

# Impact of New Hydrocarbon Sources on the Chlor-Alkali Chain

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Tecnon OrbiChem Marketing Seminar at APIC 2013

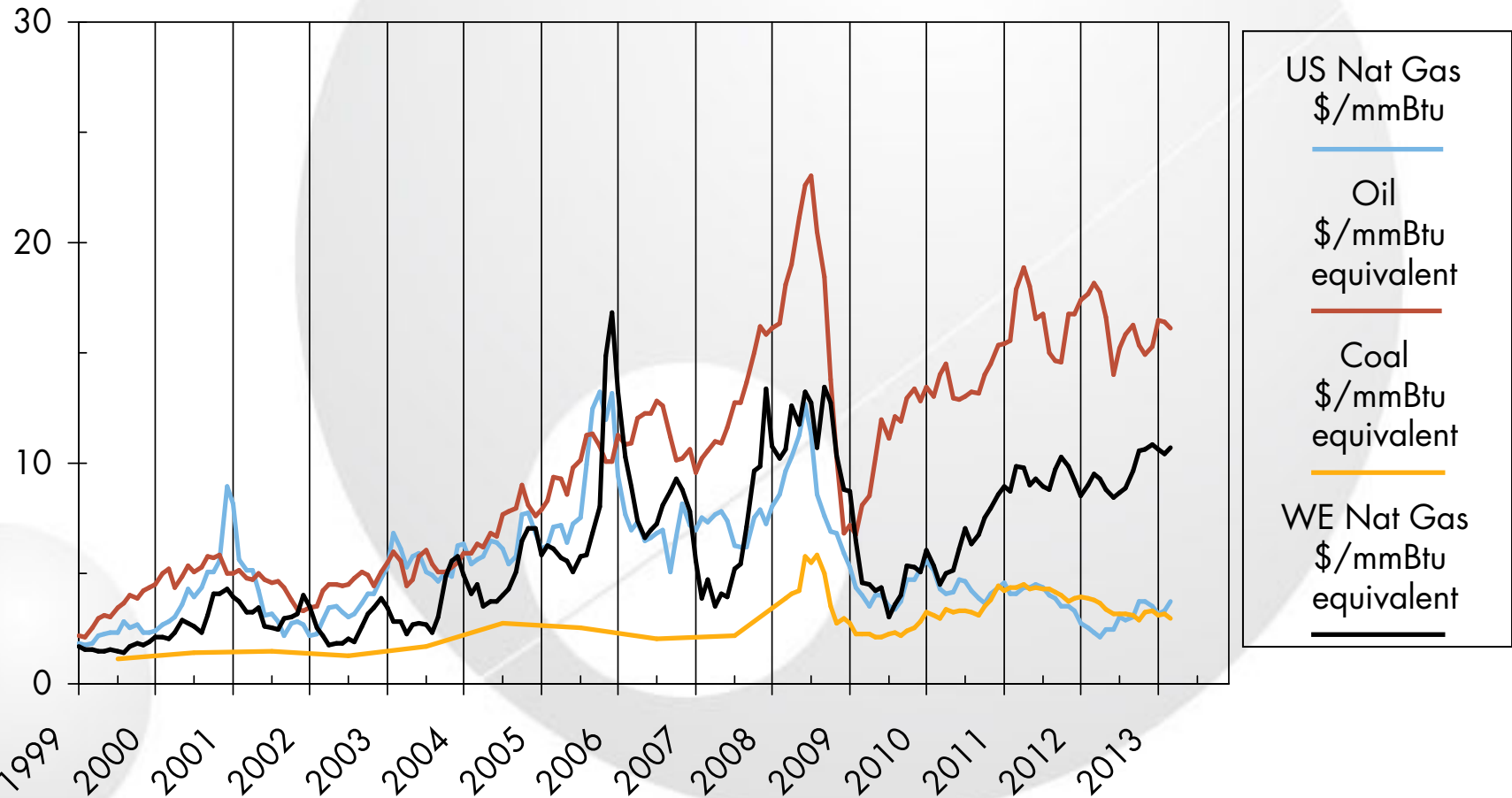
Taipei, 9 May 2013

Charles Fryer

