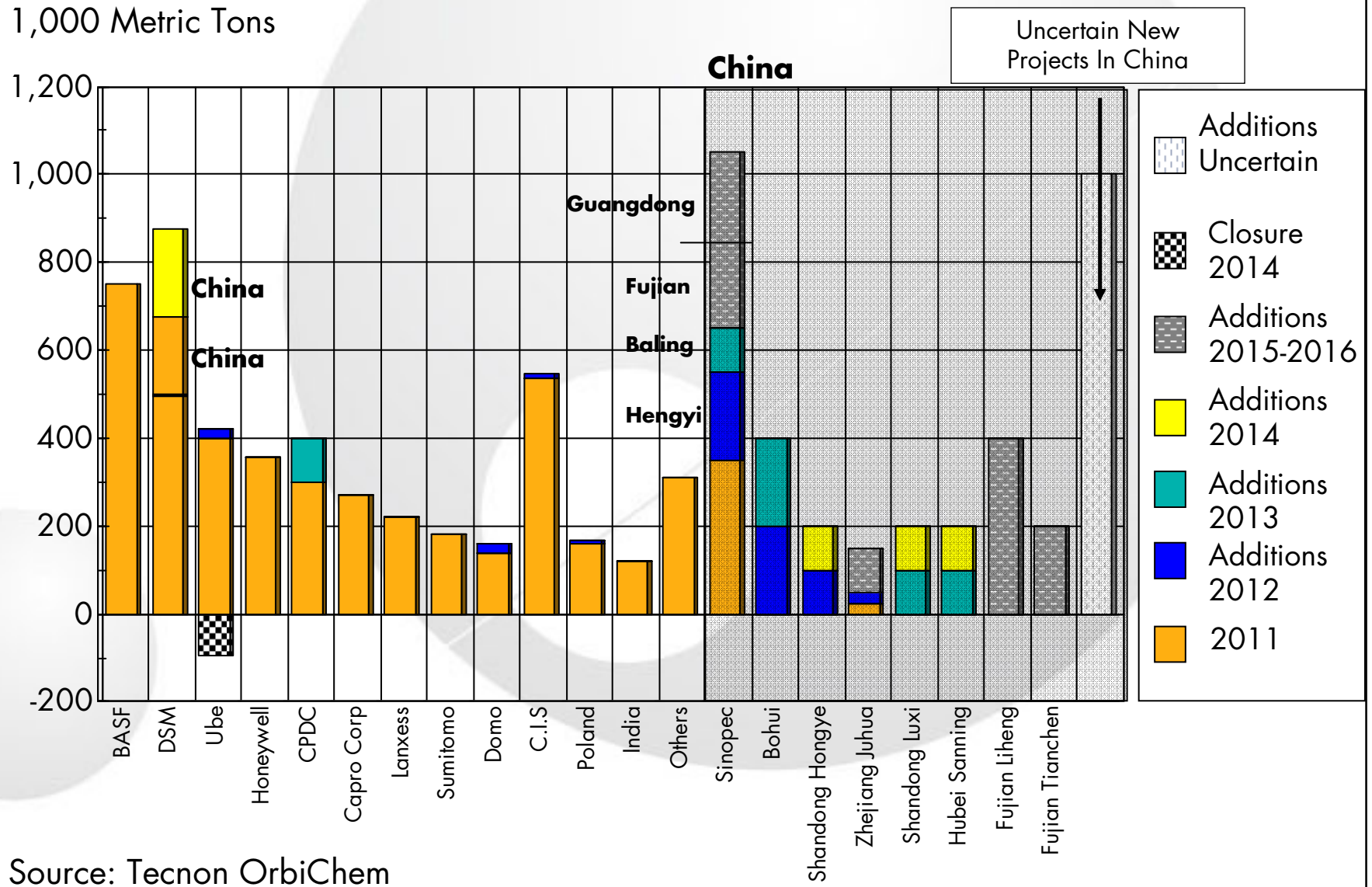
## WORLD CAPROLACTAM CAPABILITY vs DEMAND



Source: Tecnon OrbiChem

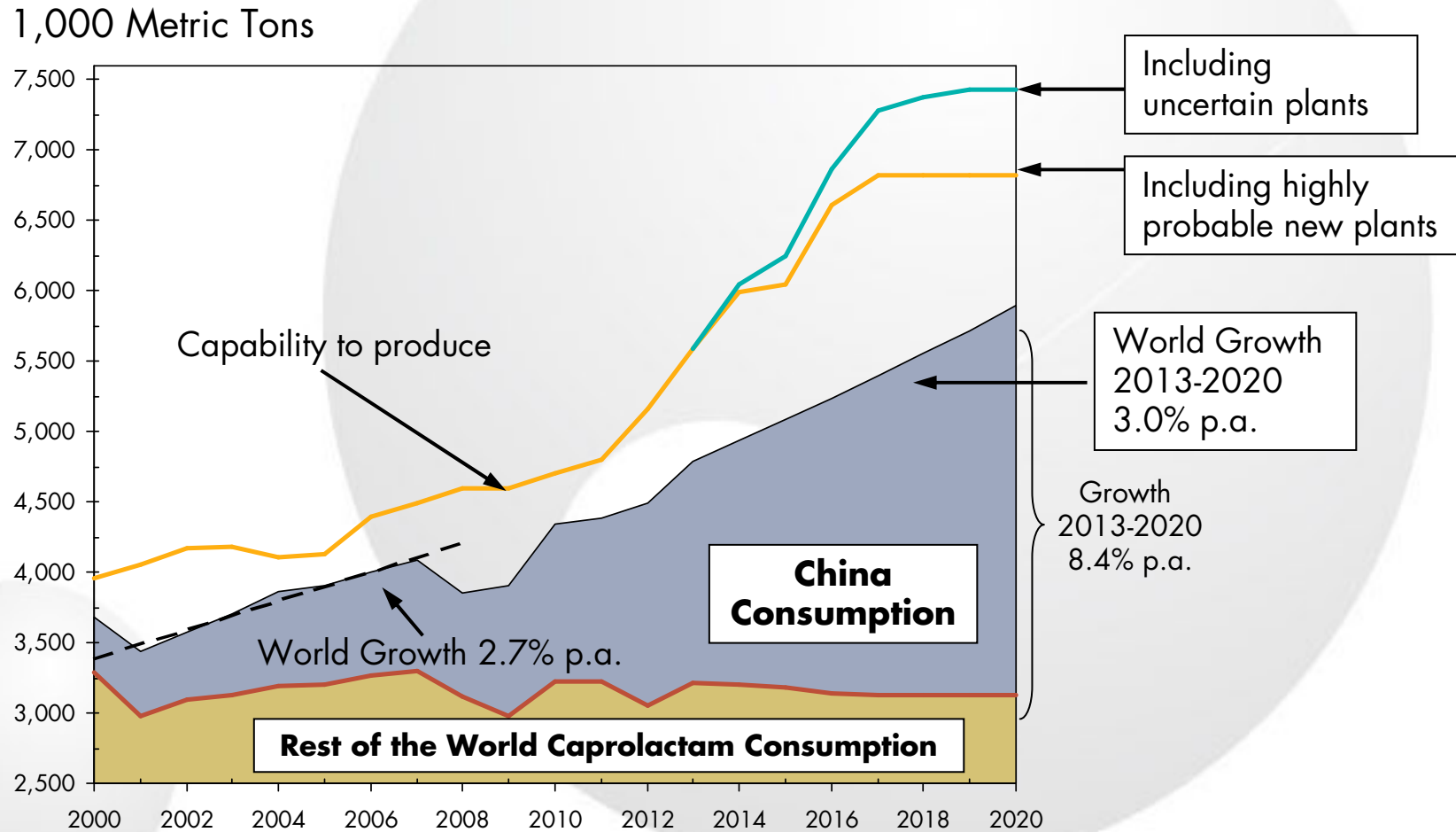
# APIC 2013

## CAPROLACTAM CAPACITY 2011-2016



# APIC 2013

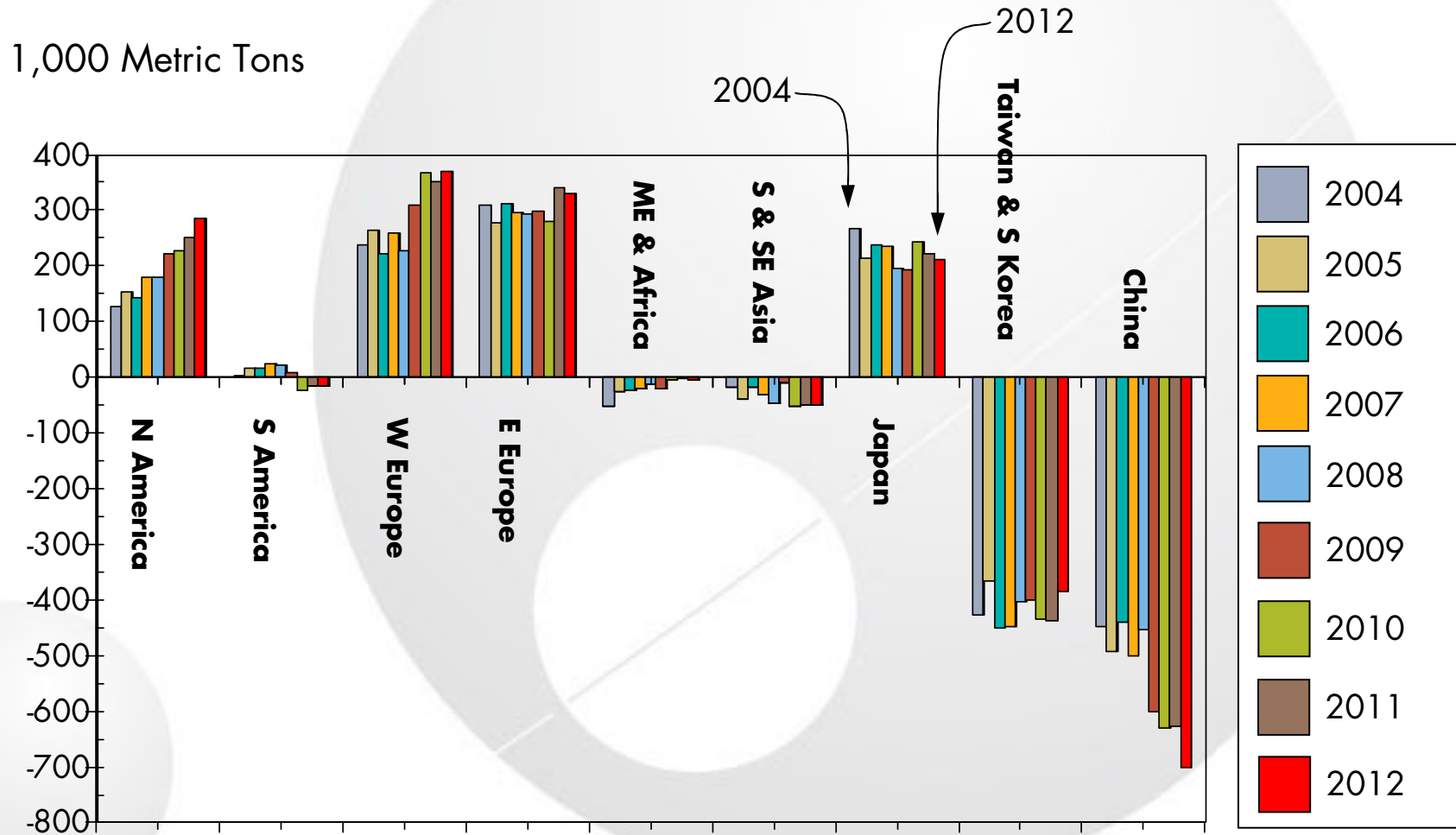
## WORLD CAPROLACTAM CAPABILITY vs DEMAND