# APIC 2013

## NATURAL GAS, CRUDE OIL & COAL PRICES

\$/mmBtu

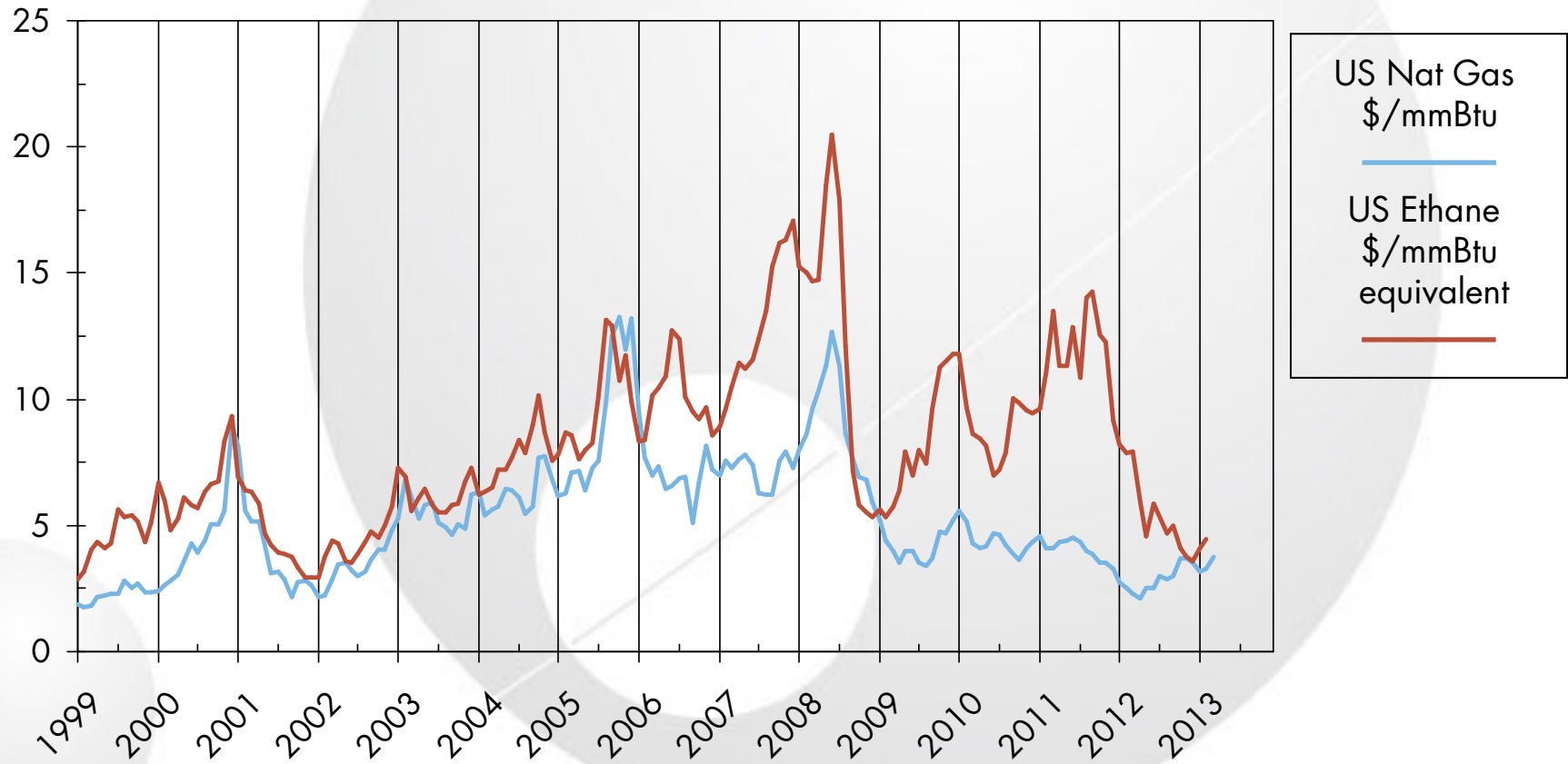


Source: Tecnon OrbiChem

# APIC 2013

## US NATURAL GAS & ETHANE PRICES

\$/mmBtu

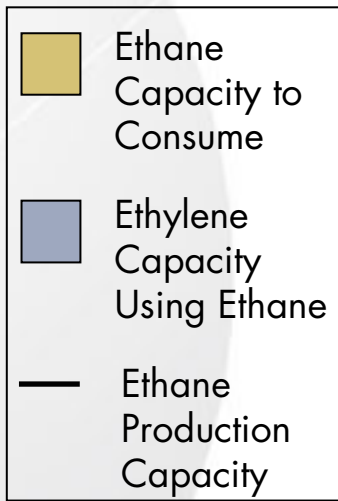
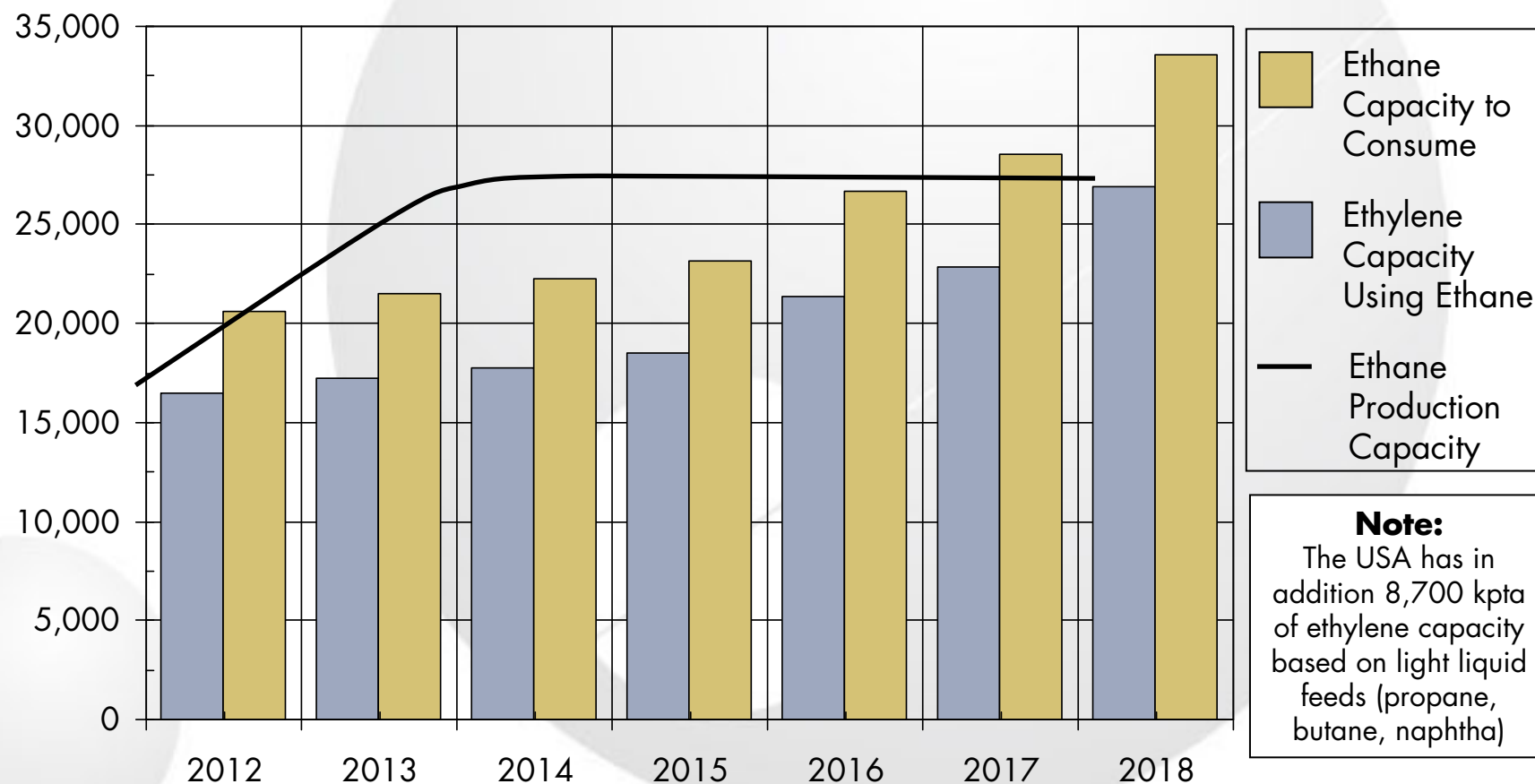


Source: Tecnon OrbiChem

## APIC 2013

# US ETHYLENE CAPACITY BASED ON ETHANE

1,000 Metric Tons

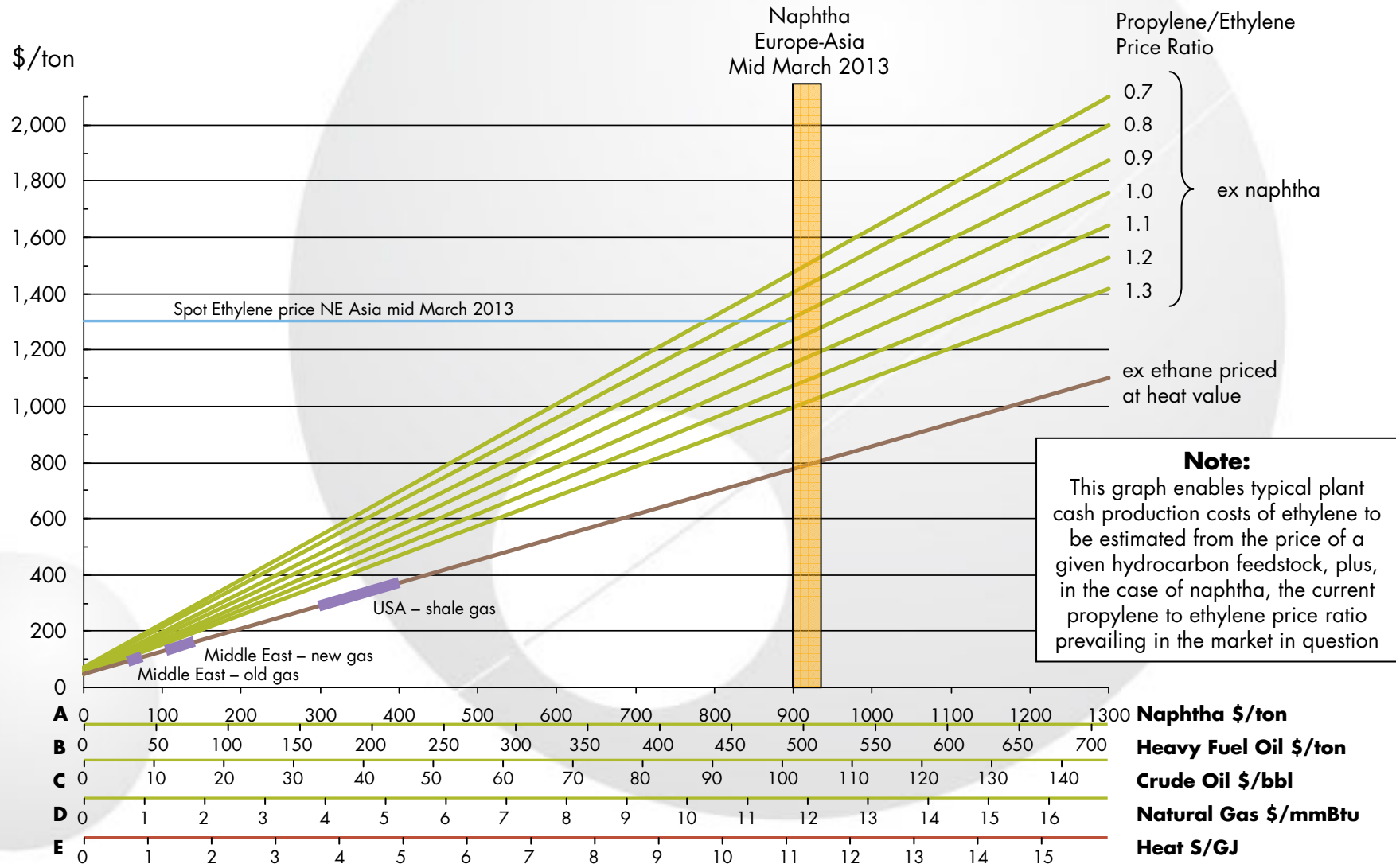


**Note:**  
The USA has in addition 8,700 kpta of ethylene capacity based on light liquid feeds (propane, butane, naphtha)