Source: Tecnon OrbiChem

# APIC 2013

## WORLD CAPROLACTAM REGIONAL NET TRADE

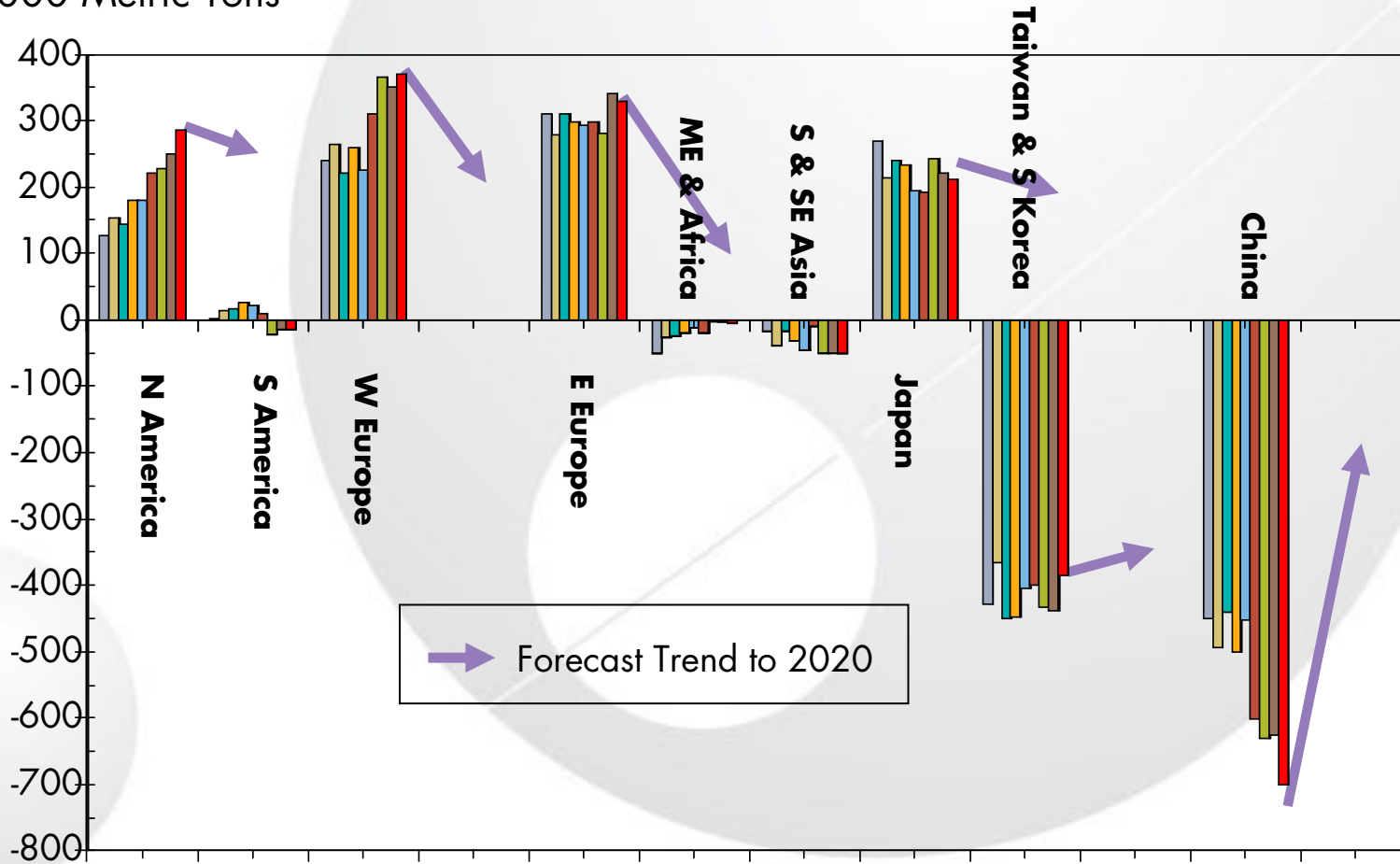


Source: Tecnon OrbiChem

# APIC 2013

## WORLD CAPROLACTAM REGIONAL NET TRADE TRENDS TO 2020

1,000 Metric Tons

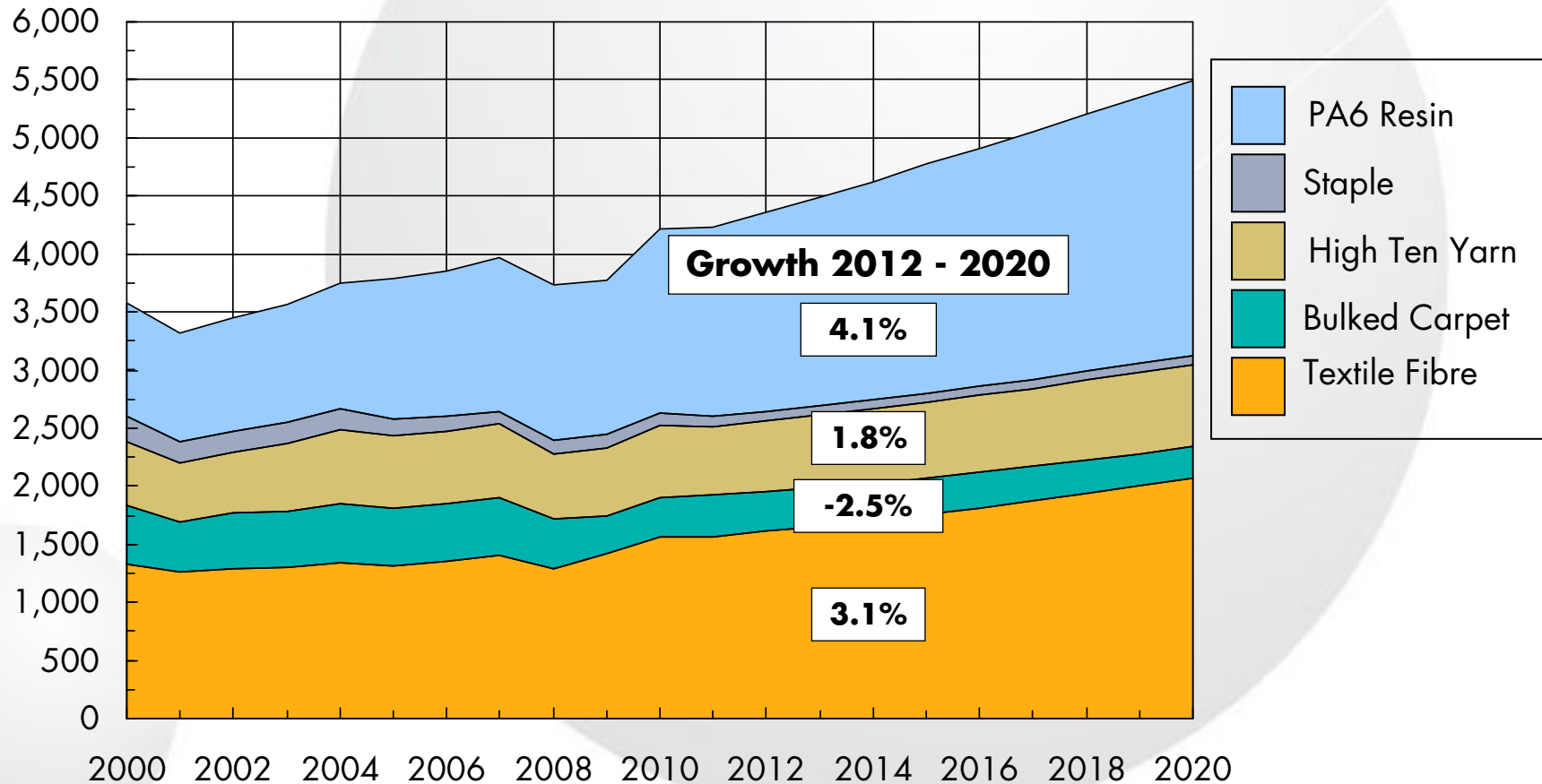


Source: Tecnon OrbiChem

# APIC 2013

## WORLD POLYAMIDE 6 CONSUMPTION BY END-USE

1,000 Metric Tons



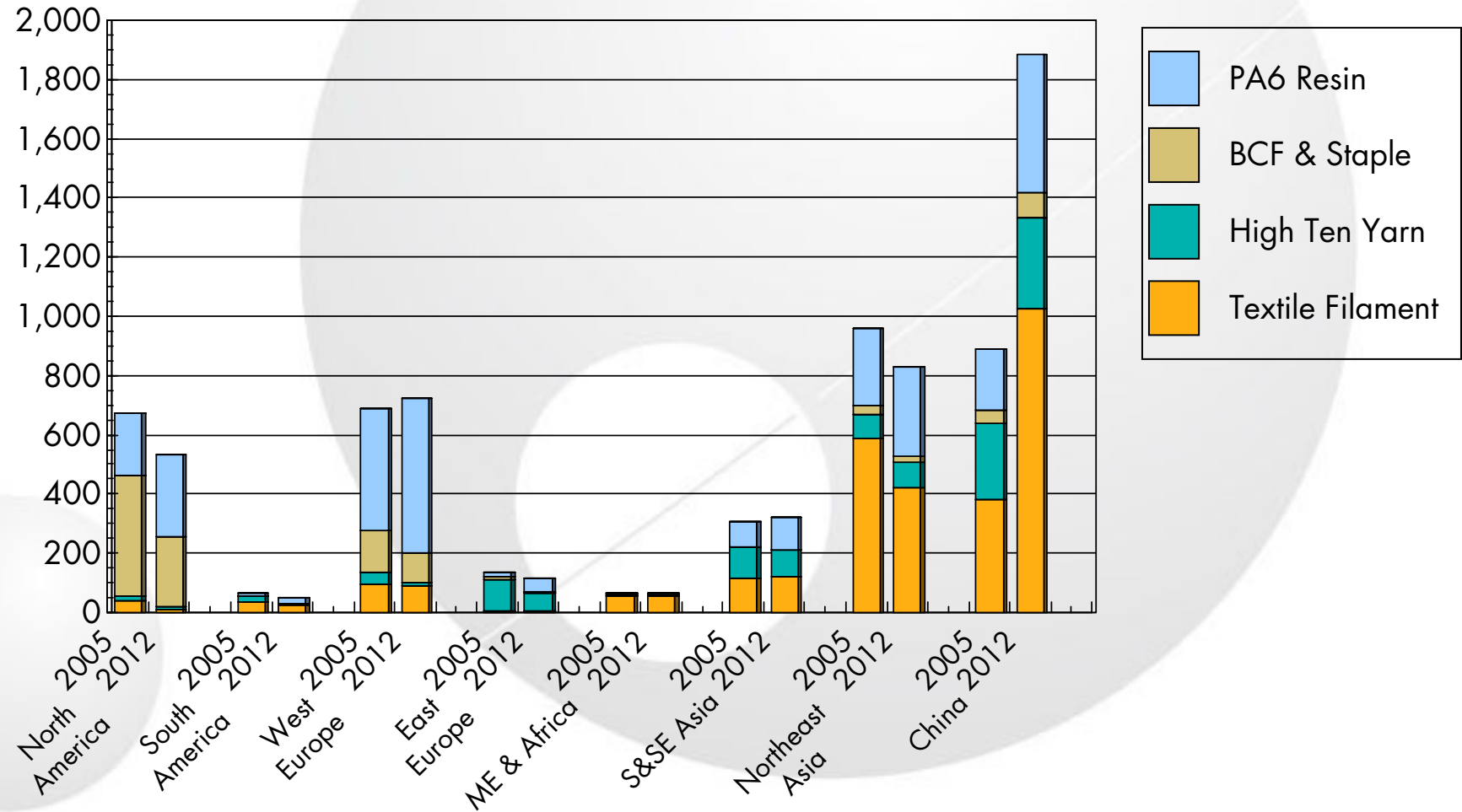
Source: Tecnon OrbiChem