Source: Tecnon OrbiChem

# APIC 2013

## CASH PRODUCTION COST OF ETHYLENE

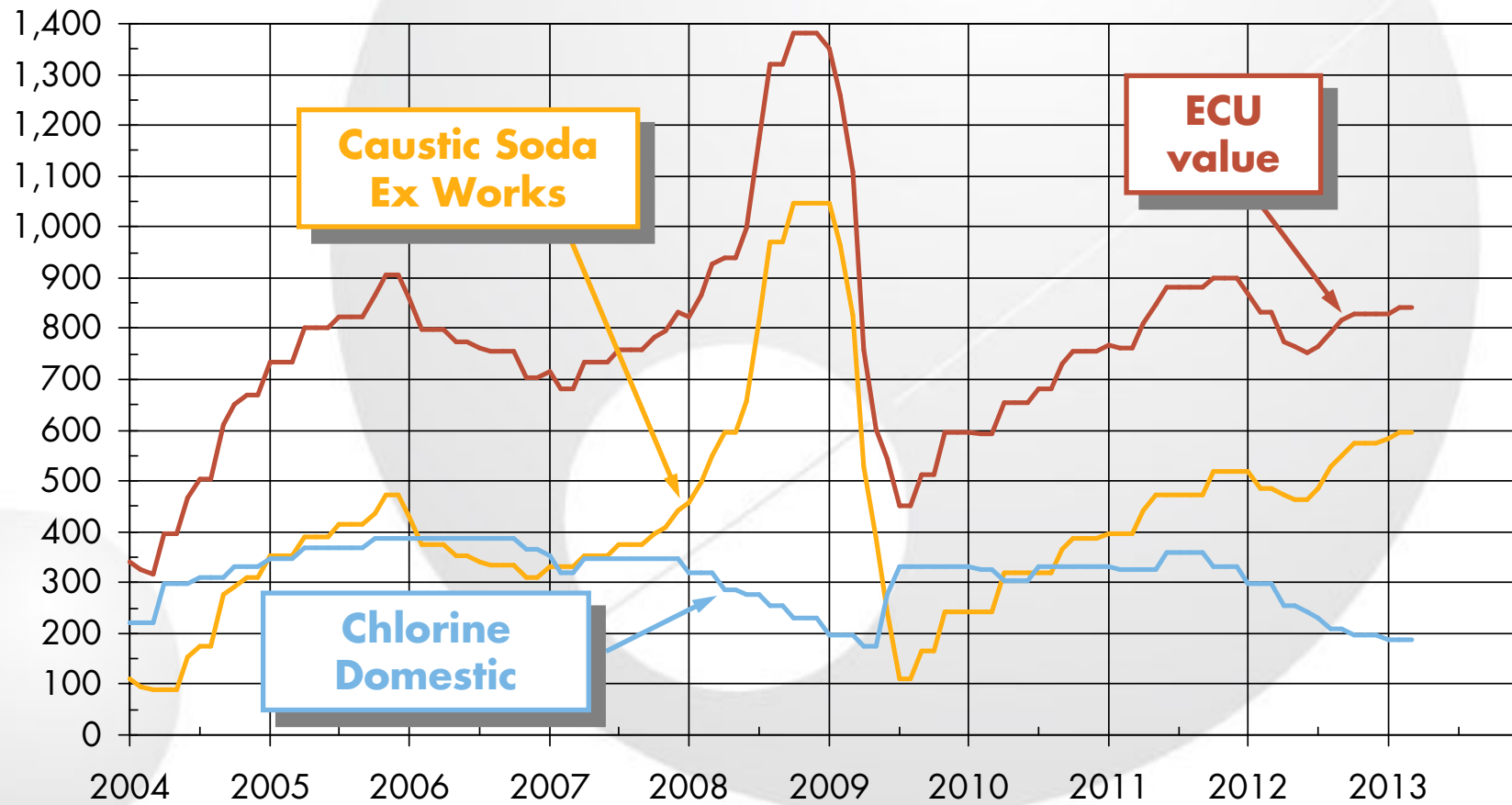


Source: Tecnon OrbiChem

# APIC 2013

## US GULF CAUSTIC SODA & CHLORINE PRICES

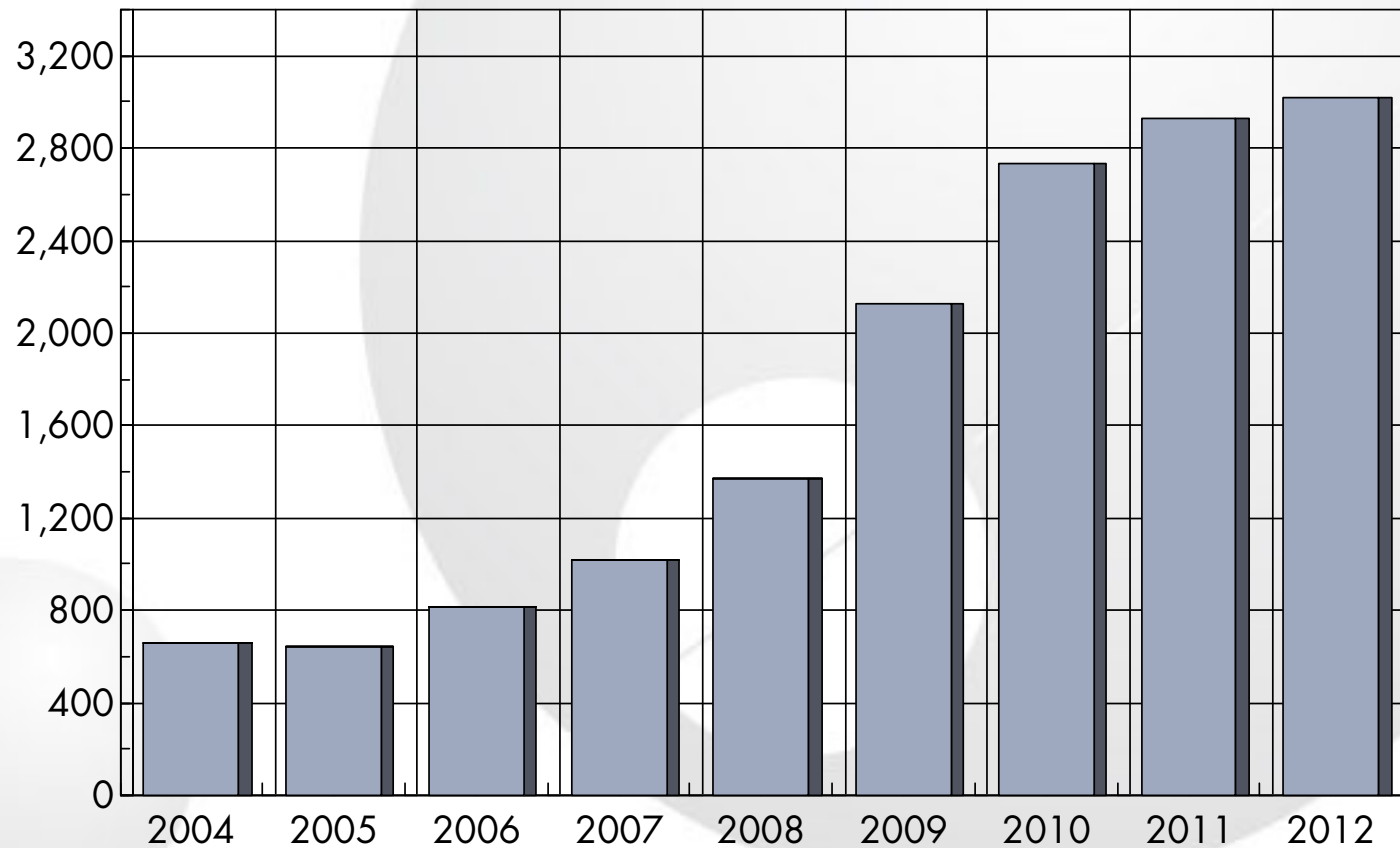