# APIC 2013

## WORLD POLYAMIDE 6 DEMAND BY REGION

1,000 Metric Tons

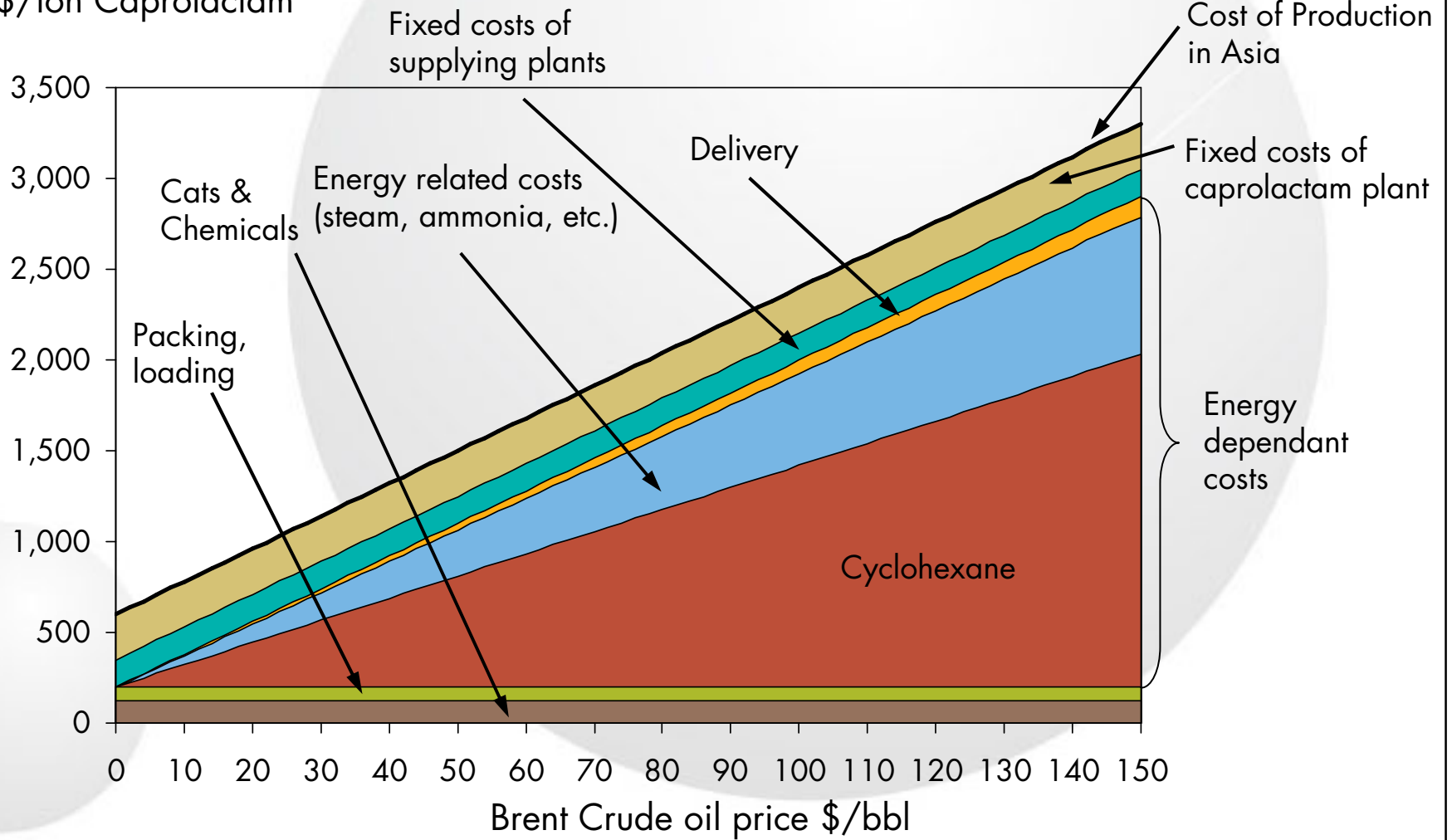


Source: Tecnon OrbiChem

**APIC 2013**

# **CAPROLACTAM PRODUCTION COST vs OIL PRICE**

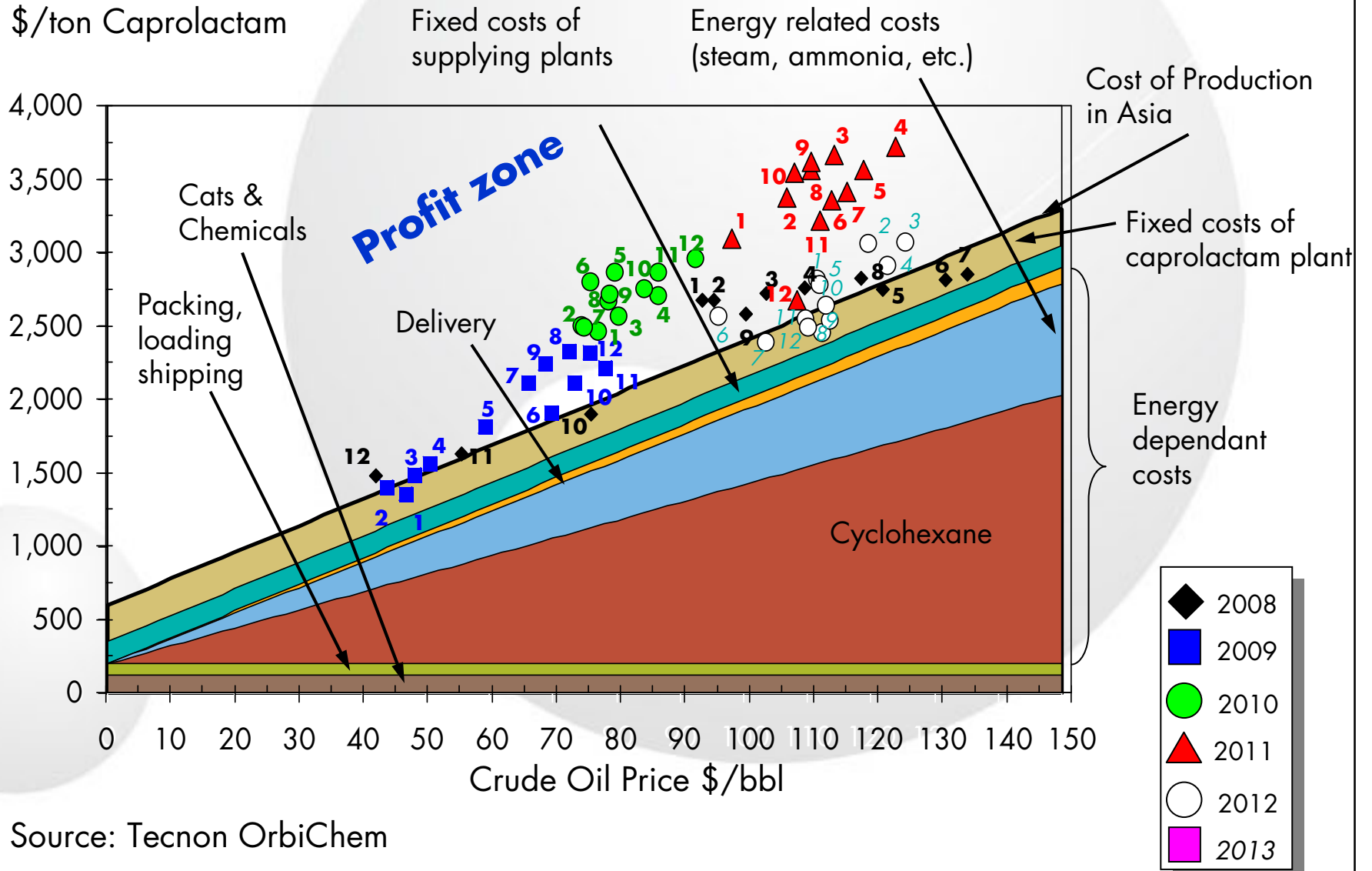
\$/ton Caprolactam



Source: Tecnon OrbiChem

# APIC 2013

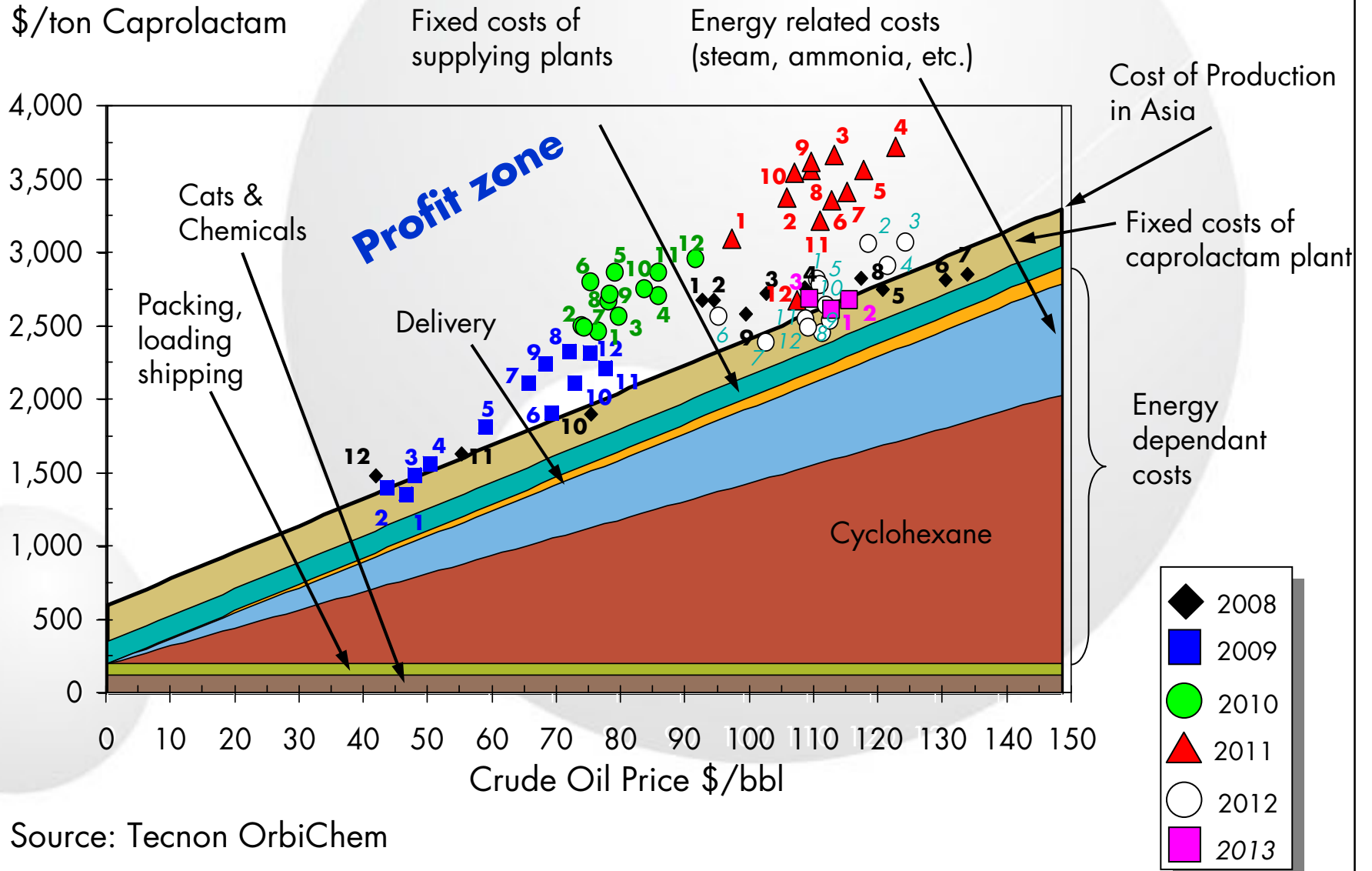
## CAPROLACTAM PRODUCTION COST vs OIL PRICE



Source: Tecnon OrbiChem

# APIC 2013

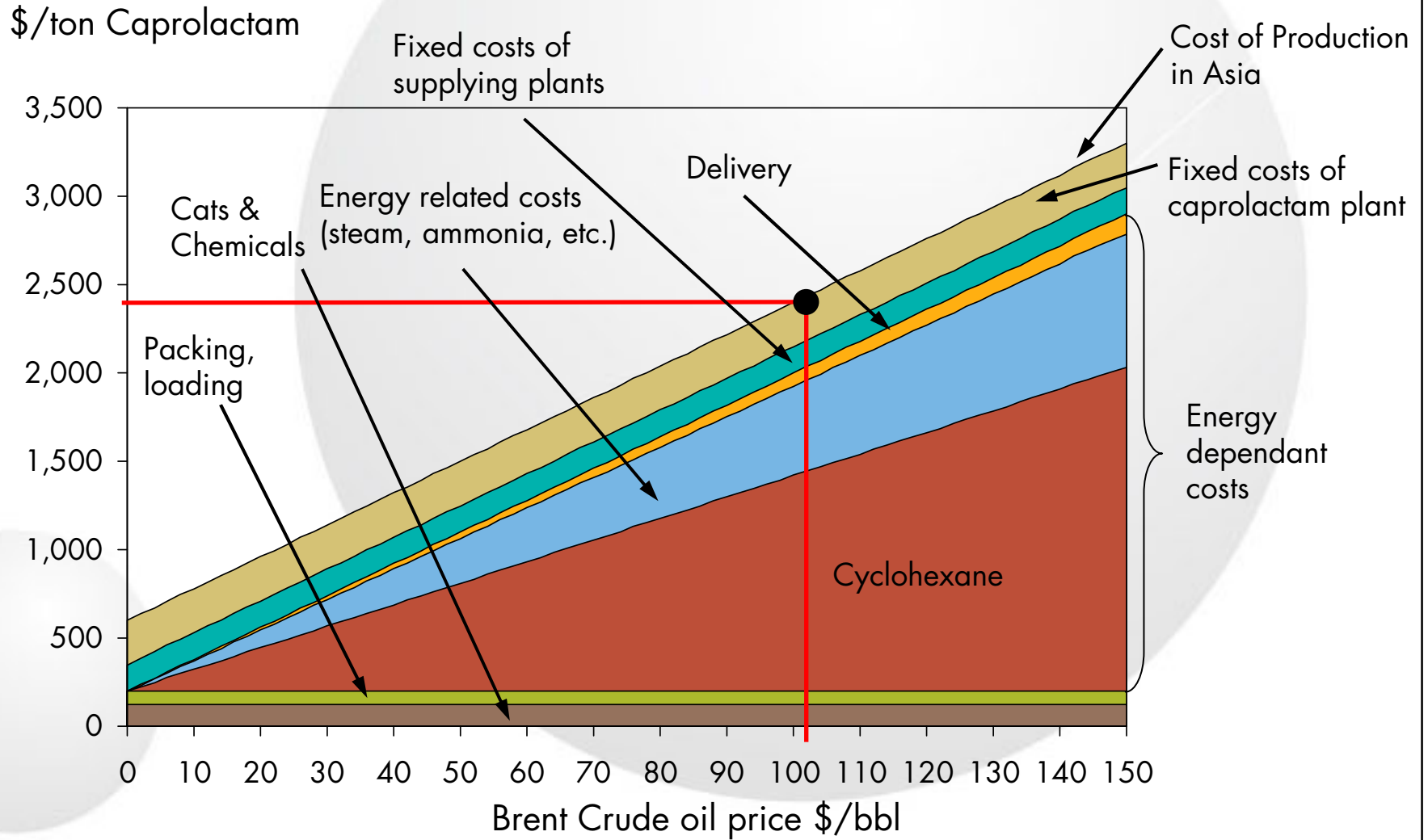
## CAPROLACTAM PRODUCTION COST vs OIL PRICE



Source: Tecnon OrbiChem

# APIC 2013

## CAPROLACTAM PRODUCTION COST vs OIL PRICE

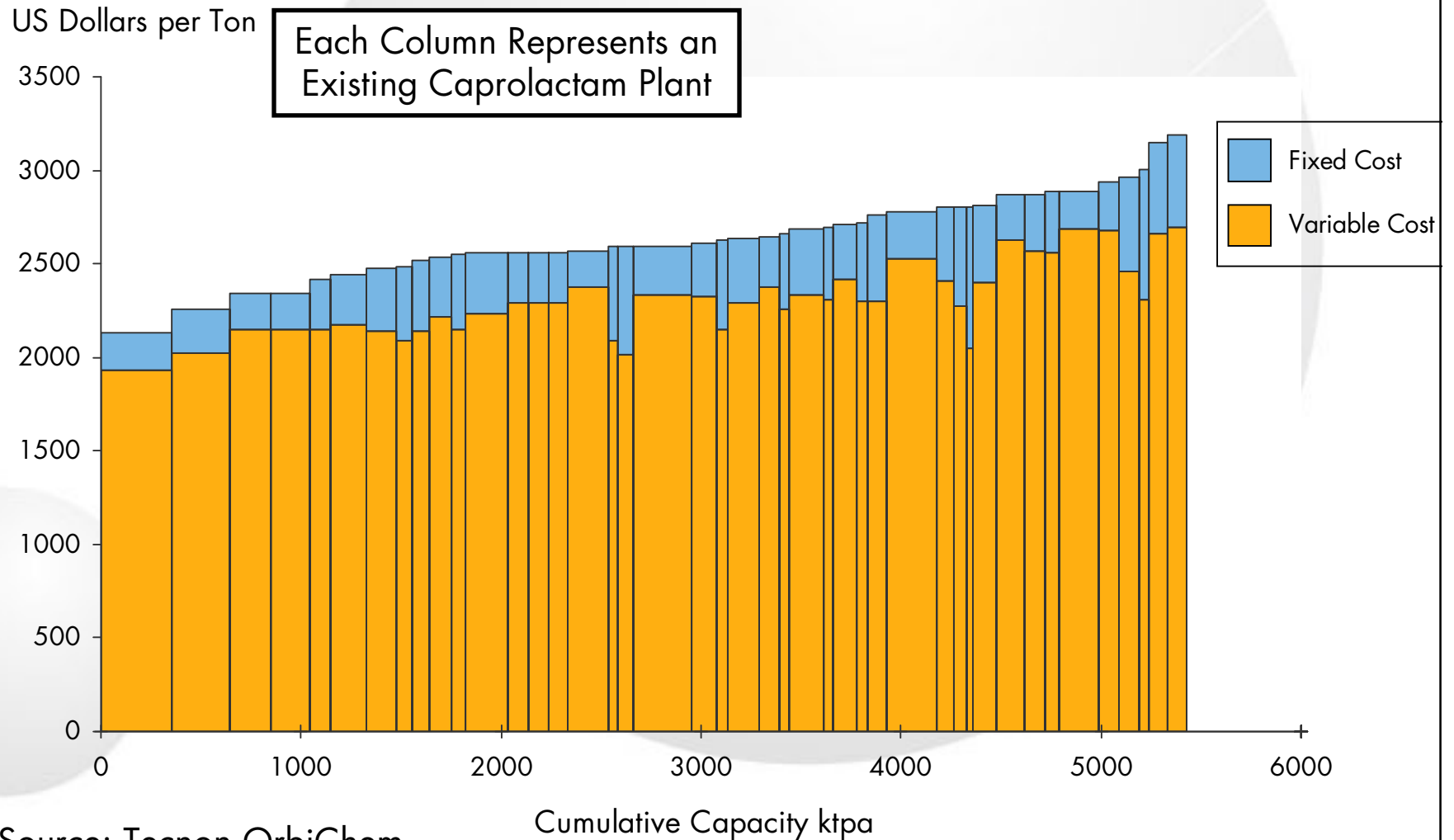


Source: Tecnon OrbiChem

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# **CAPROLACTAM INDUSTRY CASH COST CURVE**

## **October 2012**



Source: Tecnon OrbiChem

# APIC 2013 TIGHTNESS INDEX

**World Capacity  
Utilisation Rate**

96.0%

93.7%

90.0%

84.0%

75.0%

**World  
Markets**

Very Tight

Tight

Balanced

Loose

Over-Supplied  
(Sloppy)

**Tightness  
Index**

1.4

1.2

1

0.8

0.6

Source: Tecnon OrbiChem

# APIC 2013 TIGHTNESS INDEX

For a given year:

$$\text{World Tightness Index} = \log_{10} \left[ \frac{\text{Capability}}{\text{Capability} - \text{Consumption}} \right]$$

**Capability = Annual Nameplate Capacity less Capacity off line\***

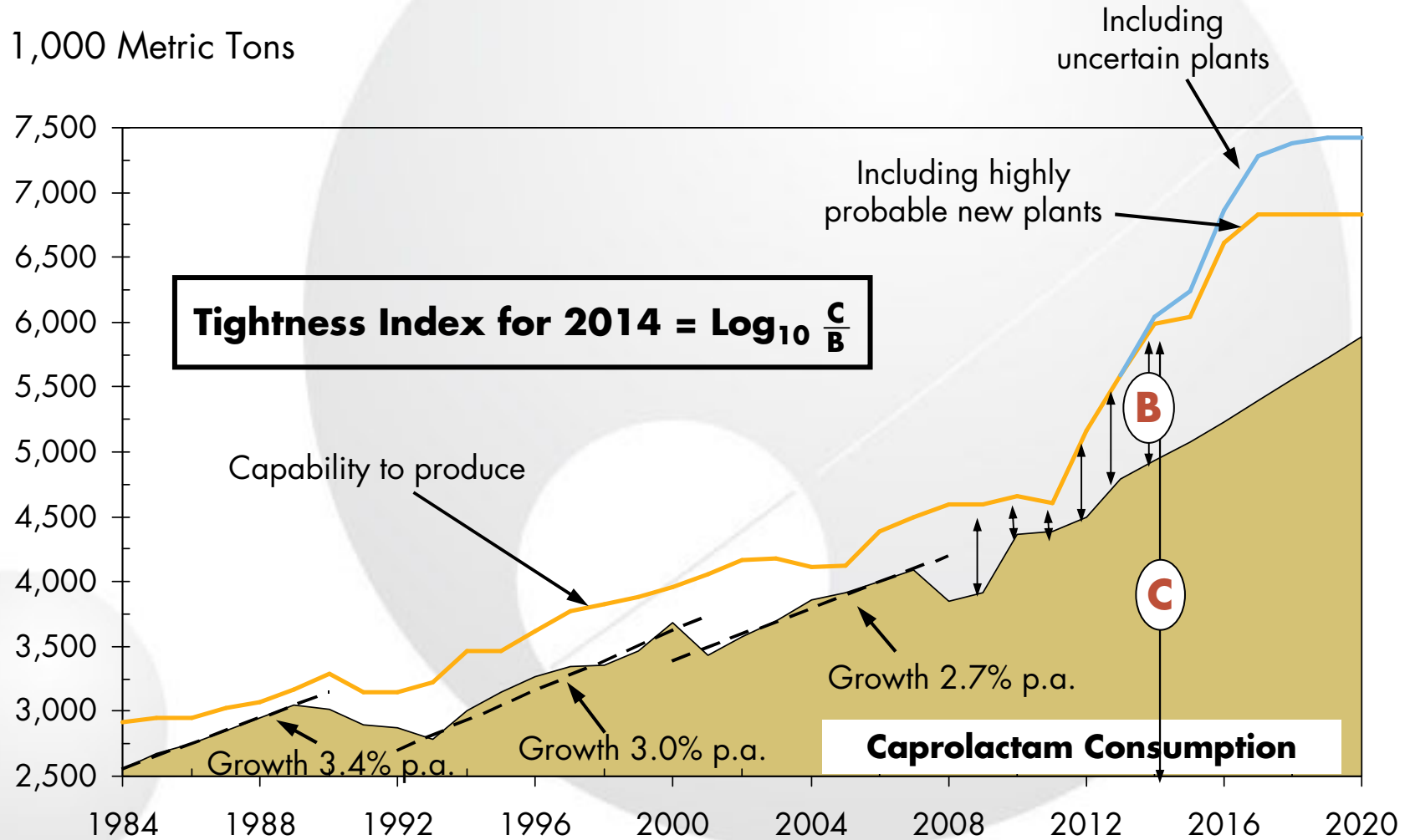
**\* Due to unscheduled stoppages, not scheduled maintenance turnarounds**

Source: Tecnon OrbiChem



# APIC 2103

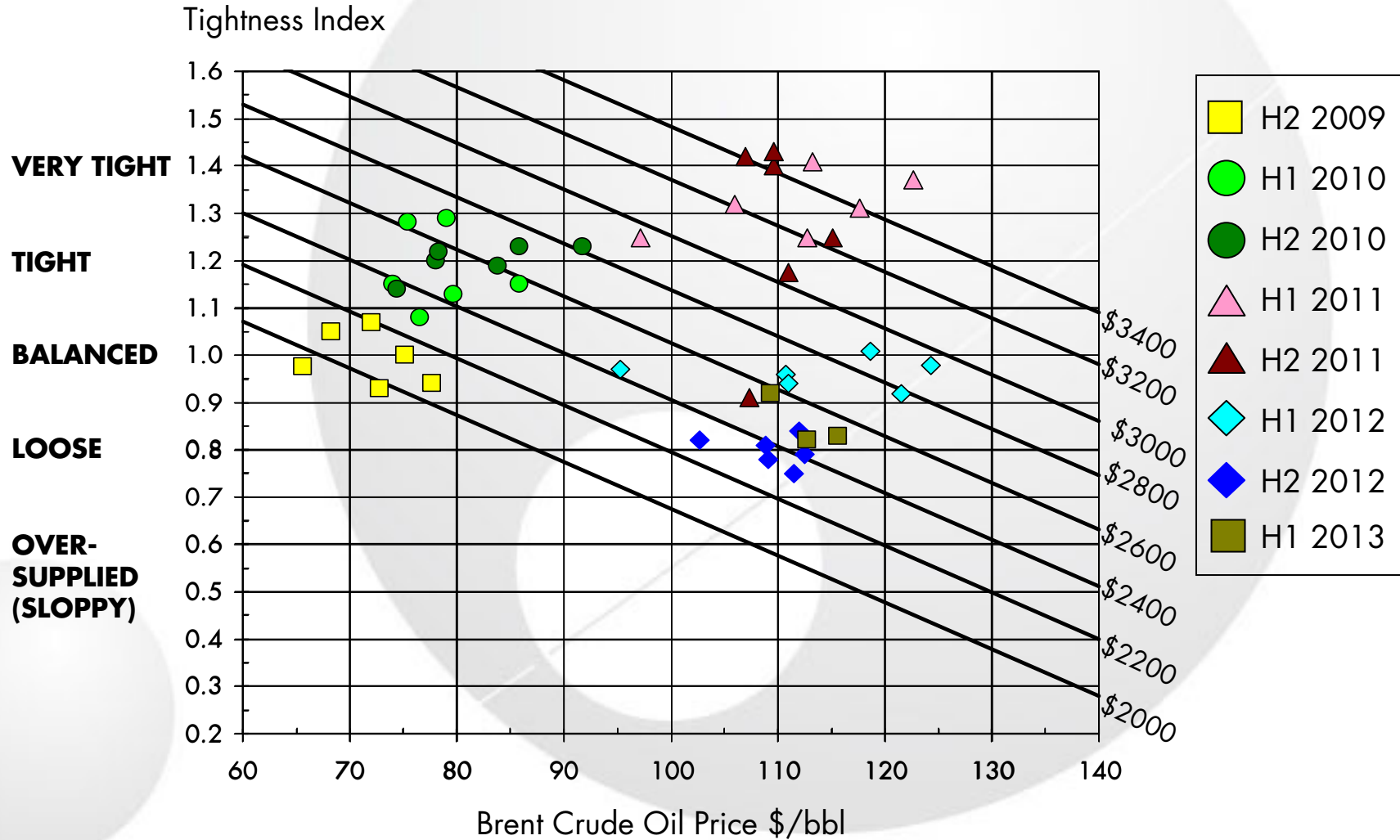
## WORLD CAPROLACTAM CAPABILITY vs DEMAND