\$/Metric Ton



Source: Tecnon OrbiChem

# APIC 2013 US PVC EXPORTS

1,000 Metric Tons

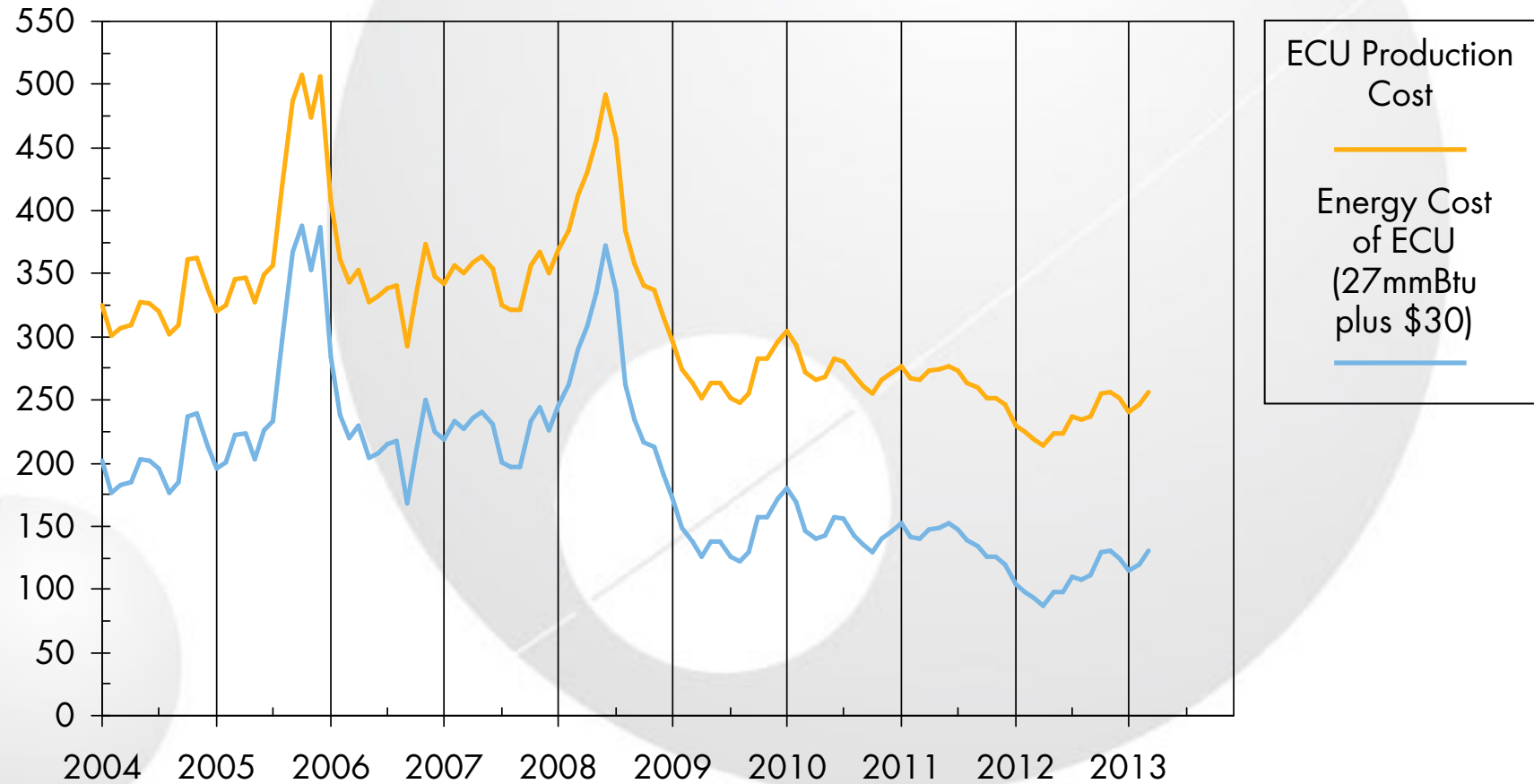


Source: Tecnon OrbiChem

# APIC 2013

## COST of ECU on the US GULF

\$/Metric Ton