Source: Tecnon OrbiChem

# APIC 2013

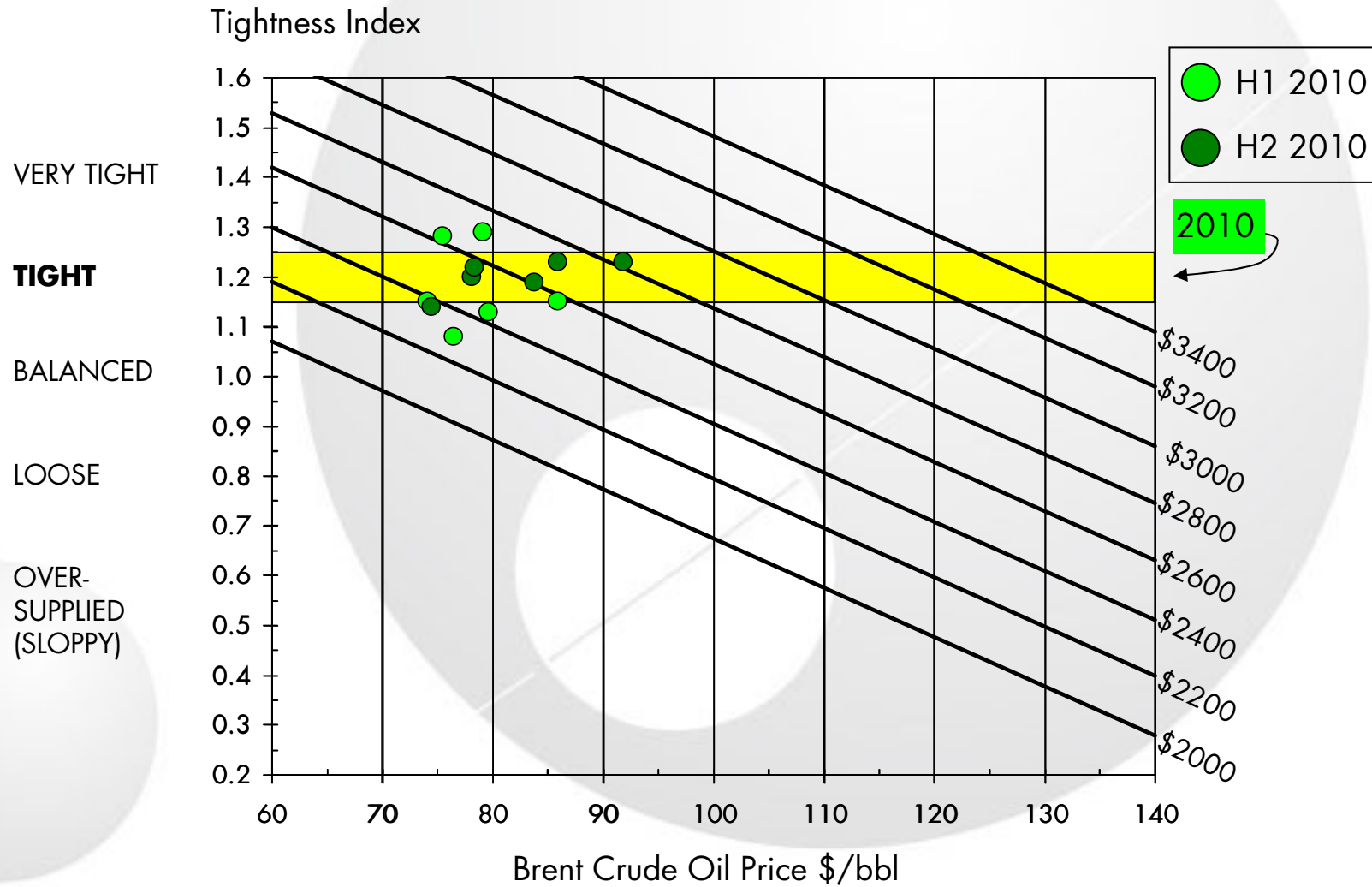
## CAPROLACTAM PRICE HISTORY - ASIA



Source: Tecnon OrbiChem

# APIC 2013

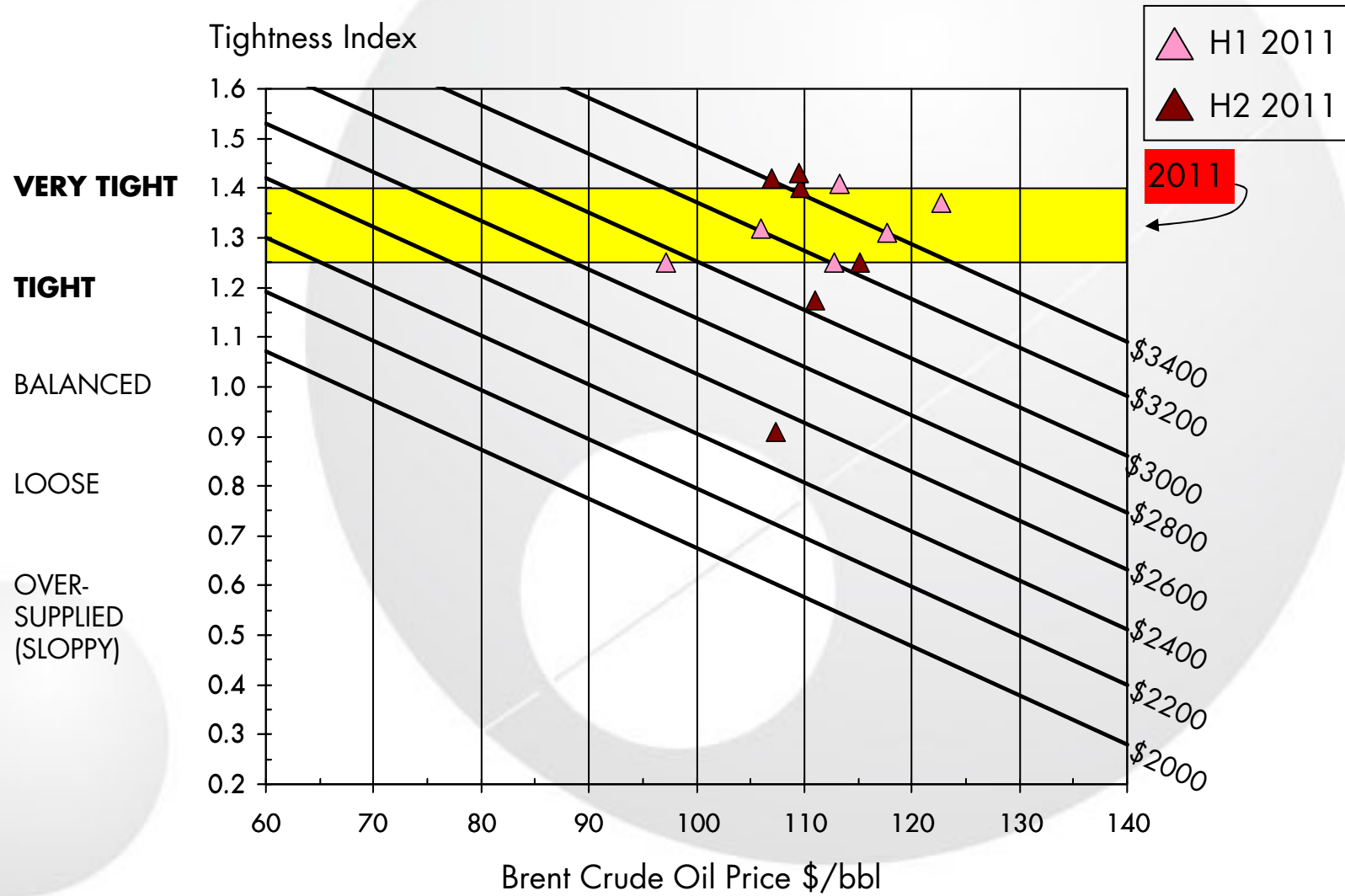
## CAPROLACTAM PRICE - ASIA - 2010 by month



Source: Tecnon OrbiChem

# APIC 2013

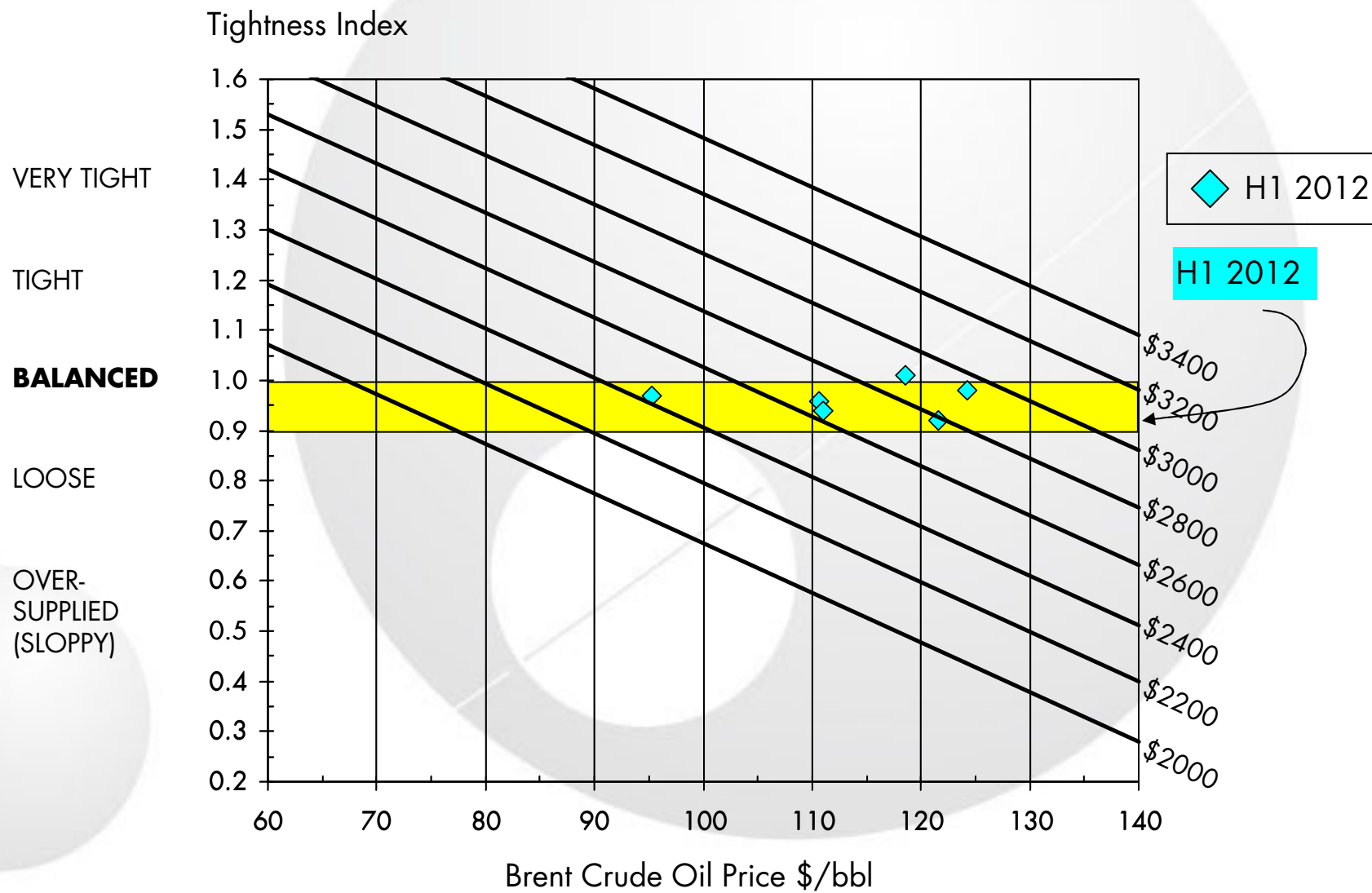
## CAPROLACTAM PRICE - ASIA - 2011 by month