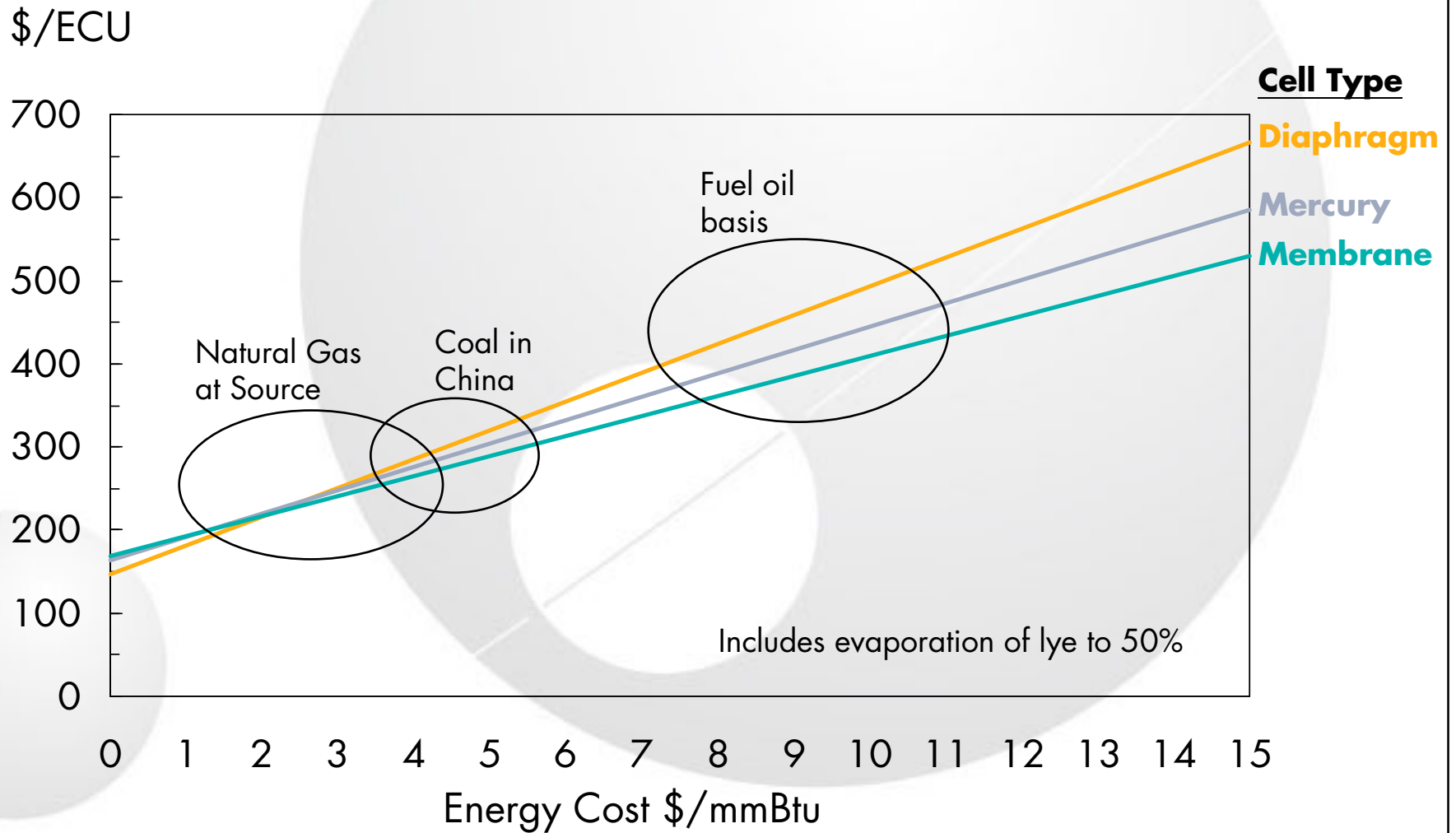


Source: Tecnon OrbiChem



# APIC 2013

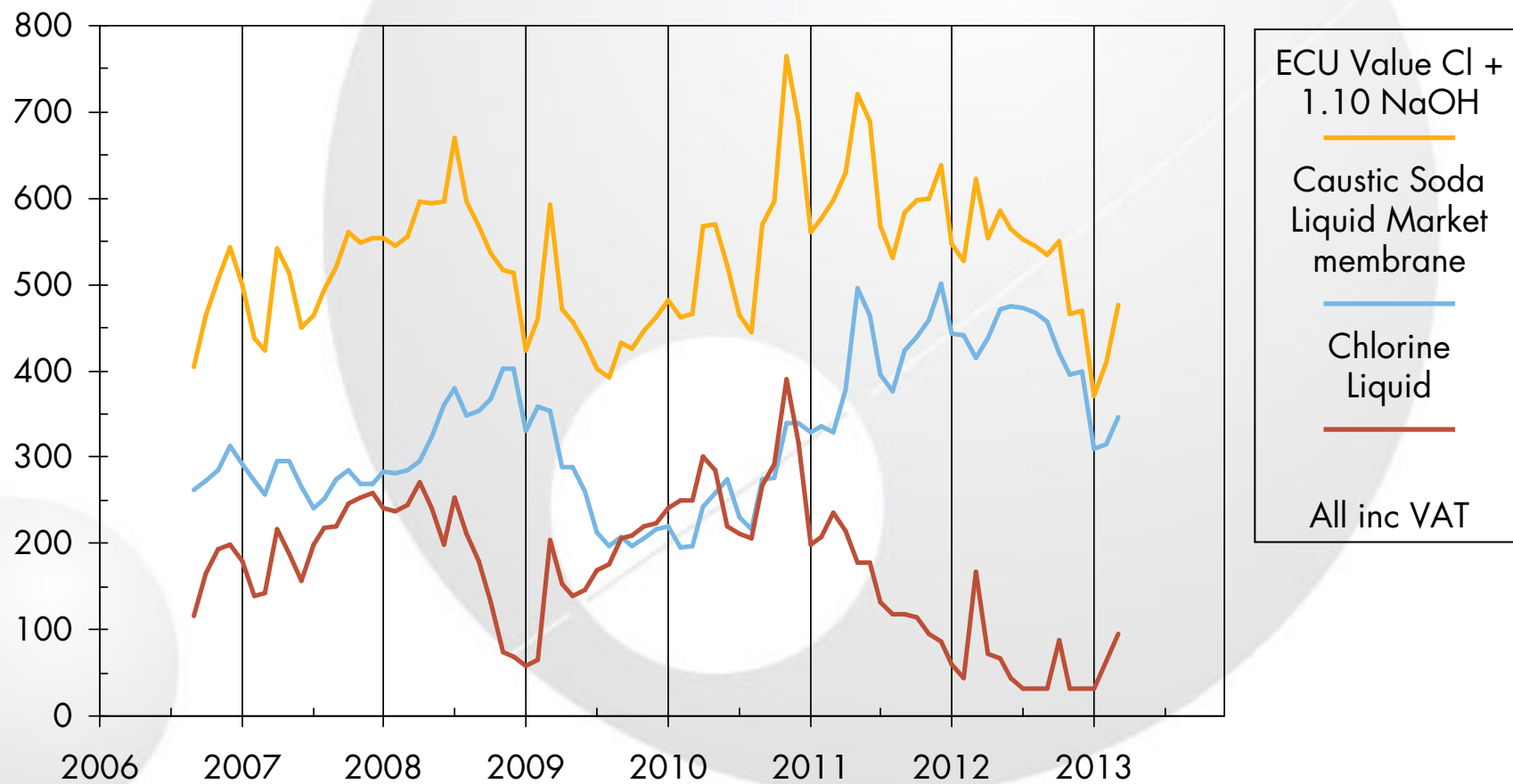
## EFFECT OF ENERGY COST ON CASH COST OF PRODUCTION OF THE ECU (Metric)