Source: Tecnon OrbiChem

# APIC 2013

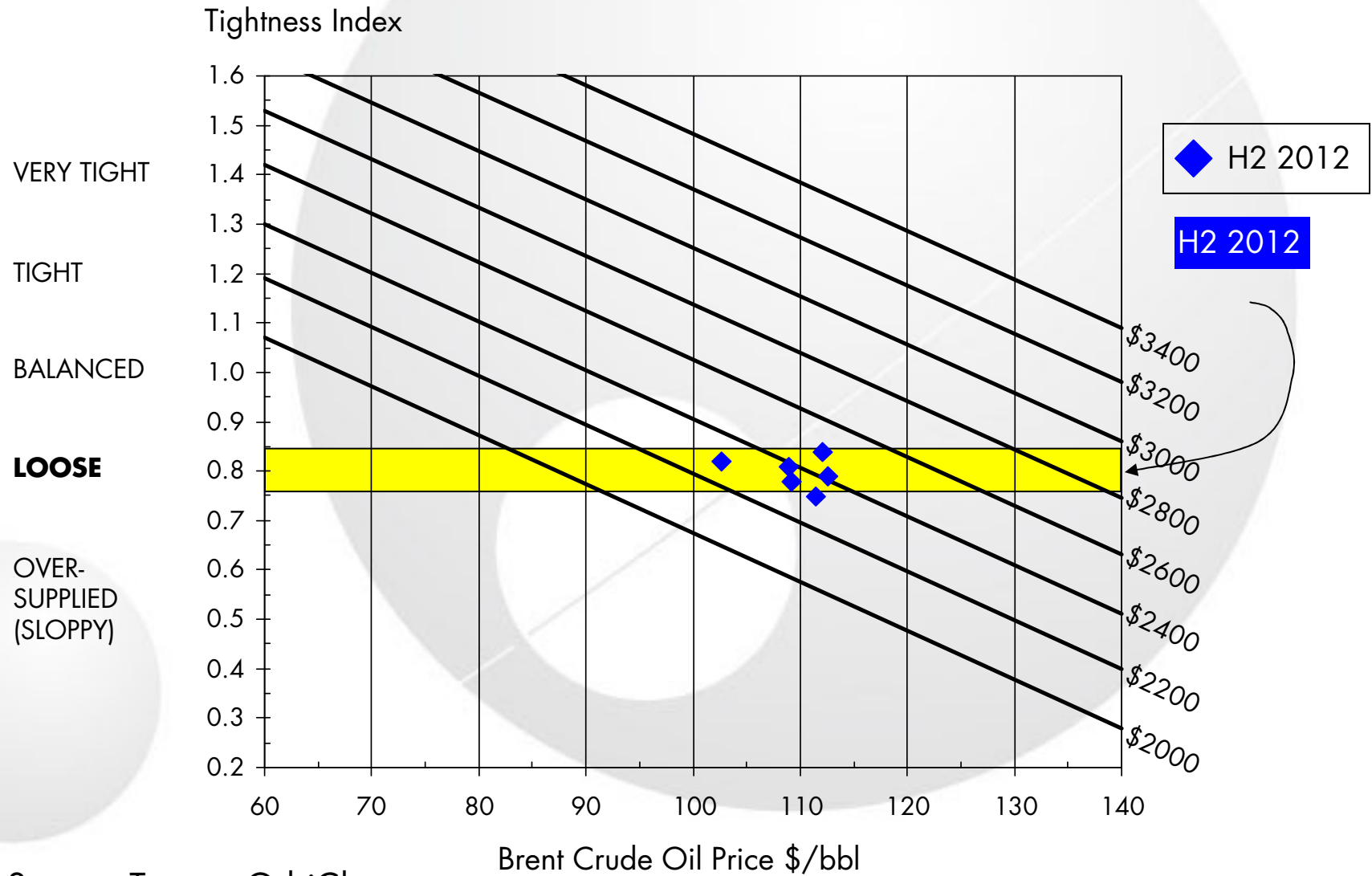
## CAPROLACTAM PRICE - ASIA - H1 2012 by month



Source: Tecnon OrbiChem

# APIC 2013

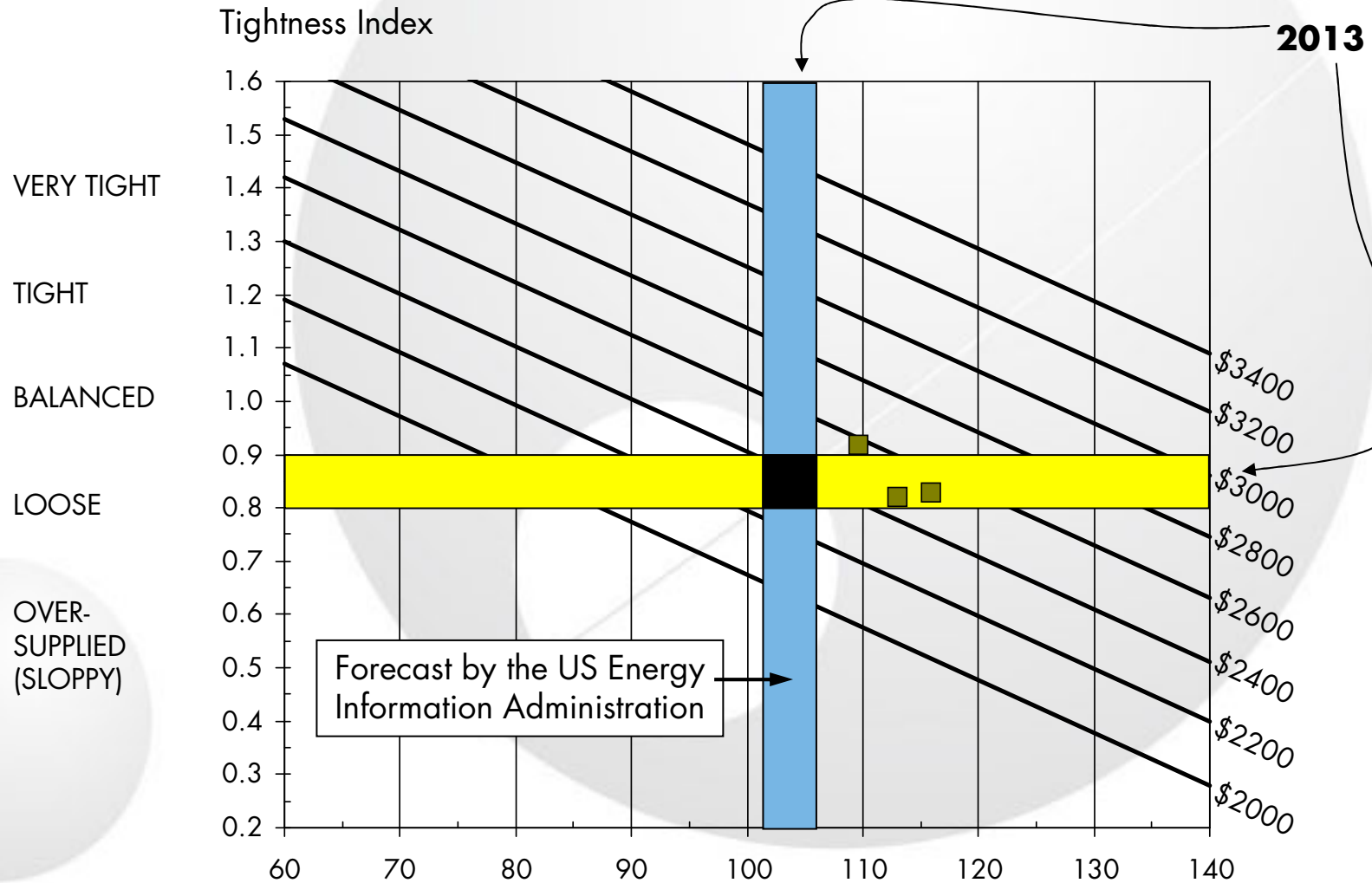
## CAPROLACTAM PRICE - ASIA - 2012 by month



Source: Tecnon OrbiChem

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## CAPROLACTAM 2013 PRICE FORECAST – ASIA (Dec 2012 Forecast)

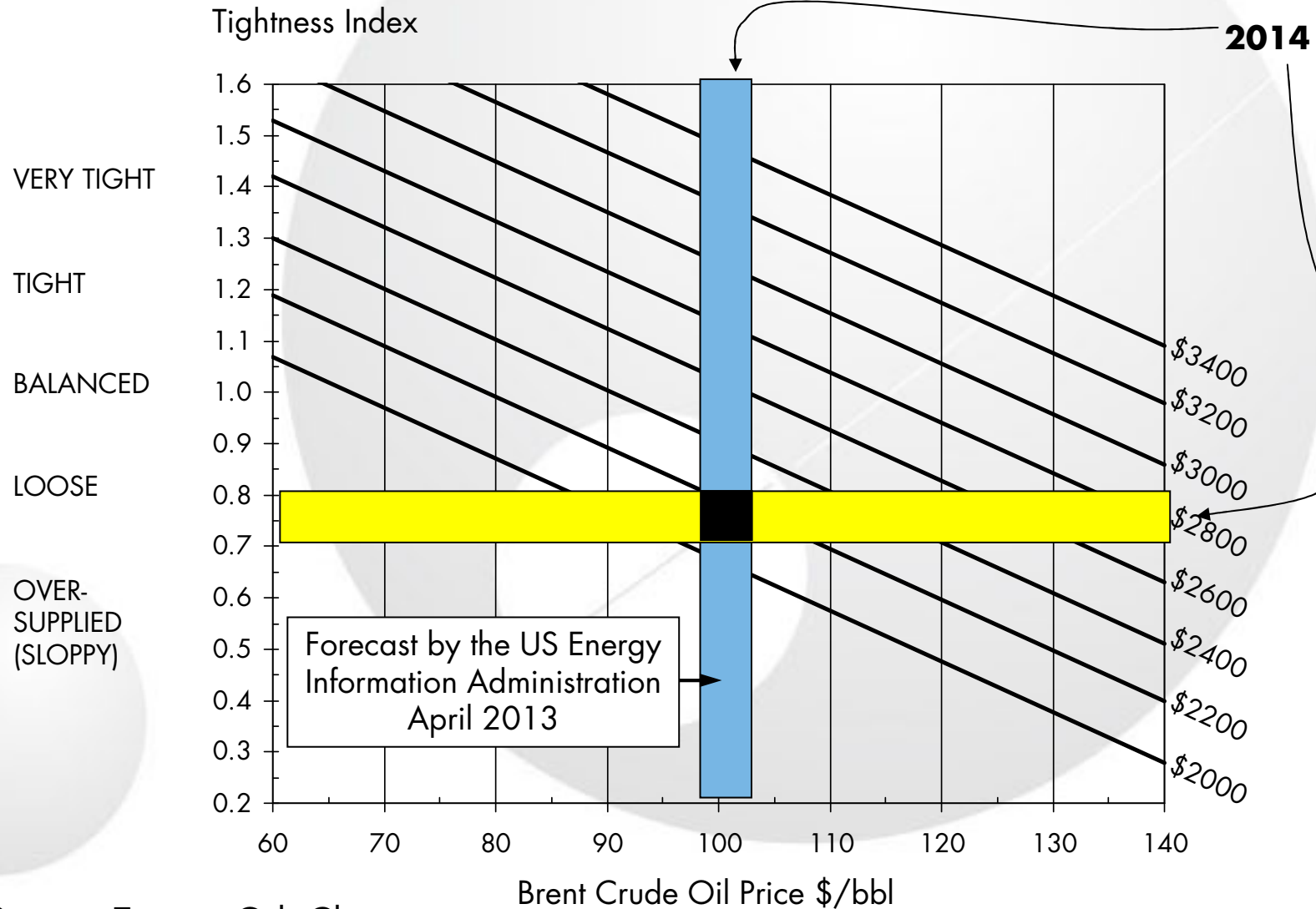


Source: Tecnon OrbiChem

Brent Crude Oil Price \$/bbl

# APIC 2013

## CAPROLACTAM 2014 PRICE FORECAST - ASIA



Source: Tecnon OrbiChem



## APIC 2013

# CONCLUSIONS - POLYAMIDE 6 INDUSTRY

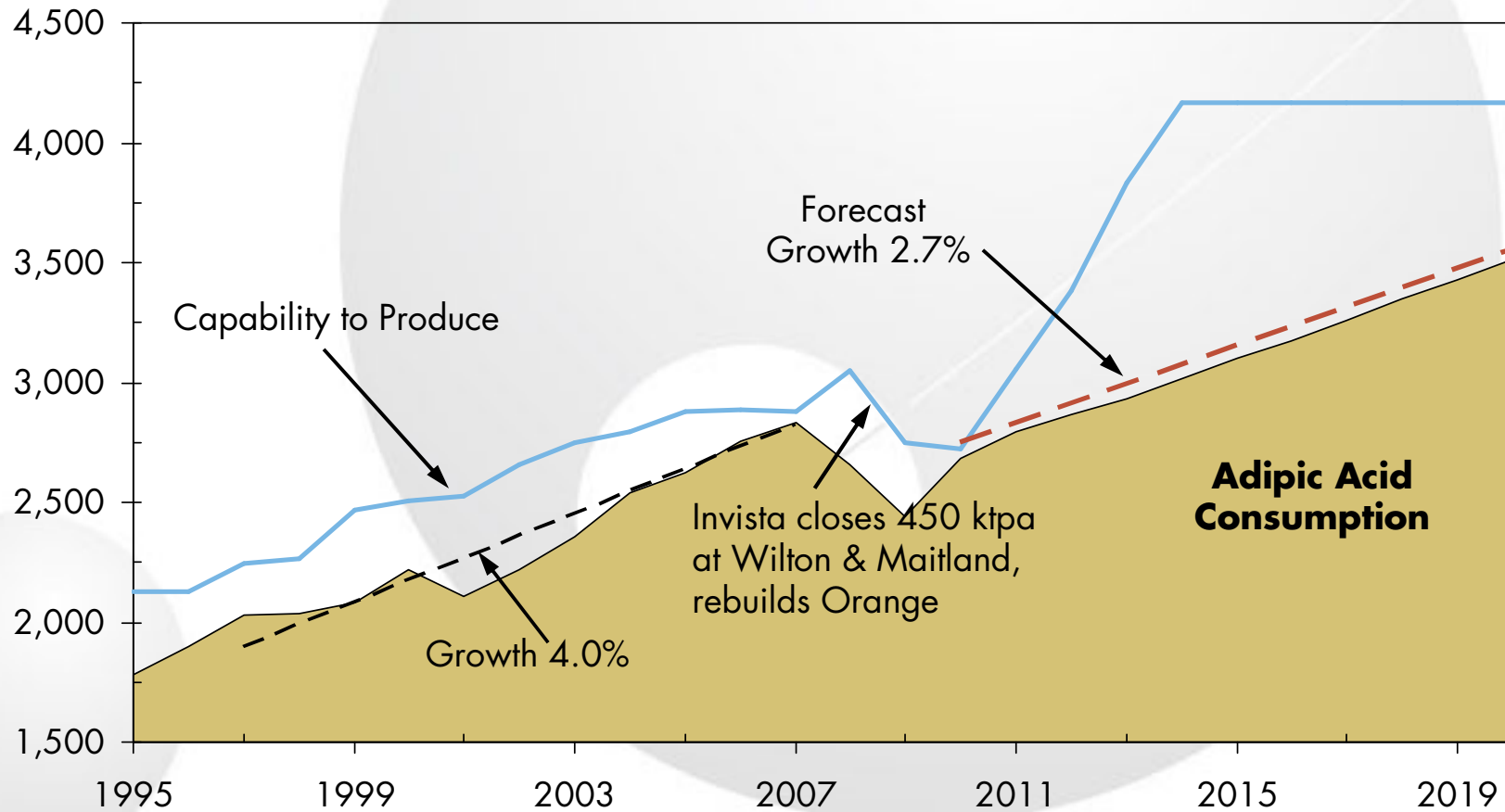
- World caprolactam consumption showed little growth in 2011, then returned to growth in 2012 – but only in China
- Caprolactam consumption has grown about 18% in 2012 in China, a bounce-back after stagnation in 2011, boosted by both textile applications and engineering plastics applications
- Outside China, caprolactam growth has been zero or negative in 2012
- Six new 100 ktpa caprolactam units have been brought on stream in China in 2012, by Haili (2), Hengyi (2), Hongye (1) and Sinopec (1), doubling China's capacity within 12 months
- These additions have moved the world caprolactam balance into over-supply, yet more capacity of 400 ktpa will come on stream in H2 2013 and various other projects are under construction or planned in China
- World caprolactam over-supply is thus inevitable over the next few years, possibly mitigated by closure of some old plants
- This has dire consequences for caprolactam industry profitability over the next few years
- Caprolactam producers need to develop and promote PA6 engineering plastics applications in order to boost consumption