Source: Tecnon OrbiChem

# APIC 2013 CHINESE VALUE OF ECU

\$/Metric Ton/ECU

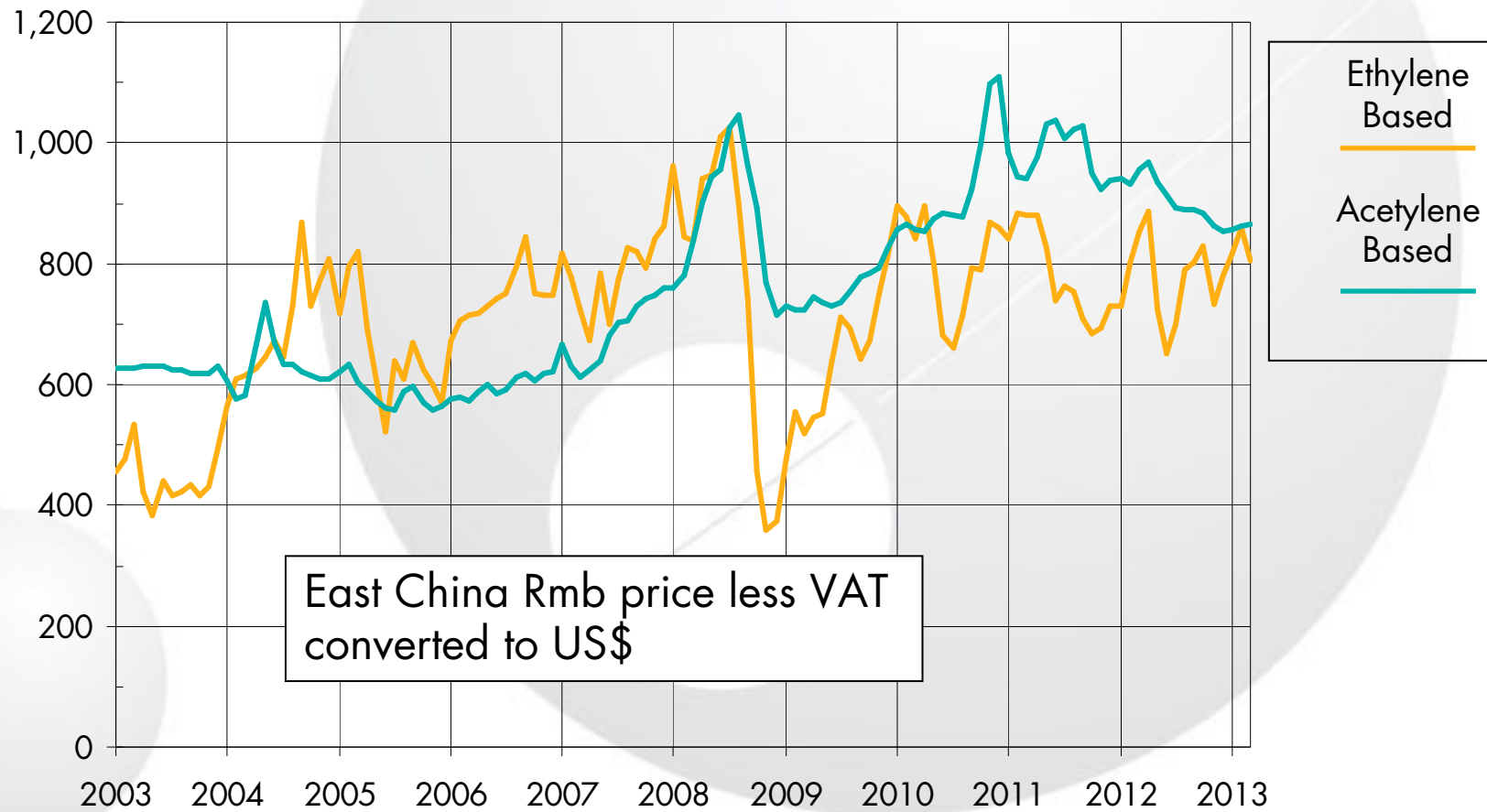


Source: Tecnon OrbiChem

# APIC 2013

## PVC CASH COST COMPARISON IN CHINA

\$/Metric Ton

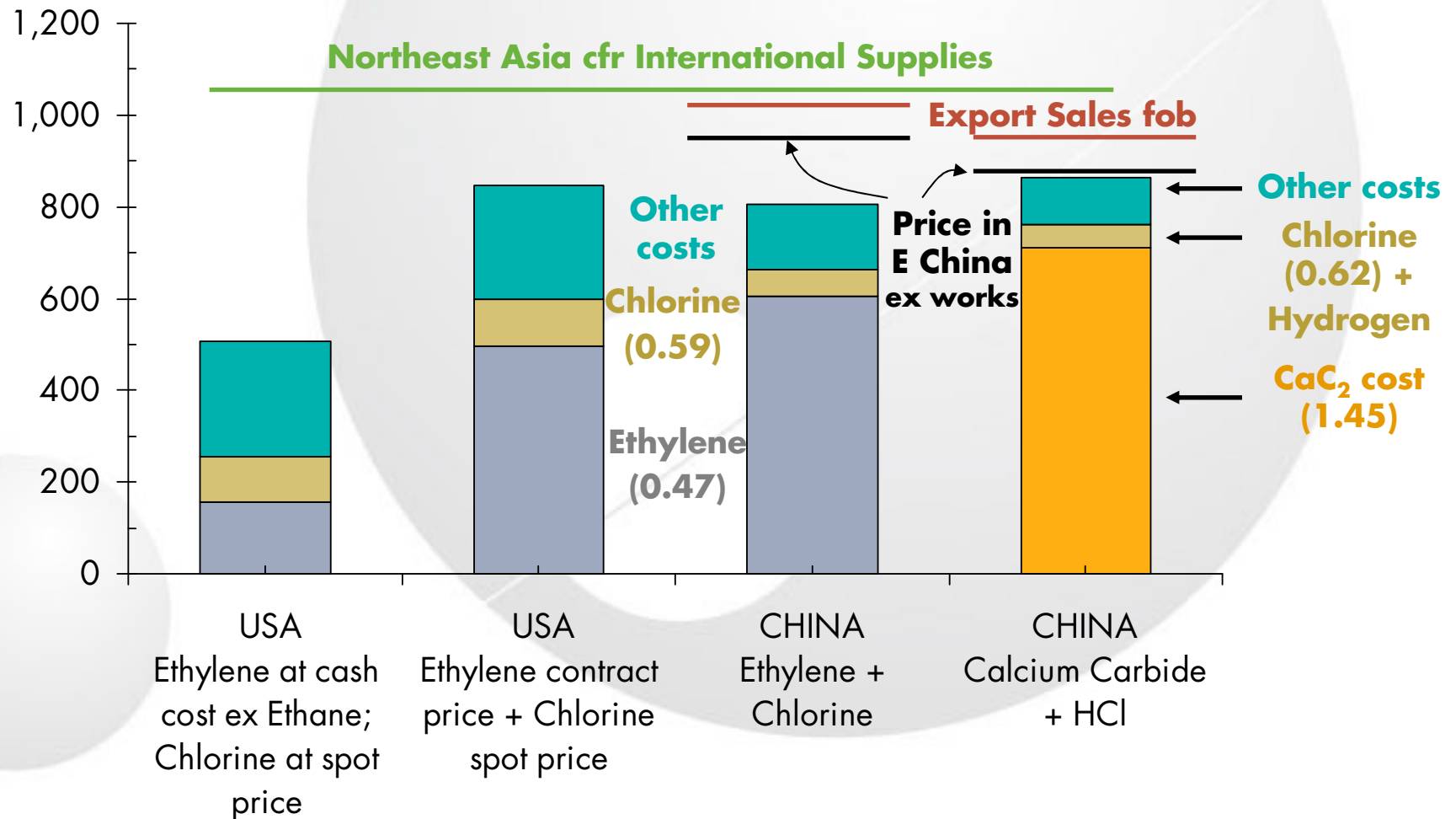


Source: Tecnon OrbiChem

# APIC 2013

## USA & CHINA CASH PVC PRODUCTION COSTS (March 2013)

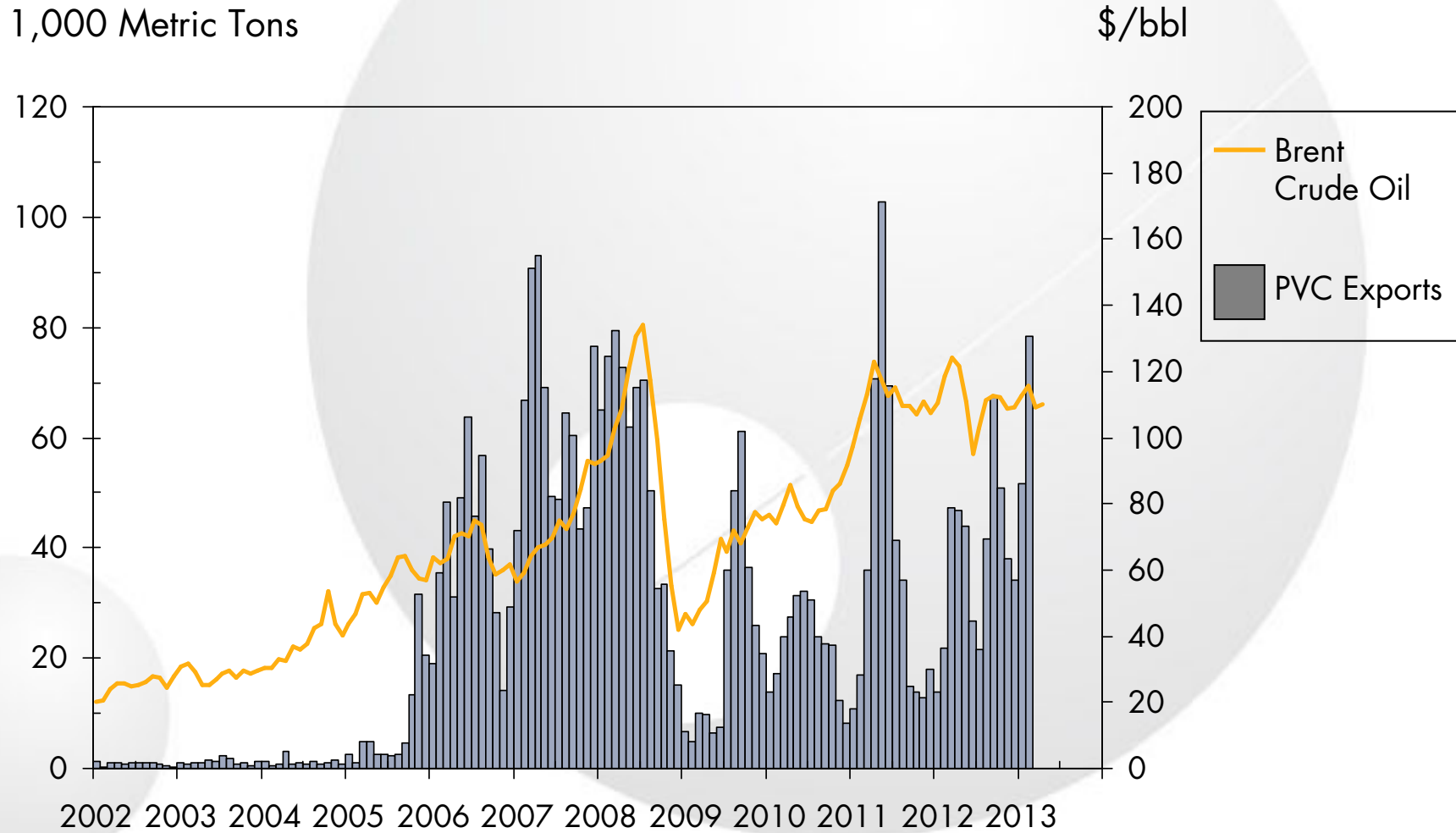
\$/Ton ( for China excl VAT)



Source: Tecnon OrbiChem

# APIC 2013

## CHINA PVC EXPORTS vs CRUDE OIL PRICE



Source: Tecnon OrbiChem

## APIC 2013 CONCLUSIONS

- Low-cost gas from shale has greatly strengthened the US competitive position for chemicals, particularly for vinyl products
  - US ethylene production costs from ethane are far lower than from Naphtha-based crackers widely used in Asia and Europe
  - US electrical power costs and hence the cost of the ECU are lower than for most other chlor-alkali producers
  - Hence US producers of EDC, VCM and PVC have a huge competitive advantage
  - US advantages will last for many years
- The slump in building construction in the USA and Europe and the 2012 slowdown in the Chinese economy led to weakened prices for vinyl chain products, worldwide, and therefore for chlorine
  - This has forced caustic soda prices to high levels, but Asian caustic prices are now in decline, so ...
  - Chlorine prices are likely to recover, then strengthening PVC prices
- Chinese PVC, largely acetylene-based, had lost competitiveness in 2011-2012 based on high coal costs, but a decline in coal prices over the past 12 months is leading to restoration of health and export flows

Source: Tecnon OrbiChem



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