Source: Tecnon OrbiChem

# APIC 2013

## WORLD ADIPIC ACID CAPABILITY vs DEMAND

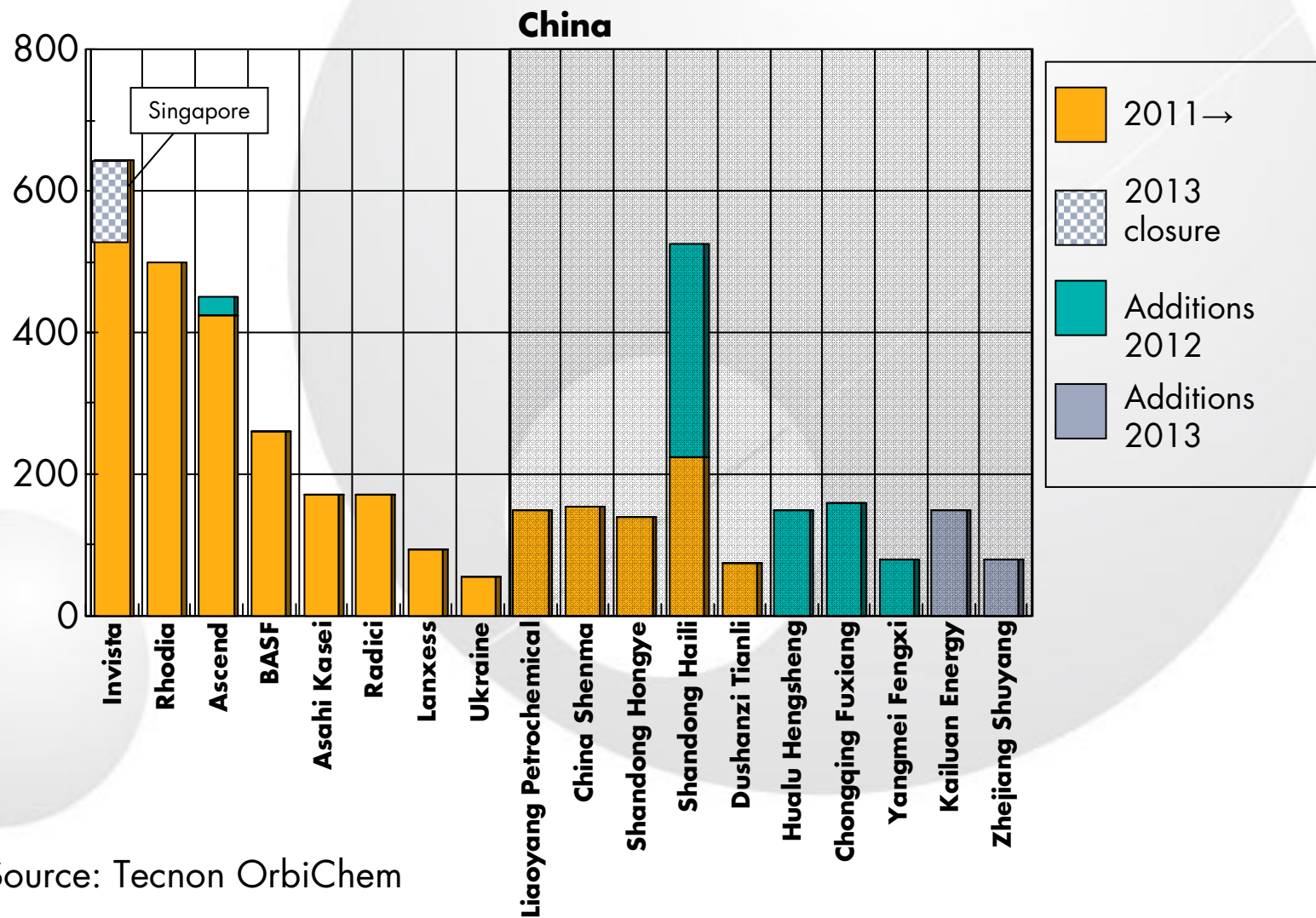
1,000 Metric Tons



Source: Tecnon OrbiChem

# APIC 2013 WORLD ADIPIC ACID PRODUCERS

1,000 Metric Tons

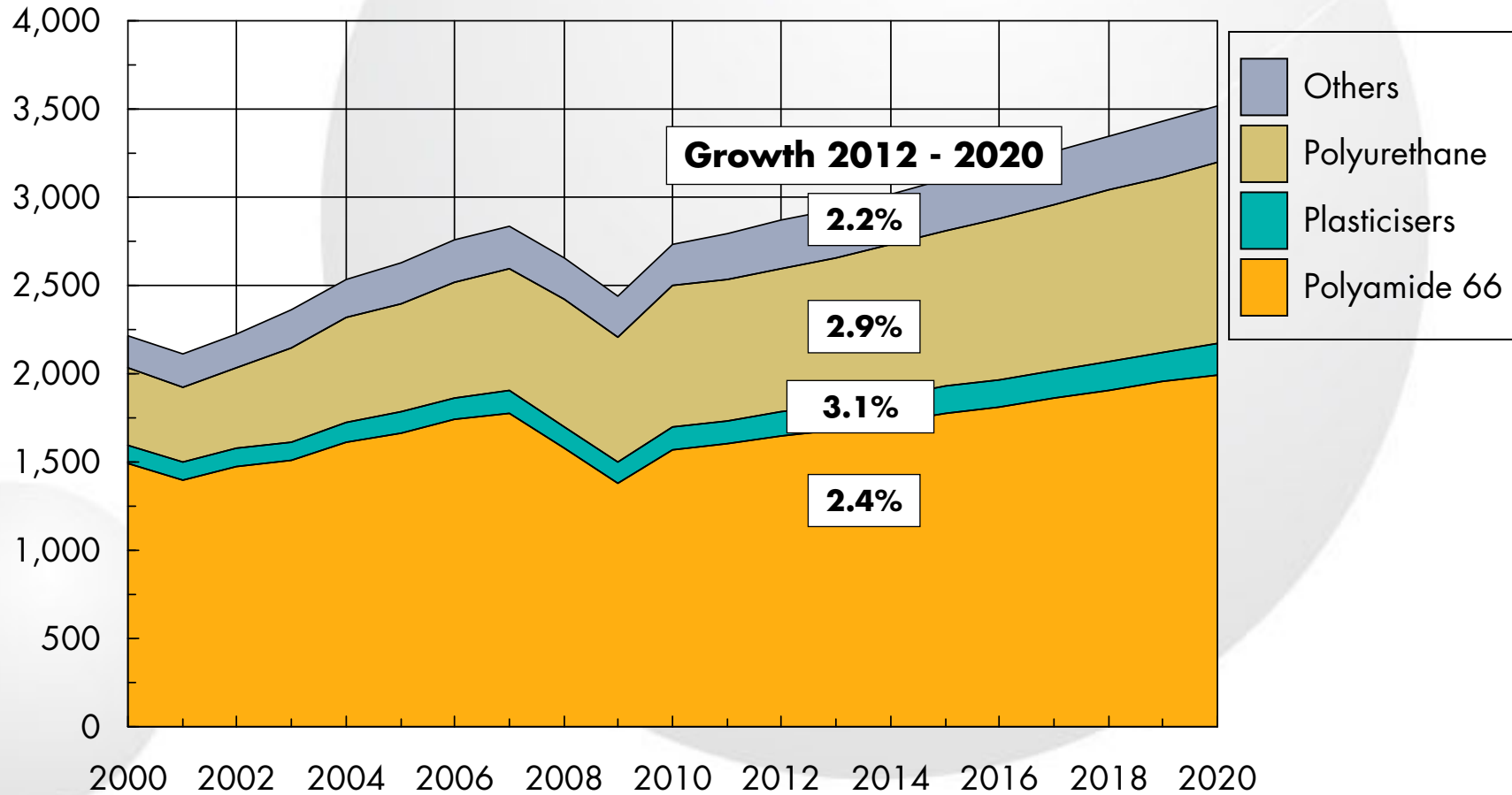


Source: Tecnon OrbiChem

# APIC 2013

## WORLD ADIPIC ACID CONSUMPTION BY END-USE

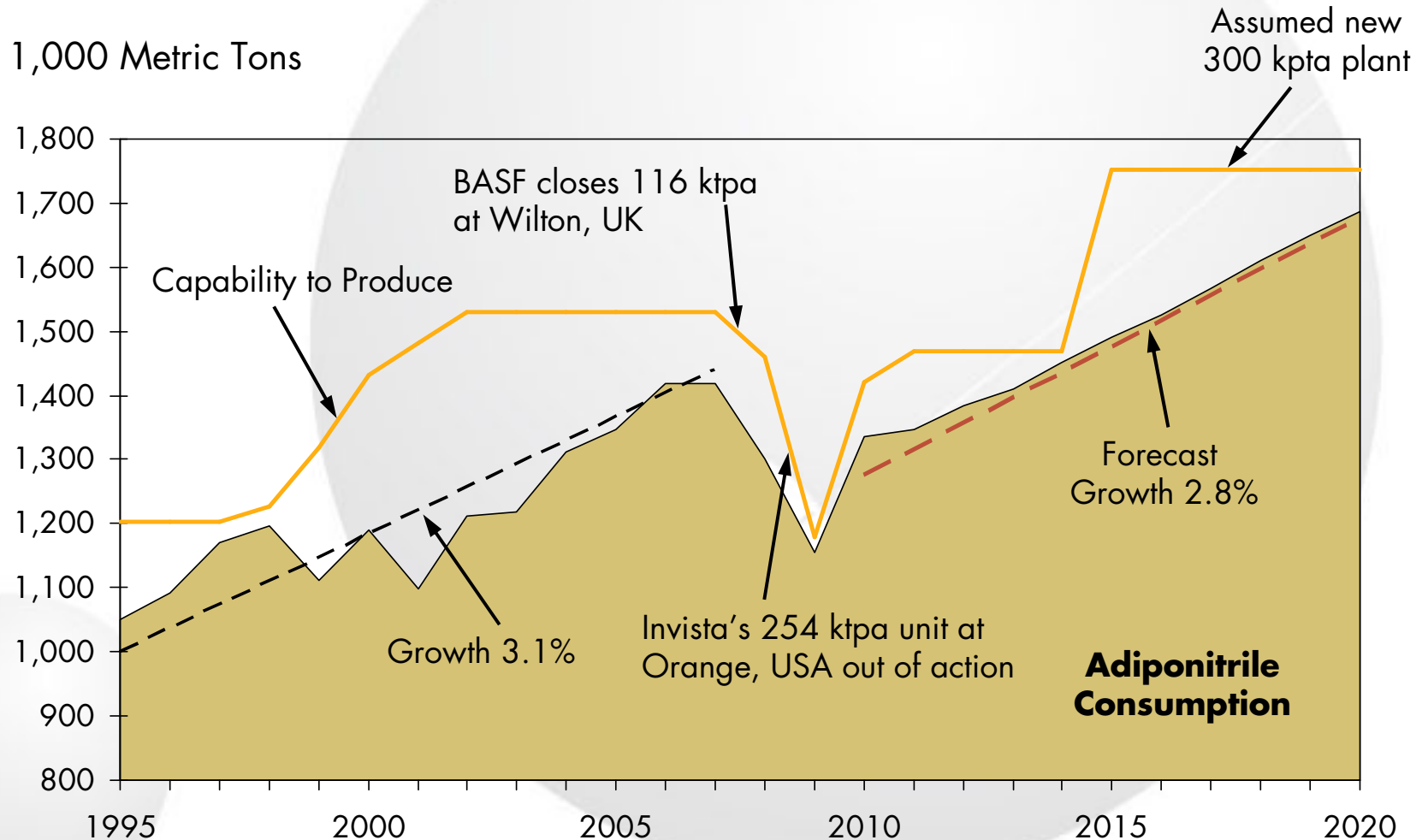
1,000 Metric Tons



Source: Tecnon OrbiChem

# APIC 2013

## WORLD ADIPONITRILE CAPABILITY vs DEMAND



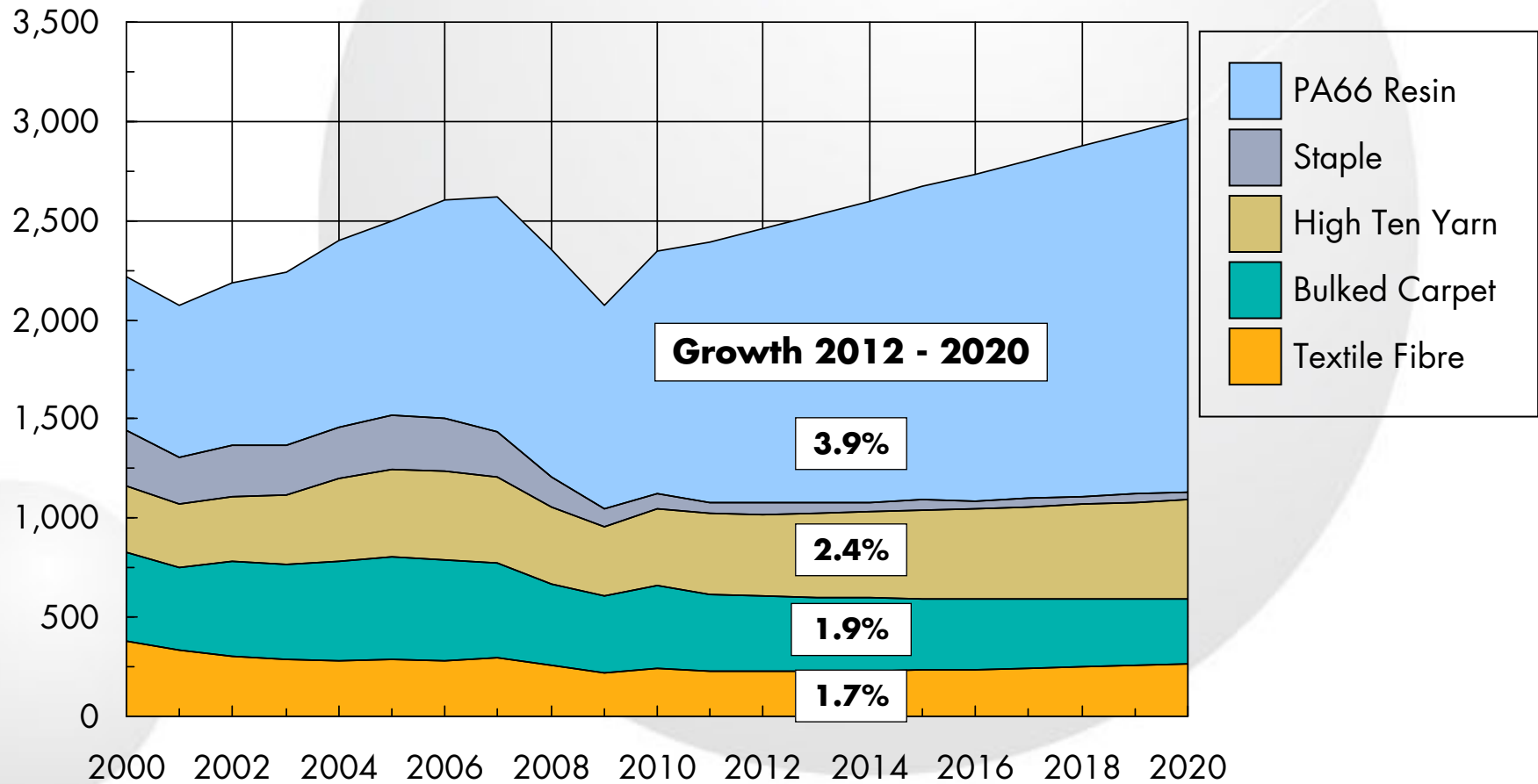
**Capability = 0.95 x Nameplate Capacity**

Source: Tecnon OrbiChem

# APIC 2013

## WORLD POLYAMIDE 66 CONSUMPTION BY END-USE

1,000 Metric Tons

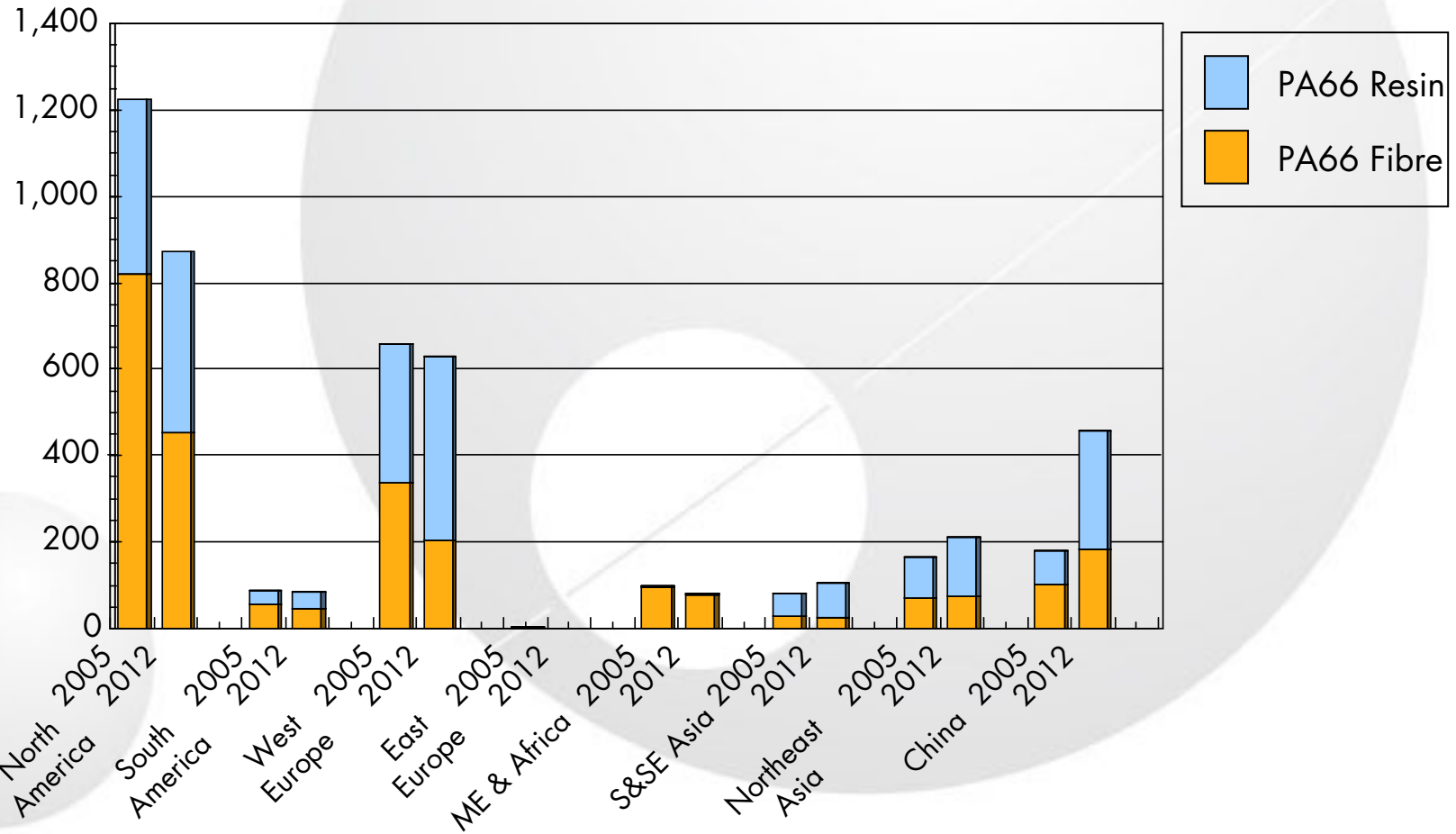


Source: Tecnon OrbiChem

# APIC 2013

## WORLD POLYAMIDE 66 DEMAND BY REGION

1,000 Metric Tons



Source: Tecnon OrbiChem

## APIC 2013

# CONCLUSIONS - POLYAMIDE 66 INDUSTRY

- The world adipic acid market is seriously oversupplied. China has the biggest adipic acid capacity of any country, but the average utilisation rate in China is now as low as 50%.
- Adipic acid demand for both polyurethane and polyamide applications will grow steadily, with major increases taking place in China
- However, fierce competition will lead to low profit, even for top quality adipic acid producers. A reshaping of the adipic acid industry is possible if the global economy stays volatile in 2013 and beyond
- If adiponitrile capacity is not increased in the near future, adiponitrile will be extremely tight from 2016, possibly earlier
- PA66 producers have to grapple with high and volatile costs which are likely to persist and may damage long term PA66 growth
- Polyamide 66 resin demand in engineering plastics applications shows more dynamism than polyamide 66 fibre
- PA66 faces substitutional pressure from PA6, due to the widening pricing difference

Source: Tecnon OrbiChem





.....your source of expert  
chemical industry knowledge